Muskowekwan Project

Project Description and Technical Proposal

Prepared for:

Canadian Environmental Assessment Agency
Winnipeg, MB

Saskatchewan Ministry of Environment,
Environmental Assessment Branch
Regina, SK

December 2012

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First Potash Ventures

Executive Summary

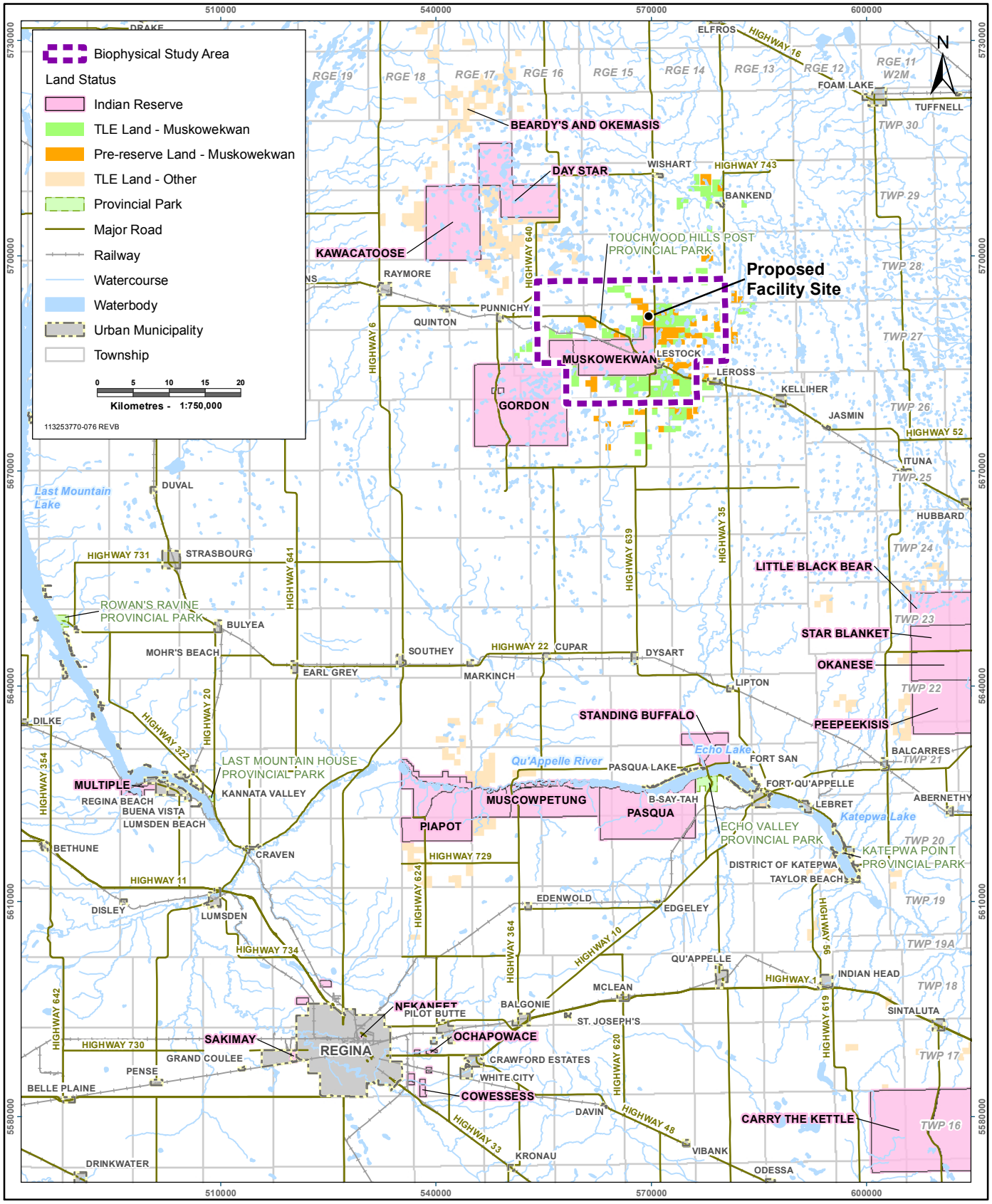
E.1 GENERAL INFORMATION AND CONTACTS

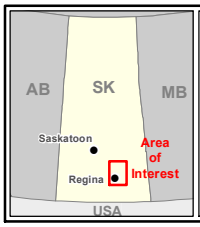
E.1.1 FPV Background

First Potash Ventures (FPV), a joint venture between Encanto Resources Ltd. (Encanto), Muskowekwan First Nation (MFN), and Muskowekwan Resources Limited (MRL), proposes to develop a potash mine on the Muskowekwan Reserve (IR #85), Treaty Land Entitlement (TLE), and pre-reserve lands. The Muskowekwan Project (the Project), located about 100 km north-northeast of Regina, Saskatchewan (SK), would comprise a solution mine producing about 2.8 million tonnes (Mt) of potash per year for at least 50 years. The lands subject to development for the Project include the MFN Reserve, TLE, and pre-reserve lands (see Figure E-1).

MFN is a First Nation that owns the lands and potash reserves that will be used for the Project. MFN lands and resources are protected by Treaty Rights, which form the basis of MFN's economic development strategy. MRL is an economic development company of MFN, incorporated in 2009, based in Lestock, SK. Encanto is a subsidiary of Encanto Potash Corp, a Canadian potash exploration company, with offices in Vancouver, BC, Calgary, AB, and Regina, SK. MFN and MRL participate on the Project management committee and provide land and resource access, while Encanto provides financing, technical and management expertise. No federal financial support has been provided in support of this Project.

Key Project personnel include the principals of Encanto Potash Corp., who have existing relationships with Saskatchewan First Nations through oil and gas development activity and have recognized the opportunity to develop a potash mine on such lands in cooperation with First Nation landowners. Although FPV is a joint venture formed for this Project, the joint venture partners understand the need to implement measures to reduce likely environmental effects of the Project. FPV has retained the services of highly-skilled professional engineering and environmental consulting companies to conduct its feasibility and environmental assessment (EA) studies. These firms and FPV executives collectively have global expertise in potash mining engineering and major project development.





MUSKOWEKWAN POTASH PROJECT

Project Location

Acknowledgements: Original Drawing by Stantec. Basedata: Canvec Ver10 2012, GeoSask. TLE Lands: NorthRim April 2012.

PREPARED BY Stantec

PREPARED FOR

FIGURE NO. **E-1**

Last Modified: Nov 28, 2012 By: aolson

E.1.2 Project Proponent Contact Information

The proponent of the Muskowekwan Project is FPV. FPV was formed through a Joint Venture Agreement (JVA) between MRL, MFN and Encanto in 2010. The contact information for the proponent is provided in Table E-1, below.

Table E-1 Proponent Contact Information

Proponent	**First Potash Ventures**
Contact at MFN	Chief Reg Bellerose P.O. Box 249 Lestock, SK S0A 2G0 Telephone: 306-274-7641 Email: rbellerose@sasktel.net
Contact at MRL	Chief Reg Bellerose President (MRL) P.O. Box 129 Lestock, SK S0A 2G0 Telephone: 306-274-7641 Email: rbellerose@sasktel.net
Contact at Encanto	James Walchuck President and CEO Suite 450 - 800 W. Pender Street P. O. Box #6 Vancouver, BC V6C 2V6 Telephone: 604-683-2402 Email: jwalchuck@encantopotash.com
Principal Contact for Purposes of Regulatory Review	Wayne Stanley Manager, Government and Regulatory Affairs First Potash Ventures Suite 500, 1414 8th Street SW Calgary AB T2R 1J6 Telephone: 403-538-8447 Email: wstanley@encantopotash.com

E.1.3 Federal and Provincial Regulatory Requirements

The Project constitutes a “designated project” for the purposes of the *Canadian Environmental Assessment Act, 2012*, as it involves the:

- construction and operation of a potash mine with a potassium chloride (KCl) production capacity of more than 1,000,000 tonnes per year (per article 15(e) of the Schedule to the Regulations Designating Physical Activities (SOR/2012-147)); and
- short-term use of over 200,000 m^3/year of groundwater (per article 8 of the Schedule to the Regulations Designating Physical Activities (SOR/2012-147)).

Thus, the Project is subject to a screening by the Canadian Environmental Assessment Agency (the CEA Agency or the Agency) under requirements of Section 10 of CEAA 2012, to determine if an EA is required. FPV anticipates, given the nature and scale of the Project and the potential for adverse environmental effects, that an EA will be required.

The Project will constitute a "development" for the purposes of Saskatchewan *Environmental Assessment Act* (SKEAA), as that term is defined in that *Act*. In particular, the mineral rights underlying certain pre-reserve lands on which the Project will be located are still held by the Province, although these will eventually be transferred to the federal Crown in trust for the MFN, through the TLE process. Also, the Project will use water sourced from water bodies under provincial jurisdiction, although the water supply infrastructure will be undertaken by a third party and is not part of the Project proposed by FPV. The Project is expected to require a provincial EA pursuant to the SKEAA.

As the Project will likely be subject to both a federal and provincial EA, it is anticipated that Canada and Saskatchewan will coordinate and cooperate in the exercise of their respective powers and performance of their respective duties to ensure that in effect, a single EA of the Project is conducted in a timely, efficient, yet fully defensible manner.

E.1.4 Project Need and Benefits

The purpose of the Project is to develop the potash resource that underlies MFN lands, thereby generating a return on investments for the shareholders of FPV and creating economic and social benefits particularly for the Muskowekwan people, but also the surrounding community, Saskatchewan, and Canada. The Project will help to meet the growing global demand for potash and will create employment and procurement opportunities locally, regionally, and provincially. This Project is particularly unique as the MFN is a co-proponent and will benefit in a variety of ways, including increased employment, contracting, training, and business opportunities. The Project will deliver significant economic benefits to MFN. As the owner of the mineral rights, MFN will earn royalty revenue annually for the minimum 50-year operational life of the Project. At current potash prices, this royalty revenue would be about $80 million per year.

The total construction personnel required at peak levels will be approximately 1,000, and between 300 and 500 jobs will be created during operation. Opportunities for employment, contracting, and training will be felt in nearby communities and rural municipalities, and by service providers (i.e., hotels, restaurants, contractors). The JVA between the FPV partners guarantees preferential employment and contracting opportunities, as well as a host of other economic benefits, to the MFN. The MFN is consulting with other members of the Touchwood Agency Tribal Council (TATC) regarding the extension of similar benefits to those members. In addition, FPV will support the development of training programs in cooperation with the community and government agencies to ensure the MFN is able to take advantage of employment and contracting opportunities expected to be created by the Project.

E.2 PROJECT INFORMATION

E.2.1 Environmental Management Framework for Project

FPV is committed to incorporating life-of-Project environmental management approaches and strategies into Project planning and execution so that the Project is not only compliant with provincial and federal regulatory requirements and manages the potentially adverse environmental effects, but also ensures that Project benefits and positive effects are enhanced and optimized. FPV has consulted extensively with both provincial and federal regulators to better understand the issues that are of most concern to them, as well as to understand the requirements for the preparation of the EIS. Knowledge of past potash developments will be used in the planning and pro-active management of the potential environmental effects of the Project. FPV has confidence in their understanding and ability to manage potential environmental effects of the Project using a suite of proven environmental management tools. The key environmental management tools that will be used to avoid or appropriately manage potential effects include, but are not limited to:

- the integration of environmental design mitigation to avoid or reduce environmental effects;
- environmental management procedures to address and manage environmental risk;
- environmental protection plans (EPPs) to incorporate environmental factors into final siting design using pre-disturbance assessments and proven mitigation to manage environmental effects;
- use of an environmental monitoring program to validate environmental effects predictions, evaluate the effectiveness of mitigation and address whether modifications to the environmental protection plan are required;
- emergency response plan to address emergencies related to injury, fire, spills, and other potential issues; and
- a waste management plan to ensure that all applicable legislation and standards concerning waste management, storage, and disposal are adhered to for both domestic and non-hazardous industrial waste, and hazardous industrial waste.

E.2.2 Project Alternatives

Alternative means for carrying out the Project have been considered in the preliminary stages of the Project (see Table E-2). As the feasibility study progresses, design optimization studies and the consideration of alternative means will be updated and reported in the EIS. Those that are not technically and/or economically feasible will not be considered.

Table E-2 Alternative Means for Carrying Out the Project

Project Component	Alternative
Mining methods	Conventional mining vs. solution mining. Solution mining has been chosen as the preferred option based on factors such as depth of the deposit, hazards associated with underground mining, productivity, worker safety, economics, and schedule.
Plant location	The proposed plant location was compared to three other locations and chosen based on the site's relatively flat topography, favourable geological and geotechnical conditions, proximity to the best potash resources, pre-existing disturbance by cultivation and minimal native vegetation, limited archaeological potential for intact sites, and distance from residences and towns. MFN elders were engaged to give advice on traditional and cultural land use and incorporation of information from an MFN TLU study.
Processing technology	A hybrid of multiple effect evaporation and mechanical vapour recompression technologies was determined to offer the best processing option based on the use of cogeneration.
Raw water supply	Currently the best water source option, as indicated by the Water Security Agency of Saskatchewan, is Buffalo Pound Lake (BPL), pending engineering feasibility analysis to increase its water capacity. SaskWater has completed its review of FPV's Request for Service and has advised FPV by letter dated October 22, 2012 that SaskWater will now proceed with the preparation of the conceptual report for water conveyance. This report will be based on the water source being BPL as has been indicated by the WSA. The use of groundwater is also being considered for one year until the system providing water from BPL is operational. A temporary groundwater source would not be required for initial cavern development if the water supply is in place at Project start-up.
Power options	Cogeneration, instead of electric or natural gas power, is currently the preferred option to provide the Project with both power and steam, and to facilitate the preferred processing option.
Railway	The Project's spur line will tie into Canadian National Rail's (CN) main line due to its proximity (approximately 5 km from the site), instead of a Canadian Pacific Railway side rail approximately 50 km from the site.
Well field pipelines	Underground pipelines, instead of above-ground, have been chosen for the Project to reduce disruption to surface activities such as farming, hunting and wildlife movements and to minimize insulation needs.

E.2.3 Project Components

The Project will use a solution mining technique in which hot water or brine solution will be used to mine potash deposits from the Belle Plaine and Patience Lake Members of the Prairie Evaporite Formation. Solution mining is the method by which potash is extracted from underground deposits by using wells and circulating fluids instead of shafts and conventional underground mining. In May 2012, a Technical Summary Report compliant with National Instrument (NI) 43-101 was filed with securities regulators (North Rim et al. 2012). This report confirmed the size and assay quality of the potash resources that underlie a portion of the MFN lands. Based on the findings of the Preliminary Economic Assessment (PEA) and Technical Summary Report, FPV concluded there are sufficient potash resources of appropriate quality underlying these lands to support a commercial mine capable of producing 2.8 Mtpa for a minimum 50-year economic life. The Project will include a plant site (including all infrastructure required for potash processing), a Tailings Management Area (TMA), and a mine well field (for potash extraction) (see Figure E-2).

MUSKOWEKWAN POTASH PROJECT

Proposed Facility Site Preliminary Well Field and Rail Spur Detail Base

Projection: UTM Zone 13 NAD 83
Acknowledgements: Original Drawing by Stantec.
Project Data: Novopro (20121128). TLE: NorthRim April 2012.
Basedata: Geosask, Canvec 10. Hydro: 50K. Buildings: Stantec Nov 2012.

- Proposed Facility Site
- Proposed Mine Well Field
- Proposed Rail Spur

Land Status

- Indian Reserve
- TLE Land - Muskowekwan
- Pre-reserve Land - Muskowekwan
- TLE Land - Other
- Building Structure
- Major Road
- Minor Road
- Railway
- Watercourse
- Waterbody
- Urban Municipality

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Stantec

AB SK MB
Saskatoon
Area of Interest
Regina
USA

FIGURE NO.

E-2

Last Modified Nov 29, 2012 By: adson

The solution mining caverns will be located throughout the well field (at a depth of approximately 1,200 m below ground) and a piping network will be routed from the plant through the well field to service the caverns (see Figure E-2). Initial well field development will occur close to the processing plant, and will extend outward across the well development area as the mine is developed. The productive lifespan of the Project has been conservatively estimated at 50 years; however, in the event that caverns are still producing at acceptable levels, the mine may continue to operate beyond this timeframe, with well field development occurring across the entire well development area over time. Development of the resource may occur on any and all lands owned by MFN. Subsequent to additional resource investigations, a more definitive time-frame and well development plan for the Project will be established and reflected in the EIS.

Each cavern will be serviced by two wells, drilled from a single well pad. The approximate dimensions of a well pad are expected to be 40 m x 120 m, plus or minus 50%, depending on the number of wells and their arrangement. Up to 20 caverns can be serviced from each well pad (depending on local conditions and geological constraints); this is referred to as a cluster. The hot water or brine solution will be pumped into each mining cavern through an injection well, dissolving the potassium chloride (KCl) and salt (NaCl) deposits into a brine solution. The brine will be recovered through a production well and sent via the pipeline network to the processing plant, where the KCl and NaCl deposits will be recovered in crystalline form. The specific location of each well pad will be determined during the detailed design phase for initial well field development, with the specific location of later well pads informed by additional geological, technical, and environmental data obtained during mine development.

The total annual production of potash will be accomplished through primary mining (2 Mt) and secondary mining (800 kt). Primary mining is the non-selective mining of the ore by a hot leaching process that uses raw water as the solvent and creates brine from which potash is extracted. Secondary mining is the selective mining of potash by a hot leaching process using NaCl-saturated brine.

Brine processing will occur at the processing plant and involves the following steps: evaporation and crystallization; product de-brining and drying; product screening, compaction, and crushing; secondary mining crystallization; and product storage and load-out. Processing will produce two products: KCl and NaCl. The KCl will be dried, screened, and stored prior to being shipped out by rail car. The NaCl will be sent to the above-ground TMA for storage. The salt and brine tailings from the mining and processing phases will be sent hydraulically to the TMA which consists of a salt tailings pile, brine pond, pipelines, containment ditches and dykes, and disposal wells.

Waste brine from cavern development and all other waste brines from the well field and processing plant will be accumulated in a dedicated buffer storage tank and re-injected into the Winnipeg or Deadwood aquifer, a deep brackish aquifer below the potash horizons and well isolated from surface aquifers. Other emissions, discharges and wastes will be managed as per appropriate regulations. Specific emissions, discharges and wastes are discussed below in conjunction with the descriptions of the Valued Environmental Components (see Section 4).

During construction, temporary infrastructure, including a labour camp for up to 1,000 construction employees, will be assembled on-site. During operation, permanent buildings and facilities will include administrative buildings, processing facilities, maintenance shop, product storage and load-out buildings, fuel and hazardous substances storage, and other buildings. The temporary labour camp will be operated in accordance with provincial guidelines.

Power will likely be supplied by on-site cogeneration. Access to the Project site will be from public roads such as the existing Highway 15, Highway 639, and local grid roads. Separate access roads to the well field will also be needed. Where feasible, existing roads will be used or new access roads will be constructed from the existing municipal grid road network near the well field. Efforts will be made to consolidate infrastructure (e.g., pipelines and access roads) in a common right-of-way where feasible and to avoid environmental, socio-cultural and economic constraints. An on-site rail spur approximately 7 km long will be built to connect to the nearby existing CN main rail line south of the facility site.

Ancillary projects that are outside the scope of the Project include supporting utilities and infrastructure, including water, natural gas, and communications that will be provided by third parties. Water will be supplied to the site by SaskWater via a new pipeline, likely from Buffalo Pound Lake. Natural gas will be supplied by TransGas, via an upgraded pipeline extended to the Project fenceline. Communications will be provided by SaskTel.

E.2.4 Project Activities and Phases

Project activities during construction of the Project will consist of clearing, grubbing, excavation and grading of the Project processing plant and TMA. Construction will involve the erection of buildings, preparation of roadbeds, development of well production pads and associated infrastructure (service roads, pipelines and power lines), preliminary cavern development, the drilling and development of temporary groundwater supply wells, erection of electrical distribution and co-generation plant, and other ancillary facilities. Waste management and emissions control will be achieved through implementation of the waste management plan, EPPs, and emergency response plan. During operation, the plant processing facilities will process brine and produce product for shipment via rail cars. Mining will proceed over the life of the mine through the sequential development of drilling pads within the well development area, including site access roads, water supply piping, solution piping, electrical power and steam distribution systems. Throughout operation, tailings management and operation will continue and the co-generation plant will operate and supply Project energy and steam.

A conceptual decommissioning and reclamation (D&R) plan will be developed during detailed engineering and permitting and will outline how lands disturbed by mining activities will be reclaimed to a condition compatible with neighbouring land uses. This plan will address the different types of Project infrastructure and be developed in consultation with regulatory agencies during permitting to ensure that it complies with applicable laws and regulations. Additionally, MFN will also be consulted on the D&R plan. The plan will be periodically reviewed during operations.

The key Project phases and milestones are presented in Table E-3.

Table E-3 Project Phases and Milestones

Milestones	Tentative Dates
Environmental	
Submission of Project Description/Technical Proposal	Q4 2012
Issuance of EIS Guidelines/Terms of Reference	Q1 2013
Environmental Baseline Studies	Q2 2012 – Q3 2013
EIS Preparation and Submission	Q4 2012 – Q3 2013
EIS Review and Approval	Q3 2013 – Q2 2014
Permitting	Q3 2014 – Q1 2015
Engineering/Construction	
Pre-feasibility Study	Q1 2012 – Q1 2013
Feasibility Study	Q1 2013 – Q1 2014
Detailed Engineering/Procurement/Construction	Q3 2014 – Q4 2016
Commissioning	Q4 2016 - Q1 2017
Operation	Q2 2017 and beyond
Decommissioning and Reclamation	2067 and beyond

E.3 PROJECT LOCATION AND LAND STATUS

The Project will be located entirely on MFN lands, which are comprised of IR #85 (original Treaty grant), TLE, and pre-reserve lands.

The federal Crown administers I.R. #85 reserve and TLE lands. TLE lands are those that have been acquired by MFN through the TLE Framework Agreement (1992). These lands have the same rights and entitlements as I.R. # 85 reserve lands.

The surface rights of pre-reserve lands are owned by the MFN but remain under the administration of Saskatchewan until they transfer to reserve status through the TLE Framework Agreement (1992). In addition to the surface rights, mineral title associated with the pre-reserve lands will be transferred to MFN through the TLE Framework Agreement (1992) process. Figure E-2 shows the legal location of these lands and depicts the different types of lands owned by MFN that could be subject to development for this Project.

The MFN has mineral rights for both the Reserve and TLE lands. As pre-reserve lands are transferred to reserve status, mineral rights will be transferred to MFN. Once this process is complete, both the surface and mineral rights will be held by MFN for the current pre-reserve lands. Currently, the mineral rights underlying 61,509 acres (24,892 ha) of MFN lands, located mainly in Townships (Twp) 27-27A, Ranges (Rge) 14-16, West of the Second Meridian (W2M), have been designated under the *Indian Act* by a February 2012 Mineral Rights Designation vote for the purpose of potash mine development (North Rim et al. 2012).

The facility will be located over approximately ten contiguous quarter sections of land (see Figure E-2). The plant site is located approximately at 51° 22' 15.453" latitude and 103° 59" 57.005" longitude, subject to final siting and design.

The Project location is proximal to several buildings, including residences for MFN as well as the Town of Lestock. The use and occupancy of these buildings (i.e., permanent residents, commercial, seasonal use, abandoned, etc.) will be verified during the engagement process and included in the Environmental Impact Statement (EIS). Standard avoidance and other mitigation techniques will be employed to ensure that any Project-related developments incorporate appropriate setbacks from buildings or land use associated with population settlements.

E.4 FEDERAL AND PROVINCIAL INVOLVEMENT

Table E-4 includes a list of federal legislation, regulatory requirements and permits, licences and authorizations that may be applicable to the Project. This list of federal permits and approvals will be refined in the EIS as Project details are confirmed.

Table E-4 Federal Legislative and Regulatory Requirements

Act	Regulation	Relevance to Project
Fisheries Act	Not applicable	The Project may require an authorization from Fisheries and Oceans Canada (DFO) pursuant to Section 35(2) of the *Fisheries Act*, if any part of the Project results in a harmful alteration, disruption, or destruction of fish habitat. However, field studies and available information indicated that no fish bearing water bodies are expected to be affected by the Project. Further amendments to the *Fisheries Act* are anticipated to be made pursuant to the *Jobs, Growth and Long-term Prosperity Act*. After such amendments come into effect, it is expected the Project may require an authorization from DFO if any part of the Project results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support it. However, as above, no fisheries or fish supporting fisheries are expected to be affected by the Project.
Species at Risk Act, S.C. 2002, c. 29	Applicable	Several federally listed species at risk may occur in the Project area. However, information review and field surveys to date indicate that no critical habitat for these species is expected to be affected by the Project. Consultation with Environment Canada regarding federally listed species at risk has already been initiated.
Migratory Birds Convention Act, S.C., 1994, c. 22	Migratory Bird Regulations, C.R.C., c. 1035	The Project will interact with migratory birds and the EIS will describe appropriate mitigation to avoid potential significant residual adverse environmental effects.

Table E-4 Federal Legislative and Regulatory Requirements (cont'd)

Act	Regulation	Relevance to Project
Canada Transportation Act (CTA)		Under Section 98(2) of the CTA, the Canadian Transportation Agency may, on application by the railway company (or, in this case the proponent), grant an approval if it considers that the location of the railway line is reasonable, taking into consideration requirements for railway operations and services and the interests of the localities that will be affected by the right-of-way (ROW).
Canadian Environmental Assessment Act, 2012		The Project is a "designated project" and requires a screening under Sections 8 to 12. The Agency may require an EA under Sections 22 to 27. It is anticipated, due to the nature and scale of the Project, an EA will be required.
First Nations Commercial and Industrial Development Act (FNCIDA)		The MFN has requested the Minister of Aboriginal Affairs and Northern Development Canada (AANDC) to recommend to the Governor in Council the negotiation of an agreement and establishment of a regulation pursuant to FNCIDA.
Canadian Emission Reduction Incentives Agency Act, S.C., 2005, c. 30		Applicability to be determined in EA.
Canadian Environmental Protection Act, 1999, Canadian Environmental Protection Act, 1999, C-15.1	Environmental Emergency Regulations, *Environmental Emergency Regulations.* SOR/2003-307	Applicability to be determined in EA.
Canadian Environmental Protection Act, 1999, C-15.1	Federal Above Ground Storage Tank Technical Guidelines, P.C. 1996-1233	Applicability to be determined in EA.
Canadian Environmental Protection Act, 1999, C-15.1	Federal Halocarbon Regulations, 2003 SOR/2003-289	Applicability to be determined in EA.
Canadian Environmental Protection Act, 1999, C-15.1	Federal Underground Storage Tank Guidelines	Applicability to be determined in EA.
Canadian Environmental Protection Act, 1999, C-15.1	Inter-provincial Movement and Hazardous Waste Regulations, SOR/2002-301	Applicability to be determined in EA.
Canadian Environmental Protection Act, 1999, C-15.1	National Pollutant Release Inventory and Municipal Wastewater Services May 2003	Applicability to be determined in EA.
Canadian Environmental Protection Act, 1999, C-15.1	Ozone-depleting Substances Regulations, 1998 SOR/99-7	Applicability to be determined in EA.
Canadian Water Act, R.S.C., 1985, c. C-11	Guidelines for Canadian Drinking Water Quality	Relevant to the establishment of the potable water supply and the assessment of environmental effects on water resources.

Table E-4 Federal Legislative and Regulatory Requirements (cont'd)

Act	Regulation	Relevance to Project
Indian Act	Indian Mining Regulations C.R.C., c.956 (IMR)	Mining activity on federal reserve lands is subject to these regulations. In particular, Section 4 of the IMR requires the proponent to comply with provincial legislation and regulations pertaining to mining.
Indian Act	Indian Reserve Traffic Regulations C.R.C., c.959	Applicability to be determined in EA.
Indian Act	Indian Reserve Waste Disposal Regulations C.R.C., c.960	Applicability to be determined in EA.
Indian Act	Indian Timber Harvesting Regulations SOR/2002-109	Licence required to cut timber on First Nation lands.
Indian Act	Indian Timber Regulations C.R.C., c.961	Licence required to cut timber on surrendered lands or with consent of the council of a band, on reserve lands.
Indian Act	Property Assessment and Taxation (Railway Right-of-Way) Regulations SOR/2001-493	Applicability to be determined in EA.
Indian Act	Indian Mining Regulations C.R.C., c.956 (IMR)	Exploration Permits for Home Reserve were issued under IMR.
Indian Act		Exploration Permits for TLE lands were issued under the *Indian Act*.

Section 4 of the *Indian Mining Regulations* requires the proponent to comply with provincial laws and regulations pertaining to mining, even if the mining activity occurs on federal (reserve and TLE) lands. Moreover, if a regulation pursuant to FNCIDA is established, as requested by MFN, the regulation will specify those provincial laws and regulations, and particularly those sections of provincial laws and regulations that will apply to the Project on federal, reserve and TLE lands. It is anticipated the FNCIDA regulation will establish a robust and comprehensive regulatory framework for the life of the Project for activities occurring on both federal and provincial lands (essentially mirroring the suite of provincial regulations that Saskatchewan employs to regulate potash mines on provincial Crown lands), and in particular will enable the respective regulators, notably the Agency and Saskatchewan Ministry of the Environment (MOE), to confidently establish conditions for follow-up programs, including mitigation and monitoring.

E.5 ENVIRONMENTAL EFFECTS

The description below summarizes the biophysical setting for the Project and a discussion of potential Project-environment interactions and effects.

E.5.1 Biophysical Setting

The Project occurs in a relative flat area dominated by agricultural land use and, as a result, vegetation communities are highly fragmented. However, sporadic patches of remnant native vegetation remain in the region providing good quality habitat for wildlife species of management concern (SOMC) and rare plants or communities. These areas are not considered widespread and do not consist of very large patches due to past developments; native vegetation areas are mainly concentrated in the western half of the MFN Reserve and immediately south of the southwestern corner of the reserve. The broader Project study area is dominated by cultivated land (60%) followed by native grassland (17%), tall shrub (7.6%) and hardwood tree stands (6.6%). Well locations will be sited to avoid the relatively more contiguous habitat features where possible. The proposed facility site location is highly dominated by cultivated land (95%). Wetlands are prevalent and interspersed throughout the surrounding landscape and the facility site; however several wetlands, particularly those within the facility site, have already had their riparian zones disturbed by human activities (e.g., cultivation). There are no well-defined creeks or rivers in the Project area. Fisheries studies completed in 2012 indicate that the local environment has no fish resources, with the exception of some minnow species. Although several SOMC have the potential to occur at the proposed facility site and the broader Project area where suitable habitat exists, there are no records of wildlife SOMC and rare plants in the Saskatchewan Conservation Data Center database for the proposed facility site.

Due to the extensive agricultural developments, existing air quality and noise conditions in the Project area are likely typical of a rural, prairie environment. In general, air quality is good with localized periods of decreased air quality mostly due to farming and CN main line rail activities, and noise levels are primarily influenced by natural sound, domestic activity, local traffic, birds, locomotive and train activity and aircraft flyovers.

The Project straddles the divide between two major watersheds: the Qu'Appelle River watershed and the Quill Lakes watershed within the South Saskatchewan River watershed. The two main drainage systems are the Birch Creek (1,146 km^2) and Jumping Deer Creek (1,676 km^2) systems. Due to limited development in the region, with the exception of agriculture and community and transportation infrastructure, it is expected that the existing surface water quality within the Project area will be typical of other prairie wetlands and shallow lakes (i.e., generally alkaline in pH, highly buffered, with variable hardness and salinity). Groundwater quantity and quality is related to the geologic framework of the Project area, and consists of the following units (in ascending order): the Pierre Formation, the Empress Group, the Sutherland Group, and the Saskatoon Group. Within these geological units, there are several units with sufficient permeability to be considered aquifers.

Initial consultation activities and reviews of regional information have not identified the existence of a regional environmental study or land use management plan that has been completed or is ongoing in the area.

E.5.2 Valued Environmental Component Approach and Context

Valued Environmental Components (VECs) are important aspects of the biophysical and human environments that are considered to be important from public, First Nations, and/or scientific and technical perspectives. VECs are identified to focus the EA on those aspects of the environment that are valued, and most likely to be affected by the Project. The selection of VECs is influenced by a number of factors, including:

- consultation with regulators that helped to identify issues of greatest concern to them (e.g., water use, TMA design and prevention of contaminant migration to aquifers, subsidence, species of management concern);
- Aboriginal and public concern;
- an understanding of potential Project-environment interactions and potential effects through the experience of environmental professionals who have an extensive history with understanding and describing these interactions;
- an understanding of the sensitivity of the environmental aspects to perturbation; and
- experience with the design and implementation of practical mitigation by the Project team.

FPV proposes that the EA of the Project focus on 11 VECs, reflecting the anticipated Project-environment interactions, and based upon an understanding of the biophysical and socio-economic environment at and near the MFN Reserve and nearby communities. The biophysical, socio-cultural and economic VECs to be considered for this Project and the potential environmental effects on each of these VECs are presented in Table E-5.

Table E-5 Potential Biophysical, Social-cultural and Economic VECs

VEC	Potential Environmental Effects
Atmospheric Environment	Change in air quality Change in sound quality Change in climate
Vegetation	Change in vegetation species and communities
Wildlife	Change in wildlife populations
Wetlands	Change in wetland function
Water Resources	Change in quality of ground and surface water Change in quantity of ground and surface water
Muskowekwan First Nation Community	Change in community
Employment and Business	Change in employment Change in business

Table E-5 Potential Biophysical, Social-cultural and Economic VECs (cont'd)

VEC	Potential Environmental Effects
Land and Resource Use	Change in land and resource use
Aboriginal Land and Resource Use	Change in Aboriginal land and resource use
Heritage and Historic Resources	Change in heritage and historic resources
Community Services and Infrastructure	Change in community services and infrastructure

The evaluation of the Project inherently considers cumulative environmental effects of past, present and future projects. The description of existing conditions reflects consideration of past and present projects and activities, many of which will continue into the future at current levels. Within the lands of the MFN, there are no likely future projects planned other than the proposed Project. In the EIS, cumulative effects will be broadly considered in compliance with the TOR and Project-specific EIS Guidelines.

In selecting VECs, FPV also considered the Aquatic Environment, Soils and Terrain, and Public Health and Safety as candidate VECs but concluded that either the potential environmental effects on these components would not be substantive, or they will be addressed through the consideration of particular interactions within other VECs.

E.5.2.1 Biophysical VECs

ATMOSPHERIC ENVIRONMENT

Potential effects on local air quality and climate will be due to added emissions of critical air contaminants (CACs) (NOx, SOx, CO, TSP, PM_{10}, $PM_{2.5}$), greenhouses gases (GHGs) (primarily CO_2, CH_4, and N_2O) and particulate matter (i.e., potash and salt dust) associated with natural gas combustion, product storage and conveyance, off-road and on-road vehicle and equipment gasoline and diesel-fuelled engines, and fugitive dust from roads. Ambient sound level at noise-sensitive receptors (i.e., residences) at or near the Project may be increased during construction due to vehicles and equipment. FPV is committed to implementing appropriate mitigation to manage potential air quality and noise effects by ensuring that the Project meets or exceeds all applicable air quality and noise standards and guidelines.

WILDLIFE, VEGETATION, AND WETLANDS

Ground disturbance activities, including clearing activities for the construction of the facility site, well pads, pipeline, access roads, and rail spur line, which will result in the incremental loss of vegetation and wetland, can potentially affect vegetation communities, rare plants, and wetland communities if these cannot be avoided during the final siting of facilities. These construction activities may also contribute to wildlife mortality and habitat loss and/or fragmentation in contiguous patches of native vegetation which might affect habitat availability and suitability for wildlife SOMC. Several SOMC have the potential to occur at the proposed facility site and the broader Project area where suitable habitat exists. SOMC that have legislated protection (i.e., protection under either *The Wildlife Act, 1998* of Saskatchewan or the federal *Species at Risk Act* (SARA)) and have the potential to occur within the Project area include: northern leopard frog (Special Concern), common nighthawk (Threatened), loggerhead shrike

(Threatened), Sprague's pipit (Threatened), yellow rail (Special Concern), and monarch butterfly (Special Concern). Other SOMC that are not protected under legislation but considered sensitive by the province or identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) that may have the potential to occur within the Project area include: barn swallow, bobolink, horned grebe, and short-eared owl. These potential effects will be addressed through the use of pre-disturbance assessments and final siting criteria to avoid or reduce effects to vegetation, rare plants, and wetlands. Wildlife may be affected during construction and operation by mortality due to vehicle collisions and sensory disturbance (i.e., from noise, sights, and smells). Planned mitigation, such as avoidance, scheduling of work, establishing buffer zones around sensitive wildlife features, establishing traffic management procedures, and limiting fragmentation of contiguous patches of native habitat through design mitigation, will avoid or reduce potential effects described above. FPV is also committed to adhering to provincial guidelines such as *Disturbance Impact Thresholds: Recommended Land use Guidelines for Protection of Vertebrate Species of Concern in Saskatchewan* (MOE 2009) and avoidance guidelines outlined by Environment Canada to ensure the Project is in compliance with the *Migratory Birds Convention Act, 1994* and *Migratory Birds Regulations*. During operation, deposition of particulate matter on the surrounding vegetation may occur, but FPV will minimize the effects on vegetation quality by meeting or exceeding applicable air quality guidelines.

WATER RESOURCES

Potential effects of the Project on surface water features relate to changes to infiltration rates, increased erosion, loss of a small proportion of wetlands from facilities, and alterations to surface drainage due to subsidence. Several design mitigation and effects management protocols have been used in the preliminary design and layout of facilities to consolidate disturbances (i.e., shared ROWs for infrastructure, design optimization studies to reduce water use and TMA size) and reduce the Project footprint and associated changes to infiltration rates. FPV is committed to developing a stormwater and industrial runoff management plan that will direct surface runoff from undeveloped areas of the Project site toward natural drainages or use engineered drainages to bypass facilities and tie into pre-existing natural pathways, so that flow will continue. Subsidence studies and modeling work is being completed to ensure that changes in surface conditions are within acceptable limits and to determine the extent to which the landscape may change and alter local drainage and hydrological characteristics.

The operation phase may potentially affect surface water quality due to dust, air emissions, or accidental spills. Indirect effects associated with the diversion of surface water around the Project, or changes in drainage patterns due to subsidence, may also affect water quality by altering the water balance in the wetlands in and around the site. Design mitigation and operating protocols as outlined above help to address these issues.

Construction of surface facilities and infrastructure will result in changes in grade elevations, minor alterations to the surface drainage patterns, and impoundment of water, which may alter local infiltration rates and groundwater flow patterns. The quantity, distribution, and flow of shallow groundwater may also be affected by subsidence and the use of groundwater as a source for early cavern development (to be verified through studies and modeling to determine feasibility). Groundwater quality may be adversely

affected by accidental releases of products (e.g., fuel, diesel oil, chemicals). Groundwater quality may also be affected by runoff and seepage from potash and salt storage piles and the brine pond.

Project infrastructure will be developed so that groundwater quantity and quality will not be adversely affected significantly. Emergency response protocols and environmental protection measures will be in place to address such situations in the Emergency Prevention and Response Plan. Measures to mitigate subsidence and effects on surface water hydrology will also serve to mitigate potential effects on groundwater quality and quantity/flow. To avoid potential effects due to seepage from the TMA, its location was selected on the basis of the hydro-stratigraphic and geotechnical data demonstrating the suitability of the underlying till (i.e., low permeability) to limit vertical and horizontal migration of brine from the TMA. Off-site lateral migration of brine will also be prevented by the installation of perimeter ditches and barriers that penetrate through surficial materials into the underlying impermeable till.

E.5.2.2 Socio-cultural and Economic VECs

MFN COMMUNITY

The MFN community will be affected in several positive ways by increased opportunities for employment, the payment of substantive royalties that will have the potential to fund significant social infrastructure that can benefit both on and off reserve MFN members, and by preferential access to contracts and business opportunities. Possible adverse effects such as social instability could occur due to the increased wealth in the community and presence of a labour camp. This instability may occur as the MFN adapts to managing an increase in income, both at an individual level and for the community as a whole. FPV is committed to optimizing and enhancing the positive benefits of the Project, in a manner that supports the community and government agencies in the reduction and management of potentially adverse effects. FPV will work with the community and responsible government agencies early in the Project in support of their development and implementation of training programs in money management and/or assistance with developing strategies for setting up a community legacy fund for future generations. FPV is committed to Project mitigation including those related to traditional land and resource use to augment the value of the MFN lands as an attractive home for future generations to enjoy.

EMPLOYMENT AND BUSINESS

Potential effects to employment and business will be largely positive with MFN benefiting from increased employment, increased contracting opportunities, increased training opportunities and increased business opportunities. Many of the employment, contracting, and training opportunities will be felt in nearby communities and rural municipalities (RMs) as well, and by service providers (i.e., hotels, restaurants, contractors). Training programs developed to ensure the MFN is able to take advantage of employment and contracting opportunities may also be available to other neighbouring First Nations, Métis, and other stakeholders. The Saskatchewan and local government will be positively influenced with increased GDP and tax revenue.

FPV will work with the MFN community, government agencies, and other parties at interest to support the development of a variety of training programs early in the planning stages to help ensure that workers are trained and ready to work when employment opportunities associated with mine construction and operation arise. FPV will also work with the business community to ensure that contracting opportunities can be maximized within the local community.

LAND AND RESOURCE USE

Potential effects to land and resource use will occur through lands and resources being taken out of production and/or by causing disturbances to adjacent lands (i.e., through vegetation clearing, ground disturbance, infrastructure development, and sensory disturbance). This may affect the use and/or location of other mineral dispositions, linear facilities, agriculture, and recreational uses. FPV will work to identify and avoid conflicting with land and resource uses, where possible. Where mitigation is not possible, FPV will work with affected parties to compensate, where appropriate, for direct loss of land and resource uses.

Noise generated during certain construction and operation activities may temporarily displace wildlife populations, thereby reducing hunting potential at that location. Livestock operations in the area may be affected in a similar manner. BMPs for noise control will be implemented to reduce this temporary disturbance and FPV will comply with all applicable standards and regulations.

ABORIGINAL LAND AND RESOURCE USE

Activities that have the potential to affect traditional land use activities include ground disturbance, sensory disturbance, and habitat fragmentation produced during the construction of above-ground facilities and infrastructure, and the ongoing development of the well field during operations. These activities may affect traditional activities such as trapping, hunting and berry picking. Mitigation strategies outlined to reduce or avoid potential effects on habitat features (see wildlife, vegetation and cultural site mitigation) will reduce or avoid related effects to these traditional land use activities. FPV will also work with trap line operators to avoid or reduce effects through timing of Project activities and siting of facilities. Burial sites and ceremonial sites are also vulnerable to disturbance by construction activities. Ceremonial sites could be impacted by noise that was not present before. Culturally significant sites may be sensitive to visual effects. FPV will collect information on these features and engage with the MFN to discuss mitigation approaches. Mitigation of potential effects on cultural sites, such as ceremonial sites, will be accomplished through avoidance during the Project design phase.

HERITAGE AND HISTORIC RESOURCES

During construction, ground disturbance activities such as excavation, grading, trenching, drilling, vegetation clearing, and landscaping have the potential to affect heritage resources. During operation, the ongoing development of the well field will generate new ground disturbance that has the potential to affect heritage resources. Mitigation of effects on heritage resources will occur in three phases, each of which

will be implemented by FPV where appropriate: 1) heritage resource inventory, 2) heritage resource impact assessment, and 3) heritage resource mitigation.

COMMUNITY SERVICES AND INFRASTRUCTURE

The Project's construction phase will produce increased traffic and increased demand for local and regional services. During operation, the Project will produce a small increase in rail traffic (approximately one train per day compared to 30+ trains per day) through a new spur line connecting the mine site to the CN rail line. However, with the Project there will also be increased revenue brought into the MFN and surrounding communities enabling them to invest in the development of community services and infrastructure. FPV will work with the MFN, and neighbouring First Nations, Métis, RMs, and communities, to develop appropriate strategies to optimize potential economic benefits and manage the anticipated burden on community services and infrastructure. Some issues such as lack of adequate housing, restaurants and/or accommodations are beyond the scope of the Project mitigation proposed by FPV.

E.6 ENGAGEMENT AND CONSULTATION WITH ABORIGINAL GROUPS

As the Project is located on lands owned by the MFN and will exploit resources owned by the MFN, preliminary engagement activity by Encanto with MFN has been ongoing for the past three years. Continued engagement with the MFN both on- and off-reserve will serve to introduce the larger MFN community to FPV and the team responsible for completing the EA; provide an opportunity for the community to learn about the Project in detail, ask questions, and raise concerns; use information gathered from MFN members to assist in issues scoping for the EA; and gather Traditional Knowledge and Traditional Land Use information, in addition to available existing studies, to inform the EA. Ongoing engagement with the MFN will include, but not be limited to, community Open Houses and ongoing in-person meetings. FPV will use available tools to disseminate information to and receive input from the MFN, including newsletters, social media and a website which FPV has provided financial support to develop.

Several other First Nation and Métis communities who will or may be affected by, or have an interest in, the Project have been identified and will be engaged as well. Based on a documentary review of relevant materials related to the study area, we anticipate engagement will be required with the George Gordon First Nation (FN), Kawacatoose FN, Day Star FN, the TATC (which represents these three FNs, as well as the MFN), Métis Local #8 Lestock, Métis Eastern Region II, and Métis Eastern Region III. However, this list may be altered as required based on the results of our initial engagement activities within the region and as directed by regulatory authorities.

Consultation and engagement with all parties will continue throughout the completion of the EIS. Project updates and further engagement will continue to occur into the construction and operational phases of the Project.

E.6.1 Muskowekwan First Nation

Specific examples of engagement with MFN include:

- engagement and BCR support in relation to EPA;
- engagement and BCR support in relation to the JVA;
- multiple information sessions on reserve and in four off-reserve centers (Regina, Saskatoon, Edmonton, Winnipeg) related to the designation of potash reserves for development (which received more than 80% approval) and to the EA process;
- numerous technical presentations made to MFN Chief and Council;
- provision of TLU study reports by MFN to inform the EA planning process;
- meetings between MFN Chief and Council and federal and provincial ministers and senior government officials;
- informal discussions between MFN Chief and leaders of other TATC First Nations; and
- community open houses.

A selected list of MFN community meetings is included in Table E-6.

Table E-6 2010-2012 Selected List of MFN Community Meetings

Community	Location	Date	Summary
Muskowekwan First Nation	Regina	24-Nov-10	Information session related to the designation of potash reserves for development
Muskowekwan First Nation	Saskatoon	25-Nov-10	Information session related to the designation of potash reserves for development
Muskowekwan First Nation	Edmonton	29-Nov-10	Information session related to the designation of potash reserves for development
Muskowekwan First Nation	Winnipeg	30-Nov-10	Information session related to the designation of potash reserves for development
Muskowekwan First Nation	Muskowekwan Band Hall	22-Aug-12	Initial Open House to introduce the Project, provide information, gather initial feedback, and engage in issues scoping.
Muskowekwan First Nation	The Gathering Place, Regina	6-Sep-12	Initial Open House to introduce the Project, provide information, gather initial feedback, and engage in issues scoping.

Engagement between MFN and Encanto has in many cases moved to include “accommodation”. For example:

- MFN will be paid directly substantial royalty and lease payments for the use of their land and resources;
- MFN will be paid directly a substantial development fee for its accomplishment of certain Project progress milestones;

- MFN and MRL participate directly in the management of the Project as members of the project management committee and are regularly and fully advised of Project decisions;
- the proposed facility site was moved from home reserve lands to a location on TLE and pre–reserve lands in response to a request from MFN to minimize the effect of the Project on culturally sensitive areas within the home reserve;
- preferential employment and contracting commitments, including an 'open book' contracting protocol, have been established to ensure direct economic participation in the Project;
- the JVA allows MFN to monitor and hold FPV accountable to achieve certain Project employment, contracting, and training commitments; and
- financial support from Encanto for capacity development assistance to MFN and MRL.

The two open houses held on August 22, 2012 and September 6, 2012 resulted in the attendance of 61 and 30 people, respectively. At both open houses, the format was largely the same: storyboards discussing the basics of the mine plan and the EA process. Representatives from FPV, Stantec, and Novopro were in attendance and engaged attendees one-on-one, explaining the Project and answering questions. At the Regina open house, a formal presentation and "question and answer" session was held as well, in response to requests from community Elders.

An Issues Scoping Questionnaire was used in which participants were asked to rate the importance of various issues or aspects of the environment to them, and to indicate other issues that should form part of the EA study. The results of the Issues Scoping Questionnaire, as well as of the conversations held with community members, were used to inform VEC selection for the Project.

Feedback received from participants included the following.

- Concerns around water supply and quality were heard often.
- Many comments in these initial open houses relate to the EA engagement process. The importance of Elder engagement was stressed.
- Desire was expressed for a website to keep people informed, and also a newsletter for people who do not use the internet, especially Elders.
- Traditional Land use issues were expressed often, in particular around unmarked burials that exist in many places on the reserve.
- Socio-economic concerns, especially around jobs and training, were frequently expressed. There is a desire for training of various kinds (not just at mining skills, but also skills to deal with change in the community such as money management courses, and drug and alcohol treatment programs).
- Overall, people view the mine as a chance for a better future for the next generation, but would like more communication at all levels – from FPV, Chief and Council, and regarding the EA process.

Current traditional land and resource uses include hunting and trapping, berry picking, and culturally significant areas (e.g., ceremonial sites, burial sites (both marked and unmarked), and the remains of a historic Métis settlement). Existing Traditional Knowledge has been recorded for the Project area as a

result of previous studies. These studies have informed current Project planning efforts and will continue to be referenced as Project development proceeds. To supplement this information, Traditional Knowledge will also be sought from knowledgeable members of local Aboriginal communities throughout the engagement component of this Project. Follow-up interviews will be used as needed to build on Traditional Land Use information recorded during community meetings. As part of ongoing engagement activities, Traditional Knowledge will also be sought from First Nation and Métis communities within 25 km of the proposed plant site; further communities will be included if initial engagement activities and ongoing baseline data gathering indicate that it is warranted and/or as directed by regulatory authorities.

E.6.2 Aboriginal Communities other than Muskowekwan First Nation

MFN is a member of the TATC. MFN Chief Bellerose, a leader of one of the parties to the joint venture and a representative of FPV's management committee, has undertaken a series of informal and formal engagement meetings with the other TATC member First Nations, which include Day Star FN, Kawacatoose FN, and George Gordon FN. Initial engagement was informal and included discussions about the Project and its potential impacts, descriptions of MFN's role in the ownership and management of the Project and MFN's commitment to ensure environmental protection and protection of traditional values, not just for MFN, but for the TATC members as well.

More recently, Chief Bellerose had made more formal presentations to the Day Star and Kawacatoose FNs that have resulted in a sharing of Project economic benefit commitments and a commitment to establish a joint economic development enterprise to maximize economic benefits from the Project.

George Gordon FN has elected not to participate in this common development enterprise along with the other TATC member First Nations. FPV will continue to engage with Gordon FN on an individual basis.

Chief Bellerose has contacted each of the TATC members to discuss the methods by which they wish to be engaged. Upon receipt of that direction, the Project will proceed with providing information and recording comments within the respective communities (options include leadership and Elder meetings, public open houses, or other mechanisms). Once a response is received, additional engagement activities with these FNs are anticipated to occur early in 2013.

MFN also participates in regional organizations structured around traditional land use, water and fishing interests. In addition to the TATC member FNs, these organizations include the Beardy's, Okemasis and Fishing Lake FNs. FPV is coordinating with Chief Bellerose regarding the appropriate level of engagement and information sharing required to inform these FNs about the Project.

A leadership meeting is planned for the Metis Local #8 in Lestock in early December 2012, with an open house to follow in early 2013.

E.7 PUBLIC CONSULTATION AND ENGAGEMENT

Information sessions will occur with members of the public who may be interested and/or affected by the Project including, but not necessarily limited to, RMs (see Table E-7), local communities, and landowners, both formally as part of the EA process and informally as part of FPV's efforts to provide information about the Project to the public at large. The purpose of this engagement will be to introduce the Project team, discuss Project details, including socio-economic impacts to the region, and solicit and document questions, comments, and issues. The information collected will be considered in the EA, along with information about how concerns have been or will be addressed. Project updates and further engagement will continue to occur with the public during the construction and operational phases of the Project.

In-person meetings have also been ongoing with both provincial and federal regulatory bodies, including the Agency, AANDC, and the Major Projects Management Office, on the federal side, and MOE, Economy and WSA on the provincial side, and will continue throughout the EA and permitting process. The purpose of the regulatory engagement to date has been to inform regulatory agencies about the Project and to discuss matters pertinent to the EA process.

Table E-7 Completed and Planned Public Engagement Activities

Community	Communication Mechanism	Location	Date	Summary
Completed				
RM of Mount Hope	In-Person Meeting	Semans	8-Nov-12	Introduction to Project and preliminary feedback
RM of Kellross	In-Person Meeting	Leross	8-Nov-12	Introduction to Project and preliminary feedback
RM of Ituna Bon Accord	In-Person Meeting	Ituna	16-Nov-12	Introduction to Project and preliminary feedback
RM of Emerald	In-Person Meeting	Wishart	19-Nov-12	Introduction to Project and preliminary feedback
RM of Foam Lake	Information Package Mailout	n/a	30-Oct-12	Introduction to Project and preliminary feedback
Planned				
RM of Touchwood	In-Person Meeting	Punnichy	11-Dec-12	Introduction to Project and preliminary feedback.
Village of Lestock	In-Person Meeting	Lestock	12-Dec-12	Introduction to Project and preliminary feedback.
Village of Leross	In-Person Meeting	Leross	10-Dec-12	Introduction to Project and preliminary feedback.
Lestock Community Open House	Public Open House	Lestock	January or February 2013	

This component of the overall engagement plan is in the early stages because it was decided that Project details needed to be more advanced and that initial engagement with MFN members should be completed before moving out into the wider public community.

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Abbreviations

%	percent
AANDC	Aboriginal Affairs and Northern Development Canada
AB	Alberta
Agency or CEA Agency	Canadian Environmental Assessment Agency
BC	British Columbia
BCR	Band Council Resolution
BMP	Best Management Practice
BPL	Buffalo Pound Lake
CAC	criteria air contaminants
$CaSO_4$	calcium sulfate
CEAA 2012	*Canadian Environmental Assessment Act, 2012*
CH_4	methane
CN	Canadian National Railway
CO	carbon monoxide
CO_2	carbon dioxide
CP	Canadian Pacific Railway
CTA	Canada Transportation Act
dBA	A-weighted decibels
DFO	Department of Fisheries and Oceans
D&R	decommissioning and reclamation
EA	environmental assessment
EIS	Environmental Impact Statement
Encanto	Encanto Resources Ltd
EPA	Exploration Participating Agreement
EPP	Environmental Protection Plan
ERCB	Energy Resources Conservation Board
FN	First Nations
FNCIDA	*First Nations Commercial and Industrial Development Act*
FPV	First Potash Ventures
GHG	greenhouse gas
GJ/hr	gigajoule per hour
ha	hectare
HCl	hydrochloric acid
HRIA	heritage resource impact assessment
IMR	Indian Mining Regulations
IR	Indian Reserve
JVA	Joint Venture Agreement

KCl ..... potassium chloride
km ..... kilometre
K_2O ..... potassium oxide
kt ..... kilotonne
kV ..... kilovolt
LML ..... Last Mountain Lake
m ..... metres
m^2 ..... square metres
m^3/h ..... cubic metres per hour
MDH ..... MDH Engineered Solutions Corp.
MEE ..... multiple effect evaporation
MFN ..... Muskowekwan First Nation
MMT ..... Million Metric Tonnes
$MgCl_2$ ..... magnesium chloride
mm ..... millimetres
MOE ..... Saskatchewan Ministry of Environment
MRL ..... Muskowekwan Resources Limited
Mt ..... million tonnes
Mtpa ..... million tonnes per annum
MVA ..... mega volt-amps
MVR ..... mechanical vapour recompression
NaCl ..... sodium chloride
NOx ..... nitrogen oxides
NO_2 ..... nitrogen dioxide
N_2O ..... nitrous oxide
Novopro ..... Novopro Project Development and Management
NTS ..... National Topographic System
PCS ..... Ministry of Parks, Culture, and Sport
PDA ..... pre-disturbance assessment
PEA ..... Preliminary Economic Assessment
PM ..... particulate matter
RM ..... rural municipality
ROW ..... right-of-way
SARA ..... *Species at Risk Act*
SK ..... Saskatchewan
SKCDC ..... Saskatchewan Conservation Data Centre
SKEAA ..... Saskatchewan *Environmental Assessment Act*
SOx ..... sulphur oxides
SO_2 ..... sulphur dioxide

SOMC ..... species of management concern
SRC ..... Saskatchewan Research Council
Stantec ..... Stantec Consulting Ltd.
t ..... tonne
t/h ..... tonne per hour
TATC ..... Touchwood Agency Tribal Council
TLE ..... Treaty Land Entitlement
TLU ..... Traditional Land Use
TMA ..... Tailings Management Area
TOR ..... Terms of Reference
TSP ..... total suspended particulates
VEC ..... Valued Environmental Component
W2M ..... West of Second Meridian
WDA ..... well development area
WSA ..... Water Security Agency of Saskatchewan

1 INTRODUCTION

This document is intended to fulfill the requirements of a Project Description under the *Canadian Environmental Assessment Act, 2012*, Section 8(1) (CEAA 2012). The document is also intended to fulfill the requirements of a Technical Proposal under *The Environmental Assessment Act* of Saskatchewan (SKEAA).

1.1 Project Overview

First Potash Ventures (FPV), a joint venture between Encanto Resources Ltd. (Encanto), Muskowekwan First Nation (MFN), and Muskowekwan Resources Limited (MRL), proposes to develop a potash mine on the Muskowekwan Reserve (IR #85), Treaty Land Entitlement (TLE) lands and pre-reserve lands. The Muskowekwan Project (the Project), located about 100 km north-northeast of Regina, Saskatchewan (SK), would comprise a solution mine producing about 2.8 million tonnes per annum (Mtpa) of potash for at least 50 years (see Figure 1-1).

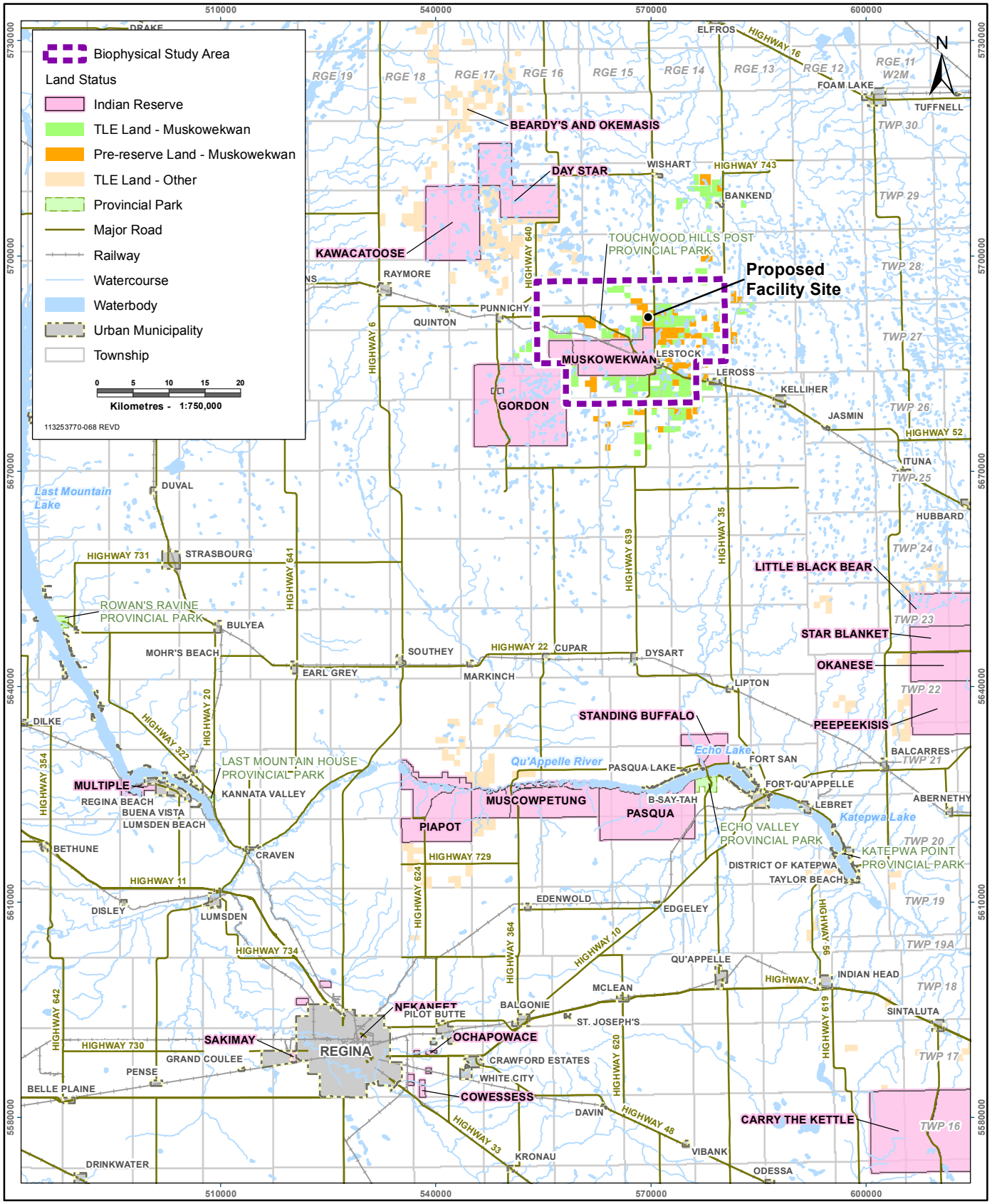
MFN is a First Nation that owns the lands and potash reserves that will be used for the Project. MFN lands and resources are protected by Treaty Rights which forms the basis of MFN's economic development strategy.

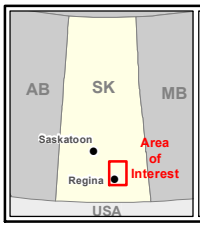
MRL is an economic development company of MFN, incorporated in 2009, based in Lestock, SK. Encanto is a subsidiary of Encanto Potash Corp, a Canadian potash exploration company, with offices in Vancouver, BC, Calgary, AB, and Regina, SK. MFN and MRL participate on the Project management committee and provide land and resource access, while Encanto provides financing, technical and management expertise. No federal financial support has been provided in support of the Project.

The Project will help to meet the growing international demand for potash, while providing a unique opportunity for the Muskowekwan people to realize significant, and much-needed economic and social opportunities and benefits through the implementation of their Treaty rights.

1.2 Project Background

In recent years, an expanding world population and the growth of a dynamic middle class in major developing markets, like China, India and Brazil, have led to increased demand for food and commodities that serve the agricultural sector. This demand is expected to continue to grow. In particular, potash and fertilizer prices have risen quickly, stimulating much interest in this sector, including in Canada, the world's largest potash producer.





MUSKOWEKWAN POTASH PROJECT

Project Location

Acknowledgements: Original Drawing by Stantec. Basedata: Canvec Ver10 2012, GeoSask. TLE Lands: NorthRim April 2012.

PREPARED BY Stantec

PREPARED FOR

FIGURE NO. 1-1

Last Modified: Nov 28, 2012 By: aolson

In Canada, the development of new potash mines to meet this growing demand is constrained in part due to the challenges associated with assembling surface and mineral rights, the current ownership of which is diverse. However, First Nations located in the Saskatchewan potash belt own large tracts of land with contiguous surface and mineral rights. The principals of Encanto Potash Corp., who have existing relationships with Saskatchewan First Nations through oil and gas development activity, recognized the opportunity to develop a potash mine on such lands in cooperation with First Nation landowners.

Encanto Potash Corp. entered into Exploration Participation Agreements with a number of Saskatchewan First Nations and undertook seismic exploration and drilling programs to define the potash resources underlying these lands. After assessing the resource potential and determining the most appropriate possible project structures, in 2010 Encanto entered into a Joint Venture Agreement (JVA) with MFN and MRL to develop a potash mine on MFN lands.

Potash exploration activities undertaken between 2009 and 2011 are summarized in Table 1-1.

Table 1-1 Summary of 2009-2011 Exploration Programs

Exploration Program	Start Date	Completion Date	Number / Area Covered	Metres Drilled
2D Seismic Survey	May 2009	September 2009	241.57 km^2	N/A
3D Seismic Survey	November 2009	May 2010	223 km^2	N/A
2D Interpretation	October 2009	November 2009	N/A	N/A
Drilling Program	November 2009	December 2009	1 hole drilled	1,392
3D Interpretation	May 2010	December 2010	N/A	N/A
Drilling Program	October 2010	November 2010	4 holes drilled	5,582
Drilling Program	September 2011	October 2011	2 holes drilled	2,525.5
NOTE: N/A = Not Applicable				

On behalf of FPV, in 2011 Encanto conducted a Preliminary Economic Assessment (PEA) that concluded a solution mine is the preferred mining option, compared to conventional underground mining (see Section 2.4). In May 2012, a Technical Summary Report compliant with National Instrument (NI) 43-101 was filed with securities regulators (North Rim et al. 2012). This report confirmed the size and assay quality of the potash resources that underlie a portion of the MFN lands. Based on the findings of the PEA and Technical Summary Report, FPV concluded there are sufficient potash resources of appropriate quality underlying these lands to support a commercial mine capable of producing 2.8 Mtpa for a minimum 50-year economic life.

On behalf of FPV, Encanto has retained the specialist potash engineering company, Novopro Project Development and Management (Novopro), to undertake a Pre-Feasibility Study for the Project. Novopro is supported by a number of technical specialty engineering and environmental firms, including Stantec Consulting Ltd. (Stantec), a leading environmental consulting firm, to undertake the environmental assessment (EA) of the Project. Other mining specialists involved in the Project include North Rim Exploration Ltd., MDH Engineered Solutions, Agapito Associates Inc., RESPEC Consulting & Services, Institut fuer Gebirgsmechanik GmbH (Institute for Rock Mechanics GmbH), and NG Consulting.

1.3 Project Proponent

The proponent of the Muskowekwan Project is FPV. FPV was formed through a JVA between MRL, MFN and Encanto in 2010.

The contact information for the proponent is provided in Table 1-2, below.

Table 1-2 Proponent Contact Information

Proponent	**First Potash Ventures**
Contact at MFN	Chief Reg Bellerose P.O. Box 249 Lestock, SK S0A 2G0 Telephone: 306-274-7641 Email: rbellerose@sasktel.net
Contact at MRL	Chief Reg Bellerose President (MRL) P.O. Box 129 Lestock, SK S0A 2G0 Telephone: 306-274-7641 Email: rbellerose@sasktel.net
Contact at Encanto	James Walchuck President and CEO Suite 450 - 800 W. Pender Street P. O. Box #6 Vancouver, BC V6C 2V6 Telephone: 604-683-2402 Email: jwalchuck@encantopotash.com
Principal Contact for Purposes of Regulatory Review	Wayne Stanley Manager, Government and Regulatory Affairs First Potash Ventures Suite 500, 1414 8th Street SW Calgary AB T2R 1J6 Telephone: 403-538-8447 Email: wstanley@encantopotash.com

1.4 Project Location and Land Status

The Project will be located entirely on MFN lands, which are comprised of IR #85 (original Treaty grant), TLE and pre-reserve lands.

The federal Crown administers I.R. #85 reserve and TLE lands. TLE lands are those that have been acquired by MFN through the TLE Framework Agreement (1992). These lands have the same rights and entitlements as I.R. # 85 reserve lands.

The surface rights of pre-reserve lands are owned by the MFN but remain under the administration of Saskatchewan until they transfer to reserve status through the TLE Framework Agreement (1992). In addition to the surface rights, mineral title associated with the pre-reserve lands will be transferred to MFN through the TLE Framework Agreement (1992) process. Figure 1-2 shows the legal location of these lands and depicts the different types of lands owned by MFN that could be subject to development for this Project.

The MFN has mineral rights for both the Reserve and TLE lands. As pre-reserve lands are transferred to reserve status, mineral rights will be transferred to MFN. Once this process is complete, both the surface and mineral rights will be held by MFN for the current pre-reserve lands. Currently, the mineral rights underlying 61,509 acres (24,892 ha) of MFN lands, located mainly in Townships (Twp) 27-27A, Ranges (Rge) 14-16, West of the Second Meridian (W2M), have been designated under the Indian Act by a February 2012 Mineral Rights Designation vote for the purpose of potash mine development (North Rim et al. 2012).

The facility will be located over approximately ten contiguous quarter sections of land (see Figure 1-2). The plant site is located approximately at: 51° 22’ 15.453” latitude and 103° 59” 57.005” longitude, subject to final siting and design.

The Project location is proximal to several buildings, including residences for MFN as well as the Town of Lestock. The use and occupancy of these buildings (i.e., permanent residents, commercial, seasonal use, abandoned, etc.) will be verified during the engagement process and included in the Environmental Impact Statement (EIS). Standard avoidance and other mitigation measures will be used to ensure that any Project-related developments incorporate appropriate setbacks from buildings or land use associated with population settlements.

1.5 Project Need and Benefits

The purpose of the Project is to develop the potash resource that underlies MFN lands, thereby generating a return on investments for the shareholders of FPV (MRL, MFN and Encanto) and creating economic and social benefits particularly for the Muskowekwan people, but also the surrounding community, Saskatchewan and Canada. The Project will help to meet the growing global demand for potash. Potash is a key source of the nutrient potassium and, along with nitrogen and phosphate, a major ingredient in commercial fertilizers that increase crop yields. Potassium activates plant enzymes (ensuring the plant uses water efficiently), assists in nutrient transfer, improves water retention, and enhances a

plant's disease resistance. Approximately 95% of potash produced globally is used for agricultural fertilizer.

The global demand for potash and fertilizer has risen in response to increased global population, increased grain consumption, a decrease in the availability of arable land, and a need for higher crop yields to keep up with the growing demand for food. The demand for potash is expected to continue to increase. Since there is no known substitute for potash, it is and will remain a valuable commodity.

Economic extraction of potash is limited to only 12 countries; consequently, most countries have to rely on imports to meet demand. Potash is imported by more than 100 countries worldwide. The largest importers of potash are China, India, and Brazil. Canada is the world's largest producer of potash, with Saskatchewan producing 90% of Canada's total output and approximately 50% of the world's supply.

The Project will deliver significant economic benefits to MFN. As the owner of the mineral rights, MFN will earn royalty revenue annually for the minimum 50-year operational life of the Project. At current potash prices, this royalty revenue would be about $80 million per year. Also, MFN, through MRL, is a major shareholder in the Project, and will earn a share of Project profits through this equity interest. These royalties and revenues will enable MFN to invest in services, infrastructure, and other initiatives for the benefit of its members for generations to come. The MFN is consulting with other members of the Touchwood Agency Tribal Council (TATC) regarding the extension of similar benefits to those members. The PEA estimated over 1,000 jobs will be created during construction and between 300 and 500 full-time jobs will be created during operation. The PEA also estimated capital costs of the Project to be about $3 billion. Although these numbers will be refined during detailed engineering and design, they are indicative of the substantial economic benefits offered by the Project. These benefits and opportunities can be optimized and enhanced to support community services and infrastructure, employment, and business. FPV, by virtue of its partnership, is committed to and will work with the community and responsible agencies to maximize the benefits of the Project, and ensure that potentially adverse effects are managed.

Neighbouring First Nations, Métis, and other communities and stakeholders in Saskatchewan and Canada will also benefit from the economic and social opportunities created by the Project, and FPV is similarly committed to the optimization of Project benefits.

While the Project affords an opportunity for considerable benefit, it is important to note there is a great deal of competition in the potash mining sector globally. The window of opportunity to secure these Project benefits for the Muskowekwan people, other Aboriginal people, and for Saskatchewan and Canada overall, is very narrow due to a wide array of competing interests and proposals, in Canada and abroad.

MUSKOWEKWAN POTASH PROJECT

Proposed Facility Site, Muskowekwan First Nation Reserve, Pre-Reserve and Treaty Land Entitlement (TLE) Lands

Projection: UTM Zone 13 NAD 83
Acknowledgements: Original Drawing by Stantec.
Project Data: Novapro (2012128). TLE: NorthRim April 2012.
Basedata: Geosask, Canvec 10.

- Proposed Facility Site

Land Status

- Indian Reserve
- TLE Land - Muskowekwan
- Pre-reserve Land - Muskowekwan
- TLE Land - Other
- Major Road
- Minor Road
- Railway
- Contour (50m Interval)
- Contour (10m Interval)
- Watercourse
- Waterbody
- Urban Municipality

0 1.5 3 4.5

Kilometres - 1:120,000

113253770-067 REVG

PREPARED FOR

FP

AB SK MB
Saskatoon
Regina
Area of Interest
USA

PREPARED BY

Stantec

FIGURE NO.

1-2

Last Modified: Nov 29, 2012 By: aolson

FPV has assembled a world-class team of professionals to work with and support the realization of this Project, and will leverage the considerable experience and technical capacity of the Province of Saskatchewan to effectively manage potential Project effects throughout the life of the Project. Potential issues related to potash mine development are well understood and managed by the Province through a suite of established Best Management Practices (BMPs) and a robust regulatory framework. SK Ministry of Environment (MOE) uses a life-of-project approach to manage potash projects by imposing regulatory condition (e.g., Code-based environmental requirements and the *Mineral Industry Environmental Protection Regulations, 1996* (Government of Saskatchewan 1996) following the EA phase of review. As explained further below, Saskatchewan's robust regulatory framework will apply to Project operation, even on federal lands.

FPV is an informed proponent, committed to life-of-Project environmental management as described in Section 2.2. Importantly, FPV is a uniquely formulated joint-venture company, in which the local First Nation, as the surface and mineral rights holder, has a direct interest and stake in optimizing Project benefits, managing potentially adverse environmental effects, and achieving self-sufficiency and sustainable development.

1.6 Regulatory Framework

The Project constitutes a "designated project" for the purposes of CEAA 2012, as it involves the:

- construction and operation of a potash mine with a potassium chloride (KCl) production capacity of more than 1,000,000 tonnes per year (per article 15(e) of the Schedule to the *Regulations Designating Physical Activities* (SOR/2012-147)); and
- short-term use of over 200,000 m3/year of groundwater (per article 8 of the Schedule to the *Regulations Designating Physical Activities* (SOR/2012-147)).

Thus, the Project is subject to a screening by the Canadian Environmental Assessment Agency (the CEA Agency or the Agency) under requirements of Section 10 of CEAA 2012, to determine if an EA is required. FPV anticipates, given the nature and scale of the Project and the potential for adverse environmental effects, that an EA will be required.

The Project will constitute a "development" for the purposes of SKEAA, as that term is defined in that Act. In particular, the mineral rights underlying certain pre-reserve lands on which the Project will be located are still held by the Province, although these will eventually be transferred to the federal Crown in trust for MFN, through the TLE process. Also, the Project will use water sourced from water bodies under provincial jurisdiction, although the water supply infrastructure will be undertaken by a third party and is not part of the Project proposed by FPV. The Project is expected to require a provincial EA pursuant to the SKEAA.

As the Project will likely be subject to both a federal and provincial EA, it is anticipated that Canada and Saskatchewan will coordinate and cooperate in the exercise of their respective powers and performance of their respective duties to ensure that in effect, a single EA of the Project is conducted in a timely, efficient, yet fully defensible manner.

1.6.1 Federal Legislative and Regulatory Requirements

The Project will be subject to federal legislative and regulatory requirements, including several permits, licenses and authorizations. Project planning is at the early stages and consequently it is difficult to determine precisely the permits, licenses and authorizations that may be required. Table 1-3 includes a list of federal legislation, regulatory requirements and permits, licenses and authorizations that may be applicable to the Project. This list of federal permits and approvals will be refined in the Environmental Impact Statement (EIS) as Project details are confirmed.

As noted in the table, Section 4 of the *Indian Mining Regulations* requires the proponent to comply with provincial laws and regulations pertaining to mining, even if the mining activity occurs on federal (reserve and TLE) lands. Moreover, if a regulation pursuant to FNCIDA is established, as requested by MFN, the regulation will specify those provincial laws and regulations, and particularly those sections of provincial laws and regulations that will apply to the Project on federal, reserve and TLE lands. It is anticipated the FNCIDA regulation will establish a robust and comprehensive regulatory framework for the life of the Project for activities occurring on both federal and provincial lands (essentially mirroring the suite of provincial regulations that Saskatchewan employs to regulate potash mines on provincial Crown lands), and in particular will enable the respective regulators, notably the Agency and MOE, to confidently establish conditions for follow-up programs, including mitigation and monitoring.

Table 1-3 Federal Legislative and Regulatory Requirements

Act	Regulation	Relevance to Project
Fisheries Act	Not applicable	The Project may require an authorization from Fisheries and Oceans Canada (DFO) pursuant to Section 35(2) of the *Fisheries Act*, if any part of the Project results in a harmful alteration, disruption, or destruction of fish habitat. However, field studies and available information indicated that no fish bearing water bodies are expected to be affected by the Project. Further amendments to the *Fisheries Act* are anticipated to be made pursuant to the Jobs, Growth and Long-term Prosperity Act. After such amendments come into effect, it is expected the Project may require an authorization from DFO if any part of the Project results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support it. However, as above, no fisheries or fish supporting fisheries are expected to be affected by the Project.
Species at Risk Act, S.C. 2002, c. 29	Applicable	Several federally listed species at risk may occur in the Project area. However, information review and field surveys to date indicate that no critical habitat for these species is expected to be affected by the Project. Consultation with Environment Canada regarding federally listed species at risk has already been initiated.

Table 1-3 Federal Legislative and Regulatory Requirements (cont'd)

Act	Regulation	Relevance to Project
Migratory Birds Convention Act, S.C., 1994, c. 22	Migratory Bird Regulations, C.R.C., c. 1035	The Project will interact with migratory birds and the EIS will describe appropriate mitigation to avoid potential significant residual adverse environmental effects.
Canada Transportation Act (CTA)		Under Section 98(2) of the CTA, the Canadian Transportation Agency may, on application by the railway company (or, in this case the proponent), grant an approval if it considers that the location of the railway line is reasonable, taking into consideration requirements for railway operations and services and the interests of the localities that will be affected by the right-of-way (ROW).
Canadian Environmental Assessment Act, 2012		The Project is a "designated project" and requires a screening under Sections 8 to 12. The Agency may require an EA under Sections 22 to 27. It is anticipated due to the nature and scale of the Project an EA will be required.
First Nations Commercial and Industrial Development Act (FNCIDA)		The MFN has requested the Minister of Aboriginal Affairs and Northern Development Canada (AANDC) to recommend to the Governor in Council the negotiation of an agreement and establishment of a regulation pursuant to FNCIDA
Canadian Emission Reduction Incentives Agency Act, S.C., 2005, c. 30		Applicability to be determined in EA
Canadian Environmental Protection Act, 1999, Canadian Environmental Protection Act, 1999, C-15.1	Environmental Emergency Regulations, *Environmental Emergency Regulations.* SOR/2003-307	Applicability to be determined in EA
Canadian Environmental Protection Act, 1999, C-15.1	Federal Above Ground Storage Tank Technical Guidelines, P.C. 1996-1233	Applicability to be determined in EA
Canadian Environmental Protection Act, 1999, C-15.1	Federal Halocarbon Regulations, 2003 SOR/2003-289	Applicability to be determined in EA
Canadian Environmental Protection Act, 1999, C-15.1	Federal Underground Storage Tank Guidelines	Applicability to be determined in EA
Canadian Environmental Protection Act, 1999, C-15.1	Inter-provincial Movement and Hazardous Waste Regulations, SOR/2002-301	Applicability to be determined in EA
Canadian Environmental Protection Act, 1999, C-15.1	National Pollutant Release Inventory and Municipal Wastewater Services May 2003	Applicability to be determined in EA
Canadian Environmental Protection Act, 1999, C-15.1	Ozone-depleting Substances Regulations, 1998 SOR/99-7	Applicability to be determined in EA

Table 1-3 Federal Legislative and Regulatory Requirements (cont'd)

Act	Regulation	Relevance to Project
Canadian Water Act, R.S.C., 1985, c. C-11	Guidelines for Canadian Drinking Water Quality	Relevant to the establishment of the potable water supply and the assessment of environmental effects on water resources
Indian Act	Indian Mining Regulations C.R.C., c.956 (IMR)	Mining activity on federal reserve lands is subject to these regulations. In particular, Section 4 of the IMR requires the proponent to comply with provincial legislation and regulations pertaining to mining
Indian Act	Indian Reserve Traffic Regulations C.R.C., c.959	Applicability to be determined in EA
Indian Act	Indian Reserve Waste Disposal Regulations C.R.C., c.960	Applicability to be determined in EA
Indian Act	Indian Timber Harvesting Regulations SOR/2002-109	License required to cut timber on First Nation lands
Indian Act	Indian Timber Regulations C.R.C., c.961	License required to cut timber on surrendered lands or with consent of the council of a band, on reserve lands
Indian Act	Property Assessment and Taxation (Railway Right-of-Way) Regulations SOR/2001-493	Applicability to be determined in EA
Indian Act	Indian Mining Regulations C.R.C., c.956 (IMR)	Exploration Permits for Home Reserve were issued under IMR
Indian Act		Exploration Permits for TLE lands were issued under the *Indian Act*

1.7 Document Approach and Organization

This document has been prepared to meet the legislative requirements of both a Project Description under CEAA 2012 and a Technical Proposal under the SKEAA. As such, this document considers and reflects the requirements of the *Prescribed Information for the Description of a Designated Project Regulations* (CEA Agency 2012a) and the Agency's *Guide to Preparing a Description of a Designated Project under the Canadian Environmental Assessment Act, 2012* (CEA Agency 2012b). FPV has also considered the *Draft Guidelines of the Agency for Preparation of an Environmental Impact Statement* (CEA Agency 2012c). This document also considers and reflects the guidance of the Ministry of Environment of Saskatchewan *Technical Proposal Guidelines, a Guide to Assessing Projects and Preparing Proposals under the Environmental Assessment Act* (MOE 2012a).

This document reflects the findings of several feasibility investigations that have already been undertaken by FPV. As the Project is still in an early stage of planning, some Project details have yet to be defined or require further study; therefore some aspects of the Project are described at a high level in this document. Further details will be presented in the EIS.

The description of baseline conditions, Project interactions, and potential effects and mitigation are organized by Valued Environmental Component (VEC) to facilitate later development of the federal EIS Guidelines and the provincial Terms of Reference (TOR). As required, draft TOR will be submitted by FPV shortly after submission of this document for review by the regulators.

This document is organized into the following sections.

- Section 1 provides a brief introduction to the Project, including an overview of the Project history, the Project proponent, the Project location, the needs and benefits of the Project, and a description of the regulatory framework applicable to the Project.
- Section 2 provides a detailed Project description, describing the mining technique, mine development plan, mining and processing methods, waste management, supporting infrastructure, human resource requirements, decommissioning plan, and Project schedule. Potential environmental design features and the proponent's overall approach to life-of-Project environmental management are also described.
- Section 3 describes engagement and consultation undertaken to date (including outcomes) and the planned approach to First Nations and Métis engagement, and public consultation that will be implemented during the EA by FPV.
- Section 4 presents the potential VECs to be considered for this Project, the rationale for including or excluding them, and a discussion of potential Project environmental, socio-cultural and economic effects and planned mitigation, if required for each. An overview of existing conditions for each VEC is provided. These discussions take into consideration FPV's commitment to implement environmental and other management strategies for the Project as a whole and for each potential VEC.
- Section 5 summarizes the references used in the document.

Each of these topics will be described in further detail in the TOR, EIS Guidelines, and/or EIS.

2 PROJECT DESCRIPTION

2.1 Introduction

This section provides a description of the proposed Project based on the information available at this early stage of Project planning. More detailed information will be provided in the EIS. This Project description describes the components and activities necessary to undertake the Project and has been developed with due consideration of the proponent's environmental management framework that will help to manage potential environmental effects at all Project stages. The Project description outlines the mineral resources available, Project alternatives, mining plan and product processing, tailings management, brine and water management, infrastructure, waste management, emergency responses, decommissioning, schedule, and environmental design features considered for the Project.

FPV is committed to a life-of-Project environmental management strategy that will not only manage the potentially adverse environmental effects with a view to continuous improvement, but also more importantly, strive to enhance and/or optimize the benefits of the Project. The environmental management framework is described below. Although FPV is a joint venture formed for this Project, the joint venture partners understand the need to implement measures to reduce likely environmental effects of the Project. FPV has retained the services of highly-skilled professional engineering and scientific companies to conduct its feasibility and EA studies. These firms and FPV executives collectively have global expertise in potash mining engineering and major project development.

2.2 Environmental Management Framework

FPV is committed to incorporating life-of-Project environmental management approaches and strategies, into Project planning and execution so that not only is the Project compliant with provincial and federal regulatory requirements, but benefits and positive effects are enhanced and optimized. In preparing this document, FPV has consulted extensively with both provincial and federal regulators to better understand the issues that are of most concern to them, as well as to understand requirements for the preparation of the EIS.

MFN, through their direct involvement as co-proponents of the Project, has raised their concerns which have been and will continue to be addressed in Project design. FPV has reviewed recent Technical Proposals, TOR, and EA submissions, which reflect the standard of technical information required for a potash mining project such as this. FPV has used this information, in conjunction with regulatory guidance, to develop a Project concept that uses environmental management tools that focus on the key issues.

This Project will use solution mining technologies that are proven and already in use in several parts of the world, including Saskatchewan. As a result, experience and knowledge developed in relation to past potash developments and will be used in the planning and pro-active management of the potential environmental effects of the Project. Stemming from the level of experience with potash in Saskatchewan, the Project has the benefit of not only previous reviews, but also a robust regulatory framework and knowledgeable staff who understand the key issues and effectively manage them. Further, the proponent's engineering and environmental consulting team has considerable experience and expertise in the design and management of this type of Project, including the type of environmental effects that are expected to arise. Incorporation of environmental management aspects into Project planning will occur in several ways, including in the design and selection of Project components and activities. While the Project will be located within a fragmented and agriculturally dominated landscape, FPV has made efforts to reduce and avoid potential and incrementally harmful effects on the remaining natural features, adopting and implementing a decision-making framework to avoid or mitigate potentially adverse environmental effects using site and route selection protocols and pre-disturbance assessments (PDAs) that consider environmental, social, cultural and economic constraints.

FPV has assembled a team of expert technical advisors that work in an interactive and inter-disciplinary manner to develop the Project description. They are experienced in mining and the management of potential environmental effects. The Project details have not been developed in isolation but use, even at this early stage of planning, continuous feedback and integration of engineering, environmental, First Nation, as well as other technical expertise. As a result, FPV has developed a sound Project description that brings together information, guidance, and expertise from a variety of sources, reflecting a good understanding of design and environmental issues, and a strong commitment to environmental protection and community engagement. Due to the Project occurring on MFN lands, no provincial or municipal zoning restrictions exist; however, use of lands for their various purposes is directed by MFN administration and may include votes to direct the appropriate use of lands.

By integrating this environmental management framework into the Project description several potential environmental effects can be avoided or appropriately managed prior to Project execution. FPV is confident in its understanding of and ability to manage potential environmental effects of the Project using a suite of proven effective environmental management tools. Preliminary Project designs have considered two key potential environmental effects identified through consultation with regulators, namely the potential level of subsidence and potential issues associated with the tailings management area. Key environmental management tools that will be used to manage potential environmental effects are described below.

Figure 1-2 also depicts the proposed plant site location, which includes the processing plant, tailings management area (TMA), and crystallization ponds and which is collectively referred to as the facility site in subsequent discussions. In total, these features cover approximately ten contiguous quarter sections.

2.2.1 Integration of Environmental Design Mitigation

Many potential environmental effects related to a solution potash mine are well understood and, as a result, several design features have been and will be (pending further data collection) integrated into the Project description that avoid or reduce such environmental effects. These are described throughout the Project description.

In advance of the preliminary Project design, FPV completed a constraints analysis focusing on species of management concern (SOMC) (i.e., those listed pursuant to the federal *Species at Risk Act*, provincial *Wildlife Act*, and by the provincial Saskatchewan Conservation Data Center) to determine the likelihood of their occurrence and to assist with the preliminary siting and planning of facilities.

Other integrated mitigation design measures include, but are not limited to:

- selection of solution mining (vs. conventional mining) to significantly reduce surface disturbance;
- careful siting of the main processing facilities to avoid specific landscape and cultural features; informed by FPV's constraints analysis of the Project area and direct consultation with Muskowekwan Elders;
- regional hydrogeological factors and careful siting of the TMA facilities to mitigate against contaminant migration to underground aquifers;
- uses of best processing technologies to gain efficiencies and re-use waste streams; and
- developing contingency plans or alternatives to address upset conditions.

Section 2.11 provides a more extensive listing and description of environmental design factors integrated into the Project.

2.2.2 Environmental Management Procedures

FPV will establish environmental management procedures to address and manage environmental risks associated with specific aspects of the Project. These may include providing direction on appropriate procurement procedures used during Project execution. FPV is committed to implementing an Environmental Management System equivalent to ISO 14001 within one year of the commencement of operation. During the construction phase, the environmental management framework will include a full suite of tools including Environmental Protection Plans (EPP) (described below), Contingency and Emergency Prevention and Response Plans, Community Engagement Plans, Follow-up and Monitoring Plans, and Environmental Compliance Monitoring, including an environmental audit function to facilitate input for continuous improvement.

2.2.3 Environmental Protection Planning

Building on past solution mining best practices, environmental effects that are well understood and that will be addressed using proven mitigation will be incorporated into an EPP that will form part of the Project execution documentation that the contractor will be contractually obliged to follow and implement during construction. The EPP will also include mapping of resource sensitivities for facilities, pipelines and well pads to identify sites that may require mitigation.

A key component of the EPP will be a series of steps through which environmental factors will be incorporated into the final siting of facilities as the build-out of the well pads occurs. Specifically, PDAs will be used in advance of the final siting and routing of facilities to address potential site-specific issues. Constraints mapping studies have already been completed, the results of which have informed Project design and the approach to the EA. Site selection criteria and procedures will be developed to guide the placement of the well pads and associated roads and pipelines during phased well field development over the life of the Project. In doing so, adjustments will be made to facility locations using the results of PDAs and baseline data to build on the environmental design strategies that have already been integrated into the design of project components. The EPP will be an important reference document for all parties involved in construction, including FPV environmental inspection team, and regulatory authorities.

2.2.4 Additional Studies

FPV is undertaking several studies in support of the Project to determine feasibility and issues related to environmental and cultural resources. Field work and analyses have been undertaken and reporting is in preparation. These include:

- soil field surveys;
- vegetation field surveys, including rare plant species and communities;
- wildlife field surveys focusing on SOMC;
- aquatic resources field surveys;
- atmospheric (air quality and noise) field surveys;
- subsidence study; and
- TMA feasibility study.

These studies are further discussed in the description of VECs (see Sections 4.2 to 4.11). In addition, Traditional Land Use (TLU) studies have been undertaken by others. The results of any such studies have been and will continue to be used to inform the Project design.

As the Project design progresses, additional studies (e.g., engineering, environmental, cultural, etc.) will be undertaken to help understand potential environmental effects and to develop appropriate mitigation strategies where necessary. In doing so, issues requiring more (or less) focus can be appropriately scoped in the TOR and ultimately the EIS. As well, this additional information allows for the development of mitigation plans and modifications to the Project design, which can further reduce potential effects.

2.2.5 Environmental Monitoring and Follow-up Program

FPV is committed to develop and implement a monitoring and follow-up program and to establish protocols to validate environmental effects predictions, evaluate the effectiveness of mitigation, and determine whether modifications to the EPP are required, incorporating an adaptive management approach to continuous improvement. FPV will use environmental inspectors during construction and operation to ensure compliance with the EPP and approval conditions.

2.2.6 Emergency Prevention and Response Plan

An Emergency Prevention and Response Plan will be developed and implemented for the Project site to address potential emergencies such as injury, fire, or spills. This plan will focus on training staff to prevent accidents and malfunctions, and to respond effectively to any emergencies that arise.

Appropriate spill response materials (e.g., absorbent pads, booms, etc.) and equipment will be located on-site at strategic locations. Plant personnel will be trained on how to implement spill response procedures. Periodic simulations of plant evacuation due to hazardous material spills will be performed as part of the plant's Emergency Prevention and Response Plan.

2.2.7 Tailings Management Plan

A tailings management plan will be developed and implemented for the Project. The siting of the TMA has already considered a review of potential sites and the suitability of the proposed area for the purpose of tailings management. The tailings management plan will integrate the environmental design mitigation which include locating the TMA in an appropriate substrate that will limit brine migration. The tailings management plan will ensure that all applicable legislation and standards are adhered to.

2.2.8 Waste Management Plan

A Waste Management Plan will be developed and implemented for the Project. The plan will ensure that all applicable legislation and standards concerning waste management, storage, and disposal are adhered to.

The Waste Management Plan will form a component of FPV's overall environmental management framework for designing and executing the Project (see Section 2.2). This plan will address the following key aspects:

- implementation of third-party waste disposal contracts with licensed service providers;
- recycling program; and
- hazardous material collection and storage facilities in compliance with the applicable regulatory requirements.

2.2.8.1 Domestic and Non-hazardous Industrial Waste

Domestic waste (e.g., food waste) and non-hazardous industrial waste (e.g., plastics, metal, wood) will be collected and disposed of at approved off-site disposal facilities. A recycling program will be implemented for the on-site collection and sorting of recyclable materials, and subsequent removal to an off-site recycling facility. A third-party contract with an accredited service provider will be necessary to manage the disposal of these types of waste.

Sanitary sewer waste will be collected separately from the industrial waste produced by the plant and any of its permanent facilities before being discharged into an on-site sanitary wastewater treatment unit and then back into the process.

2.2.8.2 Hazardous Industrial Waste

Hazardous industrial waste generated at the Project site (e.g., petroleum, hydrocarbons, reagents, chemicals, oil, solvents, etc.) will be collected in designated containers and stored at dedicated locations that meet all applicable regulatory requirements. Workers will be properly trained on how to handle hazardous materials, as appropriate. Waste hazardous materials will be transported off-site and recycled or disposed of at appropriate facilities. Hazardous waste disposal will be managed by a third-party accredited service provider. Hazardous materials will be included in the Emergency Prevention and Response Plan (see Section 2.4).

2.2.9 Emissions, Discharges and Waste

The Project will result in solid, liquid, gaseous and/or hazardous wastes. The source, nature, point of emission/discharge, mitigation, and potential environmental effects of these are described in relation to the various Project elements in Sections 2.3 to 2.10 and in relation to the VECs in Section 4.

2.2.10 Decommissioning and Reclamation Plan

See Section 2.12.3 for a description of the decommissioning and reclamation plan.

2.3 Mineral Resource Review

The following description and figures of mineral formations and resources are summarized from the Technical Summary Report (North Rim et al. 2012).

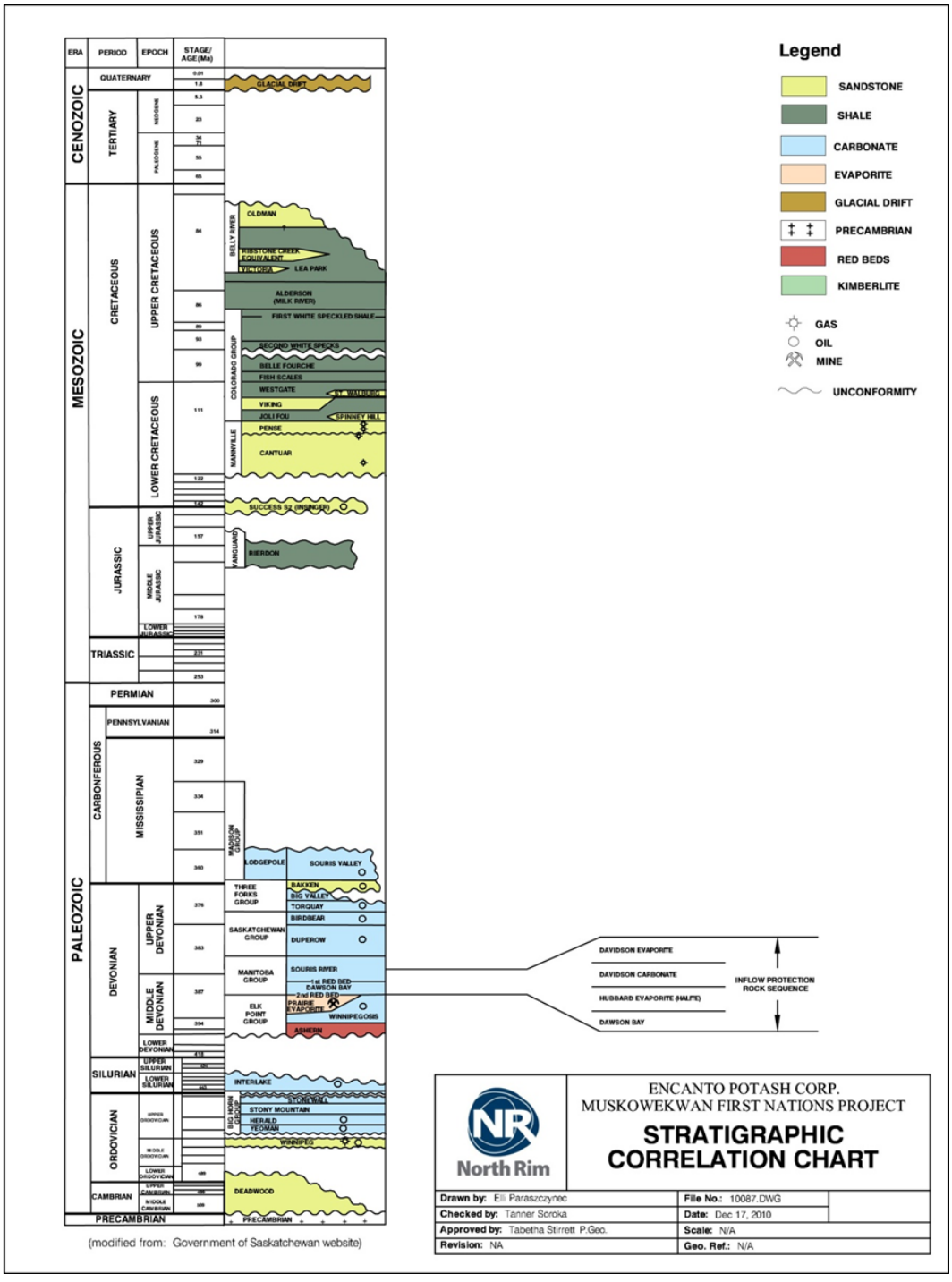
2.3.1 Mineral Formations

2.3.1.1 Local Geology and Potash-Bearing Members

The detailed stratigraphy of the Project area is summarized in Figure 2-1. The figure shows the local geological marker beds as identified by the geophysical well logs and drill cuttings taken from the 2009, 2010, and 2011 exploration programs.

The formation that hosts the potash in Saskatchewan, known as the "Prairie Evaporite", typically contains three significant potash-bearing beds. All three major potash-bearing members are present in the Project area and, in ascending stratigraphic order, are the Esterhazy, Belle Plaine, and Patience Lake Members. These Members occur as discrete strata and comprise halite, sylvite, and carnallite of variable mineral proportions and crystal size. Between each Member are sequences of bedded salts, comprising predominantly halite and clay. A thin, distinct package of bedded clay, halite, and sylvinite, termed the Whitebear Marker Bed, is absent in the Project area, but is normally situated between the Esterhazy and Belle Plaine Members.

Figure 2-2 provides a detailed correlation of the Prairie Evaporite Formation lithology with geophysical wireline log signatures from Encanto's Lestock well 15-16-027-15-W2. The Member tops were identified using the core, gamma ray, neutron porosity, and density porosity wireline log signatures. The tops as depicted in Figure 2-2 are consistent lithology picks throughout the Project area.



NOTE: Test holes did not penetrate geological bodies underlying the Prairie Evaporite Formation.

Figure 2-1 Interpreted stratigraphic column of the Phanerozoic cover in the Lestock area

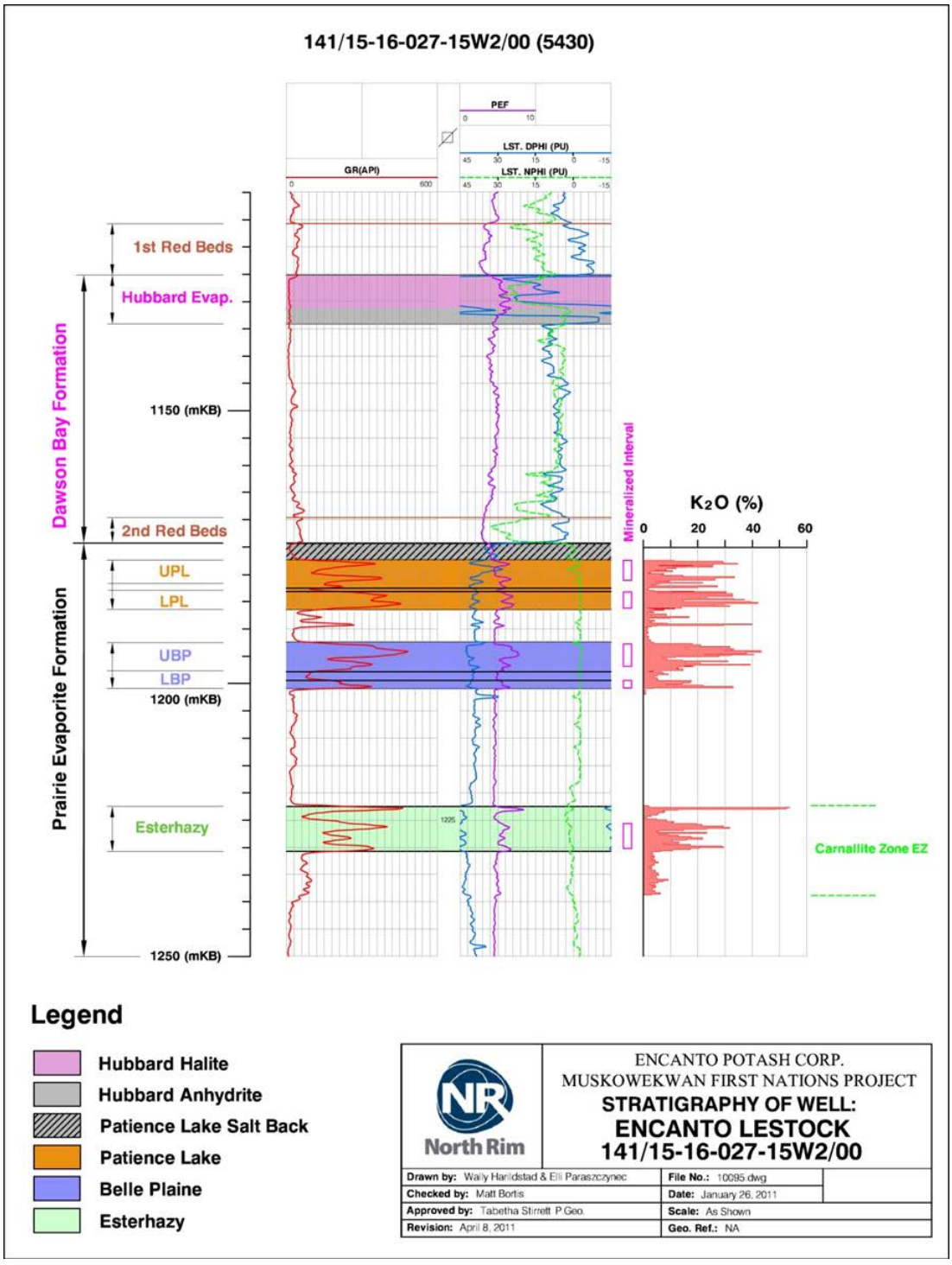


Figure 2-2 Correlation of the Prairie Evaporite Formation Lithology and Mineralogical Character with Gamma-Ray and Neutron Geophysical Wireline Log Signatures in Well 15-16-027-15-W2

2.3.2 Mineral Resource and Grade

The mineral resource is based on the assumption that the recovery of the potash will be by solution mining methods as they exist today. Measured, Indicated, and Inferred mineral resources have been estimated for these mineralized intervals (see Table 2-1 and Table 2-2).

Based on the solution mining methodology described in Hardy et al. (2010), the ”solution interval” is defined as the combined Patience Lake and Belle Plaine Members, with the barren halite interbed left un-mined. The mineable roof and floor contacts were based on a minimum potassium oxide (K_2O) grade of 10% with an average ‘mineable grade’ over the entire interval of at least 15% K_2O (Hardy et al. 2010). The Esterhazy Member was not included in the calculation as it has an average carnallite grade of 8.05% (2.75% magnesium chloride ($MgCl_2$)) and a K_2O grade lower than the economic threshold cutoff of 15%.

Cores from the two new wells drilled in 2011 are currently undergoing geo-mechanical and dissolution testing that requires the whole core to be analyzed. Consequently, the grades calculated for the updated resource presented in the Technical Summary Report (North Rim et al. 2012) are a combination of actual assays and gamma ray equivalent calculations. Resources for the new wells (02-30-27-14-W2 and 08-14-27-15-W2) are reported as Inferred Resources only until the actual assay samples are returned, anticipated sometime in the fall of 2012. Depending on the assay results, the Inferred Resources from the two 2011 wells may be moved to Indicated or Measured and a subsequent report will be filed with securities regulators as required. Based on these data, the potash reserves underlying MFN lands are sufficient to support a commercial solution mine producing about 2.8 Mtpa of KCl for at least 50 years.

Table 2-1 Average Thickness and Weighted-Average Mineralogical Parameters of the Potash Zone

Mineralogical Resource Parameters						
Member	**From** (m)	**To** (m)	**Solution Interval Thickness** (m)	**K_2O Grade Over Potash Zone** (%)	**Total Carnallite over Potash Zone** (%)	**Total Insolubles over Potash Zone** (%)
Patience Lake	1184.17	1192.36	8.19	18.33	0.50	9.51
Interbed Salt	1192.36	1197.66	5.30	4.01	0.62	5.45
Belle Plaine	1197.66	1204.92	7.26	17.88	0.55	3.66
NOTE: The Interbed Salt Member was not included in the Resource Calculation.						

Table 2-2 Solution Mining Measured, Indicated, and Inferred Resource Summary

Member	Weighted Average Thickness (m)	Weighted Average K_2O Grade (%)	Weighted Average KCl Grade (m)	In-Place Sylvinite Resource (MMT)	Net K_2O Tonnage (MMT)	Net KCl Tonnage (MMT)
Measured Resource Summary						
Patience Lake	7.10	19.31	30.57	127.76	8.21	13.00
Belle Plaine	8.05	18.20	28.80	144.82	8.77	13.88
Total Excluding Interbed	15.15			272.59	16.98	26.88
Weighted Average Excluding Interbed		18.72	29.63			
Indicated Resource Summary						
Patience Lake	6.91	19.45	30.79	484.81	31.38	49.67
Belle Plaine	8.04	18.21	28.82	564.52	34.20	54.15
Total Excluding Interbed	14.95			1,049.32	65.58	103.82
Weighted Average Excluding Interbed		18.78	29.73			
Inferred Resource Summary						
Patience Lake	8.65	18.13	28.70	1,411.64	85.19	134.85
Belle Plaine	6.65	17.48	27.66	1,084.72	63.09	99.87
Total Excluding Interbed	15.30			2,496.37	148.28	234.72
Weighted Average Excluding Interbed		17.85	28.25			

NOTES:

[1] "Average K_2O Grade" and "Average KCl Grade" refer to the weighted averages.

[2] "In-Place Sylvinite Tonnage" refers to the total tonnage of sylvinite in the project area (volume of rock * density of sylvinite).

[3] "Net K_2O Resource" and "Net KCL Resource" refer to total estimated amount of extractable K_2O and KCl resource in the project area (volume of rock * density of sylvinite * grade * deductions).

- Deductions are based on 10% for unknown anomalies inside 3D seismic and 25% for unknown anomalies outside 3D seismic, a 41.6% extraction ratio, and 20% for plant losses.

[4] Assuming 640 acres (2589988.11 m^2) per section.

[5] Effective date of table is May 09, 2012 by North Rim et al. (2012).

The information stated above is based on the geological inputs only. The Technical Summary Report cautions that the economics and extraction of the potash in the Project area are presently being evaluated as part of the Pre-Feasibility Study.

2.4 Alternative Means to Carrying Out the Project

This section describes a preliminary consideration of the alternative means for carrying out the Project. As the feasibility study progresses, design optimization studies and the consideration of alternative means will be updated and reported in the EIS. Those that are not technically and/or economically feasible will not be considered.

2.4.1 Mining Methods

There are two commonly used methods available to recover underground potash deposits: conventional mining and solution mining. Conventional mining refers to the construction of tunnels and shafts in order to reach the ore deposit, using mechanical equipment and workers underground to extract and handle the ore in solid form. Solution mining refers to the use of a solvent (water in this case) to dissolve the underground ore and recover it in liquid form. This method requires wells and pipelines to inject the solvent and recover and convey the dissolved ore to the processing plant.

The PEA compared these two methods in detail. The advantages and disadvantages of each were analyzed, including financial modeling of both methods. The PEA concluded solution mining is the preferred option for the proposed Project, based on the following reasons.

- Depth of the deposit: The deposit at the Project location is located at a depth that would require deep shafts using conventional mining techniques. This would be both costly and impractical.
- Hazards associated with underground mining: Shafts and underground operations can be hazardous and are subject to more frequent and severe work-related accidents.
- Increased productivity: Solution mining allows a higher rate of recovery of ore, through both primary and secondary mining, minimizing the loss of potash underground.
- Economics: Solution mining provides better economic results compared to conventional mining with respect to Internal Return of Rate, Capital Expenditure, and Operating Expenditure.
- Schedule: Solution mining has a shorter mine implementation/development timeframe than conventional mining.

2.4.2 Plant Location

The potential location of surface facilities, such as the processing plant, crystallization pond, and TMA, were mapped using available remote sensing imagery, review of existing data, literature, and records (e.g., for archaeological sites and species at risk), and site visits, existing environmental, cultural, and social constraints (Stantec 2012a). This information, together with geological data regarding potash distribution and quality, and local and traditional knowledge provided by MFN Elders, identified four potential locations for surface facilities. In addition to this, several other environmental management tools have been used during feasibility and planning stages to reduce or avoid potential environmental effects (see Section 2.2). One location was eliminated based on MFN input regarding potential effects on cultural values. The remaining three locations were evaluated (including site visits conducted by Stantec and

Novopro in April 2012) to determine the optimal location for the surface facilities. This included hydrogeological analysis to confirm the presence of subsurface impermeable barriers (i.e., aquifers) to protect against contaminant outflow.

The proposed plant location (see Figure 2-3, Figure 2-4 and Photo 3 in Section 4. 4.1) was chosen for the following reasons and reflects the interdisciplinary and proactive planning approach described in Section 2.2.

- From a technical perspective, the site is located on relatively flat topography underlain by favourable geological and geotechnical conditions that would inhibit the flow of contaminants (i.e., brine) to underground aquifers, and is the closest to the best potash resources.
- From an environmental perspective, the facility site is located on significantly disturbed (95%) cultivated lands and has minimal native vegetation with the presence of some wetlands. The wetlands that remain have already been affected by cultivation. Development at this site is expected to have few environmental issues due to the highly disturbed nature of the location (see Figure 4-1 in Section 4.3.1).
- From a cultural perspective, the site has limited archaeological potential for intact sites due to disturbance caused by cultivation. The site is also located away from known areas of cultural importance to MFN and neighboring First Nations.
- The site is located on TLE and pre-reserve lands which until recently were owned and cultivated by non-Aboriginal people which limited cultural uses of these lands by MFN members.
- From a social perspective, the site is located away from Lestock and the main settlement on the reserve, and has very few neighbouring residences (see Figure 2-3 and Figure 2-4).
- From a traditional land use perspective, MFN elders were engaged to give advice on traditional and cultural land use and incorporation of information from an MFN TLU study.

The other two potential sites were rejected because they have more constraints. One site was in close proximity to another First Nation community, and included intact native habitat, existing cultural uses, high archaeological potential, and limited access that would likely result in greater environmental, social, cultural, and/or economic effects. The second site was cultivated, but had more trees and wildlife habitat. It also was several kilometres from the proposed well development area and therefore much less cost effective for development.

2.4.3 Processing

Since solution mining will be used to recover the ore, the brine coming from the well will be processed to extract the potash. Based on the characteristics of the ore body and the cost of utilities, the main process unit of the plant will be the evaporation area, which evaporates water from the brine and effectively precipitates sodium chloride (NaCl) out of the solution. This can be achieved using different technologies:

- Multiple Effect Evaporation (MEE) uses energy from steam to evaporate water from the brine in a series of evaporators;
- Mechanical Vapour Recompression (MVR) uses mechanical energy from compressors to evaporate water from the brine in parallel evaporators; or
- A hybrid of these two technologies.

A natural gas cogeneration plant (see Section 2.4.5) will be built on site to supply both steam and electricity to the processing plant. The size of the plant will be determined through feasibility analyses. A hybrid process comprising both MEE and MVR technologies offers the best processing option when using cogeneration and is therefore proposed at this time.

Mechanical cooling of the brine versus natural cooling in a crystallization pond was evaluated to further optimize yield. The process of mechanical cooling would effectively eliminate the need for a crystallization pond, which is mostly functional during the winter months. However, after further analysis, mechanical cooling proved not to be cost-effective for this Project and brine cooling will be accomplished using a crystallization pond.

2.4.4 Raw Water Supply

Raw water is required throughout mine operation. Water will be conveyed to the Project fenceline via pipeline constructed and operated by SaskWater, from a source designated by the Watershed Security Agency of Saskatchewan (WSA).

The ideal water source from an economic standpoint would be Katepwa Lake due to its proximity to the mine site. However there are existing limitations that do not allow for its use at the moment. Two other water sources were considered. These are Last Mountain Lake (LML) and Buffalo Pound Lake (BPL). In May 2012, FPV submitted a request to the WSA for a water allocation to meet the water requirements of the Project. Since that time, the WSA has been evaluating water supply options for the Project, including potential water withdrawals from LML and BPL.

On June 17th, 2012, the WSA issued a draft model of the potential effects of withdrawing the water needed for the Project from LML. The model showed there would be an effect on the water level of LML and, during extended drought years, the effect of the withdrawal would bring the level of the lake below “acceptable” minimal values. Further, FPV notes there is a National Wildlife Area and significant bird sanctuary at the north end of LML. For these reasons, LML was eliminated as a potential water source for the Project.

MUSKOWEKWAN POTASH PROJECT

Proposed Facility Site, Preliminary Well Field and Rail Spur Detail Base

Projection: UTM Zone 13 NAD 83
Acknowledgements: Original Drawing by Stantec.
Project Data: Novopro (20121128). TLE: NorthRim April 2012.
Basedata: Geosask, Canvec 10. Hydro: 50K. Buildings: Stantec Nov 2012.

- Proposed Facility Site
- Proposed Mine Well Field
- Proposed Rail Spur

Land Status

- Indian Reserve
- TLE Land - Muskowekwan
- Pre-reserve Land - Muskowekwan
- TLE Land - Other
- Building Structure
- Major Road
- Minor Road
- Railway
- Watercourse
- Waterbody
- Urban Municipality

0 1 2 3

Kilometres - 1:70,000

113253770-078 REVB

PREPARED FOR

PREPARED BY

Stantec

AB SK MB
Saskatoon
Regina
Area of Interest
USA

FIGURE NO.

2-3

Last Modified Nov 29, 2012 By: adson

MUSKOWEKWAN POTASH PROJECT

Proposed Facility Site, Preliminary Well Field and Rail Spur Detail Photo

Projection: UTM Zone 13 NAD 83
Acknowledgements: Original Drawing by Stantec.
Project Data: Novapro (20121128). TLE: NorthRim April 2012.
Basedata: Geosask, Canvec 10, Hydro: 50K. Buildings: Stantec Nov 2012.
Imagery: ISC, 60cm 2009.

- Proposed Facility Site
- Proposed Mine Well Field
- Proposed Rail Spur
- Indian Reserve
- Building Structure
- Major Road
- Minor Road
- Railway
- Urban Municipality

0 1 2 3

Kilometres - 1:70,000

113253770-079 REVB

PREPARED FOR

PREPARED BY

Stantec

AB SK MB
Saskatoon
Regina
Area of Interest
USA

FIGURE NO.

2-4

Last Modified: Nov 29, 2012. By: adixon

The WSA subsequently evaluated the suitability of BPL as a potential water source for the Project. The WSA's initial findings (July 2012) confirmed the existing infrastructure conveying water from Lake Diefenbaker to BPL is inadequate to ensure sustained year-round water supply to meet future water demands, including those of the Project, on BPL.

However, the WSA is currently undertaking an engineering feasibility analysis to determine the best solution for increasing the conveyance capacity between the Qu'Appelle Dam on Lake Diefenbaker and BPL. This analysis is expected to be completed by the end of March 2013, and new infrastructure conveying adequate water to BPL be in place by about 2016 (J. Waggoner, pers. comm. July 6, 2012). Prior to this date, WSA feels that by optimizing their operating parameters it would be possible to supply water to the Project in the short term (within 1 year). These operating modifications may result in varying water level impacts to BPL until the permanent solution can be implemented. The permanent infrastructure would deliver sufficient water to BPL and the Qu'Appelle system to meet the needs of future projects, including the Project. FPV has submitted to WSA an application for a water right and is waiting for their feedback. Water supply for the Project will be secured with a Term Water Right issued by Saskatchewan. FPV is moving forward based on the assumption that modeling will demonstrate that there will not be a high level of effect to water levels of BPL. If the model results indicate that there may be a high level of effect, then FPV will address those issues in the EIS and in consultation with the regulator.

SaskWater has completed its review of FPV's Request for Service and has advised FPV by letter dated October 22, 2012 that SaskWater will now proceed with the preparation of the conceptual report for water conveyance. This report will be based on the water source being BPL as has been indicated by the WSA. The scope of the conceptual report includes:

- The determination of a potential pipeline route
- Appropriate sizing to accommodate flows
- Location of intake/pump station and booster station (if required)
- System modeling to determine optimal performance
- Capital and operating cost estimates
- Source water availability inquiry to the WSA on behalf of FPV

Due to the time it will take to bring the permanent water source on-line, FPV is considering the use of groundwater as a short-term (approximately 1 year) source for initial cavern development and will consult with MOE regarding this. It is expected that water requirements during the cavern development phase will be approximately 1,400 m^3/hour to 1,500 m^3/hour. During the first year of production water use is estimated at approximately 1500 m^3/hour. As the plant operation becomes more efficient production will increase up to the 2.8 Mtpa. At this time water use during operation is estimated to be1,400 m^3/hour. Several major aquifer units occur within the Project area. Should a surface water supply be ready at Project start-up, a temporary groundwater source for initial cavern development will not be required.

FPV is committed to undertaking the appropriate groundwater studies (i.e., to determine potential aquifer sources and capacity for an interim water supply) and to consult with MOE to confirm the feasibility of groundwater as a water source for the initial cavern development phase. A range of groundwater options are being examined, including the feasibility of using deeper, brackish groundwater sources for intitial cavern development. To complete groundwater investigations, FPV has retained MDH which has extensive groundwater modeling experience in the area and with potash projects.

Irrespective of the raw water source, the water will flow into a water retention pond on site. This pond will store approximately three days of raw water to ensure continual operation of the facility in case of a water supply interruption. Groundwater will be used as a partial backup to the long-term source described above in the event of pump or other failure in the main system. For example, if one pump failed and the system could not provide the required amount of water, the remaining water could temporarily come from groundwater. Alternatively, cavern development may be suspended.

Groundwater will also be used for potable water using a local well that will provide water at a rate of 50 m^3/day.

2.4.5 Power Options

The electrical power requirement for the Project is estimated to be approximately 100 MVA. The solution mining process also requires steam. The power and steam requirements of the Project could be met by using electricity supplied from SaskPower and natural gas from TransGas to fire boilers to make steam. Alternatively, the power and steam requirements of the process could be met by using a combined heat and power generation solution (i.e., cogeneration).

Factors that were and are being considered in the evaluation of the power supply are:

- distance to accessible high voltage (138 kV or 230 kV) lines;
- reliability of the power source;
- length of time to obtain power;
- potential environmental effects;
- operational costs; and
- technical requirements of the evaporation process.

At this time, a cogeneration plant is proposed to meet the power and steam requirements of the Project; this will be confirmed during the feasibility study. This option is preferred due to its better economics, faster time to implementation, ability to facilitate the preferred processing option, and reduced carbon footprint. In the case of a total failure of the cogeneration plant, critical safety and life support equipment would be supplied from a standby diesel emergency generator.

2.4.6 Railway

Trains will be used to transport all potash from the site. Trains will be approximately 170 cars long. The plant will receive one empty train set and send one full train set approximately every 2.4 days. There are two railway lines accessible to the Project. These are:

- the CN Rail main line, located about 5 km south of the facility site; and
- the Canadian Pacific Railway (CP) side rail at Cupar, located about 50 km from the site.

Given the proximity of the CN main line, this option is preferred for technical, economic, and environmental reasons. Initial discussions have taken place with CN to have the Project spur line tie into CN's main line. It is anticipated that FPV will contract out the construction and operation of the rail spur line.

A preliminary railway spur location is shown in Figure 2-3 and Figure 2-4. The final location of the railway spur and on-site loop will be finalized at a later stage of the Project using the following guiding principles:

- locate on MFN lands;
- road crossings will be minimized;
- water body crossings will be minimized;
- effects on local residences will be minimized; and
- the use of existing rights-of-way will be encouraged.

As well, the railway spur line will integrate environmental management factors into its design and siting to help reduce or avoid potential effects. This includes use of PDAs and site-specific mitigation to address land use, cultural, social, and environmental issues as much as feasible.

2.4.7 Well Field Pipelines

There are several pipes that must run between the process plant and the well field. These may be routed above the surface or buried underground.

Above-ground pipes offer easy accessibility for leak detection or change-out, but can be very disruptive to local activities and to wildlife. Also, during winter, above-ground pipelines can be very sensitive to cold temperatures and have an increased risk of failure due to freezing.

The installation of underground pipelines requires initial surface disturbance, but the ROW associated with each pipeline would be reclaimed once the pipes are buried. Burying the pipelines will minimize the need to insulate them and farming and other activities could continue on the surface.

For these reasons, it has been determined that underground pipelines are the best option for this Project.

Locating pipelines will be driven by the well locations and optimal configuration for conveyance of product. Several guiding principles will be used to locate pipelines in an effort to balance transporting the product with resource protection. These may include but are not limited to:

- residence avoidance buffers
- avoiding wetlands where feasible;
- use of horizontal directional drilling techniques to minimize the number of drilling sites and reduce pipeline requirements to avoid sensitive features;
- making efforts to avoid habitat loss through routing at edges of intact habitats;
- completing PDAs to integrate final routing adjustments based on site-specific features; and
- using traditional land, cultural and resource use information, and conducting heritage resource impact assessments (HRIAs) where required when planning the well pad locations and access corridors.

2.5 Mining

2.5.1 Introduction

The Project will use a solution mining technique in which hot water or brine solution will be used to mine potash deposits from the Belle Plaine and Patience Lake Members of the Prairie Evaporite Formation. Solution mining is the method by which potash is extracted from underground deposits by using wells and circulating fluids instead of shafts and conventional underground mining. Drilling wells down to the deposit and dissolving the ore is a proven technology. There are currently two operating potash mines in Saskatchewan that use the solution mining technique: Mosaic Belle Plaine Mine near Moose Jaw, Saskatchewan and the PotashCorp Patience Lake Mine, near Saskatoon, Saskatchewan. The technology for solution mining is well understood and the management of potential environmental effects well developed. The Project's minimum lifespan is estimated to be 50 years based on the availability and quality of the resource at the Project site as currently established, with an annual production of 2.8 million tonnes (Mt) of potash. The life of the mine is anticipated to be considerably longer and further study during feasibility will confirm the extent of the resource and the mine.

The Project will include a plant site (including all infrastructure required for potash processing), a TMA, and a mine well field (for potash extraction).

The solution mining caverns will be located throughout the well field (at a depth of approximately 1,200 m below ground) and a piping network will be routed from the plant through the well field to service the caverns. Each cavern will be serviced by two wells, drilled from a single well pad. The hot water or brine solution will be pumped into each mining cavern through an injection well, dissolving the KCl and NaCl deposits into a brine solution. The brine will be recovered through a production well and sent via the pipeline network to the processing plant, where the KCl and NaCl deposits will be recovered in crystalline form. Up to 20 caverns, each with two wells can be serviced from each well pad; this is referred to as a cluster.

The majority of the annual potash production (2 Mt) will be produced by primary mining. Primary mining is the non-selective mining of the ore by a hot leaching process that uses raw water as the solvent and creates brine from which potash is extracted. The primary mining lifetime of a cavern cluster will determine the rate of replacement with new clusters. It is assumed that three primary mining clusters can supply enough production brine for the processing plant. The primary clusters will switch to secondary mining approximately every three years. New clusters will be prepared to ensure primary mining on a continuous basis. On average, the well field will grow by one cluster per year.

Secondary mining is defined as selectively mining potash by a hot leaching process using NaCl-saturated brine. Secondary mining will produce an additional 800 kilotonnes (kt) per year. The lifetime of the secondary production phase of a cavern is dependent on the flow rate to that cavern. As the number of caverns in secondary mining increases, the flow rate to each cavern decreases, meaning that the lifespan of that cavern will increase. Therefore, the secondary mining process will last for several years, potentially decades, especially if the extraction is done in a non-continuous mode.

Processing of the brine will be accomplished at the processing plant and involves the following steps: evaporation and crystallization; product de-brining and drying; product screening, compaction, and crushing; secondary mining crystallization; and product storage and load-out. Processing will produce two products: KCl and NaCl. The KCl will be dried, screened, and stored prior to being shipped out by rail car. The NaCl will be sent to the above-ground TMA for storage.

The salt and brine tailings from the mining and processing phases will be sent hydraulically to the TMA. The TMA will consist of a salt tailings pile, brine pond, pipelines, containment ditches and dykes, and disposal wells.

During construction, temporary infrastructure, including a labour camp for up to 1,000 construction employees, will be assembled on-site. During operation, permanent buildings and facilities will include administrative buildings, processing facilities, maintenance shop, product storage and load-out buildings, fuel and hazardous substances storage, and other buildings. The temporary labour camp will be operated in accordance with provincial guidelines.

Power will likely be supplied by on-site cogeneration, as described above. Road access to the site will be provided by the existing provincial Highway 15 and Highway 639. As described previously, an on-site rail spur will be built to connect to an existing CN main rail line located south of the facility site.

Ancillary projects that are outside the scope of the Project include supporting utilities and infrastructure, including water, natural gas, and communications, that will be provided by third parties. Natural gas will be supplied by TransGas, via an upgraded pipeline extended to the Project fenceline. Communications will be provided by SaskTel. Water will be supplied to the site by SaskWater via a new pipeline, likely from BPL, as described in Section 2.4.4.

2.5.2 Mine Plan

The Project will include a plant site (including all infrastructure required for potash processing), a TMA, and a mine well field (for potash extraction). The core mine facilities (including the plant buildings, TMA, and crystallization pond) will have an approximate footprint of ten quarter sections (approximately 725 ha). The well field will consist of well pads, each supporting a cluster of underground solution mining injection and production wells. The wells will be directionally drilled from a centralized well pad. The wells will be approximately 1200 m in depth and approximately 80 m apart at the potash layer depth. Based on the annual production estimate, the extraction ratio and the available resources, the expected well field footprint can be estimated and is shown in Figure 2-3 and Figure 2-4.

2.5.2.1 Well and Pad Layout

Each well pad will be built of concrete and surrounded by gravel. The approximate dimensions of a well pad are expected to be 40 x 120 m, plus or minus 50%, depending on the number of wells and their arrangement. Depending on local conditions and geological constraints, a pad may be able to support up to 20 caverns. Each well pad will be a centralized point for a cluster of wells. There will be two well heads per cavern and up to 40 well heads per pad. The pads will have electricity supplied by the processing plant, communications capabilities, and road access. Power lines, pipelines, and access roads will share the same ROW to limit the amount of land disturbance.

The production wells will be directionally drilled from the central well pad to minimize the amount of disturbed land compared to the use of vertical wells drilled over each cavern. A conductor pipe will be installed to provide stable borehole conditions at the top of the well. A surface hole will be drilled down to approximately 10% of the entire well depth, equipped with a casing and cemented; this will seal the well to prevent any interaction of well fluids with groundwater in near-surface aquifers. Subsequently, a production hole will be drilled down to the bottom of the deepest target horizon, equipped with a casing string and cemented. Finally, a bottom hole will extend a few metres below the potash layer to accommodate the production tubing.

2.5.2.2 Well Field

Initial well field development will occur close to the processing plant, and will extend outward across the well development area as the mine is developed. The productive lifespan of the Project has been conservatively estimated at 50 years; however, in the event that caverns are still producing at acceptable levels, the mine may continue to operate beyond this timeframe, with well field development occurring across the entire well development area over time. Development of the resource may occur on any and all lands owned by MFN. Subsequent to additional resource investigations, a more definitive time-frame and well development plan for the project will be established and reflected in the EIS. All wells will be developed on MFN Reserve, TLE lands, or pre-reserve lands (see Figure 2-3 and Figure 2-4). The specific location of each well pad will be determined during the detailed design phase for initial well field development, with the specific location of later well pads informed by additional geological, technical, and environmental data obtained during mine development.

Several kilometers of main piping network will be routed from the plant through the well field to service the initial caverns to be developed. The pipeline corridor will follow the same ROW as the access roads leading to the well pads. The pipeline corridor will be approximately 10 m wide and will accommodate seven pipelines, each dedicated to a specific service, between 12 and 24 inches in diameter, and buried at a depth of 2.5 m (Table 2-3).

Table 2-3 Main Pipeline Header Details

Fluid	Function
Hot solvent	Primary mining
Cold solvent	Cavern development
NaCl saturated brine	Secondary Mining
Production brine	Directed to production storage tank
Secondary brine	Directed to the crystallization ponds
Disposal brine	Directed to the re-injection wells
Blanket oil	Control cavern development

The installation of underground pipelines will require initial surface disturbance, but the ROW and temporary work areas will be restored once the pipes are buried. Burying the pipelines will minimize the need to insulate them and farming and other activities will be able to continue on the surface. The pipelines will be standard carbon steel with a high-density polyethylene liner to resist high temperatures, high pressures, and chemical and physical abrasion. Pressure and flow rate measurements will be regularly taken along the pipelines as part of a leakage detection program.

The number of clusters and caverns per cluster that will be present in the initial well field is currently being determined. Regardless of the number, the main piping will be routed equidistant between the groups of caverns in order to optimize the piping requirements between the main pipeline header and the caverns, notwithstanding environmental and other constraints that will be avoided to reduce potential environmental effects.

To minimize the piping requirements, and centralize the cavern operations, each set of operating caverns will feature a valve station building located in proximity to each well pad. All valves and instrumentation associated with each well head will be located within such buildings and allow for the operations group to adjust flows rates, perform reverse flushing, or isolate caverns from one location. From the valve station building, two carbon steel lines will be routed to the inner and outer leach string connections of each well head, and one stainless steel oil line for the oil blanket will connect to each well head.

The initial well field planning is incorporating environmental management strategies as outlined in Section 2.2 with more specific and detailed protocols being developed to site the wells. Several guiding principles will be used to locate wells in an effort to optimize access to resource target areas while considering various resource features and constraints. These may include but are not limited to:

- not placing wells in permanent waterbodies;
- targeting disturbed lands as much as feasible;

- making efforts to avoid habitat loss through siting wells at edges of remnant native habitats;
- completing PDAs to integrate final routing adjustments based on site-specific features including plant and animal SOMC, high function wetlands, and archaeological sites; and
- using traditional land, cultural and resource use information, and conducting HRIAs where required when planning the well pad locations and access corridors.

2.5.3 Mining Methodology

The preferred mining method will use double-well caverns for brine production. This technique allows a layering of different brine concentrations with the extraction tubing and provides good thermal effectiveness in the well. The solution mining process will be initiated by drilling two wells, the bottom ends of which will be approximately 80 m apart. Once the initial drilling is complete, a solution mining cavern will pass through the following three stages: 1) cavern development (including sump leaching, connection leaching, and roof development); 2) primary mining; and 3) secondary mining. During cavern development, the cavern around each single well will be connected with the cavern around its well pair to form a larger cavern for mining. The shape of each double-well cavern area will comprise a rectangle of about 80 m x 150 m and two connected half circles with a radius of about 75 m (see Figure 2-5). The distance between adjacent caverns will be about 80 m. The final cavern footprint will be determined by ongoing geo-mechanical tests to prove cavern stability.

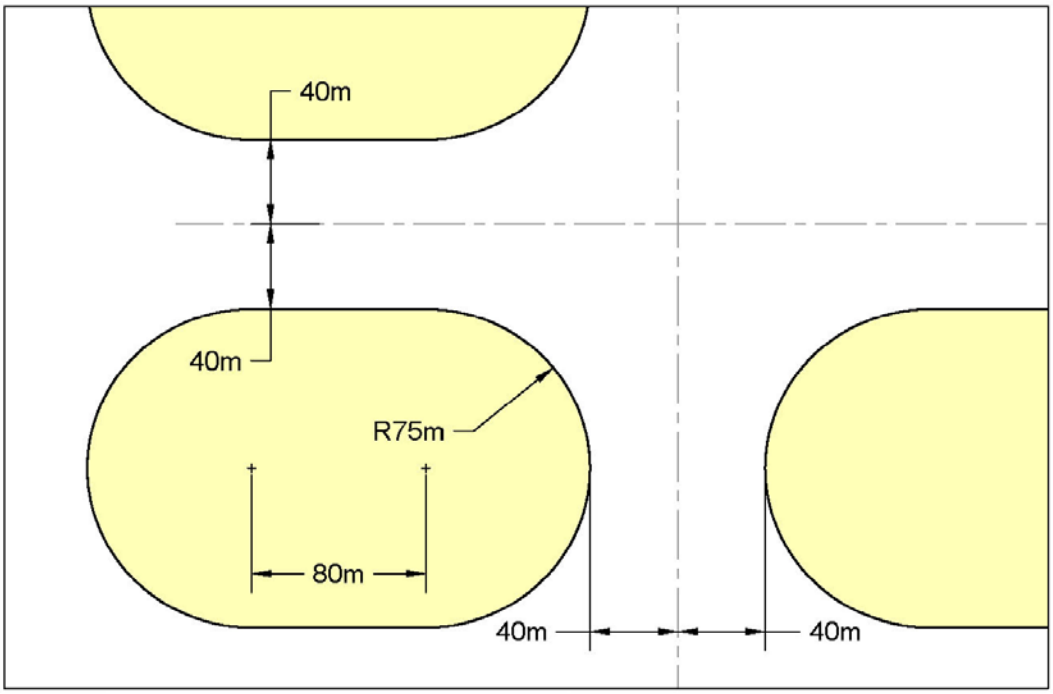


Figure 2-5 Cavern Footprint and General Cavern Arrangement

Primary mining will take place upward in horizontal layers, called mining cuts, based on the footprint developed during cavern development until the secondary mining phase begins. Secondary mining will last for several years and use the large surface exposed by primary mining.

The two potash-bearing layers that are favoured for mining due to their high potash concentrations are the Belle Plaine Member and the Patience Lake Member. The underlying Esterhazy Member usually contains carnallite in an unsuitably high amount, creating processing difficulties. There are areas within the Project's projected well field with a mineable Esterhazy Member and if the potash can be recovered economically it will be considered. For now, the Project has been developed considering the mining of only the Belle Plaine and Patience Lake Members.

2.5.3.1 Cavern Development

Cavern development will take place in a halite layer underlying the Belle Plaine potash-bearing member and can be subdivided into three different stages: sump leaching; connection leaching; and roof development.

The Belle Plaine Member is designated to be mined first, but in areas where the Esterhazy Member is suitable for mining, the sump leaching process will start in the halite layer underlying the Esterhazy Member.

During the sump leaching phase, water will be injected in the inner tubing string to dissolve a sump below the potash mineralized zone (beneath the water injection zone) and brine will be recovered through the annulus of the production casing and the inner tubing string. Due to the depth of water injection, the cavern fluid will be forced to mix and will provide a similar leaching capability to all exposed surfaces. The cavern roof will be protected by an oil blanket, injected together with the cold water; the oil will form a barrier between the water and the salt layer, forcing the development of the cavern laterally and minimizing the vertical growth of the cavern[1]. A cylindrical-shaped sump will be developed through this process, providing space to accommodate insoluble material created during the next mining stages (see Figure 2-6).

[1] Oil recovery and re-use will be described further below.

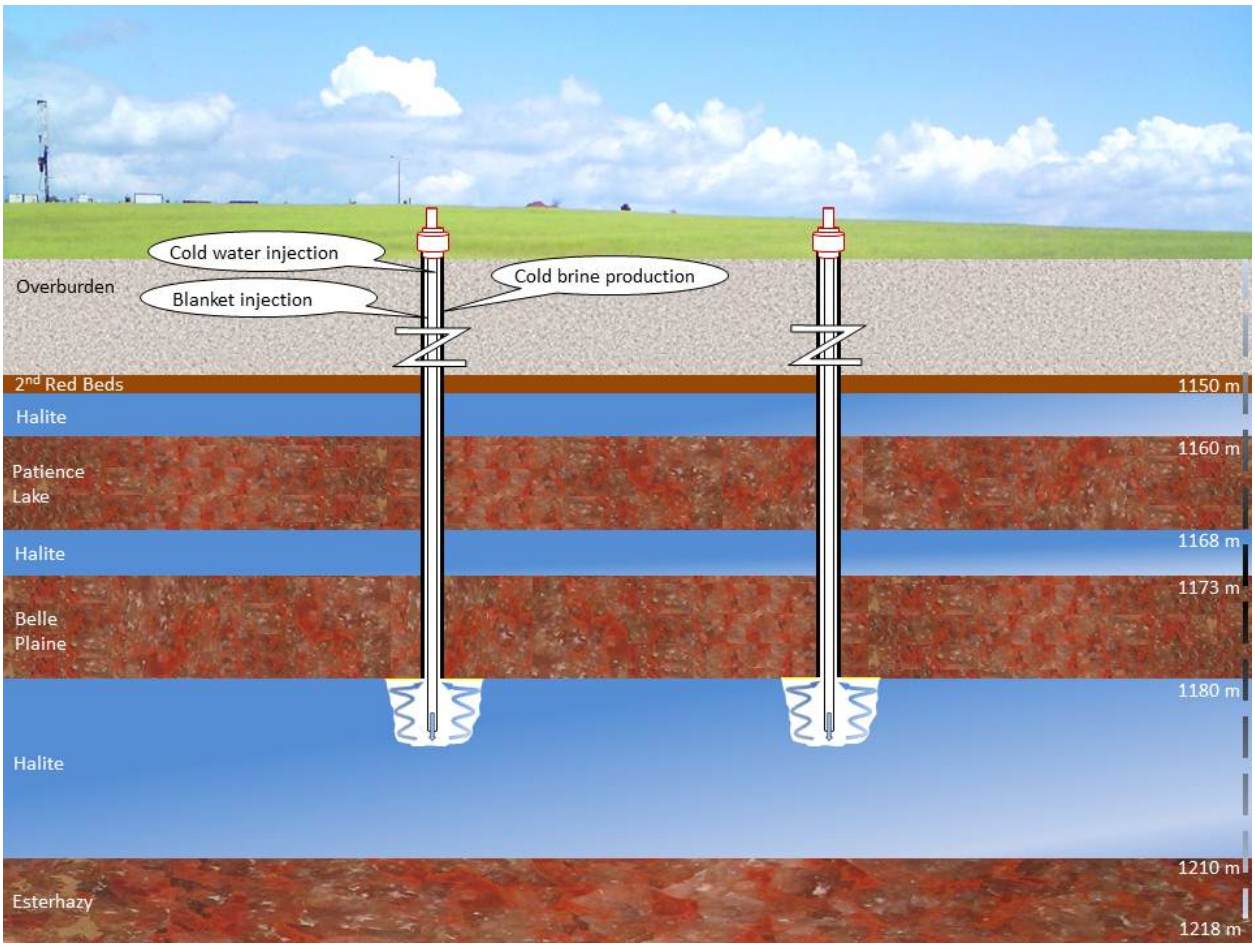


Figure 2-6 Sump Leaching of Single Well Caverns

During the connection leaching phase, the sump leaching process will continue but the injection will be reversed; that is, water will be sent through the annulus and brine will be lifted in the tubing. An oil blanket will continue to be injected regularly to protect the potash layers. The halite dissolution will take place at the top of the cavern causing it to spread outward in a cone-like shape. This process will continue until both caverns merge together to form a single cavern (see Figure 2-7).

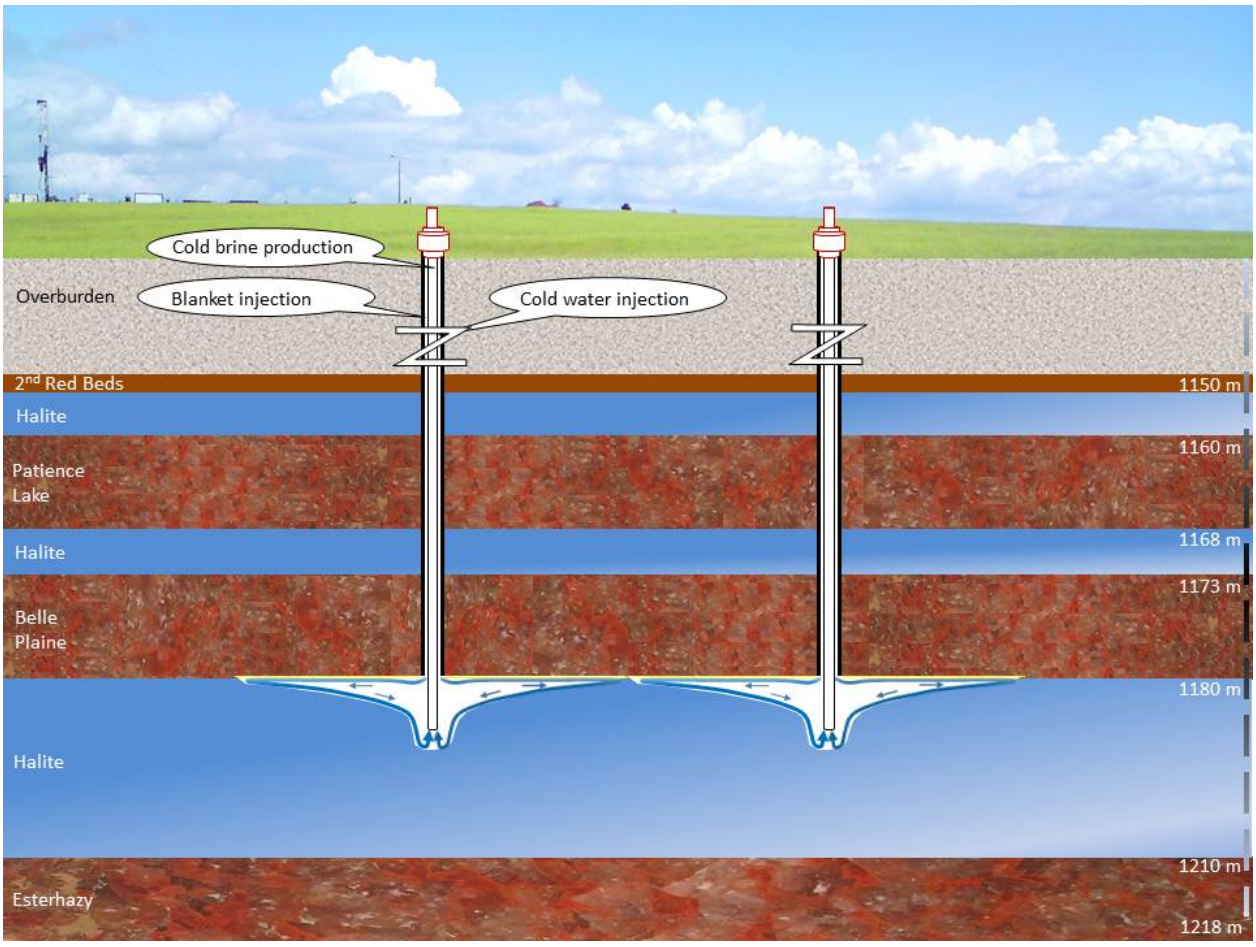


Figure 2-7 Connection Leaching of Single Well Caverns

The roof development phase is the final step in cavern development, and its goal is to provide a large dissolution surface for the subsequent primary mining phase. Both wells will be used in the roof development stage, with one well serving as an injection well and the other one as an extraction well. This arrangement will be switched regularly to provide a symmetric cavern roof. This process will continue until the full cavern footprint has been developed. Similar to the previous stages, the oil blanket will be injected during roof development to protect the potash layers (see Figure 2-8). The weak brine coming from cavern development will be treated in the processing facility to remove the oil. After treatment the brine will be sent to early brine disposal.

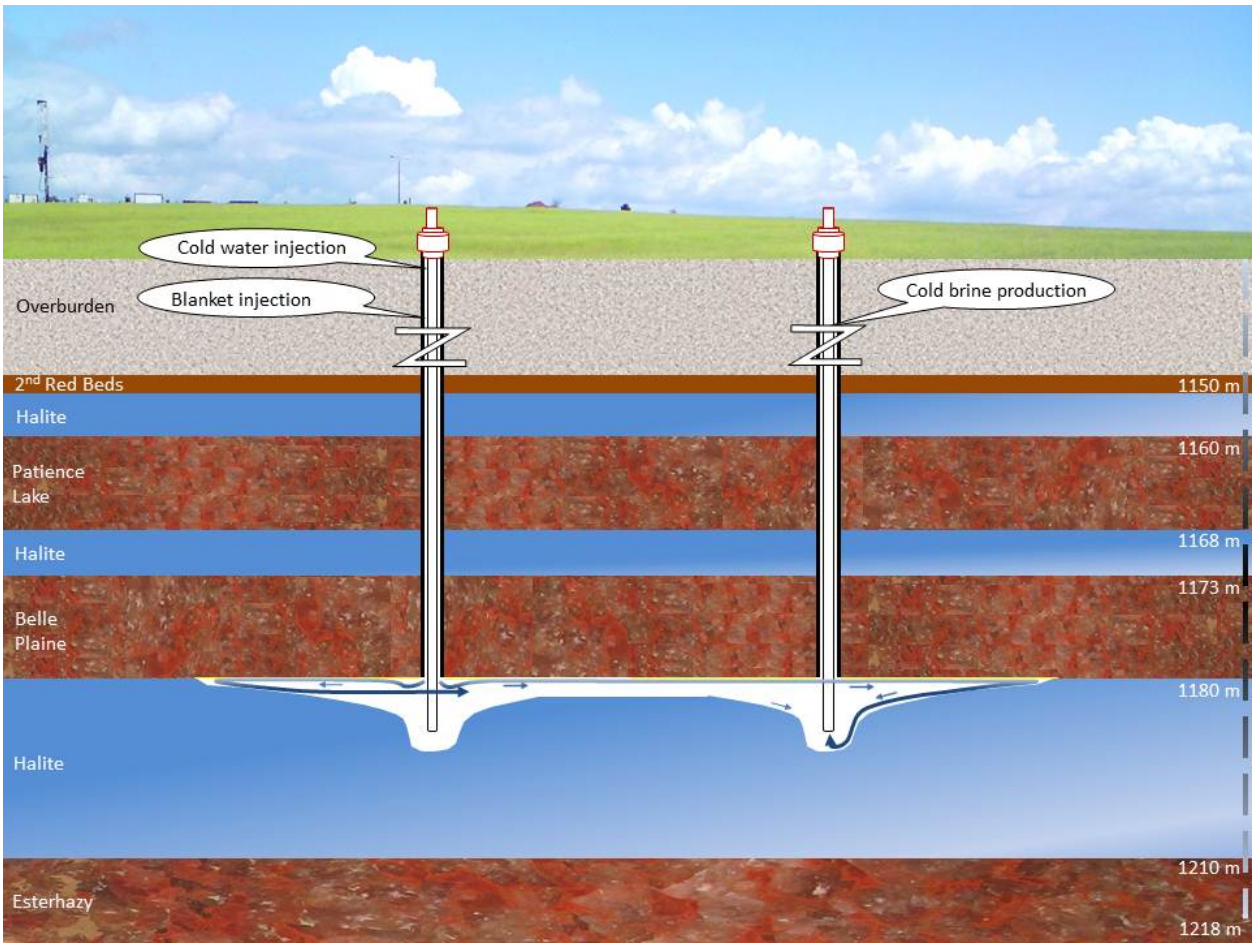


Figure 2-8 Roof Development Phase of the Connected Caverns, Development of a Double Well Cavern

2.5.4 Early Brine Disposal

The cavern development phase will produce approximately 400 m^3/h of cold NaCl brine per cluster, which is considered to be waste brine. The Winnipeg or Deadwood Formation, deep brackish aquifers below the potash horizons (approximately 1800 m deep), will be used for the disposal of the cavern development brine and all other saline waste brines from the well field and the processing plant, as it is well isolated from surface aquifers. Because of the ongoing process of cavern development and purge streams from the plant, a minimum of three disposal wells will be necessary to dispose of the expected volume of waste brine.

The disposal wells will be drilled near the plant site and constructed robustly for a long lifespan. No solid contents will be sent to the disposal wells.

2.5.4.1 Primary Mining

Primary mining is the non-selective solution mining of the potash ore, composed mainly of KCl (i.e., valuable sylvite mineral) and NaCl (i.e., halite salt). Potash will be progressively mined in horizontal 1-4 m cuts from bottom to top through the Belle Plaine Member.

After cavern development is complete and the injection well is perforated at the mining cut height, primary mining will begin. Hot water will be injected into one well, and it will accumulate at the cavern roof and leach the potash ore; that is, it will dissolve both KCl and NaCl. As the ore is dissolved, the brine will become denser and sink to the cavern bottom, displacing any remaining NaCl-enriched brine from cavern development. This will create a void at the top of the cavern and the KCl-enriched brine will be recovered through the production well and sent to the processing plant (see Figure 2-9).

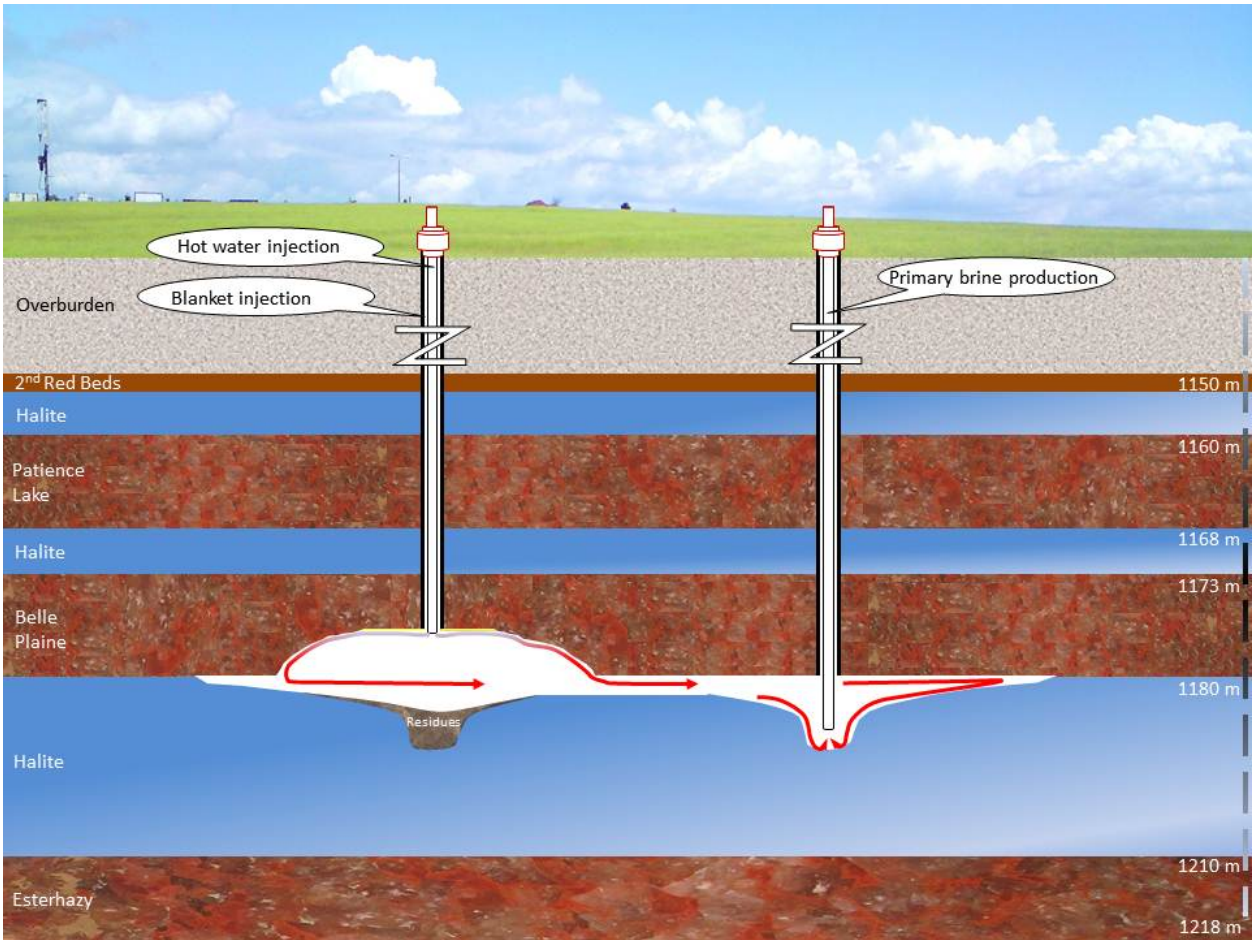


Figure 2-9 Primary Mining of the Belle Plaine Potash Member

This procedure will continue through a series of 1-4 m horizontal cuts until the ore around the injection well is depleted. At this stage, the flow directions in the injection well and production well will be reversed, so that the injection well will become the production well and vice versa. The rest of the deposit around the new injection well will then be dissolved and the brine extracted until the full volume of the mining cut is depleted. The primary mining process will be finished once the top of the Belle Plaine Member is reached, which will take approximately three years. The primary brine will be sent to the plant where it will be processed into potash and sodium chloride.

Depending on the thickness of the halite interbed (the material separating the Belle Plaine and Patience Lake mineable layers), an additional process may be necessary. If the interbed is thin, mining could continue through the Belle Plaine Member up to the Patience Lake Member. But if the interbed is thicker, it will have to be removed by another process. The most efficient process is to physically dislodge the interbed and let it fall into the cavern below. Thin clay seams provide a weak layer between the interbed and the overlying Patience Lake Member, and these seams are sensitive to pressure. By introducing some water pressure in this region, a crack would open up in the seam and cause the interbed to fall into the cavern below, exposing the lower surface of the Patience Lake Member. The method of interbed removal, where necessary, will be determined during the detailed design phase. Regardless of the method used to reach the Patience Lake Member, primary mining of this upper layer will take place in the same manner as for the Belle Plaine Member. The mining cuts will continue until the desired volume is extracted, followed by a switch to secondary mining.

2.5.4.2 Secondary Mining

Secondary mining is based on a selective leaching process to extract any remaining KCl. This phase begins once the cavern size has increased to approximately 70% of its maximum size during primary mining. This provides a sufficiently large volume and exposed surface area of the deposit.

Secondary mining uses hot NaCl-saturated (and partly KCl-saturated) brine to preferentially dissolve KCl from the cavern walls and roof, leaving the NaCl behind (see Figure 2-10). Due to the decreased flow rate of solvent during this stage, the dissolution rate is very low and secondary mining will continue for several years. The secondary brine will be sent to the crystallization pond where natural cooling will take place and causes the precipitation of KCl crystals.

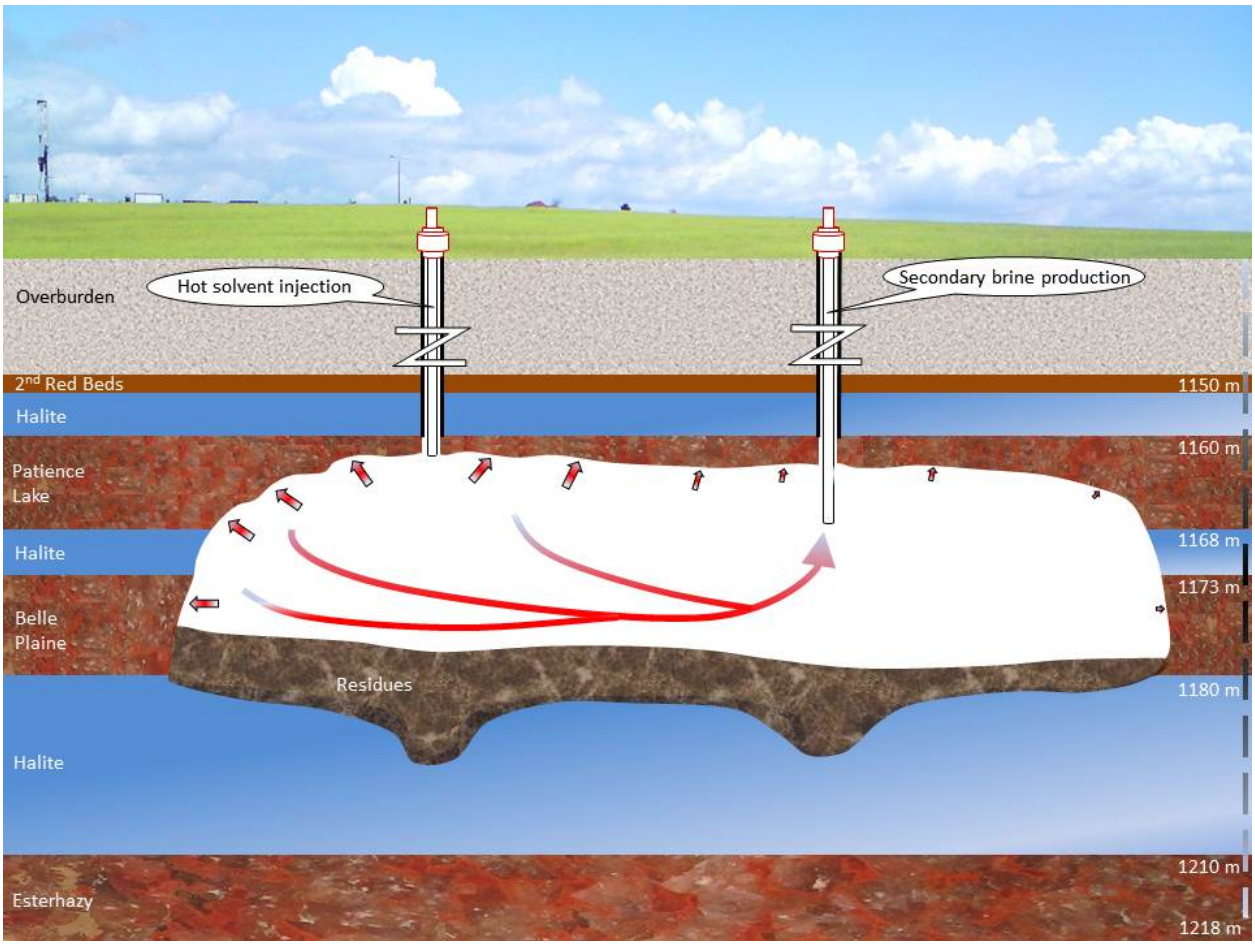


Figure 2-10 Secondary Mining

2.6 Processing

2.6.1 Overview

Processing of the brine starts with the removal of oil from the primary brine feed stream by dedicated oil separators prior to entering the evaporation feed tank. This oil will be recovered and re-injected back into the caverns.

The primary brine coming from the caverns and brine field to the process plant will have a KCl/NaCl concentration of approximately 80% of saturation. The solution will be fed through a parallel series of MEE and MVR evaporators, where the NaCl will be preferentially crystallized out as the water evaporates.

After evaporation, the precipitated NaCl will be separated from its liquid content through centrifuges and a clarifier. The objective will be to recover the liquor (referred to as “mother liquor”), which will still contain potash. The NaCl crystals will be stored in the TMA, while the recovered liquor will be further processed in the crystallization area.

Conventional crystallizers will be used to cool the brine, separating the KCl from the mother liquor.

The mother liquor, now depleted of KCl, will be recycled to the evaporator section, with a portion of the stream sent to the injection wells to purge the system of $MgCl_2$, calcium sulphate ($CaSO_4$), and any other contaminants that may build up in the process liquor. The KCl crystals will be sent to the next processing area for drying and screening.

In the drying and screening area, the KCl crystals will be dried and screened to produce standard potash product. This is a type of potash ready for sale. A compaction plant will process a portion of the product to make granular potash product, another type of saleable potash. The compaction plant will use mechanical force to produce small pellets of potash and screens to ensure the dimensions of the pellets are acceptable. The compaction plant will also include a glazing dryer/cooler to further dry the product. Both products, standard and granular, will be cooled and loaded in railcars or stored temporarily in the load-out and storage area.

The brine resulting from secondary mining will be sent to an outdoor crystallization pond, where it will cool naturally, thereby precipitating KCl into crystals. Slurry from the crystallization pond will be harvested in floating dredges and thickened in product centrifuges. The cold centrate (i.e., the fluid that remains after solids are removed) from these centrifuges and overflow from the crystallization pond will be preheated by the vacuum crystallizer surface condenser heat exchangers to recover heat before being recirculated to the secondary mining caverns. The KCl crystals reclaimed in this operation will undergo the same processing as those generated from the primary mining described above to obtain standard and granular product types. KCl solids from the crystallization pond mainly produce standard-type crystals and will represent approximately one fifth of the total plant production.

A simplified process flow diagram is provided in Figure 2-11 below.

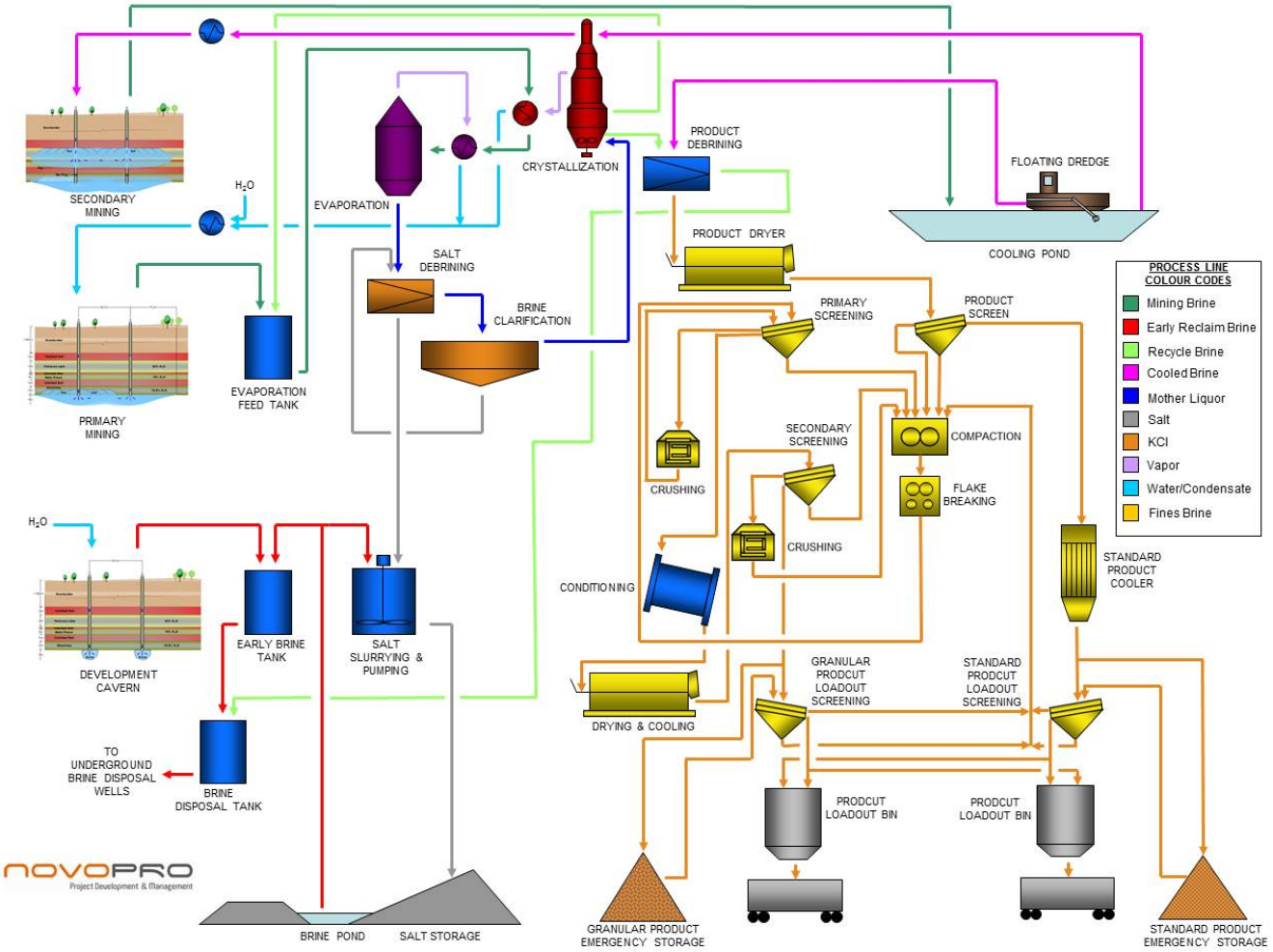


Figure 2-11 Simplified Process Flow Diagram

2.6.2 Process Details

2.6.2.1 On-Site Tanks and Pumps

All storage tanks and pumps required for the operation of the brine field will be located within a designated tank farm area that will be developed within the limits of the processing plant site.

The infrastructure and equipment required at the plant site will include:

- cold secondary solvent (water) storage tank;
- hot primary solvent (water) storage tank;
- production brine tanks;
- waste brine tanks;
- boil-out tank;
- dump tank;
- potable water tank'
- process condensate tank;
- blanket oil storage tanks;
- cold water transfer pumps;
- primary mining hot solvent pumps;
- cavern development pumps;
- secondary mining brine pumps;
- blanket oil distribution pumps;
- waste brine injection pumps;
- heat recovery exchanger (depending upon final design); and
- hot solvent heater.

The primary solvent cold water tank will store all water required to supply the solution mining operations. Sources of the water will be water allocated by WSA and supplied by SaskWater via pipeline, recovered rain water, process condensate, cooling tower blowdown, and possibly weak return brine from under-performing caverns.

The primary solvent cold water transfer pumps will take water from this tank and direct it through a heat recovery heat exchanger (depending upon the process), then on to the steam heater to bring the water up to the temperature required for solution mining. From the heater, the water will be directed to the injection pumps for primary mining.

The pumps for cavern development will also be connected to the cold solvent tanks, where injection pumps will be installed. In the event of a pump failure, the cavern development can be reduced or even stopped for a short time without impacting the overall cavern development schedule.

The blanket oil storage tank and pumps will be located within the bermed area of the plant. The oil will be supplied to the wells though a piping network to control the upward development of the caverns, as described in Section 2.5.3 above.

NaCl-saturated brine recovered from the crystallization pond will be stored in the saturated brine tank and pumped by the injection pumps to the caverns that are designated to undergo secondary mining after the primary mining of these caverns has been completed.

From the brine field, the returning production brine will pass through an oil separator to remove any blanket oil residue that may have returned with the brine to avoid fouling of the heat exchange surfaces within the crystallization plant. From the oil separator, the brine will be discharged into the production brine storage tank, while the recovered oil will be transferred to the blanketing oil storage tank.

The waste brine returning from the brine field will be accumulated in a dedicated buffer storage tank and re-injected into the Winnipeg or Deadwood aquifer.

2.6.2.2 Evaporation and Crystallization

Using parallel trains of MEE and MVR evaporators with counter-current brine flow, NaCl will be precipitated out of the primary mining brine, leaving a high temperature co-saturated brine which will be sent on to the KCl vacuum cooled crystallizer circuit via the clarifier. The NaCl that is precipitated in the evaporators will be centrifuged to remove the brine (mother liquor) and the salt crystals will be then sent to the salt handling area in the TMA (refer to Section 2.6.2.8). The number and configuration of the evaporation equipment will be reviewed and revised as needed during detailed engineering, once the expected brine composition and the energy costs are better defined.

Crystallization of KCl will be performed in a multiple stage draft tube baffle crystallizer circuit. The overflow brine from the clarifier will be fed to the first crystallizer. Product slurry and mother liquor will be carried through the crystallization circuit from the first stage to the last stage. The final product from the last stage crystallizer will be transferred to the centrifuge for debrining, and then sent to the drying circuit. Brine from the last stage crystallizer will be recycled to the evaporation circuit. A purge stream will also be taken from the last stage crystallizer to rid the system of $MgCl_2$, $CaSO_4$, and other contaminants. One single crystallizer train is anticipated to produce 2 Mtpa of potash.

2.6.2.3 Product Debrining and Drying

Product debrining will be accomplished in three stages. First, hydrocyclones will be used to increase the solid content of the recovered potash slurry. Second, several centrifuges installed in a parallel configuration will be used to debrine the slurry to approximately 95% solids content. Centrate from the hydrocyclones and the centrifuges will be recirculated to the evaporation circuit. Finally, fluid bed dryers will reduce the moisture content in the KCl, leaving the centrifuges to produce KCl crystals that are almost completely free of moisture. The crystals will then be conveyed to the product screening and compaction circuits.

2.6.2.4 Product Screening

Several stages of product screening will be required. The first screening process will separate the standard sizes and send standard product to a cooler and load-out or storage area, while the fines and the oversize crystals will be conveyed to the compaction plant for two additional screening phases, post-compaction and post-glazing, which are required for separating the correct size of the granular product.

The last screening station will be provided at product load-out onto the railcars and allows for the final granulometry separation of both product types. This is also where sampling of the final standard (0.28-1.70 mm) and granular (1.70-4.00 mm) products will occur.

2.6.2.5 Compaction and Crushing

The compaction process comprises parallel compactor trains. Part of the stream of KCl crystals exiting the standard product cooler, as well as the fines and oversize KCl separated by the product screens, will be compacted into corrugated sheets. These sheets will be fed through flake breakers, where they will be crushed and subsequently screened.

The on-size granules will undergo a glazing operation consisting of adding process water to the granulated potash stream passing through a conditioning drum. Then, the granules will be dried and cooled in a fluid bed dryer/cooler unit to reduce the moisture content and temperature of the product. The final step in the compaction process will be the addition of anti-caking and anti-dusting agents for proper handling and transportation. The target nominal production rate of the finished granular product is about 160 tonne per hour (t/h).

Numerous pick-up points throughout the compaction processing area will be provided to collect dust at all critical transfer points and from dryer/cooler exhausts. These vents will be filtered to reduce air emissions, while collected dust is re-processed.

2.6.2.6 Secondary Mining Crystallization

Warm KCl-saturated brine extracted from the caverns during secondary mining will be pumped into a large crystallization pond designed to precipitate KCl from solution. The KCl slurry from the crystallization pond will be harvested by floating dredges and pumped to the product debrining unit via a transfer tank. The crystallization pond will be used to crystallize KCl during the colder months in Saskatchewan, resulting in a much lower operating cost per tonne of KCl.

2.6.2.7 Load-Out and Storage

Both standard and granular finished products will be conveyed either to their respective load-out silos or to temporary storage areas if the train loading process is disrupted (e.g., resulting from the unavailability of empty railcars). The temporary storage areas will be designed to accommodate up to approximately ten days supply of standard and granular product at nominal production rates. Separate storage areas will be provided for both product types to avoid cross-contamination.

The load-out station will be designed to handle granular and standard products in separate streams. Load-out silos and the loading equipment will be configured and sized in such a manner that will allow railcar shunting and indexing, and product loading from the plant in real time without affecting the standard or granulated KCl production streams.

The temporary storage silos will only be used if load-out operations are disrupted.

2.6.2.8 NaCl Salt Handling

NaCl slurry from the evaporators will be sent to the NaCl salt debrining circuit, which will comprise hydrocyclones, centrifuges, clarifiers, and pumps. The salt slurry will be pre-thickened in hydrocyclones before being sent to several centrifuging units arranged in a parallel configuration. The salt crystals from the centrifuges will then be re-slurried with reclaimed brine from the brine pond and pumped to the TMA (described in Section 2.7). The centrate from the centrifuges will be sent to the clarifiers, while the overflow will be sent to the vacuum crystallization circuit.

A sump will be provided at the low point of the TMA to pump out any NaCl-saturated decant and rain water and direct them to the injection disposal wells. When solution mining caverns become depleted following the secondary mining phase, they may be considered available for possible backfilling with NaCl from the TMA. The NaCl would be re-slurried and sent back to the caverns to displace production grade feed brine from the caverns and to help stabilize the mined caverns. The feasibility of backfilling will be confirmed during detailed engineering.

2.6.2.9 Reagent Storage and Preparation

Reagents used in the solution mining process will be stored either locally (i.e., in the area where they are used) or in the tank farm described in Section 2.6.2.1. The reagents that will be stored in the tank farm are described below.

- *Blanket oil*: Diesel will be used as blanket oil in the caverns, and will be delivered to the plant by tanker trucks.
- *Flocculent*s: Flocculent will be prepared in the tank farm area and then pumped to the solids separation clarifier. Flocculent will be delivered to the plant by tote bags.
- *Hydrochloric acid (HCl)*: HCl will be delivered by tanker truck and stored in the tank farm. It will be pumped to the evaporation section for de-scaling the evaporators when required.
- *Ammonia*: Ammonia will be stored in the tank farm and pumped to the drying area, where it will be used in the scrubber. The scrubber will treat the combustion gases from the dryer. Tanker trucks will be used for delivery to the plant.

Other reagents will be stored locally. Anti-dusting oil and anti-caking oil will be delivered by tanker truck and stored locally in the load-out area of the plant. These agents will be sprayed on the product during railcar filling to prevent caking and minimize dust production.

Iron oxide will be delivered in tote bags and stored in a bin in the compaction process area. It will be added to the product prior to compaction to impart a red hue to the product. The use of iron oxide in the product will be optional depending upon the client requirements. Most of the product will be marketed in white form.

The approximate volumes of reagents to be used for the Project are not known at this time but will be determined during on-going design and considered in the EA.

2.7 Tailings Management Area

2.7.1 Waste Salt Storage

Brine processing produces two types of granular material: KCl and NaCl. The potash will be shipped from the plant in rail cars while the salt will be stored and contained on the surface in a large tailings pile embankment in the TMA. The salt tailings will be transported hydraulically from the plant to the tailings pile as slurry. The salt tailings pile produced from the solution mining process will be smaller than the pile that would be created from traditional potash mining, since the insolubles are left underground in the solution mining process caverns. This is another advantage of the solution mining process.

A typical salt tailings pile cross-section is provided in Figure 2-12. For the first several years, salt will be added to the pile at a constant rate of about 3.9 Mtpa. After this time, it may be possible to start refilling the depleted caverns with the salt. Until this can be confirmed, the TMA will be sized to accommodate the first 50 years of mine production plus a 10% contingency.

MDH Engineered Solutions Corp. (MDH), member of the SNC-Lavalin Group, has been hired to provide a conceptual development plan for the TMA. MDH is a leader in TMA design and has been working in the potash industry for more than 30 years. Initial studies, including a shallow drilling program, have been completed to assist in the siting and design of the TMA. The shallow drilling program showed the site is underlain by a thick, continuous layer of oxidized till of low permeability, between 4.5 and 16 m thick, that will limit brine migration. Under this oxidized layer is an unoxidized layer that would further limit brine migration. These results confirmed the suitability of the proposed area for the purpose of tailings management; more detailed work is currently being done to characterize the area and determine the best design for the TMA (see Section 2.11 for a description of environmental design features integrated into the TMA design).

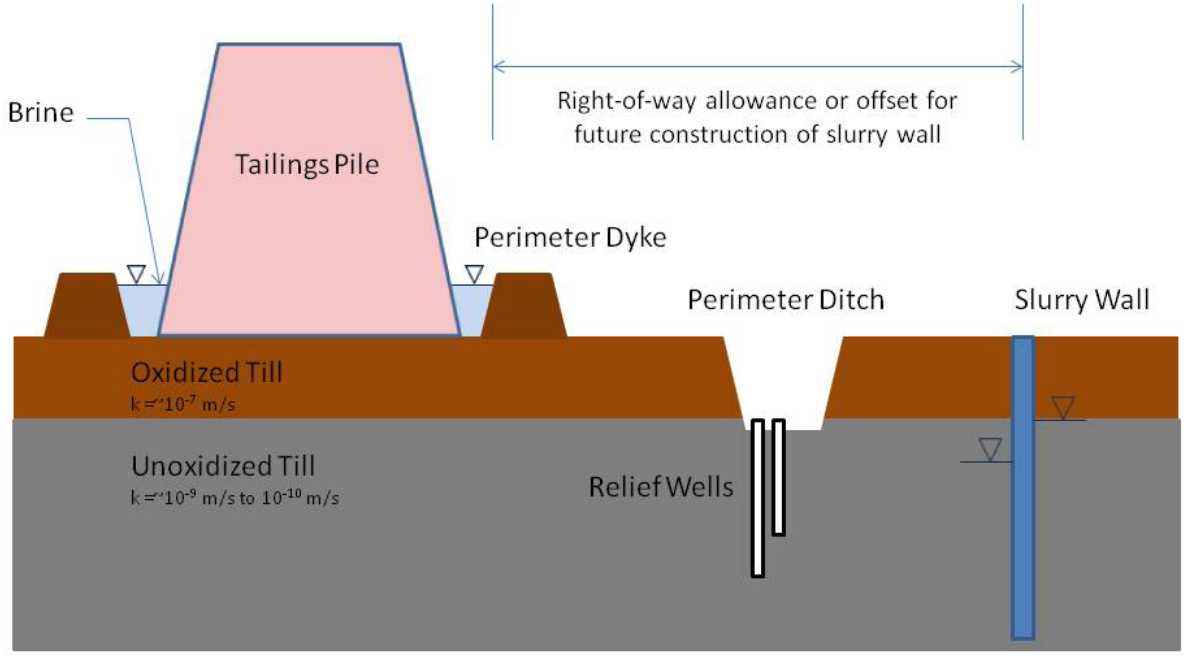


Figure 2-12 Conceptual Design of TMA

The salt tailings pile will be surrounded by a perimeter dyke, the main purpose of which will be to contain the brine that accumulates inside the TMA and prevent it from draining onto the land. Brine will come from rain or snow that falls within the TMA, as well as from the process. The brine that is collected will be re-used in the process. Any excess brine will be disposed of by deep-well injection into the Winnipeg or Deadwood aquifer.

Over time, the impounded brine will percolate through the soils underneath the TMA. The shallow drilling program established that the near surface soils consist of clays, silts, and glacial tills. The upper oxidized soils have a higher hydraulic conductivity or permeability than the lower, un-oxidized till. The bulk of the lateral brine migration is expected to occur within these oxidized soils. A perimeter ditch around the TMA will extend through the oxidized soils and into the unoxidized till to intercept and collect this brine. This brine will be pumped back to the TMA or to the deep injections wells for disposal.

If any salt brine is detected outside of the TMA due to unforeseen or changing groundwater conditions, a slurry wall or other subsurface containment system will be constructed to hydraulically separate the TMA from the rest of the site. Combined with pumping from relief wells located in the perimeter ditch, this will ensure that the hydraulic water gradient is always towards the TMA, effectively preventing any off-site lateral migration of the brine.

The efficacy of TMA location and design will be confirmed through long-term monitoring.

2.7.2 Brine and Site Water Management

Surface runoff and drainage from developed areas of the plant site will be directed to an on-site retention pond and re-used in the process. Since the processing plant will be located on the highest ground, water will naturally flow from the plant to the retention pond. Surface runoff from undeveloped areas will be directed away from the plant site to existing natural drainages, separated from developed area drainage. A surface water management plan will be presented in the EIS.

2.7.3 Deep Well Injection

Excess brine will be disposed of through deep well injection, which is the standard method of brine disposal for all the existing potash mines in Saskatchewan. Brine will be re-used as much as possible but any excess brine will be injected into the Winnipeg or Deadwood formation, brackish aquifers approximately 1800 m deep. Due to the depth of these aquifers, there is virtually no risk that the brine can contaminate any of the potable aquifers that are found above a depth of 200 m. All wells will be cased and cemented. The number of wells necessary for brine injection is estimated at three but will be confirmed during ongoing design. It is expected that this number will grow as the TMA increases over the lifespan of the Project.

2.8 Site Infrastructure

2.8.1 Temporary Facilities and Infrastructure

Temporary facilities will only be required during the construction phase of the plant and are expected to be mobile to ensure minimum impact on the overall plant site. Temporary camp facilities are planned. It is anticipated that the following temporary facilities and infrastructure will be needed:

- Security and first aid trailers with entrance/exit gates.
- Engineering offices with lunchroom and washroom.
- Contractors' offices with lunchroom and washroom.
- Parking lot.
- Safety training trailer.
- Equipment storage buildings.
- Equipment maintenance area.
- Material laydown area.
- Work camp facilities
- Temporary utilities (power, water, natural gas, and telecommunications).

2.8.2 Permanent Buildings

Permanent buildings and facilities are those associated with the Project's operation and maintenance phase. Individual buildings will be positioned in a manner to facilitate product transfers from one area/building to another. The permanent buildings proposed for the Project are listed below and generally illustrated in Figure 2-13. Figure 2-14 shows a detailed view of the processing plant and onsite facilities required for the Project's operation.

- Administrative buildings, including parking lot, security, medical clinic, dry rooms, and laboratory.
- Well field valve stations.
- Process building, including indoor tank farm and associated pumps; evaporation/crystallization plant; centrifuging and drying plant; compaction and screening plant; and control and electrical rooms.
- Transfer tower.
- Product load-out building.
- Product temporary storage buildings.
- Pump houses for raw water, brine pond, and crystallization pond.
- Power plant building.
- Emergency diesel generators building.
- Maintenance shop.
- Warehouse building.
- Cold storage building.
- Equipment and parts storage building.
- Paint shop.
- Natural gas control/metering station.
- Sanitary sewage water treatment building.
- Hazardous substance storage within the main warehouse building.

2.9 Utilities and Infrastructure

2.9.1 Electrical Power

The electrical power requirement for the Project is estimated to be 100 MVA. On-site electrical power will be generated through natural gas-fired cogeneration. This type of power generation is highly efficient, since it makes use of the waste heat that usually is exhausted to the air or cooling towers. Compared with an efficiency of 30% for most of Saskatchewan's coal burning power stations, cogeneration can provide efficiencies of up to 65%. The Project will use the latest technologies available and will meet all applicable emission standards. Currently, FPV plans to own and operate the on-site cogeneration facility.

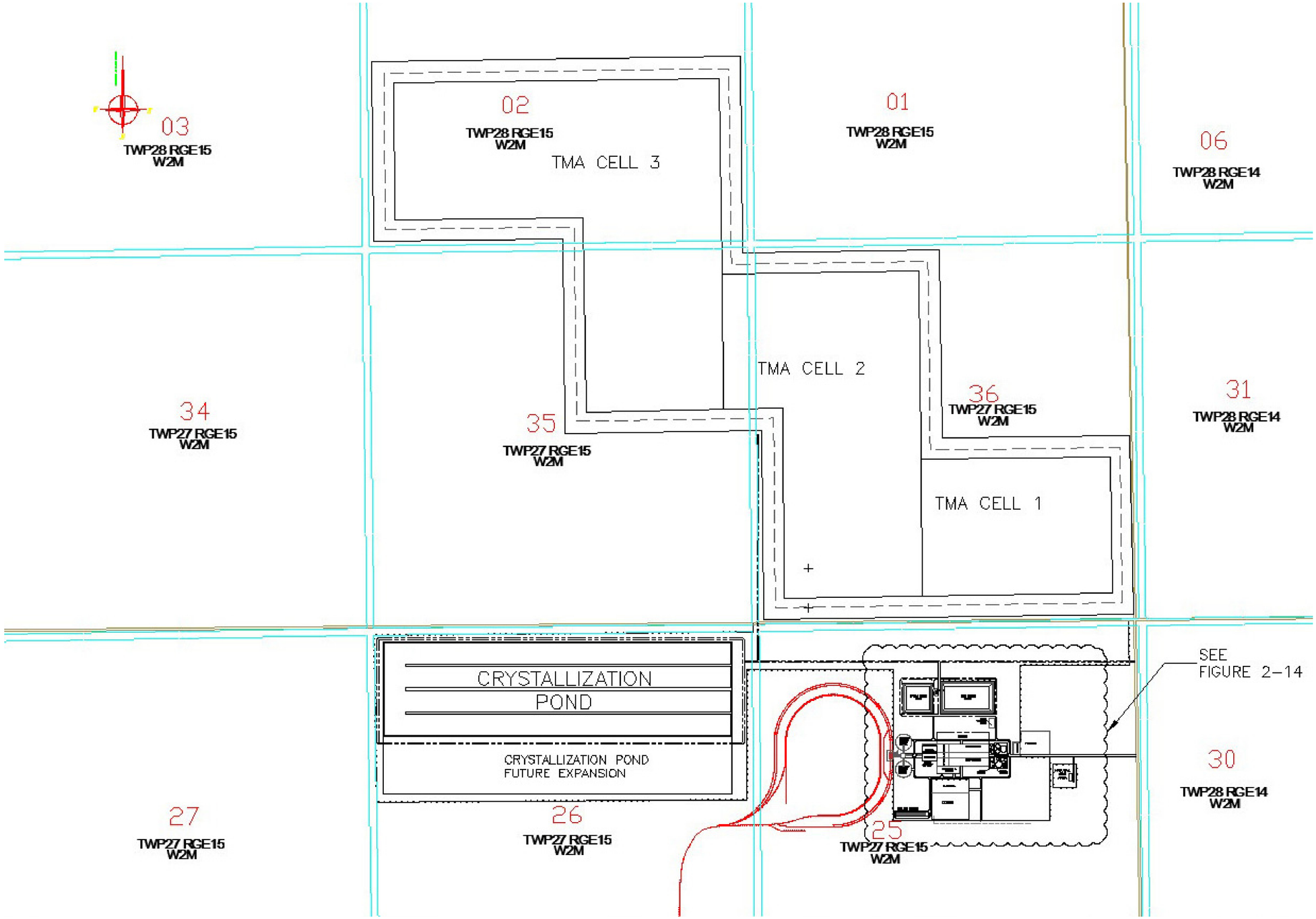
Within the plant, electricity will be distributed at the appropriate voltage for the application. For the exterior buildings and the well field valve stations, power will be distributed through underground lines along the access road ROWs to avoid interference with other activities.

2.9.2 Roads

Access to the Project site from public roads can be achieved via the existing Highway 15, Highway 639, and local grid roads (see Figure 2-3 and Figure 2-4). Upgrades will be necessary to the local grid roads and to Highway 639 to ensure safe entrance to and exit from the property, as well as to support increased Project traffic that will include transport trucks, heavy construction equipment, and materials delivery. Grid road maintenance following the upgrade work will remain the responsibility of the local Rural Municipalities (RMs).

In addition, separate access roads to the well field will be needed. They will be required at the start of the construction phase to allow heavy drill rigs to gain access to the mining area to begin well drilling and, subsequently, to provide access to the well clusters during routine mine operations. These access roads will be constructed from the existing RM grid road network near the well field. Access roads will be sited using similar guiding principles as for pipelines and efforts will be made to consolidate infrastructure in a common ROW wherever feasible. Route selection will consider the avoidance of environmental, socio-cultural and economic constraints including SOMC plants and animals, natural habitat, archaeological sites, and other land uses.

The on-site roads will be paved and constructed to handle heavy and light vehicle traffic to all areas of the plant while promoting pedestrian safety. It is expected that some sectors may be designated as having restricted access due to high traffic circulation. In those cases, separate access points will be implemented to maximize security. Roads with a 30 m ROW into the well field will be gravel and constructed to a standard to support the large trucks that will access the well sites. Existing roads will be used where feasible.



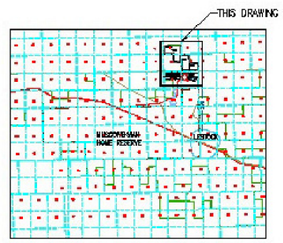
MUSKOWEKWAN POTASH PROJECT

General Facility Site Plan and Tailings Management Area

Acknowledgements: Original Drawing by Novopro.

GRID LINE
FENCE
RAIL LINES
EXISTING ROADS
PAVED ROADS
UNPAVED ROADS

KEY PLAN



113253770-081 REVA

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Project Development & Management

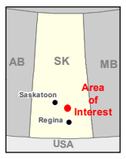


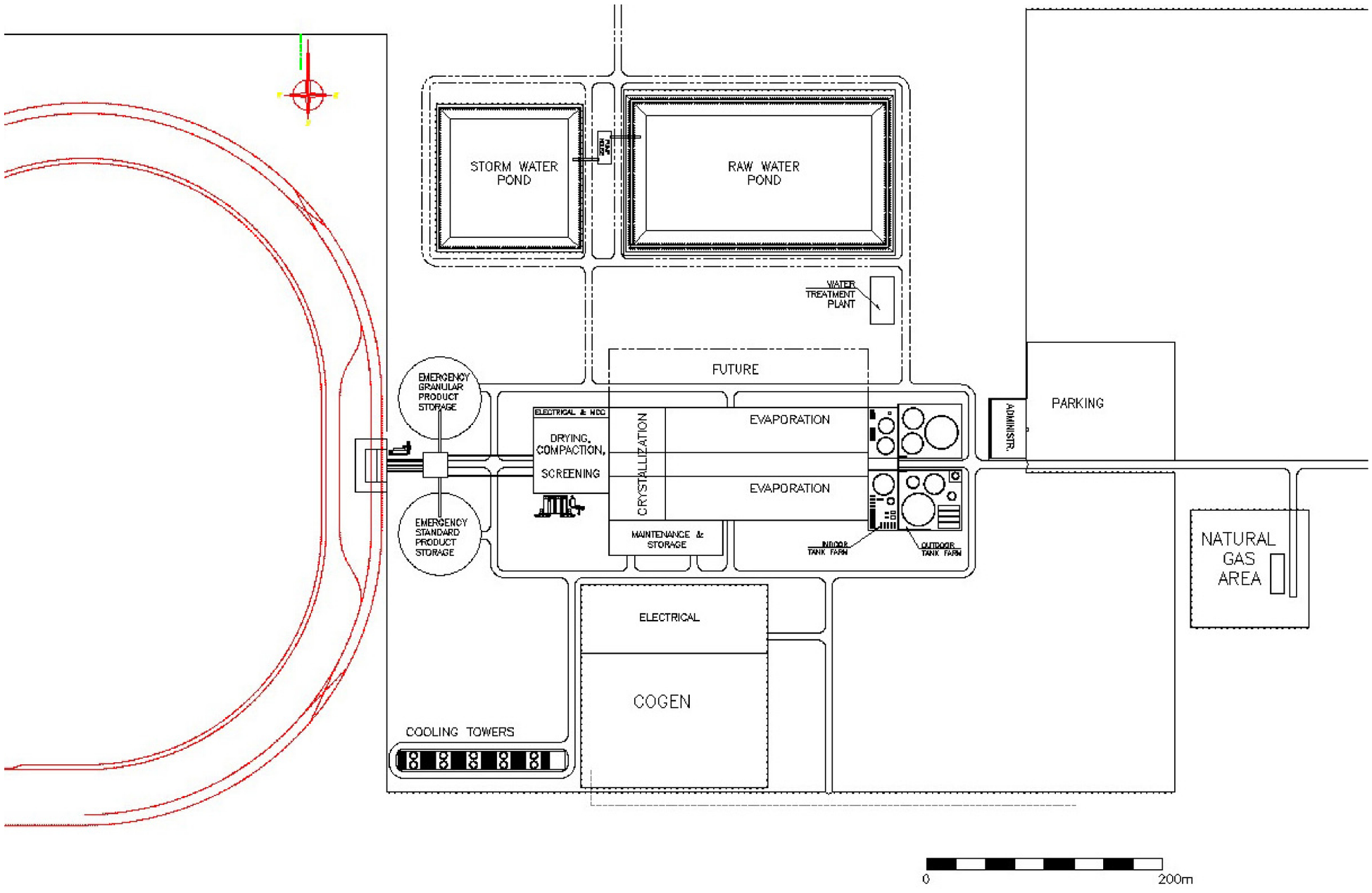
FIGURE NO.
2-13

Last Modified: Nov 30, 2012 By: jetson

MUSKOWEKWAN POTASH PROJECT

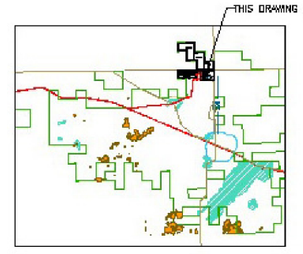
Processing Plant Site Plan

Acknowledgements: Original Drawing by Novopro.



- FENCE
- RAIL LINES
- PAVED ROADS
- UNPAVED ROADS

KEY PLAN



113253770-082 REVA

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Project Development & Management

FIGURE NO.

2-14

Last Modified: Nov 30, 2012 By: adson

2.9.3 Rail

The potash product will be shipped from the plant by rail. There is an existing CN main rail line located approximately 5 km south of the facility site. This rail line is well maintained and consistently used (approximately one train every 30 minutes). A rail spur will be built to connect the processing plant to the existing CN rail line (see Figure 2-3, Figure 2-4, Figure 2-13 and Figure 2-14) . The proposed railway spur will use an existing bend in the tracks for the connection to the main line. From this connection, the spur will be routed to the plant site avoiding as many constraints as practicable (e.g., road crossings, water body crossings, culturally sensitive lands, and local residences). Final routing has not yet been determined but will be approximately 7 km in length. The rail spur will be located entirely on MFN lands and will be assessed as part of the Project.

The on-site rail loop was designed taking into consideration the operation modes of the major rail carriers (CN and CP). Both providers recommend the “drop and hook” model that minimizes downtime of the locomotives. As such, the on-site rail track was designed in a loop configuration to accommodate the “drop and hook” model. Currently, the longest trains being used by CN consist of 170 cars, each capable of holding approximately 100 t of product. These trains require three locomotives to move them. The on-site rail will consist of four concentric tracks, each capable of holding half of the 170-car train. As the empty cars arrive, the train will be split into two portions and pushed onto the inner loops. The locomotives will then position themselves at either end of the full train and pull it away. With this design, the rail service provider should be able to turn around within three hours. All tracks will be designed using the CN Engineering Specifications for Industrial tracks, 12 September 2011 version and Canadian Pacific’s Engineering Guidelines for Private Siding Design and Construction.

It is anticipated that FPV will contract out the construction and operation of the rail spur line.

2.10 Ancillary Projects

Ancillary projects that are outside the scope of the Project include supporting utilities and infrastructure, including water, natural gas, and communications, that will be provided by third parties.

2.10.1 Water Supply

The water requirement for the plant at design capacity is estimated to be approximately 1,400 m^3/h. The estimate includes the water needs for cavern development, primary mining, secondary mining, process water, and potable water. The water use requirement at the very beginning of the Project for a period of one year, when developing the initial caverns, will be slightly higher and is estimated to range from 1400 – 1,500 m^3/h. The plant will be designed to minimize fresh water requirements by recycling, recovering, and re-using water from the plant processes.

Most Project water requirements will be met using surface water delivered to the plant site via pipeline by SaskWater, based on a water allocation from WSA (or other applicable provincial regulatory agency), as described in Section 2.4.4. The development of this water supply is a service to the Project and is not

considered a Part of the Project for the purposes of EA. That project will be subject to regulatory review following the provincial process and undertaken by SaskWater in collaboration with WSA.

2.10.2 Natural Gas

Natural gas will be used for heating and power generation for the cogeneration plant. It is estimated that the natural gas requirement of the fully operating plant will be between 2,000 and 3,000 GJ/hr. The provincially-owned TransGas, a Crown corporation, is expected to provide the natural gas from nearby, existing pipelines. Natural gas will be supplied by TransGas, via a new pipeline extended to the Project fenceline to meet the Project demands.

2.10.3 Telecommunications

SaskTel, a provincial Crown corporation, is expected to provide the necessary telecommunications services for the Project.

2.11 Environmental Design Features

As described in Section 2.2, FPV has integrated several environmental management strategies, including environmental design features, throughout the Project to avoid or reduce potential Project effects on the biophysical and human environment. The Project will also adhere to applicable provincial laws and regulations (e.g., *Environmental Management and Protection Act, 2002* and the *Mineral Industry Environmental Protection Regulations, 1996*). The following sections outline environmental design features that have been chosen for the different stages of the Project.

2.11.1 Mine Plan and Mining Methods

The environmental design features in the mine plan and mining methods are as follows.

- The method of solution mining produces less solid waste and is inherently safer than conventional underground mining. There are no safety risks due to roof collapse, poisonous gas, or worker exposure to engine exhaust from excavators.
- The extraction ratio with solution mining is higher compared to conventional mining; therefore, the footprint of the mine per extracted tonne of product is smaller.
- Data from seismic surveys are used to avoid geological anomalies, structures, and faults to ensure the best design placement for the caverns.
- Directional drilling conducted from a centralized well pad will reduce the extent of surface disturbance. There will also be a corresponding reduction in the amount of roads, piping, wiring, and maintenance with localized clusters.
- Pillars (up to 80 m in width) will be left between the caverns to increase stability during mining and reduce long-term subsidence.

- Waste salt will be re-slurried and re-injected into depleted caverns, if feasible.
- Linear facilities (i.e., power, pipelines and roads) will share a ROW and/or use existing ROWs where possible to minimize surface disturbance, and will be subject to siting studies to avoid environmental and socio-cultural and economic constraints.
- All process materials will be recycled where possible.

2.11.2 Processing

The environmental design features in process are as follows.

- The feasibility of using environmentally preferable oil for blanketing will be studied during detailed design.
- All process water will be captured and returned back into the process to reduce water requirements.
- Dust control systems will be used throughout the processing plant to reduce dust and particulate matter and meet applicable emission standards.
- Any potash material that is not within specifications will be recycled where possible.
- Conventional insulation, baffles, and noise suppressors will be used on equipment and most equipment will be housed inside buildings to reduce the amount of noise released into the surrounding environment.
- The crystallization pond will take advantage of Saskatchewan's cold winter climate to precipitate KCl, thereby reducing energy expenditure.
- Reagents will be stored in appropriate storage containers and locations.
- Fine-tuning of the mass and heat balances may result in novel uses of typical equipment that could greatly reduce the quantity of water, steam, or electricity that would be used. Any such savings will be described in the EIS.
- The use of alternative heat sources will be investigated during ongoing design and considered in the EIS.
- The use of geothermal energy from the deep injection wells will be investigated.

2.11.3 TMA and Water Management

The environmental design features in the TMA and Water Management are as follows.

- The area chosen for the TMA takes advantage of the use of natural till, instead of fragile manufactured membranes, to reduce the migration of brine.
- A containment system will be designed to control migration of brine from the TMA.
- Precipitation and surface runoff in the TMA and developed areas will be recovered and re-use, where feasible.

- Design optimization studies have been conducted to reduce water use and TMA size.
- The brine pond will be designed to provide adequate storage of process streams under normal and extreme operating conditions and storm events.
- The plant site and TMA will be designed so that uncontaminated surface water from undeveloped areas will be diverted around the Project site to natural drainages, allowing this fresh water to remain part of the natural water cycle.

2.11.4 Site and Supporting Infrastructure

The environmental design features site and supporting infrastructure are as follows.

- The location of the plant site was chosen to avoid environmentally and culturally sensitive areas, as much as possible.
- Grouping of the site infrastructure into a compact area will reduce the amount of land that is disturbed by the Project.
- Existing roads will be used where possible.
- The locations of new access roads will be chosen to avoid environmentally sensitive areas, as much as feasible.
- New access roads will share a ROW with other infrastructure such as pipelines and power lines.
- The use of co-generation for electrical generation to maximize energy efficiency and reduce Project greenhouse gas (GHG) emissions.
- The amount of energy (natural gas, electricity, or oil) and water used will be minimized where possible.

2.12 Project Activities and Schedule

2.12.1 Construction

During construction, the Project will require clearing, grubbing, excavation and grading of the Project facility site in preparation for construction of the processing facilities, access roads, railway, electrical distribution, power generation, TMA, groundwater supply and other ancillary facilities that are required in advance of operation and to support construction. Facilities will be constructed and will involve the erection of buildings, preparation of roadbed, preliminary cavern development, the drilling and development of temporary groundwater supply wells, erection of electrical distribution and other ancillary facilities. During construction, the co-generation plant will be built to supply power and steam for operation. During construction, waste management and emissions control will be achieved through implementation of environmental management procedures.

2.12.2 Operation

During operation, the plant processing facilities will process brine and produce product for shipment. Mining will proceed through the sequential development of drilling pads within the well development area, including site access roads, water supply piping, solution piping, electrical power and steam distribution systems. Mining will proceed with cavern development and progress through the well development area over the life of the mine. Tailings management and operation will continue through operation. Product will be loaded on rail cars and transported to market. The co-generation plant will operate and supply Project energy and steam.

2.12.3 Decommissioning and Reclamation

A conceptual decommissioning and reclamation (D&R) plan will be developed during detailed engineering and permitting. The D&R plan will outline how lands disturbed by mining activities will be restored to a physically stable, safe, and environmentally functional condition compatible with neighbouring land uses. The conceptual D&R plan will address the different types of Project infrastructure, including caverns, disposal wells, surface infrastructure, and the TMA. It will be developed in consultation with regulatory agencies during permitting and periodically reviewed during operations. Also, MFN will also be consulted on the D&R plan. The conceptual D&R plan will be prepared to comply with applicable laws and regulations.

The conceptual D&R plan will be presented in the EIS and may include the following topics and approaches. These are subject to finalizing the Project design and execution plan, as well as are contingent on setting decommissioning and reclamation objectives in conjunction with regulatory and permitting requirements.

- Research and development to identify optimal reclamation methods for caverns and salt piles, which may include backfilling and/or re-injection of salt tailings into caverns.
- Progressive reclamation that allows for removal of surface facilities and reclamation as the mine well field development plan progresses.
- Cutting off and capping well head infrastructure, draining of pipelines, and abandonment of pipeline infrastructure in place.
- Removal of access road and power infrastructure and subsequent re-contouring and re-seeding.

2.12.4 Project Schedule

The Project lifespan is estimated to be a minimum of 50 years based on the availability and quality of the resource on the project site. The EA will be based on this 50-year period. Authorizations for the TMA area will be requested for a minimum of 100 years since its operating life is estimated to be at least 100 years.

Key milestones of the Project and their general timing are outlined in Table 2-4.

Table 2-4 Project Phases and Milestones

Milestones	Tentative Dates
Environmental	
Submission of Project Description/Technical Proposal	Q4 2012
Issuance of EIS Guidelines/Terms of Reference	Q1 2013
Environmental Baseline Studies	Q2 2012 – Q3 2013
EIS Preparation and Submission	Q4 2012 – Q3 2013
EIS Review and Approval	Q3 2013 – Q2 2014
Permitting	Q3 2014 – Q1 2015
Engineering/Construction	
Pre-feasibility Study	Q1 2012 – Q1 2013
Feasibility Study	Q1 2013 – Q1 2014
Detailed Engineering/Procurement/Construction	Q3 2014 – Q4 2016
Commissioning	Q4 2016 - Q1 2017
Operation	Q2 2017 and beyond
Decommissioning and Reclamation	2067 and beyond

2.13 Employment and Procurement

The Project will result in employment and procurement opportunities locally, regionally, and provincially. This Project is particularly unique as MFN is a co-proponent and will benefit in a variety of ways including increased employment, increased contracting opportunities, increased training opportunities and increased business opportunities. While the precise number and type of opportunities for employment and contracting is not finalized and will depend on the detailed design and contracting plan, the total construction personnel required at peak levels will be approximately 1,000. Opportunities for employment, contracting and training will be felt in nearby communities and RMs, and by service providers (i.e., hotels, restaurants, contractors).

The JVA between the FPV partners guarantees preferential employment and contracting opportunities, as well as a host of other economic benefits, to MFN, as well as to neighbouring First Nation members of the TATC. In addition, FPV will support the development of training programs in cooperation with the community and government agencies to ensure MFN is able to take advantage of employment and contracting opportunities expected to be created by the Project. These training programs may also be available to other neighbouring First Nations, Métis, and other stakeholders.

With the commitment of FPV to optimize and enhance benefits, the Project will positively influence the surrounding communities with increased job opportunities (mine employment and/or service and contractor employment). There will be increased revenue brought into the surrounding communities, which will also provide economic benefits through the operating life of the Project, including more than 300 full time jobs and extensive contracting, maintenance and supply opportunities.

3 FIRST NATION, MÉTIS, AND PUBLIC ENGAGEMENT

3.1 Introduction

Communication and engagement with the surrounding community is an essential part of any project that has the potential to affect the human and natural environment. It is important that people have an opportunity to be engaged around decisions that will affect them. FPV recognizes the importance of communication and is committed to engaging the community in meaningful involvement regarding its Project. The goal of FPV's engagement plan is to facilitate the involvement of people who will potentially be affected by, or have an interest in, the proposed Project. Engagement activities have already started and will continue throughout the EA and permitting process.

The engagement process includes (but is and will not be limited to) members of the following groups:

- First Nations;
- Métis;
- The public (including RMs and local communities, landowners, civil society organizations, and other interested stakeholders); and
- government (municipal, provincial, and federal) and regulatory agencies.

This Project is designed in consideration of the guidance for public engagement for the Agency (CEAA 2008) and the MOE (MOE 2012b).

3.2 Engagement Approach

The following section outlines the approach to engagement for this Project. Each of the community categories to be engaged (see above) is discussed in turn, beginning with MFN, on whose lands the Project will be developed. Engagement with non-Aboriginal stakeholders (e.g., neighbouring communities, public, other stakeholders) was begun once MFN Chief Bellerose was satisfied that Muskowekwan members had been sufficiently informed about the Project. It has been FPV's policy for all important Project milestones (e.g., PD, TOR, EIS) to engage MFN first, followed by other TATC members and other First Nations, Métis, and other non-Aboriginal stakeholders.

While consultation is a key component of Project planning and integration of results into the EIS, Project updates and further engagement will continue to occur during the construction and operational phases of the Project.

3.2.1 Muskowekwan First Nation

There are several purposes for engaging MFN, including providing an opportunity to understand how the community is involved with the Project as a co-proponent of FPV. First, this work will, under the advice and direction of the Chief and Council, serve to introduce the larger MFN community to FPV and the team responsible for completing the EIS. Second, it will provide an opportunity for the community to learn about the Project in detail, ask questions, and raise concerns. As will be the case for all engagement for this Project, questions and comments will be documented in the EIS, along with an indication of how concerns have been or will be addressed. Third, information gathered from MFN members will be used to assist in issues scoping for the EA. Finally, engagement with MFN will be used to gather Traditional Knowledge and TLU information, in addition to available existing studies, that will inform the EA. Ongoing engagement with MFN will include, but is not limited to, community Open Houses and ongoing in-person meetings. FPV will use available tools to disseminate information to and receive input from MFN, including newsletters, social media and a website which FPV has provided financial support to develop. Muskowekwan members from both on and off-reserve will be engaged.

Contact information for MFN is provided in Table 3-1 below.

3.2.2 Aboriginal Communities other than Muskowekwan First Nation

Several other First Nation and Métis communities who will or may be affected by, or have an interest in, the Project have been identified. These communities will be engaged as well under the direction and advice of the Chiefs and Councils. The purposes of and methods for this engagement is the same as described above for MFN. Based on a documentary review of relevant materials related to the study area, we anticipate engagement will be required with the George Gordon First Nation (FN), Kawacatoose FN, Day Star FN, the TATC (which represents these three FNs, as well as the MFN), and Métis Local #8 Lestock. Potentially, Beardy's and Okemasis FN and Fishing Lakes FN will be included as well. The Project is currently coordinating with Chief Bellerose regarding the appropriate level of engagement and information sharing required to inform these FNs about the Project.

This list may be altered as required based on the results of our initial engagement activities within the region and as directed by regulatory authorities. A preliminary contact list of all aboriginal communities that have currently been identified as having potential for interest in the project is provided below (Table 3-1).

First Nations engagement for the Project has proceeded somewhat differently from many projects in Canada because of the unique situation of the Project being located on MFN lands, the potash resource being owned by MFN and the participation in the ownership and management of the Project by MFN. Chief Reg Bellerose, as a member of the project management committee, has been tasked with the responsibility of initial engagement with local First Nations leadership.

MFN is a member of the TATC, along with three other FNs – Day Star, Kawacatoose and George Gordon. Informal but extensive consultation, led by Chief Reg Bellerose, has taken place with all three members of the TATC over the last 2 years. The consultation has been "informal" because it is the desire of Chief Bellerose not to engage in more formal and open consultations with external groups until such

time as the communication and agreements with Muskowekwan members have proceeded to a satisfactory level. FPV has respected the wishes of Chief Bellerose and supports the informal consultation with TATC FNs that has taken place to date and has developed a strategy for providing open house information sessions on these reserves in the near future.

Three of the four TATC FNs have agreed to enter into a joint venture enterprise to jointly seek to maximize the direct employment and contracting and training opportunities associated with the Project. As part of the consultation, Chief Bellerose has extended to the Day Star and Kawacatoose FNs the full preferential employment and contracting commitments that were made available to MFN under the Project JVA. In appreciation of these commitments by MFN, the Day Star and Kawacatoose FNs have undertaken to provide written letters of support for the Project. Notwithstanding this level of outreach and consultation, George Gordon FN has elected not to participate in this Tribal Council initiative proposed by MFN. MFN and the Project will continue to consult and engage with the George Gordon FN, including offering to provide an open house information session on the George Gordon reserve.

MFN also participates in regional organizations structured around traditional land use, water and fishing interests. In addition to the TATC member Nations, these organizations include the Beardy's, Okemasis and Fishing Lake FNs. The Project is coordinating with Chief Bellerose regarding the appropriate level of engagement and information sharing required to advise these FNs about the Project.

Table 3-1 Preliminary List of Aboriginal Communities with Potential Interest in the Project

Community	Group Category	Tribal Council/ Affiliation	Contact Information
Muskowekwan First Nation	First Nation	TATC	PO Box 249 Lestock, SK S0A 2G0 Phone: 306-274-2061 Fax: 306-274-2110 E-mail: rbellerose@sasktel.net
Day Star First Nation	First Nation	TATC	P.O. Box 277 Punnichy, SK S0A 3C0 Phone: 306-835-2834 Fax: 306-835-2724
George Gordon First Nation	First Nation	TATC	P.O. Box 248 Punnichy, SK S0A 3C0 Phone: 306-835-2232 Fax: 306-835-2036 E-mail: gordonfirstnation@sasktel.net

Table 3-1 Preliminary List of Aboriginal Communities with Potential Interest in the Project (cont'd)

Community	Group Category	Tribal Council/ Affiliation	Contact Information
Kawacatoose First Nation	First Nation	TATC	P.O. Box 640 Raymore, SK S0A 3J0 Phone: 306-835-2125 Fax: 306-835-2178
Métis Local #8 Lestock	Métis Local	Métis Nation Saskatchewan	PO Box 73 Lestock, SK S0A 2G0 Phone: 306-274-4959 E-mail: marinaroy@sasktel.net
Touchwood Agency Tribal Council	Tribal Council	TATC	P.O. Box 280 Punnichy, SK S0A 3C0 Phone: 306-835-2937 Fax: 306-835–2198
Beardy's and Okemasis	First Nation	Independent	P.O. Box 340 Duck Lake, SK S0K 1J0 Phone: 306-467-4523 Fax: 306-467-4404
Fishing Lake First Nation	First Nation	Independent	P.O. Box 508 Wadena, SK S0A 4J0 Phone: 306- 338-3838 Fax: 306- 338-3635

3.2.3 The Public

Engagement will occur with members of the public who may be affected by the Project, including, but not necessarily limited to regional municipalities, local communities, and landowners. The purpose of this engagement will be to introduce the Project team, discuss Project details (including socio-economic impacts to the region) and solicit and document questions, comments, and issues. As is the case for all other outcomes of engagement, this information will be considered in the EA, along with information about how concerns have been or will be addressed.

3.2.4 Regulatory Engagement

In addition to engagement with First Nations, Métis, and the public, in-person meetings will continue to be conducted with both provincial and federal regulatory bodies. The goals of this engagement are to keep authorities informed and proactively identify any concerns or issues from a regulatory standpoint.

3.2.5 Intensity of Engagement

Levels of engagement and approaches to communication will vary from audience to audience. The most in-depth engagement will occur with the people, organizations, and communities that will or may experience the most direct effects as a result of the Project. However, levels of engagement intensity are subject to change at any time depending on the results of any initial engagement activity, be it an in-person meeting or a mail-out. Responses received from such initiatives will help in determining appropriate levels of engagement for all communities, organizations, and individuals.

3.3 Preliminary Engagement Activities

3.3.1 Muskowekwan First Nation

The Project, which is located on MFN lands, is unlike most other natural resource-based projects, and the extensive consultation and engagement activity undertaken over the last three years reflects this difference.

Most natural resource projects in Canada affecting First Nations tend to be located on traditional lands claimed by one or more First Nations, and First Nations struggle to find ways to benefit from such developments. Constitutional and other precedent-mandated fiduciary duties of the federal and provincial governments oblige the governments, First Nations, and proponents to engage in complex legal consultation to ensure that rights asserted by First Nations are not compromised.

The Project differs because it is located on lands owned by MFN and will exploit resources owned by MFN. These lands and resources are protected by Treaty, and MFN has elected to exercise its Treaty rights to develop its own resources.

In the exercise of its Treaty rights, MFN, through MRL, has entered into a legally-binding JVA with Encanto to develop a potash mine. Extensive negotiations and consultation that led to the JVA and its precursor agreement (the Exploration Participation Agreement (EPA)) specified commitments of both MFN and Encanto. Under these agreements, MFN has agreed to provide its land and resources in trust to the joint venture for the purposes of advancing the Project, and Encanto will provide all technical and financial resources to develop the Project. In return for its commitments, MFN will receive a royalty on all potash produced, equity shares and warrants in the Project, lease payments for any lands used in the Project, and preferential consideration for employment, contracting, and training opportunities. MFN also participates in the direct management of the Project as a member of the Project's management committee and retains certain project approval vetoes (e.g., final site selection, protection of cultural and traditional values, environmental protection). All such agreements have incorporated extensive consultation and subsequent accommodation, if appropriate, with MFN members and have been the subject of numerous Band Council Resolutions (BCRs) that demonstrate the level of consultation and formal agreement with MFN.

Specific examples of engagement with MFN include:

- engagement and BCR support in relation to EPA;
- engagement and BCR support in relation to the JVA;
- multiple information sessions on reserve and in four off-reserve centers (Regina, Saskatoon, Edmonton, Winnipeg) related to the designation of potash reserves for development (which received more than 80% approval) and to the EA process (see Table 3-2);
- numerous technical presentations made to MFN Chief and Council;
- provision of TLU study reports by MFN to inform the EA planning process;
- meetings between MFN Chief and Council and federal and provincial ministers and senior government officials; and
- informal discussions between MFN Chief and leaders of other TATC First Nations; and
- community open houses.

Table 3-2 2010-2012 Selected List of MFN Community Meetings

Community	Location	Date	Summary
Muskowekwan First Nation	Regina	24-Nov-10	Information session related to the designation of potash reserves for development
Muskowekwan First Nation	Saskatoon	25-Nov-10	Information session related to the designation of potash reserves for development
Muskowekwan First Nation	Edmonton	29-Nov-10	Information session related to the designation of potash reserves for development
Muskowekwan First Nation	Winnipeg	30-Nov-10	Information session related to the designation of potash reserves for development
Muskowekwan First Nation	Muskowekwan Band Hall	22-Aug-12	Initial Open House to introduce the Project, provide information, gather initial feedback, and engage in issues scoping.
Muskowekwan First Nation	The Gathering Place, Regina	6-Sep-12	Initial Open House to introduce the Project, provide information, gather initial feedback, and engage in issues scoping.

Engagement between MFN and Encanto has in many cases moved to include “accommodation”. For example:

- MFN will be paid directly substantial royalty and lease payments for the use of their land and resources;
- MFN will be paid directly a substantial development fee for its accomplishment of certain Project progress milestones;
- MFN and MRL participate directly in the management of the project as members of the project management committee and are regularly and fully advised of project decisions;

- the proposed facility site was moved from home reserve lands to a location on TLE and pre–reserve lands in response to a request from MFN to minimize the effect of the Project on culturally sensitive areas within the home reserve;
- preferential employment and contracting commitments, including an 'open book' contracting protocol, have been established to ensure direct economic participation in the Project;
- the JVA allows MFN to monitor and hold FPV accountable to achieve certain Project employment, contracting, and training commitments; and
- financial support from Encanto for capacity development assistance to MFN and MRL.

The two open houses held on August 22, 2012 and September 6, 2012 resulted in the attendance of 61 and 30 people, respectively.

At both open houses, the format was largely the same. Information boards describing the basics of the mine plan and the EA process were placed around the room. Representatives from FPV, Stantec, and Novopro were in attendance and engaged attendees one-on-one, explaining the Project and answering questions. At the Regina open house, a formal presentation and "question and answer" session was provided as well, in response to requests from community Elders.

An Issues Scoping Questionnaire was used in which participants were asked to rate the importance of various issues or aspects of the environment to them, and to indicate other issues that should form part of the EA study. The results of the Issues Scoping Questionnaire, as well as of the conversations held with community members, were used to inform VEC selection for the Project.

Feedback received from participants included the following.

- Concerns around water supply and quality were heard often.
- Many comments in these initial open houses relate to the EA engagement process. The importance of Elder engagement was stressed.
- Desire was expressed for a website to keep people informed, and also a newsletter for people who do not use the internet, especially Elders.
- TLU issues were expressed often, in particular around unmarked burials that exist in many places on the reserve.
- Socio-economic concerns, especially around jobs and training, were frequently expressed. There is a desire for training of various kinds (not just at mining skills, but also skills to deal with change in the community such as money management courses, and drug and alcohol treatment programs).
- Overall, people view the mine as a chance for a better future for the next generation, but would like more communication on all levels – from FPV, Chief and Council, and regarding the EA process.

The purpose of these initial Open Houses was to introduce the Project and identify issues. In part because of the very preliminary nature of the data presented, formal responses were not provided to these issues. However, all of the issue-related information from the Open Houses has been logged and will be presented with responses in later engagement activities, and in the final EIS. A preliminary table of key issues is presented below in Section 3.3.4.

3.3.2 Aboriginal Communities other than Muskowekwan First Nation

MFN is a member of the TATC. MFN Chief Bellerose, a leader of one of the parties to the joint venture and a representative of FPV's management committee, has undertaken a series of informal and formal engagement meetings with the other TATC member First Nations which includes Day Star FN, Kawacatoose FN, and George Gordon FN. Initial engagement was informal and included discussions about the Project and its potential impacts, descriptions of MFN's role in the ownership and management of the Project and MFN's commitment to ensure environmental protection and protection of traditional values, not just for MFN, but for the TATC members as well.

More recently, Chief Bellerose had made more formal presentations to the Day Star and Kawacatoose FNs that have resulted in a sharing of Project economic benefit commitments and a commitment to establish a joint economic development enterprise to maximize economic benefits from the Project.

George Gordon FN has elected not to participate in this common development enterprise along with the other TATC First Nations. FPV will continue to engage with Gordon FN on an individual basis.

Chief Bellerose has contacted each of the TATC members to discuss the methods by which they wish to be engaged. Upon receipt of that direction, the Project will proceed with providing information and recording comments within the respective communities (options include leadership and Elder meetings, public open houses, or other mechanisms). Once a response is received, additional engagement activities with these FNs are anticipated to occur early in 2013.

MFN also participates in regional organizations structured around traditional land use, water and fishing interests. In addition to the TATC member FNs, these organizations include the Beardy's, Okemasis and Fishing Lake FNs. FPV is coordinating with Chief Bellerose regarding the appropriate level of engagement and information sharing required to inform these FNs about the Project.

A leadership meeting is planned for the Metis Local #8 in Lestock in early December 2012, with an open house to follow in early 2013.

3.3.3 The Public

Information sessions will be undertaken with local communities and with a wide range of interested stakeholders, both formally as part of the EA process and informally as part of FPV's efforts to provide information about the Project to the public at large. This engagement is currently just beginning because it was felt that initial engagement with MFN members should be complete before moving out into the wider public community. Initial meetings with local Rural Municipalities (Reeve and Council) have been held in November and additional meetings with remaining Rural Municipalities and nearby Villages (Mayor and

Council) are planned for December (Table 3-3). A public open house will be held in Lestock in late January/early February of 2013. Notification for the open house will be distributed to surrounding communities and will include notices in local and regional newspapers and other multi-media information tools. Table 3-3 outlines the completed and planned public engagement activities. .Project updates and further engagement will continue to occur with the public during the construction and operational phases of the Project.

Table 3-3 Completed and Planned Public Engagement Activities

Community	Communication Mechanism	Location	Date	Summary
Completed				
RM of Mount Hope	In-Person Meeting	Semans	8-Nov-12	Introduction to Project and preliminary feedback
RM of Kellross	In-Person Meeting	Leross	8-Nov-12	Introduction to Project and preliminary feedback
RM of Ituna Bon Accord	In-Person Meeting	Ituna	16-Nov-12	Introduction to Project and preliminary feedback
RM of Emerald	In-Person Meeting	Wishart	19-Nov-12	Introduction to Project and preliminary feedback
RM of Foam Lake	Information Package Mailout	n/a	30-Oct-12	Introduction to Project and preliminary feedback
Planned				
RM of Touchwood	In-Person Meeting	Punnichy	11-Dec-12	Introduction to Project and preliminary feedback.
Village of Lestock	In-Person Meeting	Lestock	12-Dec-12	Introduction to Project and preliminary feedback.
Village of Leross	In-Person Meeting	Leross	10-Dec-12	Introduction to Project and preliminary feedback.
Lestock Community Open House	Public Open House	Lestock	January or February 2013	

3.3.4 Issues and Responses as a result of Preliminary Engagement

A table of preliminary Issues and Responses is presented below (Table 3-4). Note that this is not all of the issues that have been logged to date, but rather a selection of the most common issues and preliminary responses.

Table 3-4 Key Issues and Responses

Issue Category	Issue Sub-Category	Issue	Raised At	Response
Muskowekwan First Nation Community	MFN Community Wellbeing	Effects of Project on MFN Community Wellbeing (social instability, increase in drugs and alcohol, gang activity, from unaccustomed wealth)	Muskowekwan Open Houses	Recommendations within EIS for investment in community wellbeing to prepare the community for this change
Aboriginal Land and Resource Use	Places of Cultural Significance - Burials	Effects of Project on Places of Cultural Significance - Burials (Unmarked) (impacts from mine infrastructure)	Muskowekwan Open Houses	Avoidance by mine components; identification of features in Heritage and TLU studies
Employment and Business	Job Skills Training	Community Input - Job Skills Training (job skills training desired)	Muskowekwan Open Houses, RM of Kellross Meeting	Jobs available/required skills information to be provided to community, recommendations for job skills training within EIS
Water Resources	Water Supply	Effects of Project on Water Supply (what is the water source?)	Muskowekwan Open Houses, all RM Meetings	Information on current water supply considerations (water to likely come from Buffalo Pound Reservoir) provided
Water Resources	Water Supply	Effects of Project on Water Supply (how much water does the mine use?)	RM of Emerald, RM of Ituna Meetings	Figure of 1500 m^3/hour has been provided, a "layman's terms" analogy of the water requirement is being developed to provide to communities
Water Resources	Ground Water Supply	Effects of Project on Ground Water Supply (drawdown on groundwater in first year)	RM of Emerald, RM of Ituna Meetings	Effects of using groundwater for the first year are still being modeled to see if drawdown will be at acceptable levels, if not, alternatives may be considered

3.3.5 Regulatory Engagement

In-person meetings have also been ongoing with both provincial and federal regulatory bodies, including the Agency, AANDC, and the Major Projects Management Office, on the federal side, and MOE, Economy and WSA on the provincial side, and will continue throughout the EA and permitting process. The purpose of the regulatory engagement to date has been to inform regulatory agencies about the Project and to discuss matters pertinent to the EA process.

4 VALUED ENVIRONMENTAL COMPONENTS

This section outlines the process for selecting VECs. The overall approach to identifying and describing VECs is to focus on those environmental, social, cultural and economic factors that are of greatest relevance to the proposed Project. The description of VECs has been prepared using guidance documents for preparing a Project Description and Technical Proposal for federal and provincial regulators, respectively (see Section 1.6 and 1.7) as well as the professional experience of Stantec, who has completed VEC scoping on numerous EAs. The selection and description of each VEC has factored in FPV's proactive approach to environmental management (see Section 2.2). For each VEC, the sub-sections below describe the rationale as to why the VEC was selected; provides a summary of existing conditions for each VEC and describes potential project environmental effects and mitigation.

In doing so, the evaluation inherently considers cumulative environmental effects of past, present and future projects. The description of existing conditions reflects consideration of past and present projects and activities, many of which will continue into the future at current levels. Within the lands of the MFN, there are no likely future projects planned other than the proposed Project. In the EIS, cumulative effects will be broadly considered in compliance with the TOR and Project-specific EIS Guidelines. Following the guidance of the Canadian Environmental Assessment Agency *Guide to Preparing a Description of a Designated Project under the Canadian Environmental Assessment Act, 2012* (CEA Agency 2012a) and the Ministry of Environment of Saskatchewan *Technical Proposal Guidelines, a Guide to Assessing Projects and Preparing Proposals under the Environmental Assessment Act* (MOE 2012a) the information in this section is meant to provide a brief assessment of the environmental interactions of the Project; a detailed examination of the Project will be provided in the EIS.

4.1 Selection of Valued Environmental Components

VECs are important aspects of the biophysical and human environments that are considered to be important from public, First Nations, and/or scientific and technical perspectives. VECs are identified to focus the EA on those aspects of the environment that are valued, and most likely to be affected by the Project.

The selection of VECs is influenced by a number of factors, including:

- consultation with regulators that helped to identify issues of greatest concern to them (e.g., water use, TMA design and prevention of contaminant migration to aquifers, subsidence, SOMC);
- Aboriginal and public concern;
- an understanding of potential Project-environment interactions and potential effects through the experience of Stantec who has an extensive history with understanding and describing these interactions;

- an understanding of the sensitivity of the environmental aspects to perturbation; and
- experience with the design and implementation of practical mitigation by the Project team.

In planning for the Project and the EA, FPV has gained unique insight into the Project and related issues through its establishment of the JVA between Encanto and MFN to develop the Project. FPV has worked with Stantec and its engineering consultants (Novopro, MDH, North Rim, Agapito, RESPEC Consulting & Services, Institute for Rock Mechanics GmbH, and NG Consulting) to plan the Project with an understanding of the sensitivity of the receiving environment. Initial consultation activities and reviews of regional information have not identified the existence of a regional environmental study or land use management plan that has been completed or is ongoing in the area.

In consideration of this, FPV proposes that the EA of the Project focus on 11 VECs, reflecting the anticipated Project-environment interactions, and based upon an understanding of the biophysical and socio-economic environment at and near MFN and nearby communities. The scoping and description of VECs has considered parameters, such as magnitude, extent, duration, reversibility, frequency and probability of occurrence in contextualizing the potential effects. Proactive mitigation planning has focused on these parameters. The biophysical VECs to be considered are:

- Atmospheric Environment;
- Vegetation;
- Wildlife;
- Wetlands; and.
- Water Resources.

The recommended socio-cultural and economic VECs reflect a variety of receiving environment characteristics such as the First Nation communities, agricultural land use, and the capabilities of the surrounding rural municipalities and small communities to adapt to the presence of a large mining operation, and include:

- Muskowekwan First Nation Community;
- Employment and Business;
- Land and Resource Use;
- Aboriginal Land and Resource Use;
- Heritage and Historic Resources; and
- Community Services and Infrastructure.

The VECs initially selected for this assessment are identified and briefly discussed within Tables 4-1 and 4-2, including the potential environmental effects to be assessed.

Table 4-1 Potential Biophysical VECs

VEC	Potential Environmental Effects	Discussion
Atmospheric Environment	Change in air quality Change in sound quality Change in climate	Air emissions from construction and mining activity may adversely affect air quality. FPV is committed to implement BMPs for management of emissions and will meet all applicable air standards. The EIS will include an inventory of the major sources to inform the evaluation of potential environmental effects and the development of specific mitigation to be incorporated within the environmental management framework for the Project. Noise generated by construction and operation activities may affect local communities and residents, and related land use. Many design features and BMPs can be implemented to mitigate noise and it is anticipated that noise will likely be of no or minor concern. However, baseline noise data is being collected, having commenced in July 2012, along with an inventory of major sources so that they can be evaluated against applicable standards in the EA process, and to identify any specific need for mitigation. FPV is committed to mitigate emissions to relevant standards. GHG emissions from equipment and vehicles potentially can, albeit in a relatively small way, contribute to global climate change. However, FPV will implement BMPs, such as and equipment idling policy, equipment selection to reduce GHG emissions, and the use of a co-generation power supply.
Vegetation	Change in vegetation species and communities	FPV has reviewed available baseline data and conducted vegetation surveys in support of the EA based on preliminary facility locations as of spring/summer 2012. Additionally, Encanto commissioned Stantec to complete a constraints analysis for vegetation for SOMC to support pre-feasibility studies. These data will support evaluation of project-environment interactions, particularly on SOMC and biodiversity. FPV will employ standard mitigation strategies including avoidance. A site selection protocol will be implemented during the well pad development phase to help avoid or reduce interactions with sensitive environments. Such measures will be described in the EA and included in the EPP and more broadly as applicable within the environmental management framework.
Wildlife	Change in wildlife populations	FPV has reviewed available baseline data and conducted wildlife surveys based on preliminary facility locations as of spring/summer 2012 in support of the EA that will be reported in the EIS. Additionally, Encanto commissioned Stantec to complete a constraints analysis for wildlife for SOMC to support pre-feasibility studies. These data will support evaluation of Project-environment interactions on SOMC, including important habitat, species at risk or with legislated protection, and biodiversity. FPV will employ standard mitigation strategies including avoidance through siting and restricting disturbance in sensitive biological periods. Such measures will be described in the EA and included in the EPP and more broadly as applicable within the environmental management framework.

Table 4-1 Potential Biophysical VECs (cont'd)

VEC	Potential Environmental Effects	Discussion
Wetlands	Change in wetland function	FPV has reviewed available baseline data and has conducted surveys in support of the EIS based on preliminary facility locations as of spring/summer 2012. FPV will evaluate the Project-wetland interactions focusing on how the Project might affect functional capabilities, including the habitat they provide for vegetation and wildlife species, and other functions such as those related to the hydrologic cycle. FPV will employ appropriate mitigation strategies including avoidance and mitigation (including compensation), as applicable and in accordance with federal and provincial policies and regulation.
Water Resources	Change in quality of ground and surface water Change in quantity of ground and surface water	The EIS will consider baseline water quantity and quality data for both groundwater and surface water resources. These resources are important to the industries, communities and residents who depend upon them, and the natural environment. A groundwater source may be used for early phases of the Project until the long-term water supply is built and operational. Project infrastructure will be developed, including mining activities and temporary groundwater supply, so that groundwater quantity and quality will not be adversely affected significantly. The details of the environmental effects of the Project on Water Resources and the planned mitigation will be described in detail in the EA and supporting studies being conducted for the feasibility study. The EA of the water supply pipeline will be completed by SaskWater and under their mandate. As a result, the surface water quantity will focus on the localized and regional hydrology as it relates to potential changes from subsidence.

Table 4-2 Potential Social, Cultural and Economic VECs

VEC	Potential Environmental Effects	Discussion
Muskowekwan First Nation Community	Change in community	Potential positive benefits to the social and economic well-being of the community and residents include increased employment, business income, financial resources to support a wide range of social infrastructure (housing, clinics, schools, etc.), training programs, improved economic stability, and new opportunities to allow MFN members to live on or near the home Reserve. Potential adverse effects relate to a variety of issues that have been expressed during open house meetings. For example, two concerns expressed during the first stages of consultation were: 1) the community and residents may be unprepared for a dramatic increase in financial benefits, with many not having the training to manage their money; and 2) job opportunities may be made available, but if training programs don't begin soon enough, tickets may not be obtained in time to get the good jobs. Recognizing this, FPV is committed to ensuring training programs are in place early in the Project, providing opportunities for the community members to participate. Additionally, preferential hiring and contracting policies will benefit MFN and a number of other First Nations in the region. FPV is committed to optimizing and enhancing the positive benefits of the Project, and reducing and managing the potential adverse effects.

Table 4-2 Potential Social, Cultural and Economic VECs (cont'd)

VEC	Potential Environmental Effects	Discussion
Employment and Business	Change in employment Change in business	The Project will provide important positive employment and business opportunities to several First Nations and communities within the region. Job and contracting opportunities will be particularly important to the First Nations who are actively participating in this Project. FPV is committed to work with First Nations and communities to optimize and enhance benefits and reduce potentially adverse effects.
Land and Resource Use	Change in land and resource use	The Project will, in some locations, remove agricultural land from production. Project activities may also temporarily affect other land and resource uses such as sport hunting. FPV is committed to reducing or avoiding the potential effects of the Project on Land and Resource Use and will work with the community and other land users to access and manage these. Where appropriate, land and resource use may require special mitigation or compensation, should mitigation not be totally effective. In particular, FPV will work within the legislative framework for mine reclamation to reclaim and rehabilitate land for future use upon the completion of mining activities. Where possible, progressive reclamation will be implemented.
Aboriginal Land and Resource Use	Change in Aboriginal land and resource use	MFN has recently completed a TLU study and has agreed to share this information with the Project. The TLU study information will supplement already completed consultation with MFN members regarding input on culturally sensitive lands and be used to identify locations within the proposed facility site and well development area having importance to the local community. The traditional activity areas include hunting, trapping, and mushroom and berry picking locations. Mitigation measures can be developed to avoid or reduce the adverse effects upon these resource use activities and areas. FPV will also work with other communities where there is potential for the Project to result in effects on Aboriginal Land and Resource Use to obtain information on TLU. FPV is committed to working with First Nations to mitigate such potential effects and the participation of MFN as a partner in the Project will greatly facilitate the provision of offsetting benefits for any Project-related changes in Aboriginal Land and Resource Use. Neighbouring Touchwood Agency First Nations will also benefit through preferential hiring and contracting initiatives. Siting criteria for the plant site, which is the major area of physical impact, took into consideration traditional land use and resulted in the site being located on TLE and pre-reserve lands that have only recently become MFN lands. Lands subject to well development have been located as much as is feasible to limit potential effects on areas of relatively contiguous native vegetation. For more than 100 years these lands were owned and occupied by non-Aboriginals, with little opportunity for MFN members to practice traditional activities on these lands.

Table 4-2 Potential Social, Cultural and Economic VECs (cont'd)

VEC	Potential Environmental Effects	Discussion
Aboriginal Land and Resource Use (cont'd)	Change in Aboriginal land and resource use (cont'd)	As part of ongoing engagement activities (see Section 3), Traditional Knowledge will be sought from First Nation and Métis communities within 25 km of the proposed plant site; however, further communities will be included if initial engagement activities and ongoing baseline data gathering indicate that it is warranted and/or as directed by regulatory authorities.
Heritage and Historic Resources	Change in heritage and historic resources	Several heritage resource locations are known and can be avoided by mine activities. Further investigations will be implemented to evaluate the potential effects and to identify mitigation, following established procedures. It is known that burials exist at various unmapped locations on MFN. There is also a potential for culturally valued spaces where traditional practices and ceremonies occur and medicinal plants are gathered. FPV will conduct further investigation in cooperation with MFN to map these locations for avoidance or mitigation. This new knowledge can be a positive benefit to MFN community, further documenting their history of occupation and use.
Community Services and Infrastructure	Change in community services and infrastructure	There are potentially positive benefits associated with these effects as jobs and business opportunities may be created in order to meet the demands of the mine and the potential increased population. There will be increased demand for housing, hotels, restaurants and other services during the construction phase, with some of these demands continuing in the operation phase. Police, medical and schooling services will potentially experience increased demands. These aspects will be considered in the EA and FPV is committed to assess and recommend or implement mitigation for any potential environmental effects. Particularly, FPV will work with the regulatory authorities and communities responsible for Community Services and Infrastructure to address potential concerns. Some provincial and municipal roadways will experience increased traffic and the need for maintenance and perhaps improvement. Further study on traffic volumes and the potential effects on the road network and its travel patterns and volumes will be conducted in support of the EIS. FPV is committed to developing mitigation strategies in cooperation with regulatory authorities and communities responsible for the transportation network.

In selecting VECs, FPV also considered the Aquatic Environment, Soils and Terrain, and Public Health and Safety as candidate VECs but concluded that either the potential environmental effects on these components would not be substantive, or they will be addressed through the consideration of particular interactions within other VECs (see Table 4-3).

Table 4-3 Potential VECs Considered and Excluded

Potential VEC	Potential Environmental Effects	Discussion
Soils and Terrain	Disturbance to sensitive terrain and soils (e.g., sandy environments) resulting in an important adverse change to Soils and Terrain	The landscape is dominated by sandy and clay loams having some agricultural potential. However, based on desktop sources, there are no sensitive terrain units such as sand hills, or erosion prone slopes. Baseline studies will be completed at the facility site, wells, and along pipeline and road ROWs to provide information for future reclamation and to confirm the absence of sensitive soils and terrain. BMPs and proven mitigation measures will reduce the degree to which project-terrain interactions may occur. Therefore, this environmental aspect will not be explicitly considered as a VEC in the EA, but indirectly in Land and Resource Use as it relates to agricultural potential. If ongoing engineering studies show that effects to terrain may occur due to subsidence that are not considered in other VECs, then terrain may be added as a VEC.
Aquatic Environment	Change in fish populations	Fisheries studies completed in 2012 indicate that the local environment has no fish resources, with the exception of some minnow species. This conclusion is supported by residents of MFN, including hunting and fishing guides, who have stated there is no traditional, commercial, or recreational fishing activity on or near the reserve. The Project area lies on a drainage divide with no streams nearby to connect the wetlands to each other. This environmental aspect is therefore not of concern and will not be considered, subject to the confirmation of subsidence and hydrological technical studies.
Public Health and Safety	Construction and operation phases may provide potentially unsafe situations affecting both workers and the residents of the area and a substantive adverse change in public health and safety.	Public health and safety is an important concern, but is also one that can be managed through the use of BMPs and adherence to Occupational Health and Safety Guidelines. Indeed, the selection of solution mining as the preferred method was, to some degree, a recognition of improved worker safety relative to conventional mining. The potential for health effects due to Project emissions will be considered in relation to the Atmospheric Environment. Road safety will be considered in relation to Community Services and infrastructure. Therefore this aspect will not be considered as a VEC in the EA.

For the Aquatic Environment, there is no fish and fish habitat, particularly supporting a fishery that is likely to be affected by the Project. However, technical studies of subsidence and the future drainage network as a part of the feasibility study and EA will confirm that the Project will not alter fish and fish habitat. The TOR and/or EIS Guidelines will include consideration of fish and fish habitat as a VEC if ongoing engineering and environmental studies indicate such unanticipated environmental effects.

For Soil and Terrain, it is felt that the issues around these aspects are addressed through their consideration in other VECs. Soil is a concern primarily as its value and capability for agriculture and as a medium for the support of habitat for flora and fauna. The environmental effects of the Project on soil will therefore be considered in relation to Land and Resource Use, Wildlife, and Vegetation. Like the Aquatic Environment, changes in terrain would primarily be a concern should subsidence affect topography in a

way that might affect Water Resources or Aquatic Resources. Studies related to subsidence will inform the extent of and need for the consideration of terrain.

Public Health and Safety will also be considered in relation to other VECs. For example, changes in traffic and potential vehicle accident rates would be considered in Community Services and Infrastructure. Air emissions and sound emissions would be considered in Atmospheric Environment and also in Land and Resource Use.

Subsequent sections describe each potential VEC in additional detail. Specifically, a summary of existing conditions is provided as well as a description of the potential effects and mitigation strategies.

4.2 Atmospheric Environment

The Project will result in air emissions, including GHGs and sound. Given the scale of the Project and potential emissions, it is recommended that the Atmospheric Environment be considered as a VEC in the EA.

4.2.1 Existing Conditions

The Project occurs in an area with extensive agricultural developments, including active cultivation and, as such, has existing air quality and noise conditions typical of a rural, prairie environment. In general, air quality is good with localized periods of decreased air quality mostly due to farming and CN main line rail activities (e.g., dust from exposed fields and cultivation). Noise levels in this type of environment are primarily influenced by natural sound, domestic activity, local traffic, birds, locomotive and train activity and aircraft flyovers, as well as frequent freight train traffic on CN's main line.

Existing data regarding air quality and the acoustic environment were reviewed to document baseline conditions related to criteria air contaminants (CACs) and noise levels that may be relevant to the Project. Site-specific air quality monitoring data are not currently available for the proposed Project site. However, air quality data for other solution potash mine projects have been collected in similar prairie, agricultural landscapes and indicate general air quality conditions; these data will inform the EA and be included in the EIS, as appropriate.

FPV is currently acquiring site-specific air quality data to support the preparation of the EIS and the development of mitigation, as required. Other air quality data collected at regionally representative sites are also being collected and will be used to determine concentrations representative of baseline or background conditions for 1-hour, 8-hour, 24-hour, and annual average intervals for sulphur dioxide (SO_2), carbon monoxide (CO), nitrogen dioxide (NO_2), total suspended particulate (TSP), and particulate matter (PM) with diameter smaller than 10 micrometres (PM_{10}) and smaller than 2.5 micrometres ($PM_{2.5}$). The nearest station collecting air quality monitoring data representative of a rural environment is the federal National Air Pollution Surveillance station in Bratt's Lake (SO_2, CO, NO_2, PM_{10}, and $PM_{2.5}$), located approximately 125 km southwest of the Project facility site.

Site-specific meteorological data are also not available for the Project site. The nearest station collecting representative meteorological data is at Wynyard, located 60 km to the north. These data (e.g., surface

wind speed, wind direction, temperature, relative humidity, and pressure) will be used primarily to develop meteorological inputs for the dispersion model used in the EA. Other data collected at regionally representative sites will be used to supplement these data and provide the parameters not measured at Wynyard (e.g., dew point, cloud cover, and precipitation). These sites include the Saskatoon and Regina airports, which are meteorological stations maintained by the Meteorological Service of Canada.

Similarly, site-specific existing sound levels are not available for the proposed Project site. However, sound levels have been quantified at other potash project sites that occur in a similar prairie, agricultural environment and these can give an indication of general baseline noise levels and will inform the EA. For example, pre-project baseline noise monitoring at the Legacy Project site (Golder 2010) found that average daytime sound levels ranged from 43 to 48 dBA and that average nighttime sound levels ranged from 40 to 45 dBA.

Since there are no site-specific sound data currently available, baseline field studies are being conducted to characterize the existing sound levels at the Project location; these data will be reported in the EIS. Since Saskatchewan does not have specific noise standards or guidelines, the baseline noise sampling will follow procedures recommended in the Alberta Energy Resources Conservation Board's (ERCB) Directive 038. According to the ERCB guidelines, in rural areas, the ambient sound level can be influenced by natural sources such as insects, animal, wind induced noise from trees, and waterbodies. The Project location is approximately 5 km north of Highway 15 and a CN rail line, both of which likely also influence baseline sound levels at the Project location. Typically, short-term (hourly to 24 hours) ambient nighttime sound levels can range from the quietest level of 26 dBA up to levels exceeding 35 dBA, depending on measurement time period, location, and meteorological conditions. The sound level of 35 dBA is considered an accurate representation of the typical long-term ambient nighttime level for rural areas, based on historical ambient data measurement and consultation with stakeholders when the ERCB established Directive 038. Baseline sound data collected at the Project site will be used in the noise dispersion modeling that will be conducted to assess changes in sound levels caused by the Project.

4.2.2 Potential Effects and Mitigation

The Project will meet or exceed all applicable air quality and noise standards and guidelines. In order to achieve this, FPV has committed to implementing appropriate mitigation to manage potential air quality and noise effects. The source and management of such effects are described below.

The key air quality issues include potential effects on local air quality due to added emissions of CACs and potential effects to climate due to incremental emissions of GHGs. Local air quality, as well as surrounding soil and vegetation, will also be potentially affected by the deposition of potash and salt dust on the ground surface. These potential effects will occur from air emissions associated with natural gas combustion, product storage and conveyance, off-road and on-road vehicle and equipment gasoline and diesel-fuelled engines, and fugitive dust from roads. The emissions typically include CACs (nitrogen oxides (NO_x), sulphur oxides (SO_x), CO, TSP, PM_{10}, $PM_{2.5}$), GHGs (primarily carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O)), and PM.

FPV will implement a number of standard mitigation measures during construction that will limit the magnitude of air quality and noise effects in compliance with applicable legislation and standards. Furthermore, FPV has integrated design features that will serve to reduce emissions at the source, particularly during operation, including incorporating best available technology economically achievable to reduce CACs, fugitive KCl dust, and GHG emissions wherever possible and employing BMPs during construction. These may include using high efficiency natural gas-fueled devices, dust collection bag house systems, and the use of well-maintained off-road and on-road vehicles.

Construction vehicles and equipment may increase the ambient sound level at noise-sensitive receptors (i.e., residences) at or near the Project. In particular, sound from heavy equipment, such as excavation equipment, piling equipment, drill rigs, diesel-powered generators, compressors, and mobile equipment with back-up alarms, as well as vehicle traffic, are potential noise sources during the construction phase. During operation, noise sources associated with the facility site, well pads, and railway spur line may affect the ambient sound level at noise-sensitive receptors. However, FPV is committed to reducing noise emissions from the Project during both construction and operation to ensure noise levels meet the permissible levels recommended in ERCB Directive 038. This will be accomplished through measures such as enclosing stationary equipment inside industrial buildings where feasible, adhering to a daytime schedule for construction activities to avoid nighttime sound disturbances, ensuring that all gasoline and diesel-powered engines are fitted with appropriate muffler systems and maintained in good working order, and using existing on-site buildings to provide acoustical screening for noise receptors. These mitigation measures will be clearly outlined in the EPP.

4.3 Vegetation

The Project will result in ground disturbance that will affect vegetation, including some natural habitats that have the potential to harbour SOMC. Consequently, Vegetation is recommended as a VEC for the EA.

4.3.1 Existing Conditions

The Project area occurs within the Touchwood Hills Upland landscape area of the Aspen Parkland Ecoregion. Vegetation communities in the Project area are highly fragmented due to the influence of agricultural land uses that dominate the landscape. However, patches of good quality habitat remain in the region with some areas being potentially suitable for rare plants or communities. Such areas are typically related to remnant patches of native vegetation and, more specifically, treed and wetland areas that have not been cleared for agricultural purposes. While these areas have also been subjected to edge effects and some invasive species, they contain a semblance of native species.

The Southern Digital Land Cover was reviewed to determine existing vegetation communities (SRC 1997). Land cover classes present within the Project area include: cultivated land, hay crop (forage), native dominant grassland, tall shrub, pasture (seeded grassland), open hardwood tree stands, waterbody, marsh, herbaceous fen, mud/sand/saline, and farmsteads (see Figure 4-1). For the purposes of this document, a biophysical study area has been established (see Figure 4-1) to facilitate the definition

of VECs and to focus the description of existing biophysical resources in the region. The intent is to use this area as a basis for describing potential direct and indirect Project effects and identifying environmental management strategies to address such effects in this early Project planning. Based on this information, the biophysical study area is dominated by cultivated land (60%) (see Photo 1). Native grassland makes up the next dominant vegetation community (17%), but is mainly concentrated in the western half of the MFN Reserve and immediately south of the southwestern corner of the reserve (see Photo 2). Elsewhere, native grassland is limited to small fragments, surrounded by agriculture. Tall shrub (7.6%) and hardwood tree stands (6.6%) also make up a small percentage of the vegetation communities in the biophysical study area. The proposed facility site location is dominated by cultivated land (95%).

A search of the Saskatchewan Conservation Data Centre (SKCDC) database was conducted for a 5 km radius from the proposed facility site to include the area in which the wells and associated infrastructure will occur. No rare plant species have been recorded in this area (MOE 2012c). Although rare plant species have not been documented in the Project area in the provincial database, they might still occur if suitable habitat is present. Existing vegetation communities that have the potential for rare species include native grassland, tree stands, and wetland riparian zones. A minimal amount of these habitat types occur within the facility site. From a regional perspective, rare plant species that might occur in the Touchwood Hills Upland landscape area include small yellow lady's slipper (*Cypripedium parviflorum var. makasin*), five-foliate cinquefoil (*Potentilla nivea var. pentaphylla*), and Canada mountain-ricegrass (*Oryzopsis canadensis*) (SKCDC 2012).

Based on preliminary facility locations as of spring/summer 2012, baseline vegetation data have been collected in the field in 2012 to confirm desktop information, document vegetation and wetland communities, and determine if rare plant species occur in the Project area. Preliminary results indicate that a number of occurrences of small yellow lady's slipper were found. This plant species is ranked provincially as S2S4, meaning that it is considered rare (S2) to common (S4) in Saskatchewan; the combined ranking indicates that existing information on this species overlaps the criteria defining two separate ranks. This species is considered sensitive but is not legally protected provincially or federally. A comprehensive review of the data is currently ongoing and the final results will be presented in the EIS. The EPP will outline site selection procedures to avoid rare plant locations, as well as appropriate mitigation if the location of Project infrastructure cannot be sited to avoid rare plant locations identified within the Project area.

Photo 1 **Typical Cultivated Agricultural Landscape taken on June 11, 2012 in SE 30-27-14 W2M looking North West**

Photo 2 **Native Prairie with Upland Deciduous in the Background taken on Aug 8, 2012 in NE 24-27-15 W2M looking West**

MUSKOWEKWAN POTASH PROJECT

Vegetation and Wildlife Resources

Projection: UTM Zone 13 NAD 83
Acknowledgements: Original Drawing by Stantec. Project Data:
Novapro (20121128). TLE: NorthRim April 2012. Basedata: Geosask, Canvec 10.
Rare Species: CDC, Landcover: SDLC AAFC

N

- Rare Species

Landcover Units

- Cultivated Land
- Hay Crop (Forage)
- Native Dominant Grassland
- Tall Shrub
- Pasture (Seeded Grassland)
- Hardwood Open
- Waterbody
- Marsh
- Herbaceous Fen
- Mud/Sand/Saline
- Farmstead

- Biophysical Study Area
- Proposed Facility Site
- Proposed Mine Well Field
- Proposed Rail Spur

Land Status

- Indian Reserve
- TLE Land - Muskowekwan
- Pre-reserve Land - Muskowekwan
- TLE Lands (Other)
- Major Road
- Minor Road
- Railway
- Urban Municipality

0 1.5 3 4.5

Kilometres - 1:120,000

113253770-071 REVE

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AB SK MB Saskatoon Regina Area of Interest USA

FIGURE NO. 4-1

Last Modified: Nov 30, 2012 By: aobon

4.3.2 Potential Effects and Mitigation

The siting of well pads will target areas of pre-disturbed lands, where possible, and will limit vegetation loss in areas of remnant native patches by siting at edges (i.e., breaks between treed and agricultural lands). Where effects may occur to vegetation communities and rare plants, they mostly relate to ground disturbance activities, including clearing activities for the construction of the facility site, well pads, pipeline, access roads, and rail spur line. Clearing activities will result in the incremental loss of vegetation and wetland communities, including rare plants that may occur within these communities. However, this will be limited by the use of PDAs and use of final siting criteria that balances the ability to target the resource with avoidance or reduction in vegetation loss. For example, the proposed facility site was selected to avoid native habitats as much as possible (i.e., 95% currently disturbed agricultural land use). The well pads and road and pipeline ROWs within the well field will be sited to avoid native vegetation communities where possible, and/or to reduce the effect on native vegetation communities by incorporating environmental design mitigation. Such mitigation may include siting criteria that result in disturbing the edge of a native habitat patch instead of cutting through its center, and/or placing new linear developments within the same ROW.

If any rare plant species or communities are found within the area likely to be disturbed by the processing plant and TMA, FPV will evaluate the feasibility of transplanting any such vegetation. Avoidance or the reduction of effects to rare plant species and communities will be included as a criterion to be considered in the selection of specific well pad and infrastructure locations during detailed design.

During operation, deposition of particulate matter on the surrounding vegetation may occur but FPV will meet applicable federal and provincial requirements and standards, thereby minimizing the effect on vegetation quality. Measures to mitigate emissions, which are described above in Section 4.2, will serve to reduce potential adverse effects of PM depositions on vegetation. FPV will also implement BMPs related to weed management to prevent and control the introduction and/or spread of invasive and/or non-native plant species.

4.4 Wetlands

Some wetlands are present within the facility site and range from small ephemeral depressions to those that contain standing water year-round. Land uses within the facility site are agriculture and have resulted in impacts up to the edge and in some cases through wetland features. . The Project is expected to result in some unavoidable environmental effects on them. Given the importance of wetlands and their various functions, it is recommended that the EA consider Wetlands as a VEC.

4.4.1 Existing Conditions

Wetlands are prevalent and interspersed throughout the surrounding landscape and the facility site (see Photo 3). Wetlands in the Project area are characteristic of the prairie pothole region of Saskatchewan and include five different classes of wetlands: ephemeral (Class 1), temporary (Class 2), seasonal (Class 3), semi-permanent (Class 4) and/or permanent (Class 5) (Stewart and Kantrud 1971). Field surveys were conducted in 2012 to document the distribution and classes of wetlands within the facility site, based on the preliminary location known at the time. Surface water quality was also measured at selected wetlands throughout the Project area.

Photo 3 Aerial Photo of Facility Site Location looking Southwest at NW 25-27-15 W2M (left side) and NE 26-27-15 W2M (right side) on May 15, 2012

4.4.2 Potential Effects and Mitigation

Well pads will not be located in wetlands or require the infilling of wetlands. Where possible, pipeline and access road ROWs will be sited to avoid the loss of wetlands as much as possible through Project planning and site selection of infrastructure locations, which will be reflected in the Project's environmental management framework. If roads and pipeline ROWs disturb well-established wetlands, such as Class 4 and 5, the effect on wetlands will be limited by routing infrastructure through wetland edges as opposed to traversing open water. Several wetlands in the Project area have riparian zones that have already been disturbed by human activities (e.g., cultivation, prescribed burns). Direct effects to wetlands are expected to occur from clearing activities for the construction of the facility site, which will result in the loss of wetlands within this area. Any potential to affect wetlands outside the well development area will be determined pending results of detailed engineering and will be mitigated to reduce these effects if they occur.

4.5 Wildlife

The Project will result in the disturbance of a considerable area of land that provides habitat for wildlife, potentially including SOMC and migratory birds (as defined in the *Migratory Birds Convention Act*), and Project activities will interact with wildlife directly. Consequently, it is recommended that the EA for the Project consider Wildlife as a VEC.

4.5.1 Existing Conditions

The landscape surrounding the Project site is dominated by agricultural land use and, as a result, is highly fragmented (see Figure 4-1). Sporadic patches of remnant native vegetation (i.e., those that have not been directly or recently affected by cultivation) or areas of vegetation that retain a semblance of native species composition exist that provide some good quality wildlife habitat in the region. The type, extent, and quality varies across the Project area but is not considered widespread and do not consist of very large patch sizes due to past disturbance. The area with the highest proportion and relatively greater levels of connectivity occur on MFN Reserve lands, particularly the western half of the reserve. The availability of habitat suitable for SOMC, which includes native grassland, pasture, tree stands, and tall shrub areas, is extremely limited within the facility site and limited in the broader region (32%).

The proposed facility site is located on predominately disturbed land with some wetland features and, as such, contains wildlife habitat more suitable for use by waterbirds and amphibians. The proposed well field will occur within this fragmented landscape; however, well development on the MFN Reserve overlaps with relatively more contiguous and larger wildlife habitat patches. Developments in these areas will be preferentially located on disturbed areas or edges of natural habitats where possible. The WDA over which wells and associated pipeline and roads will be constructed is shown on Figure 1-2. FPV will implement design mitigation, as outlined in the EPP, to ensure that well field infrastructure is situated in a manner that avoids and/or reduces impacts to native habitat as much as possible.

Several SOMC have the potential to occur at the proposed facility site and the broader Project area where suitable habitat exists. Stantec completed a constraints study in January 2012 to assess the potential for SOMC to occur within the Project area. This information has been used to inform the preliminary siting of facilities and will be described in the EIS. Desktop information included existing provincial databases, species range maps, and habitat maps; as well, discussions occurred with Environment Canada. Based on this study, several SOMC that have legislated protection (i.e., protection under either *The Wildlife Act, 1998* of Saskatchewan or the federal *Species at Risk Act* (SARA)) have potential to occur within the broader Project area. These species, along with their federal SARA status, include: northern leopard frog (Special Concern), chestnut-collared longspur (Threatened), common nighthawk (Threatened), loggerhead shrike (Threatened), Sprague's pipit (Threatened), red-headed woodpecker (Threatened), whooping crane (Endangered), yellow rail (Special Concern), and monarch butterfly (Special Concern). Of these species, six species were identified as being likely to occur within the Project area (northern leopard frog, common nighthawk, loggerhead shrike, Sprague's pipit, yellow rail and monarch) because of the presence of appropriate habitat to meet their life requirements, and three species had little likelihood of occurring (chestnut-collared longspur, red-headed woodpecker, and whooping crane) based on their respective species range and habitat suitability within the Project area.

Other SOMC that are not protected under legislation but considered sensitive by the province or identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) that may have the potential to occur within the Project area include: barn swallow, bobolink, horned grebe, and short-eared owl. Field studies have been conducted in 2012 to confirm desktop information and to determine whether any of the SOMC identified in the species at risk consultation study occur within the Project area. These studies are in progress and include amphibian, yellow rail, sharp-tailed grouse lek, breeding bird, and migratory bird surveys. Field studies have confirmed the presence of suitable habitat for certain SOMC and species observation data are currently being compiled and analyzed. The EPP will outline appropriate mitigation required if SOMC are identified within the Project area as described above.

There are no SOMC records in the SKCDC database for the proposed facility site (MOE 2012c). Within the broader region, the database has one record of a monarch butterfly (no observation date provided) located 7 km west of the facility site's western boundary. The quality, extent, and suitability of habitat for SOMC is variable across the region and while several areas have the potential to support SOMC, the limited quality and extent of habitat available makes their presence less likely for certain areas, including the proposed facility site. FPV will work closely with Environment Canada to understand the presence of critical habitat in areas that may be affected by the Project.

4.5.2 Potential Effects and Mitigation

Where suitable habitat exists, wildlife mortality could potentially occur, although planned mitigation is expected to minimize this potential environmental effect. Ground disturbance activities (e.g., site clearing and vegetation removal) particularly could cause wildlife mortality, especially during sensitive periods of the year (i.e., breeding and rearing season), because active nests and burrows could be destroyed, or fledglings/young or terrestrial adults (e.g., toads) might be unable to move quickly from the area. FPV is committed to minimizing activity in these sensitive periods. Any direct mortality would most likely be

related to ground-dwelling small mammals and birds, and such activities could affect their nests/dens and rearing features. Wildlife species that reside in or near the Project footprint will also be exposed to, and potentially disturbed by, sensory disturbance (i.e., from noise, sights, and smells) during construction and operations. Avoidance and scheduling of work can mitigate such potential environmental effects.

FPV has integrated several environmental management approaches to address potential wildlife issues up-front in the Project design. Specifically, and in order to address the issues of ground disturbance and sensory disturbances, FPV will time construction activities to avoid sensitive wildlife periods such as the breeding season and will establish setback distances and buffer zones around sensitive wildlife features such as nest/den sites or staging areas for SOMC according to regulatory guidelines. These measures will be clearly outlined in the EPP for construction and as outlined in the environmental management system document during operation. These measures will include a site selection protocol informed by field surveys and siting studies as required.

FPV is also committed to adhering to provincial guidelines such as *Disturbance Impact Thresholds: Recommended Land use Guidelines for Protection of Vertebrate Species of Concern in Saskatchewan* (MOE 2009) and avoidance guidelines outlined by Environment Canada to ensure the Project is in compliance with the *Migratory Birds Convention Act, 1994* (Government of Canada 1994), and *Migratory Birds Regulations* (Government of Canada 2012).

The desktop review also considered migratory birds which may occur in the biophysical study area, including areas of potential staging. Potential effects relate to direct and indirect disturbance to migratory birds, including mortality. However, FPV will reduce or avoid this potential effect by scheduling activities to avoid the breeding bird period or target cultivated areas for construction during this window.

Vegetation clearing and ground disturbance in contiguous patches of native vegetation could result in habitat loss and/or fragmentation which might affect habitat availability and suitability for some wildlife SOMC. Fragmentation will occur during the construction phase but its effects will persist into the operation phase. The loss of native prairie and tame pasture will affect grassland birds that may occur in the Project area, such as Sprague's pipit, while the alteration or loss of wetlands could affect SOMC such as northern leopard frogs and yellow rails. FPV will ensure that fragmentation of contiguous patches of native habitat is limited as much as possible by implementing environmental design mitigation such as paralleling new development to existing disturbances, disturbing the edge of a patch instead of cutting through its center, and/or placing new linear developments within the same ROW (i.e., access roads and pipelines to well pads). Potentially sensitive habitat areas were avoided as much as feasible in selecting the facility site. As noted above, well pad siting and ROW routing will also follow site selection protocols, to be outlined in the EPP, to avoid where feasible and otherwise mitigate potential effects on Wildlife.

Vehicle collisions with larger, more mobile wildlife (e.g., ungulates, birds) might result in wildlife mortality during both construction and operation. FPV will establish traffic management procedures, including speed limits for Project-related traffic, to reduce the likelihood of wildlife collisions. FPV will also establish appropriate policies for wildlife management in consultation with the MFN.

4.6 Water Resources

The Project will result in water withdrawals from both surface and groundwater resources. The Project may also affect surface water and groundwater quality, and changes in drainage pattern. Consequently, it is recommended that the Project consider Water Resources as a VEC.

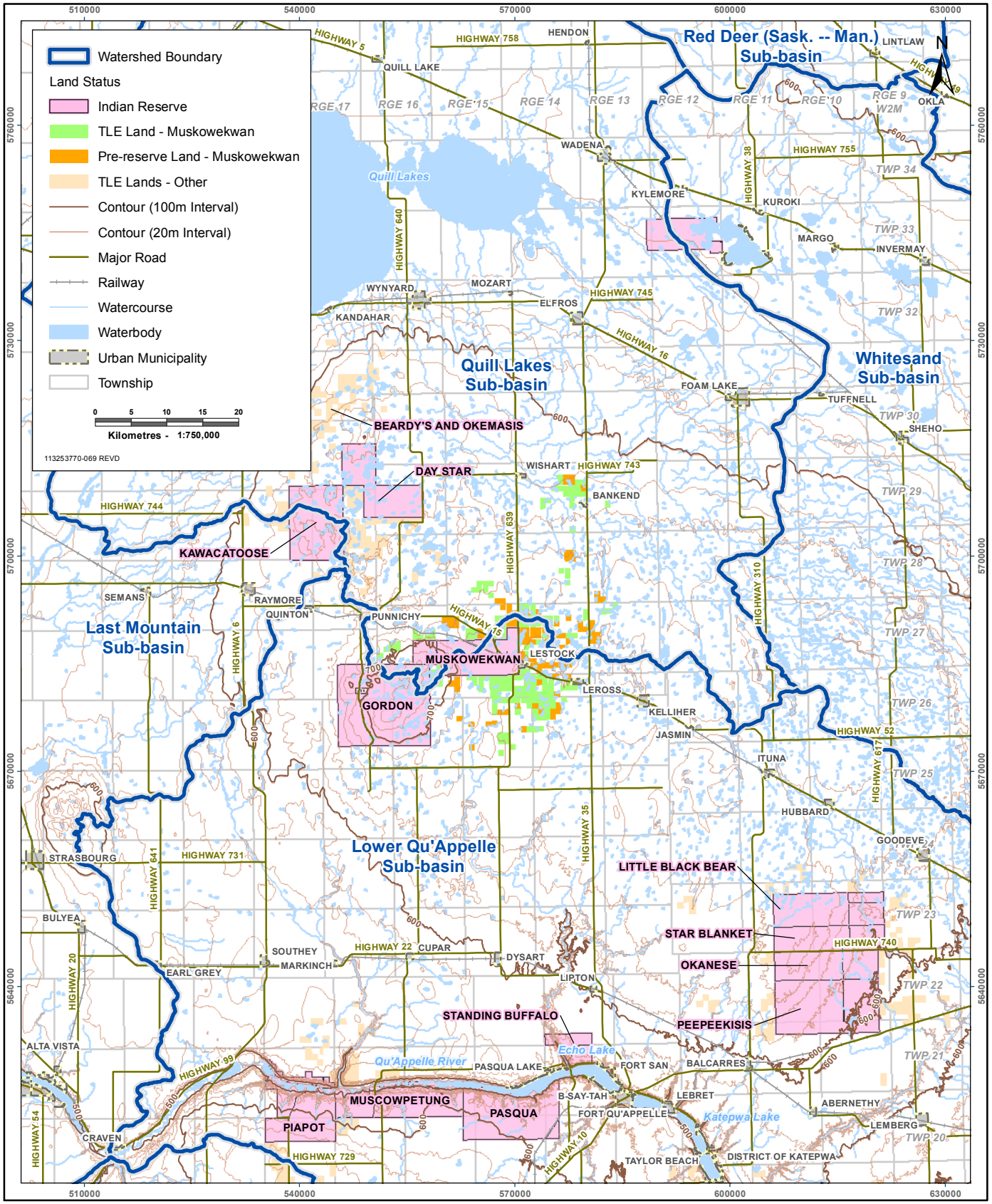
4.6.1 Existing Conditions

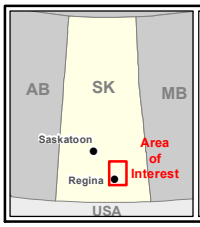
4.6.1.1 Surface Water Quantity and Quality

The Project straddles the divide between two major watersheds: the Qu'Appelle River watershed and the Quill Lakes watershed within the South Saskatchewan River watershed (see Figure 4-2) and lies within an agricultural environment having many wetlands but no well-defined creeks or rivers. Regionally, the drainage system is also highly dominated by wetlands. The two main drainage systems are the Birch Creek (1,146 km²) and Jumping Deer Creek (1,676 km²) systems.

Baseline hydrology information is generally lacking for the Project area. However, a hydrologic model (including average annual flow, monthly flows, and peak flows) of the watersheds within the Project area will be developed in order to complete a baseline study for the EIS to characterize the hydrology of the Project area. The study will facilitate an evaluation in the EIS of how the Project may interact with drainage and water balance, including changes that might arise from changes in drainage pattern due to subsidence. This will be discussed in the EIS.

The hydrology of prairie wetlands and lakes is characterized by the introduction and accumulation of nutrients from surface runoff and accumulation of total dissolved solids over the years. Data regarding existing surface water quality is currently being collected in 2012 for the wetlands and shallow lakes in the Project area. As this region has experienced little development other than agriculture, small community development, and transportation infrastructure (vehicle and rail), it is expected that the existing surface water quality will be typical of other prairie wetlands and shallow lakes. Shallow prairie lakes are generally alkaline in pH, highly buffered, with variable hardness and salinity.





MUSKOWEKWAN POTASH PROJECT

Surface Hydrology Features and Sub-basins

Acknowledgements: Original Drawing by Stantec. Basedata: Canvec Ver10 2012, GeoSask. Hydro: 250K Watersheds: Geogratis, Altas of Canada. TLE Lands: NorthRim April 2012

PREPARED BY Stantec

PREPARED FOR

FIGURE NO. 4-2

Last Modified: Nov 28, 2012 By: aolson

Groundwater quality and quantity, hydrology, and sediment and soil chemistry can all affect surface water quality. The basic chemistry of shallow lakes often reflects local groundwater chemistry where surficial aquifers are unconfined (University of Alberta 2005). Seasonally, water quality is higher during spring snow melt and lower in late summer. Shallow prairie lakes naturally contain elevated levels of nutrients, such as nitrogen and phosphorus, making them mesotrophic to eutrophic. Natural, seasonal processes (e.g., mineralization, volatilization, and precipitation) cause water to improve in quality. Alternatively, weather events or anthropogenic inputs can have the reverse effect of reducing water quality. Prairie lakes and ponds that occur in proximity to agricultural land uses typically include contaminants, such as nutrients and herbicide and pesticide residues (Loehr 1975).

4.6.1.2 Groundwater Quantity and Quality

Groundwater quantity and quality is related to the geologic stratigraphy of the Project area, which consists of the following units (in ascending order) (MDH and Stantec 2011):

- The Pierre Formation: Upper Cretaceous bedrock consisting of a thick sequence of marine shales. The Pierre Formation forms the bedrock surface and pre-glacial and glacial erosion is interpreted to have created a structural surface with relatively high relief in the Project area.
- The Empress Group: Tertiary and Lower Quaternary unconsolidated deposits of fluvial, lacustrine, and colluvial origin. These deposits unconformably overlie the bedrock surface and can be further divided into upper and lower units. The lower unit is a pre-glacial deposit consisting of non-calcareous clastic deposits. The upper unit is found at higher elevations of the Hatfield Valley and associated tributaries and comprises generally calcareous deposits.
- The Sutherland Group: Quaternary sediments comprising glacial till. The Sutherland Group can be further separated into three formations: the Mennon, Dundurn, and Warman Formations. Each of these formations represent at least one distinct glacial period.
- The Saskatoon Group: Quaternary sediments comprising glacial till. The Saskatoon Group can be differentiated from the Sutherland Group on the basis of resistivity signatures, lithologies, geotechnical properties, and carbonate content. In general, the Saskatoon Group is higher in carbonate content and coarser than the underlying Sutherland Group formations. The Saskatoon Group can be further separated into the Floral Formation, Battleford Formation, and surficial deposits.

Within these geological units, there are several units with sufficient permeability to be considered aquifers. The baseline quality and quantity of potential aquifers for use as temporary water supply during cavern development (i.e., until the surface water supply infrastructure is commissioned) and/or for potable water supply and back-up process water supply will be determined through a feasibility study to be completed. Results of the existing conditions, potential for use, as well as consultation with MOE, will be summarized in the EIS.

4.6.2 Potential Effects and Mitigation

4.6.2.1 Surface Hydrology Quantity and Quality

Environmental management strategies have been developed to limit potential effects on surface water features. Effects from the Project primarily relate to changes to infiltration rates, loss of a small proportion of wetlands from facilities, and alterations to surface drainage due to subsidence. During construction, soil compaction as well as an increase in impervious surfaces due to the presence of buildings, and paved areas, may result in temporary and/or permanent changes to infiltration rates. Several design mitigation and effects management protocols have been used in the preliminary design and layout of facilities that consolidate disturbances (i.e., shared ROWs for infrastructure, design optimization studies to reduce water use and TMA size) to reduce the Project footprint and associated changes to infiltration rates. Increased erosion during construction also has the ability to reduce water quality; however, an EPP, including erosion and sediment control measures will be implemented to avoid or reduce potential effects to surface water bodies. The feasibility study will include investigation of the potential rate of subsidence to ensure that it is within acceptable limits and to determine the extent to which the landscape may change and alter local drainage and hydrological characteristics.

Initial construction of the surface facilities and infrastructure, expansion of the well field during mining, and construction and use of the TMA will result in the removal of small surface water bodies and/or the loss or alteration of local flows and change in drainage patterns and drainage areas. FPV is committed to developing a stormwater and industrial runoff management plan that will direct surface runoff from undeveloped areas of the Project site toward natural drainages or use engineered drainages to bypass facilities and tie into pre-existing natural pathways, so that flow will continue. Treatment, if required, will be implemented, along with standard erosion and sediment control mitigation.

As noted above, over time the Project will result in subsidence of the ground surface. This will result in changes to surface water flow patterns and the number, type, and distribution of surface water bodies. Subsidence studies and modeling work is being completed to ensure that changes in surface conditions are within acceptable levels and rates. In the EIS, estimates of the timing and extent over which subsidence and changes to surface flow patterns from the Project will occur will be presented. The hydrologic model will simulate hydrologic conditions during the life of the Project, based on estimates of changes in infiltration (i.e., due to impervious areas), removal of flow contributions from the developed areas (i.e., core facilities), and subsidence over time.

The operation phase may have potential effects on surface water quality. For example, these may include direct effects of the Project on surface water quality due to dust, air emissions, or accidental spills; and indirect effects associated with the diversion of surface water around the Project, or changes in drainage patterns due to subsidence, which may indirectly affect water quality by altering the water balance in the wetlands in and around the site. Mitigation measures related to subsidence and surface water (stormwater and industrial runoff) management were described previously. In addition, FPV will implement environmental BMPs to control dust, reduce emissions, and prevent (and respond to) accidental spills. Industrial runoff and waste brine will be re-used in the process, and excess waste brine will be disposed of by deep well injection. There will be no discharge of industrial runoff, brine, or process

effluents to surface water. Water releases from lagoons or other sources will be subject to all applicable guidelines and all relevant permits and approvals from WSA and MOE will be obtained and adhered to.

4.6.2.2 Groundwater Quantity and Quality

Construction of surface infrastructure, such as road, rail, and pipelines, and the processing plant and TMA will result in changes in grade elevations, minor alterations to the surface drainage patterns, and impoundment of water, which may alter local infiltration rates and groundwater flow patterns. The quantity, distribution, and flow of shallow groundwater may also be affected by subsidence over the long term. A groundwater source may be used for early phases of the Project until the long-term water supply is built and operational. Although this would be a temporary activity, if drawn from the Empress/Hatfield Valley aquifer, this use could have an adverse environmental effect upon other water users in the region. FPV is currently completing studies to determine what aquifers are suitable for this use and to better assess the potential environmental effects on a regional basis. Use of groundwater as a source for early cavern development will be verified through these investigations and modeling activities to determine the feasibility of this plan. Project infrastructure will be developed, including mining activities and temporary groundwater supply, so that groundwater quantity and quality will not be adversely affected significantly. FPV has retained the services of groundwater experts, MDH, to complete investigations into temporary groundwater use for the Project.

Groundwater quality may be adversely affected by accidental releases of products (e.g., fuel, diesel oil, chemicals) through:

- unexpected loss or escape of drilling or production fluids;
- intermediate casing failure;
- surface spills from vehicles and equipment or during transport, transfer, storage, or handling of products; and
- pipeline leaks.

Prevention measures, emergency response protocols, and environmental protection measures will be in place to address such situations in the Emergency Prevention and Response Plan.

Groundwater quality may also be affected by runoff and seepage from potash and salt storage piles and the brine pond. To avoid these potential effects FPV contracted MDH, one of Canada's leading hydrological and TMA design experts, to help site the TMA. MDH has consulted on all recent potash TMA designs in Saskatchewan. The location of the TMA was selected on the basis of the hydro-stratigraphic and geotechnical data demonstrating the suitability of the underlying till to limit vertical and horizontal migration of brine from the TMA. The TMA is underlain by thick till with low permeability, which reduces the vulnerability of shallow aquifers to brine incursion. Off-site lateral migration of brine will also be prevented by the installation of perimeter ditches and barriers that penetrate through surficial materials into the underlying impermeable till. These Project design features will serve to reduce or avoid the likelihood of potential adverse effects on groundwater due to salt and brine storage in the TMA. The efficacy of TMA location and design will be confirmed through long-term monitoring.

Measures to mitigate subsidence and effects on surface water hydrology are described above. These measures will also serve to mitigate potential effects on groundwater quality and quantity/flow. The EIS will also present computer-modeled simulations to demonstrate the ability of the natural and engineered controls to limit migration of brine.

4.7 Muskowekwan First Nation Community

As discussed in Section 1.0, MFN is a joint venture participant in the Project and, as such, will be affected in various ways by the Project, mainly positively through the receipt of substantial royalty payments and revenue sharing, and employment and benefit opportunities. Despite these benefits, the intensity and scale of development will also have the potential to put strain on MFN community and it will be necessary for FPV to work closely with the community and regulatory authorities to ensure that the benefits of the Project are optimized and enhanced, and potentially adverse effects minimized. As a result, FPV proposes to consider the Muskowekwan First Nation Community as a VEC in order to ensure the potential positive and negative effects on various community values for the community are considered in the EIS.

4.7.1 Existing Conditions

The community is located 100 km north-northeast of Regina and is accessible by road via Highway 639, off Highway 15. MFN is a signatory to Treaty 4 and a member of the Salteaux Tribe. A recent MFN newsletter described the goal of MFN as being to “provide a quality of life acceptable to its citizens based on promoting spiritual, physical, emotional, and mental health of all citizens” (Muskowekwan First Nation 2011). MFN has a registered population of 1,681 (AANDC 2012). Approximately 435 of this population live on-reserve. Many MFN members live off-reserve in communities such as Regina, Saskatoon, Edmonton, Calgary, and Winnipeg.

MFN has a band administration office, health centre, and school. One hundred and twenty-five housing units exist on site with over 50% of private dwellings on reserve listed as requiring major repairs (AANDC 2012). In 2006, workforce statistics indicated that there was a 23.1% unemployment rate (AANDC 2012) within MFN. The unemployment rate for the province for that year was 5.6% and the average unemployment rate for First Nations communities was 24.9% (Government of Saskatchewan 2008). In 2006, 31% of the population age fifteen years and older had a degree or certificate from a high school, trade, or university. Women as a group held degrees or certificates more often than men (AANDC 2012). The majority of persons within MFN are employed in sales and services occupations, with secondary occupations being in trades, transport and equipment operators, social science, education, government service and religion, business, finance and administration and management (Statistics Canada 2012a).

MFN on-reserve business services include a gas bar and confectionary and a bingo hall. Privately owned businesses include outfitting, bus owners, semi-truck owners, septic truck owners, restaurant and catering service and food providers (e.g., food booth). MFN leases land to One Earth Farms and collects lease

payments for the following activities: grazing (11,939 acres), hayland (3,938 acres), cropland (9,519 acres), greenfeed (4,779 acres) and silage (875 acres).

Initial engagement activities have demonstrated that the community places a high value on creating economic opportunities within the context of a thriving and vibrant culture, guided by the knowledge of the Elders. The community also places value on MFN lands, both as a home and as a legacy to pass on to the next generation with as few adverse environmental effects as possible.

4.7.2 Potential Effects and Mitigation

The MFN community will be affected in several positive ways by increased opportunities for employment, the payment of substantive royalties that will have the potential to fund significant social infrastructure that can benefit both on and off reserve MFN members, and by preferential access to contracts and business opportunities. Encanto is working with MFN to optimize the benefits that flow to the community. MFN will also as a whole will also benefit substantially from revenue-sharing on the Project allowing for more money for improving infrastructure, education, housing, facilities, and other programs. Job opportunities will mean that more young people will be able to stay in the community.

At the same time, possible adverse effects could occur due to the increased wealth in the community and the presence of a labour camp. This may include social instability as MFN adapts to managing an increase in income, both at an individual level and for the community as a whole. As a partner in the joint venture, Encanto will work with MFN to assist with mitigation strategies to address this potential situation. Such strategies could include financial support for capacity development for MFN and MRL, including support for the development of an economic development corporation with a formal, transparent trust structure to manage project revenues, establishing community courses in money management or assistance with developing strategies for setting up a community legacy fund for future generations. FPV is committed to working with the community and responsible government agencies in support of their development and implementation of training programs early in the Project, providing opportunities for the community members to participate. FPV is committed to optimizing and enhancing the positive benefits of the Project, in a manner that supports the community and government agencies in the reduction and management of potentially adverse effects.

The community places a high value on maintaining a thriving cultural identity. FPV is working closely with MFN to obtain information on important cultural places or features on the landscape to integrate into the Project planning process to avoid or reduce potential effects. Likewise, FPV is committed to Project mitigation including those related to traditional land and resource use to augment the value of the MFN lands as an attractive home for future generations to enjoy (see Section 4.10).

4.8 Employment and Business

The Project will have a profound impact on employment and business within the adjacent non-MFN setting of an otherwise largely rural, agriculturally-dominated area. Consequently, Employment and Business is proposed as a VEC to consider the potential positive and adverse environmental effects of these opportunities, and to ensure that the Project benefits are optimized.

4.8.1 Existing Conditions

The Project occurs within a rural, agriculturally-dominated, prairie environment and, as such, has corresponding levels of population, employment and business opportunities and economic diversification. The area is sparsely populated with 125 people residing in Lestock, SK, (Statistics Canada 2012b) and 362 people residing in the RM of Kellross (Statistics Canada 2012c), based on 2011 data. The employment rate in the RM of Kellross in 2006 was 76.1%. The primary occupation within the RM of Kellross is focused on the primary industry, agriculture. Other occupations includes trades, transport and equipment operators; sales and service; occupations unique to processing, manufacturing and utilities; art, culture, recreation and sport; and business, finance and administration occupations.

The Village of Lestock is mainly sustained by agriculture, relying upon the local grain farms and cattle operations. The business services include the Cornerstone Credit Union, Lestock Motors, Lestock Co-operative Grocery Store, Don's Pharmacy, Viterra Ag, Vass Farm Supply, Link Electric and Canada Post. Lestock is also equipped with a health care facility, St. Josephs Integrated Care Centre which also offers home care (Village of Lestock 2012).

Section 4.7 discusses population, employment and business characteristics of the MFN. Other First Nations in the region (Touchwood Agency Tribal Council) include George Gordon, Kawacatoose, Day Star, and Fishing Lake. Employment varies significantly between them, with unemployment rates (2006) ranging from 15.4% to 52.6% (AANDC 2012, First Nation Profiles). Occupations are generally in sales and service, social science (government), and trades and related occupations.

4.8.2 Potential Effects and Mitigation

The Project will affect the socio-economic environment locally, regionally, and provincially. This Project is particularly unique as MFN is a co-proponent and will benefit directly in a variety of ways including increased royalty revenues, revenue sharing, increased employment, increased contracting opportunities, increased training opportunities and increased business opportunities. Many of the employment, contracting, and training opportunities also will be felt in nearby communities and RMs as well, and by service providers (i.e., hotels, restaurants, contractors).

The JVA of the FPV partners guarantees preferential employment and contracting opportunities, as well as a host of other economic benefits, to MFN, as well as to neighbouring First Nation members of the TATC. In addition, FPV will support the development of programs in cooperation with the community and government agencies to ensure MFN is able to take advantage of employment and contracting opportunities expected to be created by the Project. These training programs may also be available to other neighbouring First Nations, Métis, and other stakeholders.

The Project will positively influence the surrounding communities with increased job opportunities (mine employment and/or service and contractor employment). There will be increased revenue brought into the surrounding communities which will also provide economic benefits. The Saskatchewan and local government will be positively influenced with increased GDP and related tax revenue.

Negative effects could be associated with training programs not being adequate to meet the needs of the Project or where contracting is bundled, limiting access to smaller businesses. FPV will work with the MFN community, government agencies and other parties at interest to support the development of a variety of training programs early in the planning stages to help ensure that workers are trained and ready to work when employment opportunities associated with mine construction and operation arise. Training programs can be designed not only for job skills, but money management skills, preparing the communities for the economic and social change they will be experiencing. FPV will also work with the business community to ensure that contracting opportunities can be maximized within the local community.

4.9 Land and Resource Use

The Project has the potential to interact with land and resource use in the area surrounding the Project in a variety of ways. Although a majority of the Project's direct effects will be on MFN Reserve, pre-reserve, and TLE lands (which are addressed in respect of Aboriginal Land and Resource Use in Section 4.10), there may be some direct effects on non-Aboriginal lands and the possibility of indirect effects of the Project including, among other things, visual intrusion and sound, and interaction or conflict with other land uses. Consequently, FPV proposes to consider Land and Resource Use as a VEC in the EA.

4.9.1 Existing Conditions

Current non-Aboriginal Land and Resource use in the Project area is consistent with other areas in southern Saskatchewan and is primarily focused on agricultural activities, as well as some recreational activities (e.g., hunting, snowmobiling). Being a typical prairie environment, linear developments are numerous and include provincial highways (e.g., Highway 15 passes through the MFN Reserve) and roads, rural grid roads, electrical distribution and transmission lines, gas and utility pipelines, and railways (a CN mainline railway passes through the MFN Reserve with approximately two trains per hour).

Several communities are proximal to the Project and contain residences and other buildings, with the nearest being Lestock, SK. Lestock is immediately adjacent to the MFN Reserve and approximately 5 km south of the proposed plant site (see Figure 2-1). Other nearby communities that include residences and buildings are Leross, Punnichy, Kelliher, Wishart, Bankend and Jasmin.

Hunting and trapping activities are engaged in throughout the Project area. Big game hunting typically includes moose, white-tailed deer, and mule deer. Black bears are reported to occur on the MFN Reserve. Primary furbearer species include coyote, red fox, beaver, and muskrat. Upland game birds and waterfowl species include grouse, ducks, geese, and sandhill cranes. Due to the absence of large lakes and rivers, sport fishing does not occur locally (personal communication with MFN band members obtained at the open houses in August and September 2012).

Provincially designated agricultural Crown land, resource lands, a Ducks Unlimited project, and wildlife habitat protection lands occur in the region, but none will be directly affected by the plant site or WDA. The only regional, provincial, or national recreation park located within the vicinity of the Project is a small historic site known as the Touchwood Hills Post Provincial Park, located just north of the MFN Reserve;

this is not expected to be affected by the Project. Locations for services provided by SaskPower, SaskTel, TransGas, and SaskWater are unknown at this time, but these will be subject to their own environmental approvals by the appropriate service provider.

There are other land and resource use features scattered throughout the region, which will be considered in the EA if required (i.e., if potentially affected by the project). These include water wells, small commercial enterprises, gravel pits, and livestock operations.

4.9.2 Potential Effects and Mitigation

By taking lands and resources out of production and/or causing temporary or long-term disturbances to adjacent lands (i.e., through vegetation clearing, ground disturbance, infrastructure development, and sensory disturbance), the Project may affect the use and/or location of linear facilities (e.g., highways/roads, power lines, oil and gas pipelines, railway, etc.), agriculture, recreational uses (e.g., camping, snowmobiling, and hunting). FPV will work to identify and avoid conflicting with land and resource uses, where possible. In the EA and throughout public consultation, FPV will identify land and resource uses and employ siting and avoidance, scheduling and other mitigation to address potentially adverse environmental effects. Where mitigation is not possible, FPV will work with affected parties to compensate, where appropriate, for direct loss of land and resource uses.

The Project requires a railway spur line from the CN line to the facility site. Development of the ROW will remove lands from agricultural production, and may require the crossing of municipal and provincial roadways. The rail spur will be located on MFN lands and routing will be completed in consultation with residents, RMs, CN Rail, and others as required. Routing will make efforts to reduce or avoid effects to biophysical and socio-cultural features. Construction will be completed using BMPs and, where feasible, scheduled to reduce conflict with land use activities (e.g., seeding, harvesting).

Noise generated during certain construction and operation activities may temporarily displace wildlife populations, thereby reducing hunting potential at that location, and could interact with other land uses. Livestock operations in the area may be affected in a similar manner. BMPs for noise control will be implemented to reduce this temporary disturbance and FPV will comply with all applicable standards and regulations.

4.10 Aboriginal Land and Resource Use

The Project is located on the MFN Reserve and its TLE and pre-reserve lands. The TLE and pre-reserve lands are interspersed with privately owned lands. Although a large proportion of TLE and pre-reserve lands are fragmented by cultivation and grazing, MFN Reserve lands contain some relatively intact patches of native habitat. Three other FN reserves are located within a 25 km radius from the proposed plant site and well field: George Gordon, Kawacatoose, and Day Star. The Project site also overlaps with portions of two Métis regions: Métis Eastern Region II and Métis Eastern Region III. Métis Local #8 is located in Lestock, SK. The Project will interact with Aboriginal Land and Resource Use and is consequently proposed as a VEC for the EA.

4.10.1 Existing Conditions

Aboriginal people often have a long history of living in close proximity to the land and can possess in-depth knowledge of the land and the resources of the area in which they make their home. This knowledge, sometimes called Traditional Knowledge, is an important part of a study of land and resource use. Traditional Knowledge about the land (e.g., information on hunting, fishing, trapping, berry picking, plant gathering for food or medicinal purposes, wood gathering, or cultural sites or sites of spiritual significance, etc.) can provide important information about the biophysical world, including historical information that might not otherwise be evident. As well, it can help identify potential environmental effects, and can be incorporated into the EA to improve and strengthen decision-making. As a key part of project planning, FPV is using consultation and specific studies to identify Aboriginal Land and Resource Use such that they can be addressed through Project design and mitigation during execution. FPV will also, with the cooperation of the MFN and other Aboriginal communities, rely upon existing traditional land use studies and information that these communities can provide to support the EA.

A large portion of MFN Reserve and TLE lands are under agricultural land use and minimizing the effect of the Project on agricultural land will be a key element in siting and route selection of Project facilities throughout its duration.

Hunting and trapping activities are engaged in throughout the area. Big game hunting typically includes moose, white-tailed deer, and mule deer. Black bears are reported to occur on the MFN Reserve. Primary furbearer species include coyote, red fox, beaver, and muskrat. Upland game birds and waterfowl species include grouse, ducks, geese, and sandhill cranes. Due to the absence of large lakes and rivers, sport fishing does not occur locally (personal communication with MFN band members). Traditional plant and berry gathering is common and includes harvesting of Saskatoon berries, chokecherries, and pin cherries.

Ongoing engagement with the MFN community has revealed that there are numerous important culturally significant areas within the study area. Principal among these are unmapped burial sites at various locations. The surrounding community has communicated the existence of culturally significant areas such as ceremonial sites and the remains of a historic Métis settlement.

Currently, a body of existing Traditional Knowledge has been recorded for the Project area as a result of previous studies. These studies have informed current Project planning efforts and will continue to be referenced as Project development proceeds. To supplement this information, Traditional Knowledge of the land will also be sought from knowledgeable members of local Aboriginal communities in concert with the engagement component of this Project, as described previously. Through community engagement meetings, knowledgeable community members will be sought out. Follow-up interviews will be used as needed to build on traditional land use information recorded during community meetings.

As part of ongoing engagement activities (see Section 3), Traditional Knowledge will be sought from First Nation and Métis communities within 25 km of the proposed plant site; however, further communities will be included if initial engagement activities and ongoing baseline data gathering indicate that it is warranted and/or as directed by regulatory authorities.

4.10.2 Potential Effects and Mitigation

Construction and operation of the processing facility and TMA will take agricultural land out of production. However, the site comprises agricultural lands owned by MFN and MFN sees the opportunity to convert this existing use of their lands to another higher value land use providing substantially greater economic benefit to their community. While land use at this location will shift from agriculture to mining, land ownership is not affected and MFN is involved in the siting decisions and is in agreement with the location, as co-proponent. When the operation phase is complete portions of the site will be reclaimed for agricultural and other use, although the salt piles may exist far into the future. As noted previously, FPV will minimize the effects of the Project on agricultural land use through the siting and route selection of facilities.

Development of well pads over the mine life will require access roads, electrical distribution lines, and pipelines connecting to the mine facility. Construction of these linear facilities will take some agricultural land out of production and may disturb some activities such as hunting and snowmobiling. FPV will reduce the extent of ground disturbance by co-locating utilities and infrastructure in shared ROWs, where possible, using existing ROWs where possible, minimizing new ROW width, using directional drilling from multi-well pads, and using low impact development techniques. A well pad siting and development protocol will be established. As the well pads are installed over many years, biophysical and heritage resource studies will be conducted prior to the development of each well pad and access corridor to inform the development of mitigation strategies. Where feasible, routes and well pad locations will be sited to avoid high quality agricultural lands, or important wildlife lands, and will involve consultation with MFN. Where feasible, construction will be scheduled to avoid conflicts with adjacent agricultural activities (e.g., seeding, harvesting), hunting seasons, and cultural events. When a well pad is no longer required for mining, the pad and associated infrastructure will be decommissioned. The land surface will be returned to agriculture or reclaimed appropriately.

Activities that have the potential to affect traditional land use activities relate to ground disturbance, sensory disturbance, and habitat fragmentation produced during the construction of above-ground facilities and infrastructure, and the ongoing development of the well field during operations. Several mitigation strategies have been discussed in Sections 4.3 to 4.5 to reduce or avoid potential effects on habitat features. In implementing this mitigation, the effects on wildlife, vegetation communities, and cultural sites can be limited, which in turn will reduce or avoid related effects to traditional land use activities such as hunting and trapping, berry picking, and the use of ceremonial sites. Trap lines may be physically disturbed by construction, or wildlife may avoid an area where a trap line exists due to construction activities. Well pads and associated infrastructure could also affect traditional access to resource lands, thereby adversely affecting hunting, berry picking, and other traditional activities. FPV will work with trap line operators to schedule project activities and locate facilities to avoid or reduce effects.

Other physical locations on the landscape, such as burial sites and ceremonial sites, are also vulnerable to disturbance by construction activities. Ceremonial sites could be affected by noise that was not present before. Culturally significant sites may also be sensitive to visual effects. FPV will collect information on these features and engage with MFN to discuss mitigation approaches.

The Project has the potential to affect traditional land use activities in a positive way through the continued collection of Traditional Knowledge to facilitate avoidance of important land use areas. TLU information has been gathered to inform other projects but may have to be augmented by data collection specific to the current study. This continued study will also benefit the community by compiling a list of important cultural spaces in the Project area and by recording the Traditional Knowledge of the Elders. These can be used for school curricula, genealogical research and web-based resources. Further, the technical assistance of local residents will build capacity in field science and traditional land use data gathering. Finally, the gathered traditional land and resource use data can be used to facilitate decision-making for future projects or activities by the MFN community.

Mitigation of potential effects on cultural sites, such as ceremonial sites, will be accomplished through avoidance during the Project design phase. In consultation with MFN, a “no-go” area has already been established and the preliminary siting of mine facilities has accounted for areas of known and concentrated cultural significance. Project engagement activities will focus on locations of cultural significance that may be vulnerable to disturbance by mining activities such that appropriate mitigation can be implemented based on discussions with MFN.

4.11 Heritage and Historic Resources

Heritage and Historic Resources include archaeological sites and objects, spaces, landscapes and objects of cultural significance, and built features and structures of historical and cultural significance. Examples include stone circle sites, plant harvesting sites for traditional practices, churches, burial grounds, historic trails, and scatters of pre-contact artifacts in cultivated fields. The Project has the potential to affect such resources and consequently Heritage and Historic Resources is proposed as a VEC for the EA.

4.11.1 Existing Conditions

Very little archaeological study has been done in the region, so there are few recorded archaeological resources. To describe the existing heritage resource conditions in the Project area for the purposes of this document, the following sources of information were consulted: the Provincial Inventory of Archaeological Resources; the Developer’s Screening Tool on the Saskatchewan Ministry of Parks, Culture and Sport (PCS) website; the Saskatchewan Archives Board map collection and homestead records; 1:50,000 scale NTS maps and satellite imagery; and a reconnaissance survey of the Project site conducted in April of 2012.

MUSKOWEKWAN POTASH PROJECT

Heritage Resources

Projection: UTM Zone 13 NAD 83
Acknowledgements: Original Drawing by Stantec.
Project Data: Novopro (20121128). TLE: NorthRim April 2012.
Basedata: Geosask, Canvec 10. Known Sites: SK Heritage Branch

- Known Archaeological Site
- Biophysical Study Area
- Proposed Facility Site
- Proposed Mine Well Field
- Proposed Rail Spur

Land Status

- Indian Reserve
- TLE Land - Muskowekwan
- Pre-reserve Land - Muskowekwan
- TLE Land - Other
- Major Road
- Minor Road
- Railway
- Watercourse
- Waterbody
- Urban Municipality

0 1.5 3 4.5
Kilometres - 1:120,000

113253770-072 REVE

PREPARED FOR

PREPARED BY

Stantec

AB SK MB
Saskatoon
Regina
Area of Interest
USA

FIGURE NO.
4-3

Last Modified: Nov 30, 2012 By: aolson

The facility site has no previously recorded archaeological resources. The proposed facility site is currently under cultivation, with the exception of wetlands that are interspersed across the landscape. As such, heritage resources in the area may be mostly disturbed already, but relatively easy to identify and test. Feedback from the two open houses held in August and September of 2012 indicates that the community feels that all lands must be considered irrespective of cultivation. This is because cultivation is a reasonably recent phenomenon and there is a body of traditional knowledge of culturally important spaces in lands that are currently cropped. The WDA is a combination of native prairie and parkland, cultivation, and wetlands in the hummocky terrain of the Touchwood Hills. Hummocky moraine, especially in proximity to historically significant water bodies, is recognized as a landscape with a high potential to contain archaeological resources. The native prairie, wetlands, and treed areas around the wetlands are also potentially significant as traditional resource harvesting and cultural practice areas. The potential for intact archaeological resources in the native prairie and parkland areas is very high, and low to moderate in the cultivated areas, based upon the application of provincial Heritage Branch criteria.

As the Project is regionally located in the important upland terrain of the Touchwood Hills, is within the traditional lands of several First Nations, and is very close to the Touchwood Hills Post and associated trails, the Project is considered to be located on lands having moderate to high archaeological potential.

4.11.2 Potential Effects and Mitigation

Several environmental management strategies and protocols have been considered by FPV and will be implemented in order to avoid affecting heritage and historical resources. This is important because activities that involve ground disturbance have the potential to affect heritage resources. During construction, the excavation, grading, trenching, drilling, vegetation clearing, and landscaping that are required to build the plant, TMA, well pads, pipelines, access roads, and rail spur may, therefore, affect heritage resources. During operation, the ongoing development of the well field will generate new ground disturbance that has the potential to affect heritage resources. Decommissioning would not involve any new ground disturbance, and thus is not expected to affect heritage resources.

Archaeological and cultural resources are disturbed or destroyed by ground disturbing activities as described above. “Disturbed” refers to a disruption of the natural horizontal and vertical integrity of a heritage resource without its complete removal. Soil stripping, vegetation clearing, cultivation, and vehicular traffic are activities that may disturb heritages resources. “Destroyed” refers to the complete removal of a heritage resource. This includes the unintentional excavation of an archaeological site, the demolition of a heritage structure, or the alteration of a culturally significant space. Activities that result in resource destruction include grading, excavation, trenching, and flooding.

Mitigation of effects on Heritage and Historic Resources occurs in three phases, each of which will be implemented by FPV where appropriate:

Phase 1 - Heritage Resource Inventory: An inventory of the heritage resources of the Project development area will be compiled through visual examination, prospective testing, and interviews with Elders, traditional resource users, and the immediate community who use the land for traditional practices and who identify certain features and structures as having cultural significance. This study will benefit the

community by compiling a list of important cultural spaces in the project area and by recording the Traditional Knowledge of the Elders. These can be used for school curricula, genealogical research and web-based resources. Further, the technical assistance of local residents will build capacity in field science and traditional land use data gathering.

Phase 2 - Heritage Resource Impact Assessment: Systematic testing, archival research, and follow-up interviews will be employed to determine and rank the significance of heritage resources in the Project development area. Resources will be ranked as high, moderate, and/or low importance based on cultural, spiritual, historical, scientific and aesthetic criteria. The HRIA will rely on the results of public engagement, the traditional land use study results, as well as the technical assistance of local people to identify culturally significant features and structures that may not be obvious to practitioners from outside the study area.

HRIAs are typically conducted by archaeologists and ethnographers under a provincially issued permit. On federal, reserve and TLE lands, there is no clear responsible authority and no permitting system. In this case, the standards and practices as recommended by Parks Canada and by the Heritage Branch of the PCS will be followed. This assessment will benefit the community by allowing them to conserve and manage important cultural spaces.

Phase 3 - Heritage Resource Mitigation: Heritage resources ranked moderate to high will require an impact management plan. The preferred mitigation is avoidance. Avoidance can easily be accomplished in those development activities with some flexibility in location, such as well pads and pipeline ROWs. At locations where avoidance is not feasible, more proactive mitigation will be recommended if necessary, including salvage archaeological excavation.

4.12 Community Services and Infrastructure

The Project has the potential to interact substantively with community services and infrastructure in the vicinity of the Project due to the scale and scope of the proposed development. Consequently, Community Services and Infrastructure is proposed as a VEC for the EA.

4.12.1 Existing Conditions

Lestock, the community nearest to the Project, offers several services including a health care facility, Touchwood EMS (emergency medical services), Mary Queen of All Heart's Roman Catholic Church, a community hall, the Lestock Housing Authority, a family resource centre, a volunteer fire department, and a public library. Several organizations also exist within the Lestock area including the Lestock and District Recreation Board, Lestock Rodeo Committee and the Lestock and District 4-H Club. The nearest school is located in Kelliher and the nearest RCMP detachment is in Punnichy (Village of Lestock 2012). There are limited accommodations within the surrounding Project area with the closest located within Punnichy, Ituna, Raymore, Wynyard and Lipton.

MFN community services includes a band office, health facility, band hall, workshop, maintenance office, water treatment plant and pump house, school and teacherage, outdoor rink, gas station and restaurant, the 4-Directions Youth Stabilization Centre, and a bingo hall.

The Project's construction and operation phases will use existing road networks and infrastructure. In 2011, traffic volumes along Highway 15 between Raymore and Highway 35 averaged 740 and 820 vehicles daily, respectively. Traffic volumes along Highway 35 between Highway 15 and Highway 16 averaged between 450 and 520 vehicles daily (Government of Saskatchewan 2012). Highways 6 and 16 are currently designed to a primary weight classification. Highway 15 between Raymore and Highway 35 has a secondary weight classification. Highway 35 between Highway 16 and Fort Qu'Appelle has a 9 month primary weight classification with secondary weight classification for the month of April, May and June (Saskatchewan Ministry of Highways and Infrastructure 2012). Highway 639, which is directly adjacent to the core facility site, is classified as a rural road class 4. Class 4 roads serve communities of populations of greater than 100, large industrial sites and parks with greater than 25,000 yearly visitations. These roads also generally have a network spacing of 20 km, carrying 40,000 t annually with 100 vehicles per day and serve as an inter-municipal link (Saskatchewan Ministry of Highways and Infrastructure 2010).

An existing CN main line (CN Watrous) runs along Highway 15, through the MFN Reserve (Saskatchewan Ministry of Highways and Infrastructure 2011). The current rail traffic is approximately two trains per hour (peak) with more than 30 trains per day.

4.12.2 Potential Effects and Mitigation

During construction the Project will produce increased traffic (highways and local roads) and increased demand for local and regional services (hotels, rental accommodations, restaurants, police, medical, etc.). However, with the Project there will also be increased revenue brought into MFN and surrounding communities enabling them to invest in the development of community services and infrastructure. To alleviate potential adverse effects and enhance the positive benefits, FPV is committed to developing mitigation strategies in cooperation with regulatory authorities and communities responsible for the transportation network. FPV will support communities through engaging in community programs and becoming a corporate citizen. FPV will work with MFN, and neighbouring First Nations, Métis, RMs, and communities to develop appropriate strategies to optimize potential economic benefits and manage the anticipated burden on community services and infrastructure. There may be some issues beyond the scope of the Project mitigation proposed by a proponent. The lack of adequate housing, restaurants and/or accommodation is a private sector issue that FPV recognizes. FPV will encourage private development opportunities and provide scheduling and work force details to the business community and government agencies for their use.

The Project's operation phase will produce a small increase in rail traffic through a new spur line connecting the mine site to the CN Watrous rail line. The operation will require approximately two more trains every 2.4 days, which is a small increment to the current 30 (or more) trains per day and is not expected to adversely affect railway capacity.

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