Canada Kuwait Petrochemical Corporation

Summary of the Project Description for the Sturgeon Petrochemical Rail Yard Project

13 September 2018

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CANADA KUWAIT PETROCHEMICAL CORPORATION

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List of Acronyms

Acronym	Definition
AAAQO	Alberta Ambient Air Quality Objectives
ABMI	Alberta Biodiversity Monitoring Institute
ACIMS	Alberta Conservation Information Management System
ACT	Alberta Culture and Tourism
AEP	Alberta Environment and Parks
AER	Alberta Energy Regulator
AIH	Alberta's Industrial Heartland
ATRIS	Aboriginal and Treaty Rights Information System
CAC	criteria air contaminants
CEAA	Canadian Environmental Assessment Agency
CKPC	Canada Kuwait Petrochemical Corporation
CNR	Canadian National Railway
CO	Carbon Monoxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CUB	Central Utilities Block
ECCC	Environment and Climate Change Canada
ECFR	Electronic Code of Federal Regulations
EIA	Environmental Impact Assessment
EPEA	Environmental Protection and Enhancement Act
ESRD	Alberta Environment and Sustainable Resource Development
FAP	Fort Air Partnership
FWMIS	Fish and Wildlife Management Information System
GHG	Greenhouse Gas
IAA	Industrial Approval Application
IH	Heavy Industrial (zoning)
NCIA	Northeast Capital Industry Association

Acronym	Definition
NO_X	Nitrogen Oxides
NSR	North Saskatchewan River
NSRP	North Saskatchewan Regional Plan
PDH/PP	Propane Dehydrogenation/Polypropylene
PDH/PP Facility	Propane Dehydrogenation/Polypropylene Facility
Pembina	Pembina Pipeline Corporation
$PM_{2.5}$	Particulate Matter Less Than 2.5 Microns (μ) in Diameter
RDL	Reliable Detection Limit
RFS	Redwater Fractionation and Storage
RNMP	Regional Noise Management Plan
RWDI	Rowan Williams Davies & Irwin Inc.
SARA	*Species at Risk Act*
SIT	Storage in Transit
SIF	Strategic Innovation Fund
SO_2	Sulfur Dioxide
SoJ	Statement of Justification
US EPA	United States Environmental Protection Agency
USGS	United States Geological Survey

1. General Information and Contacts

1.1 Name, Nature and Location of the Project

The Proponent, Canada Kuwait Petrochemical Corporation (CKPC), plans to build, own and operate the Sturgeon Petrochemical Rail Yard (the Project) in support of a propane dehydrogenation/polypropylene (PDH/PP) Facility (the PDH/PP Facility). The PDH/PP Facility will be designed to convert propane to polypropylene plastic pellets. The pellets will be loaded into rail cars for transport to international and local markets, either through rail cars or transferred to bags at an on-site bagging facility for transport by container trucks. The Project also includes a Pembina Pipeline Corporation (Pembina) Rail Line, which will connect the rail yard to an existing Canadian National Railway (CNR) rail line.

CKPC is an equal partnership joint venture between Calgary's Pembina Pipeline Corporation (Pembina) and Kuwait's Petrochemical Industries Company K.S.C.

The Project will comprise 42 yard tracks with approximately 25 kilometres (km) total length of track and includes tracks for rail car loading, rail car storage for both empty and full rail cars, a building for rail car loading with associated rail car washing, and a transloading/bagging facility. The Project also includes the construction of a Pembina Rail Line, which will connect to the CKPC rail yard at the southwest PDH/PP Facility boundary to the existing CNR rail line. Once constructed, the Project will occupy an area of approximately 40 hectares (ha).

The Project will be located in the Alberta's Industrial Heartland (AIH), near multiple industrial facilities (Figure 1). A map of the Project relative to other industrial developments within the AIH is included in Appendix 1 (Figure A1-1). The map helps to put the Project into context within the overall plans for development of the area as largely industrial with a strong local industrial base of oil refineries, chemical manufacturing, and power generation facilities.

The Project and the PDH/PP Facility are co-located on the same property within AIH. The Project will be located on land currently owned by Pembina within the northwest (NW), northeast (NE) and southeast (SE) quarters of Section 11 and the East half of Section 2, Township 56, Range 22, West of the Fourth Meridian, with latitude and longitude coordinates of 53° 49′ 24.6′′ N and 113° 9′ 35.1′′ W. The portion of land that includes the Project and the PDH/PP Facility will be transferred to CKPC from Pembina prior to the start of construction. The Pembina Rail Line will remain on Pembina-owned land.

The Project location in relation to provincial and international boundaries is provided in Figure 2. Key regional features are indicated on Figure 3.

1.2 Proponent Contact Information

Name of the Designated Project:

Sturgeon Petrochemical Rail Yard Project

Name and Contact Information of the Proponent:

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1.3 Regulations Designated Physical Activities

Physical activities which are required to undergo a screening under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012a) are defined in the *Regulations Designating Physical Activities* (the Regulations). Pursuant to item 25(b) of the Regulations, the following defines a designated physical activity which is required to undergo a screening under CEAA 2012:

The "construction, operation, decommissioning and abandonment of a new railway yard with seven or more yard tracks or a total track length of 20 km or more".

Consequently, the proposed Project is considered to be a designated activity as it will be comprised of 42 yard tracks and a rail line with approximately 25 km total length of track, which exceeds the thresholds set out

in item 25(b) of the *Regulations Designating Physical Activities* (CEAA 2012c) of more than seven yard tracks or a total track length of 20 km or more.

The PDH/PP Facility is not listed in the *Regulations Designating Physical Activities* (CEAA 2012c).

1.4 Applicable Regulatory Requirements

The following federal regulations are relevant to the Project.

- *Fisheries Act* (Government of Canada 1985b)
  - The *Fisheries Act* focuses on conservation and protection of fish habitat essential to sustaining freshwater and marine fish species. The construction, operation and decommissioning of the Project must not harm fish that are part of a commercial, recreational or Indigenous Peoples fishery. The Project does not require a Fisheries Act permit.
- *Migratory Birds Convention Act, 1994* (Government of Canada 1994)
  - The construction, operation and decommissioning of the Project must not harm migratory birds and must not cause disturbance or destruction of their nests and eggs.
- *Species at Risk Act (SARA;* Government of Canada 2002*)*
  - SARA-listed species must not be harmed by the construction, operation, or decommissioning of Project works. It is illegal to kill, harm, harass, capture, or take in any way any species listed under SARA.

Each of these Acts and how they apply to the Project are discussed in detail in Section 5.2 below.

The following Provincial regulations are relevant to the Project and the PDH/PP Facility.

- *Environmental Protection and Enhancement Act* (EPEA) – Environmental Impact Assessment (EIA)
  - Pursuant to Schedule 1 of the Alberta EPEA *Environmental Assessment (Mandatory and Exempted Activities) Regulation* (Government of Alberta 1993), the development of an industrial rail yard is not considered an activity for which an EIA must be conducted prior to receiving approval from AEP. However, the Project was included in the scope of the PDH/PP Facility Project Summary Table submission to AEP to confirm the exemption of an EIA under the EPEA. On April 21, 2017, AEP provided the decision that no further assessment of the activity was required for the full PDH/PP Facility, including the Project.
- EPEA – Industrial Approval
  - The Project is not included as an activity identified in Schedule 1 (Divisions 1, 2, and 3) of the EPEA *Activities Designation Regulation*; therefore, no industrial approval is required. However, the Project has been included in the scope of the EPEA Application for the PDH/PP Facility.

- The PDH/PP Facility will consist of a Propane Dehydrogenation (PDH) Facility, a Polypropylene Facility, a Central Utilities Block (CUB), the Project and associated infrastructure (Figure 4). The CUB includes a cogeneration unit with a maximum production capacity of 123 megawatts (MW). The PDH/PP Facility requires an operating industrial Approval under EPEA and all segments, including the Project are described in the Industrial Approval Application (IAA) that was submitted to AEP on June 8, 2018.

- *Water Act / Public Lands Act* - Wetlands
  - Multiple wetlands have been identified within the Project footprint. An application package was submitted on August 20, 2018 and was prepared to fulfill all requirements to obtain *Water Act* approvals for all wetlands anticipated to be disturbed. Mitigation measures will incorporate applicable compensation measures. A *Water Act* application was completed for each wetland requiring an approval.
  - A Crown Ownership Assessment including all wetlands of reasonable permanence (i.e. wetlands belonging to Class 4, Class 5 and Class 6) was submitted on November 7, 2017 to the Provincial Wetlands and Water Boundaries Unit within AEP for processing. The Water Boundaries Unit determined that none of the wetlands contain a permanent and naturally occurring body of water with a Crown claimable bed and shore under Section 3 of the *Public Lands Act*. As such, no *Public Lands Act* dispositions are required and none of these wetlands need to be protected from disturbance from the Crown perspective.

- *Historical Resources Act*
  - A Statement of Justification (SoJ) was submitted to ACT on November 3, 2017. Approval for the activities described in the SoJ was received on December 7, 2017 with no requirements other than those for chance discoveries under the *Historical Resources Act*.

- *Alberta Transportation*
  - Since the proposed development is within the development control zone [300 metres (m)] from provincial right-of-way or within 800 m of the centerline of a highway and public road intersection), a permit from Alberta Transportation is required for roadside developments. CKPC has consulted Alberta Transportation with the support of Sturgeon County to determine the requirements for roadside development within the Province and County.

- Railway (Alberta) Act – Railway Regulation (Government of Alberta 2009).
  - Prior to construction, a "Notice to Construct New Railway Works", which includes preliminary design information, will be submitted to the Alberta Transportation Railway Administrator in accordance with the *Railway (Alberta) Act – Revised Statutes of Alberta* (Government of Alberta 2010a). After a letter accepting the proposed new works is received, CKPC will proceed with an "Operating Approval Application". This application will include information on Project design, the safety management system, and the security management program. An Operating Approval is granted for a renewable three-year term.

- The *Railway (Alberta) Act* also includes the federal requirements as contained within the *Rail Safety Act* (Government of Canada 1985a) and Canada's *Transportation of Dangerous Goods Act* (Government of Canada 1992).

The Project will be located in Sturgeon County, where the following regional initiatives apply:

- Alberta Environment and Sustainable Resource Development (ESRD) Cumulative Effects Management System (ESRD 2015a);
  - Water Management Framework for the Industrial Heartland and Capital Region (ESRD 2015b); and
  - Capital Region Air Quality Management Framework (ESRD 2012a).
- Sturgeon County Management Plans:
  - AIH Area Structure Plan Bylaw (Sturgeon County 2007);
  - Municipal Addressing System;
  - Capital Region Land Use Plan (Capital Region Board 2009); and
  - Land Use Bylaw 1385/17 (Sturgeon County 2017).
- Northeast Capital Industrial Association (NCIA):
  - Regional Noise Management Plan (RNMP) (NCIA 2014); and
  - Regional Groundwater Monitoring Framework (NCIA 2015).

Municipal requirements for industrial rail yards are addressed as part of the Development Permit Application process and included within the scope of the PDH/PP Facility Development Permit Application package, currently under preparation.

CKPC will comply with the requirements of the Sturgeon County Development Authority.

1.5 Regional Environmental Studies

The *Canadian Environmental Assessment Act, 2012* (Canadian Environmental Assessment Agency [CEAA] 2012b) Section 73 states the following regarding regional studies:

- 73 (1) The Minister may establish a committee to conduct a study of the effects of existing or future physical activities carried out in a region that is entirely on federal lands.
- 73 (2) If the Minister establishes a committee, he or she must establish its terms of reference and appoint as a member of the committee one or more persons.

There are no Regional Environmental Studies as defined under the *Canadian Environmental Assessment Act, 2012* that apply to the region in which the Project is located (S. Tiege, personal communication, February 7, 2018).

In 2007, the Government of Alberta adopted the Cumulative Effects Management System (ESRD 2015a). The Cumulative Effects Management System provides a comprehensive integrated and legislated system to protect water, air, land and biodiversity in Alberta (ESRD 2015a). While the Cumulative Effects Management System applies to all of Alberta, the AIH is identified as a key area for managing cumulative environmental effects because of the concentrated industrial and municipal development.

Since the adoption of the Cumulative Effects Management System, two frameworks were developed for the AIH that are applicable to the Project:

- the Water Management Framework for the Industrial Heartland (ESRD 2015b); and
- the Capital Region Air Quality Management Framework (ESRD 2012a).

Under the *Alberta Land Stewardship Act*, the North Saskatchewan Regional Plan (NSRP) is under development for the North Saskatchewan Region. The first phase of consultation for the plan has been completed, and the Regional Advisory Council is preparing its recommendations. The Phase 2 online survey was scheduled for May 4, 2018. The NSRP has not yet been finalized and implemented.

2. Project Information

2.1 General Project Description

The Project includes the construction of a rail yard and rail line to support the PDH/PP Facility. The objective of the Project is to facilitate a product shipment service from the PDH/PP Facility, also owned and operated by CKPC. The PDH/PP Facility is not listed in the *Regulations Designating Physical Activities* (CEAA 2012c), however is subject to the provincial EPEA IAA process, as a petrochemical plant.

The PDH/PP Facility will produce polypropylene pellets, a commercial non-hazardous material that will be gravity-loaded into rail cars. Up to 40% of loaded rail cars will be sent to an on-site transloading/bagging facility whereas the remaining 60% will be sent to on-site rail car storage.

The Project includes the construction of 42 yard tracks and a rail line with approximately 25 km total length of track (Figure 4). Rail car storage, rail car loading and product bagging will be completed in Areas 1 (Figure 4A), 2 (Figure 4B) and 3 (Figure 4C), respectively. All products will be put into rail cars through hoppers in the pellet loader building. The product transferred (by rail car) to the transloading/bagging facility (Area 3, Figure 4C) will be loaded into trucks containing sea can containers. The Pembina Rail Line (Figure 4D) will connect the rail yard to the CNR rail line.

The Project location (Figure 1) will be on land currently owned by Pembina, that will be transferred to CKPC prior to the beginning of any construction activities. The Project will be owned and operated by CKPC, with the exception of the Pembina Rail Line (Figure 4), that will be owned by Pembina and under Pembina's care and control.

The Project will accommodate rail storage of up to two weeks of production, with expected loading of approximately 20 to 30 rail cars per day. The Project will predominately receive empty rail cars, and only manufactured polypropylene in pellet form will be shipped out by rail and road. The Project will occasionally receive raw materials to support the start-up and normal operations of the PDH/PP Facility. These raw materials could include propylene, polypropylene resin, solvent, and trimethylaluminum.

Once constructed, the Project will occupy an area of approximately 40 ha.

The Project operations will be undertaken by a suitably qualified third party under the control of CKPC management. Removal of full rail cars from the site and delivery of empty rail cars to the site will be completed by Pembina. Connection to the existing CNR rail line is currently being negotiated. The likely point of rail car entry/exit is indicated on Figure 4D.

2.2 Components and Activities

2.2.1 Physical Works

The Project comprises 42 yard tracks and a rail line with approximately 25 km total length of track, on an occupied area of 40 ha. The rail loading capacity will be 600 kt/a, based on 8,000 hours per year (hr/year) of operation of the PDH/PP Facility. The daily load will be between 20 and 30 rail cars and 20 to 40 trucks. The empty and loaded storage rail car facilities will have target capacities of 200 and 472 rail cars, respectively.

The storage area of the bagging facility will have six loading bays to accommodate truck loading and unloading components.

The main components of the Project include:

- Area 1 – Storage, Maintenance and Fueling, 34 yard tracks (Figure 4A);
- Area 2 – Loading and Washing, 5 yard tracks (Figure 4B);
- Area 3 – Transloading/Bagging, 2 yard tracks (Figure 4C); and
- Area 4 – Pembina Rail Line, 1 track (Figure 4D).

A brief description of the Project's major components is included below. The site layout is shown on Figure 4. Other, minor, components of the Project include:

- connection to PDH/PP on-site firewater piping;
  - The Project will be protected with fire hydrants connected to the PDH/PP firewater system. Approximately 400 m of 12" piping will be required. Firewater water will be sourced from a 3rd party to supply water to the existing fire water pond. The firewater system will be constructed by CKPC and under their care and control. The water volumes requirements are minimal as the firewater system is only used in the event of an emergency.
- connection to PDH/PP on-site power lines;
  - Power will be distributed at a 34.5kV voltage level throughout the Project. Infrastructure will include overhead distribution wiring, poles and typical wiring. CKPC will maintain care and control of this system and be responsible for its construction and operation.
- connection to off-site CNR rail line; and
  - The Pembina Rail Line will connect directly to the existing CNR rail spur. No additional track or switching equipment is required. Pembina will be responsible for the construction and operation of the Pembina Rail Line, to the point of connection at the existing CNR rail spur.
- surface water runoff control.
  - The surface water runoff will be collected and managed through the PDH/PP Facility stormwater management system. Additional details are provided in Section 2.3.1.5.

The Project facilities will be sized to accommodate approximately 20 people. Staff will work in two 12-hour shifts. The Pellet Loader Building, located within Area 2: Loading and Washing (Figure 4B), will include a management office, a break room and washroom facilities. Potable water will be supplied by the PDH/PP facility through a 3" diameter pipeline approximately 400 m long.

The raw water for rail car washing will be supplied to the Project from the PDH/PP Facility. This pipeline is approximately 400 m long and expected to be 6" in diameter. The Project will require approximately 20 cubic metres per hour (m^3/hr) of potable and raw water once in full operation.

Sanitary waste will be sent to the PDH/PP Facility through a 3" line. The PDH/PP Facility will have a connection to the Sturgeon County sewer system.

All piping and infrastructure will be constructed on-site and will be under the care and control of CKPC.

Electricity will be supplied via the cogeneration unit in the PDH/PP Facility. The cogeneration unit will have a maximum production capacity of 123 MW; the Project is expected to consume approximately 6 MW.

There is not expected to be any natural gas consumption.

2.2.1.1 Area 1: Storage, Maintenance and Fueling

This area covers approximately 31 ha and includes rail tracks, rail car and locomotive storage, a rail car repair building and a locomotive fueling pad (Figure 4A).

The rail car storage tracks will be between 20 and 30 rail cars in length. All storage tracks will be double ended. To the extent practical, storage tracks will be arranged in groups of four to six tracks with an access road/utility corridor in between to accommodate necessary system equipment such as utility duct banks, underdrains, and high mast yard lighting. The filled rail car storage and rail car storage in transit (SIT) have capacities of 475 and 150 rail cars, respectively (Figure 4A). Filled rail car storage is used for filled cars that are not yet assigned to a customer. SIT is used for filled cars assigned to a customer that are held until shipment is required. The empty rail car storage can accommodate 200 rail cars to ensure 10 days of loading capacity is available.

A maintenance track, with ten rail car spots for storing and repairing rail cars will be provided. This track will include an enclosed maintenance shed to handle liner repairs, replacement of air hoses, brakes and roof hatches. A track with four rail car spots will be provided for unloading solvents and other process fluids, located across from the rail wash area (Figure 4A).

The locomotive fueling area is located to the north. Locomotive fueling will be undertaken by a fuel truck that will come to site. No fuels will be stored on-site.

2.2.1.2 Area 2: Loading and Washing

This area occupies approximately 1 ha and includes rail car product loading and rail car washing (Figure 4B). The rail loading capacity will be 600 kt/a (based on 8,000 hr/year of operation of the PDH/PP Facility). Up to 40% of loaded rail cars will be sent to the bagging facility whereas the remaining 60% will be sent to rail car storage. There will be two loading tracks with capacity for nine to ten rail cars per track staged for simultaneous loading. The pellet loading facility will be an enclosed building over both tracks, covering two rail cars on each track ready for loading. The daily load out will be approximately 20 rail cars (based on a 24 hour period).

The rail car washing facility is located north of the Pellet Loader Building (Figure 4B). The rail car wash rate will be up to 30 rail cars per day. The rail car washer will be an enclosed building, located between the interchange tracks and empty rail car storage, with three rail car spots and will be able to process 21 rail cars in a 12 hour period. All rail cars will be washed upon arriving at the Project site. Pneumatic washing will be predominately used for removal of pellets and large particles. If required, wash water will be used for washing of contaminants that cannot be removed pneumatically. Hot air blowers will be used to help dry the rail cars.

2.2.1.3 Area 3: Transloading/Bagging

The transload of product will be handled in the transloading/bagging area located north of the loading and washing operations and occupies approximately 2 ha (Area 3, Figure 4C).

The bagging facility will accommodate 40% of the total polypropylene produced at the PDH/PP Facility. Pellets will be transferred by two combination vacuum/pressure pneumatic conveying systems. A pellet cleaning system (deduster) will be located above the bagging system to remove fines and enhance product quality. The storage area of the bagging facility will have six loading bays to accommodate truck loading and unloading components.

2.2.1.4 Area 4: Pembina Rail Line

The Pembina Rail Line will be located south of the Project (Figure 4D) and will connect the Project rail facility with the existing CNR system. The Pembina Rail Line covers approximately 6 ha and will operate as an outbound, inbound and swing track with a capacity of 50 rail cars each.

2.2.1.5 Stormwater Management

Stormwater from the Project footprint will be managed by CKPC through the stormwater management ponds located at the PDH/PP Facility (Figure 4). A permanent storm drainage water retention system has been designed to collect and retain the stormwater flows during the construction and operation phases based on the most conservative 1:100 year, 24 hour storm event (Figure 4; CKPC 2018). The approximate dimensions for the north stormwater pond include a surface area of 25,000 square meters (m^2), a depth of 3.5 m and an effective storage volume of 67,000 cubic meters (m^3). The approximate south stormwater pond dimensions are a surface area of 25,000 m^2, a depth of 2.9 m and an effective storage volume of 55,000 m^3.

Key features of the surface/stormwater management system for the Project will include:

- grading to ensure effective collection and control of stormwater runoff;
- construction of a surface drainage system consisting of swales, ditches, open trenches, and culverts, which will discharge at the stormwater ponds;
- construction of berms and/or perimeter ditches constructed along the boundary of the PDH/PP Facility's footprint to prevent run-on from the adjacent properties;
- installation of a geotextile and high-density polyethylene geomembrane liner to the stormwater ponds to prevent the runoff from entering the groundwater system;
- assessing stormwater prior to release in accordance with the operating conditions noted in the PDH/PP Facility EPEA Approval (not yet issued by AEP); and
- surface-release of stormwater to the Sturgeon County ditching network via pumping to an approved discharge location(s) at an allowable discharge rate as per Sturgeon County requirements. The detailed engineering will be conducted as part of the development permit application to Sturgeon County. No

upgrades will be required to the Sturgeon County ditching network. Discharge of the stormwater ponds will be managed by CKPC.

2.2.2 Anticipated Size and Production Capacity

There will not be any production undertaken in the Project footprint. The Project itself consists of 42 yard tracks and a rail line with approximately 25 km of track, which exceeds the thresholds of item 25(b) of the *Regulations Designating Physical Activities* (CEAA 2012c) of more than seven yard tracks or a total track length of 20 km or more. The total Project footprint is expected to be approximately 40 ha.

As described in Section 2.2.1 and shown on Figures 4A, 4B, 4C and 4D, permanent structures will include a rail car repair building, rail car and locomotive storage, a pellet loader building, rail car washing, locomotive fueling and a polypropylene pellet transloading/bagging facility.

Temporary structures will be required during construction, including office space, equipment storage, workforce muster points and for various other functions. The temporary structures will be similar to those typically used on large construction sites, such as integrated workforce trailer systems. All temporary structures will be removed from the site once construction is complete. The construction laydown areas will be located within the PDH/PP Facility footprint.

2.3 Emissions, Discharges and Waste

2.3.1 Atmospheric Emissions

During the life of the Project, emissions of criteria air contaminants (CACs) and greenhouse gases (GHGs) are expected. The CACs include hydrocarbon, nitrogen oxides (NO_X), sulphur dioxide (SO_2), carbon monoxide (CO) and suspended particulates in various sizes such as total suspended particulates, particulates with a diameter less than 10 microns (PM_{10}) and particulates with a diameter less than 2.5 microns ($PM_{2.5}$), GHG emissions are typically reported as carbon dioxide equivalent (CO_2e).

Results of the 2018 Air Quality Assessment (Rowan Williams Davies & Irwin Inc. [RWDI] 2018a) for the PDH/PP Facility, which includes the Project, reported predicted ground level maximum concentrations for all CACs evaluated (SO_2, NO_2 as NO_x, NO_2, CO, $PM_{2.5}$, Cl_2, HCl, ethylene, n-hexane, acetic acid and acetone) as well below the Alberta Ambient Air Quality Objectives (AAAQO).

CKPC will ensure compliance with this management framework through existing ambient air quality monitoring. Air quality in the region is monitored by the Fort Air Partnership (FAP), which currently operates nine continuous and 63 passive air monitoring stations. CKPC will work with the FAP to ensure appropriate air monitoring is conducted in the vicinity of the Project and the proposed PDH/PP Facility.

During the construction phase of the Project, air emissions could include dust and emissions associated with construction equipment. Dust control will be completed using water trucks and vehicle emissions will be limited by reducing idling time for equipment.

GHG emissions from construction equipment are estimated using activity-based fuel consumption rates for the following construction activities: land clearing, grading track work, and building structures such as office trailers and security fences. Diesel equipment such as graders, trackers, and bulldozers are expected during

the construction phase. Various types of trucks are also expected to be used. The equipment required and the emissions estimated using emission factors from Canada's National Inventory Report 1990-2016 (Electronic Code of Federal Regulations [ECFR] 2018a) are presented in CO_2e. The total amount of GHG emissions during the construction phase is estimated to be approximately 19,267 t/a of CO_2e, which accounts for 0.0073% of the 2016 Alberta GHG emissions (ECFR 2018b).

In addition to dust and GHG emissions during construction, fuel combustion from construction equipment will result in emissions of CACs such as NO_X, CO and $PM_{2.5}$. Construction CAC emissions could result in small detectable quantities of these contaminants relative to background levels. Any occurrences of elevated CAC emissions resulting from Project-related construction activities will be immaterial and short-lived due to the temporal and spatial characteristics of the Project-related construction activities.

During operation, emission sources will include emissions from locomotives and particulate matter associated with loading or washing of rail cars. Each rail car loading station will be equipped with a dedicated vacuum system to remove streamers and fines that may be produced during polypropylene pellet blending/transfer and is housed within the rail loading building.

To provide an estimate of CAC and GHG emissions during operation, the following operational assumptions were made:

- one locomotive per five rail segments;
- continuous operation of three locomotives at a time;
- each locomotive will have ten daily trips over two 12 hour shifts;
- total idling time of 4 hours/day/locomotive (24 minutes of idling time per trip);
- transit time on-site based on average distance of 0.95 km/trip and 10 km/h velocity (this corresponds to notch 1 setting);
- up to five locomotives (900 hp each) operate an average of 344 days/year and with an average of 688 trips/year; and
- expected fuel consumption of 7.5 litres/hour (2 US gallons/hour) of diesel.

The emissions were estimated using 1% and 4.5% of the total power output for idling and transit, respectively, based on Code of Federal Regulations for Control of Emissions from Locomotives (ECFR 2018a)[1]. Emissions were estimated using emission factors for freight yard switching locomotives from the Railway Association of Canada's (RAC's) Locomotive Emission Monitoring Program (RAC 2015). To be conservative, Tier 0 emission standards, which refer to the least stringent emission standards established by the US EPA for locomotives manufactured between 1973 and 2001, were assumed (US EPA 1998).

[1] 1% was used as a conservative assumption for idling; the reference document suggests 0%.

Emissions of SO_2 were estimated based on the requirements of a sulphur content of not more than 15 parts per million (ppm) in locomotive diesel that came into effect June 1, 2012 (Environment and Climate Change Canada [ECCC] 2014). Emissions of GHG were estimated using emission factors for diesel trains from ECCC (ECCC 2014).

The total amount of GHG emissions during the operation phase is estimated to be approximately 20.6 t/a of CO_2e, which accounts for 0.00001% of the 2016 Alberta GHG emissions (ECFR 2018b). The estimated GHG emissions are very low and not expected to exceed the provincial and federal reporting threshold of 10,000 t per year of CO_2e.

2.3.2 Liquid Discharges

The liquid discharges associated with the Project will primarily consist of surface water runoff, which will be contained in the PDH/PP Facility North and South stormwater ponds. This runoff will consist of primarily clean stormwater with little contact with any industrial areas. The stormwater ponds will be operated by CKPC in accordance with their EPEA Approval (pending) and are designed as test and release ponds. If the stormwater contents do not meet the EPEA Approval limits, then the water will be retested and if not suitable for release, will be removed from site by a licensed disposal contractor. There is no on-site water treatment planned for stormwater runoff.

Once discharge criteria are met, water will be released to the Sturgeon County ditch network at no greater than the allowable discharge rate of 1 litre per second per hectare (l/s/ha) of land (as per Sturgeon County requirements) (CKPC 2018). This rate of discharge is low and is considered by Sturgeon County to be consistent with natural drainage from a site. There is little or no direct connection from the stormwater pond release points and the North Saskatchewan River (NSR). Additional details are provided in Sections 5.1.5 and 5.1.7.

Other liquid discharges generated by the Project may include:

- Used oil and other solvents: disposal off-site by a qualified carrier;
- Rail car wash water: on-site treatment and recycle, eventual discharge to the Sturgeon County sanitary sewer; and
- Domestic sewage: discharge to the Sturgeon county sanitary sewer.

2.3.3 Wastes

The Project will generate both recyclable and non-recyclable solid waste. Recyclable material will be separated into containers and removed from the Project site for recycling by a qualified carrier. Non-recyclable waste will be collected on-site and then sent off-site for disposal through a qualified carrier. All solid waste will be removed from site by a qualified carrier for recycle or disposal. The anticipated waste streams include:

- Polypropylene pellets;
- Domestic waste;

- Metal and recyclables (cardboard, air filters);
- Oil filters (hazardous waste;
- Dust;
- Batteries; and
- Scrap material.

2.4 Project Phases and Scheduling

Project activities will include consultation and engagement activities, baseline studies, construction, commissioning, operation and decommissioning of the Project and ancillary facilities. Site preparation activities are included in the construction phase of the Project. The Project will have a design life of approximately 30 years, after which the Project could be decommissioned. Decommissioning of the Project will be based on market conditions and the life cycle of the PDH/PP Facility infrastructure.

The anticipated project schedule is as follows:

- Indigenous, Stakeholder and Public Consultation and Engagement: Late 2017 to present (ongoing);
- Environmental work: late 2017 (ongoing);
- Construction: Early 2019 – late 2022 (pending);
- Commissioning: late 2022 (pending);
- Operation: early 2023 (pending); and
- Decommissioning: approximately 2053 (pending).

2.4.1 Indigenous, Stakeholder and Public Engagement

The consultation and engagement program commenced in late 2017 and is ongoing. The progress to date is discussed further in Sections 6 and 7.

2.4.2 Environmental Work

In support of the provincial permitting process, environmental baseline studies began in 2017 and include soil, groundwater, vegetation, wildlife, wetland, air and noise assessments.

2.4.3 Construction

Topsoil and subsoil will be stripped, salvaged and stockpiled prior to site grading, placement of fill, and site development. Soil will be stockpiled in designated topsoil and subsoil stockpiles located within the PDH/PP Facility footprint.

The Project footprint and the PDH/PP Facility will be fenced off. Roadways and railways into the site will be constructed to connect to existing transportation infrastructure. Site construction infrastructure (e.g., trailers, electricity, natural gas services) will be installed. Construction laydown, storage and fabrication areas will be established.

Access to the Project will occur from the internal roadways constructed for the PDH/PP Facility. The PDH/PP Facility will have permanent access roads from Range Road (RR) 221 and RR 222. There are four access roads proposed to service the PDH/PP Facility from RR 221; three access roads are 30 m in width, while the fourth access road is 22 m in width. The single permanent access road from RR 222 is proposed to be 22 m in width. There are five temporary construction access roads proposed for the PDH/PP Facility from RR 221 to the construction laydown areas, each expected to be 30 m in width.

Grading activities within the Project footprint will include collecting/placing fill with earth-moving equipment to build the subgrade, followed by compacting the subgrade. Once the subgrade has been constructed, the ties and steel rails will be laid by a qualified contractor. Ballast will then be dumped in place. Specialized rail construction equipment will tamp the ties and steel rails so that the ballast settles into place. Final grading will include contouring drainage ditches such that outlets channel water into the stormwater ponds. The foundations for Project buildings will be excavated, and concrete poured.

Structural steel will then be erected on the foundations. Some modularization and preassembly work will occur where practical to speed building erection. Roof cladding and wall cladding will then be installed to enclose the building while equipment installation continues indoors. Once the building is enclosed, the building can be heated to facilitate construction in cold weather.

2.4.4 Commissioning

Prior to Project operation, testing and commissioning of various pieces of equipment and systems will occur. It is expected that the testing and commissioning phase of the Project will span the final three to six months of construction. The Project will then be ready for commercial operation.

2.4.5 Operation

The Project loading area is expected to operate continuously, with new rail cars being positioned once or twice daily. It is anticipated that full rail cars will be stored on-site and taken off-site as required, with replacement (empty) rail cars brought on-site daily to replace them.

Polypropylene pellets will be pneumatically conveyed to the rail car loading area from the PDH/PP Facility by a set of blowers from the pellet screen to blenders and silos and from the blenders to the rail car load out at a rate of 76 mt/hour and 90 mt/hour, respectively. All conveying system components will be installed in an enclosed building, or winterized.

The rail loading capacity will be 600 kt/a (based on 8,000 hr/year of operation of the PDH/PP Facility). There will be two loading tracks with capacity for nine to ten empty clean rail cars per track staged for loading. The loading facility will be an enclosed building over both tracks. The daily load out will be between 20 and 30 rail cars. After use, the rail cars will be cleaned with a pneumatic system to remove the polypropylene pellets and large particles. If required, wash water will be used for washing contaminants that cannot be removed

pneumatically. The rail cars will be stored in the rail yard storage area, which has capacity for 200 empty rail cars (equivalent to a 10 day supply) and 472 loaded rail cars (equivalent to 28 days of production).

The maintenance of equipment will be handled in the rail car repair building located on the north side of the Project footprint (Area 1, Figure 4A). A maintenance track, with ten rail car spots for storing and repairing rail cars will be provided. This track will include an enclosed maintenance shed to handle liner repairs, replacement of air hoses, brakes and roof hatches. A track with four rail car spots will be provided for unloading solvents and other process fluids.

The Project will include a segregated area to undertake the interchange with the existing CNR line. The outbound track and inbound track will each have a capacity of 50 rail cars.

2.4.6 Decommissioning

The proposed reclamation activities for the entire PDH/PP Facility site are outlined in the IAA, which was submitted to AEP on June 8, 2018. During site development, topsoil and subsoil from the project footprint will be salvaged and stockpiled for future site reclamation. Prior to the end of life of the Project, CKPC will submit a detailed decommissioning and reclamation plan to AEP for review and approval. The CKPC EPEA Approval will then be amended to include the conditions of the proposed and approved program.

Project decommissioning will include removing all major equipment and the associated tracks, buildings, piping and electrical systems from the site. Depending on the condition at the time of decommissioning, the track materials will be sold for reuse or recycling. Following Project decommissioning, the Project footprint (i.e. the area occupied by buildings and infrastructure during Project operation) will be regraded to promote positive drainage. The reclamation program will include the replacement of the salvaged topsoil and subsoil and re-vegetation to re-establish the pre-disturbance agricultural land use capability.

3. Project Location

The Project is located approximately 6 km north of the City of Fort Saskatchewan, Alberta on freehold Industrial land currently used for agriculture. The Project will be situated in the AIH and it is adjacent to the Pembina Redwater Fractionation and Storage (RFS) complex. The NSR is located approximately 3.0 km from the south end of Area 1. A location map is provided on Figures 1 and 2 and the Regional Features and Local Infrastructure are shown on Figures 3 and 5, respectively.

The Project will be located on land currently owned by Pembina within the NW, NE and SE quarters of Section 11 and East half of Section 2, Township 56, Range 22, West of the Fourth Meridian, with latitude and longitude coordinates of 53° 49′ 24.6′′ N and 113° 9′ 35.1′′ W.

Sub-surface rights to the salt in the Project footprint are owned by Fort Hills and Crown. No other sub-surface ownership was noted for the Project footprint.

3.1 Proximity to Regional Features

The location of the Project in relation to provincial and international boundaries is shown in Figure 2. The distance to the boundaries are as follows:

- Alberta-Saskatchewan border: 207 km
- Alberta-British Columbia border: 325 km
- Alberta-Northwest Territories border: 686 km
- Canada-USA border: 534 km

The location of the Project relative to other key features such as residences, environmentally sensitive areas, watercourses, waterbodies and transportation infrastructure is shown on Figure 3.

There are three permanent residences located approximately 1.2 km, 1.5 km, and 1.7 km from the Project footprint and are shown on Figure 3. Figure 5 shows the Project location relative to local infrastructure. Figure 6 shows the Project location relative to select Indigenous communities.

The nearest First Nation Reserves are the Alexander First Nation (Treaty 6) on Indian Reserves 134, 134A and 134B (located west of Morinville, Alberta, approximately 47 km west of the Project), and the Enoch Cree Nation (Treaty 6) located approximately 49 km southwest (SW) of the Project (Figure 6). The Buffalo Lake Métis Settlement, Kikino Métis Settlement and Saddle Lake 125 Reserve are located approximately 77, 81 and 86 km NE of the Project, respectively (Figure 6).

Photographs of the Project site are provided in Appendix 2 along with a photo location map (Figure A2-1).

3.2 Federal Lands

The Project will not be located on federal land, including federal First Nation Reserve lands, and there is no federal land within approximately 20 km of the Project site. The closest Federal lands are Elk Island National Park, located 21 km SE of the Project and Canadian Forces Base Edmonton, located 24 km west of the Project (Figure 3). The closest First Nation reserve is that of Alexander First Nation located approximately 47 km west of the Project. Distances to additional First Nation Reserves are provided in Section 3.1.

3.3 Indigenous Lands/Resource Involvement

The potentially affected Indigenous communities have been identified in Section 6.1 with the nearest Indigenous Peoples land area being approximately 50 km from the Project site (Figure 6). A review of the federal Aboriginal and Treaty Rights Information System (ATRIS) indicated that the Project is within Treaty 6 lands and within an area where there are currently asserted rights by Métis Groups and the Métis Nation of Alberta (Government of Canada 2018). While the ATRIS only identifies Treaty 6, Métis Groups and the Métis Nation of Alberta, CKPC has taken an inclusive approach to engagement, recognizing that members of Treaty 7 or Treaty 8 may have an interest in lands near the Project site.

The Project will be constructed and operated on an industrial-zoned site that is privately owned by Pembina, and located entirely within the AIH. Considering the private ownership and existing levels of industrial development immediately surrounding the Project, it is not anticipated that the Project will impact traditional land, or water and/or lands where traditional land use is exercised. The Project will be constructed on lands that were homesteaded since at least the 1950s and have been privately owned/farmed since that time (Integrated Environments Ltd. 2016).

The Project is located 3.0 km from the NSR and access to the river will not be impeded by the Project any more than the existing infrastructure and heavy industrial development located between the Project site and the NSR.

CKPC notified Indigenous groups identified by CEAA as those who may have an interest in the Project footprint. To date, through ongoing engagement, CKPC has not yet received any claim to traditional land or impacts to traditional land use. The Indigenous Peoples engagement program is further discussed in Section 6 of this document.

4. Federal Involvement – Financial Support, Lands and Legislative Requirements

4.1 Federal Financial Support

No federal authority is currently providing financial support for the Project. CKPC has submitted a Statement of Interest for the Strategic Innovation Fund (SIF). The SIF, which is administered by Innovation, Science, and Economic Development, allocates repayable and non-repayable contributions to firms of all sizes across all of Canada's industrial and technology sectors. Specifically, the SIF supports industrial research and innovation, economic growth opportunities, and foreign investment in Canada. CKPC's requested contribution from the SIF represents less than 2% of the expected total capital cost of the PDH/PP Facility, which includes the Project.

4.2 Federal Lands

No federal lands will be required for the Project.

4.3 Federal Permit, License, or Other Authorization Requirements

There are no federal legislative or regulatory requirements (including any federal license or permit) that are applicable to the Project. The only purported Federal Regulatory Requirement is in relation to the *Canadian Environmental Assessment Act, 2012* which requires the Project to undergo screening through the submission of a project description. Depending on the results of the screening, the Project may be required to undergo a federal environmental assessment under *CEAA 2012*.

5. Environmental Effects

5.1 Site Conditions

This section summarizes available information on the existing physical, biological and human environment at the Project footprint and surrounding area. This section also describes the potential interactions between the Project and the environment, and assesses changes that might occur as a result of Project activities or infrastructure.

5.1.1 Local and Regional Vegetation Types

A baseline vegetation assessment was completed for the Project footprint. The baseline vegetation assessment was designed to demonstrate pre-construction vegetation conditions of the Project footprint through a desktop review and field assessment. Figure 7 denotes the vegetation within the Project footprint.

The Project footprint is located within the Dry Mixedwood Natural Subregion. A desktop search of the Alberta Conservation Information Management System (ACIMS) for potential provincially listed rare plants within the Dry Mixedwood Natural Subregion resulted in a total of 42 rare vascular (e.g. grasses, forbs, trees, shrubs), and 101 rare non-vascular plant species (e.g. mosses, lichens, liverworts) with habitat ranges that overlap Project footprint. The results from the desktop ACIMS search for Township 56, Range 22, West of the Fourth Meridian returned historical observations of long-leaved bluets (*Houstonia lonifolia*), which is a provincially tracked rare plant species with S3 conservation rank. Typical habitat for long-leaved bluets is sandy soil in open woods and on dunes, and in grasslands. The Project footprint is predominantly agricultural land (95% of the footprint), and the majority of these rare species and communities have low potential of occurring within the Project footprint.

The field assessment confirmed that the overall Project footprint includes two vegetation communities as shown on Figure 7: Cultivated (approximately 95% of the Project footprint) and Deciduous Forest – Disturbed (approximately 5% of the Project footprint).

The Cultivated vegetation community type represented approximately 95% of the Project footprint. This community was comprised of tilled annual crops seeded in 2018, which include Bird's rape (*Brassica rapa* L.) and cultivated barley (*Hordeum vulgare* L.). In addition to the seeded crop species, the cultivated vegetation community also had agronomic and noxious weeds throughout, with highest concentrations along field and wetland edges where cultivation was not present, and therefore there was no suppression from crop species and herbicide treatments. Dominant weeds included annual hawk's-beard (*Crepis tectorum* L.), shepherd's-purse (*Capsella bursa-pastoris* (L.) Medik.), lamb's-quarters (*Chenopodium album* L.), and provincially listed noxious species creeping thistle, (*Cirsium arvense* (L.) Scop.).

The Deciduous Forest – Disturbed vegetation community was mainly present along the quarter section boundaries (approximately 5% of Project footprint) where cultivation avoidance occurs due to property boundaries, wind breaks and/or wetland presence. Signs of disturbance within this community type were frequent, including fence lines, overgrown road beds, and drainage ditches. Vegetation species were dominated by balsam poplar, aspen (*Populus tremuloides* Michx.), and Manitoba maple forest with a shrubby understory of red-osier dogwood (*Cornus stolonifera* L.) and willow species (*Salix* spp.). Herbaceous species were dominated by agronomic grasses (i.e. smooth brome) and a variety of native forbs and grasses.

Three noxious weed species, perennial sow-thistle (*Sonchus arvensis* L.), creeping thistle (*Cirsium arvense* (L.) Scop.), and field bindweed (*Convolvulus arvensis* L.) as defined by the *Weed Control Act and Regulations* (Government of Alberta 2008; 2010b) were observed. No prohibited noxious species were observed.

One provincially listed rare plant species was observed during wetland assessments. Clammy hedge-hyssop (*Gratiola neglecta* Torr.) was observed in six wetlands, and is a provincially tracked rare plant species with S3 conservation rank. This species was found within the Project footprint primarily in temporary and seasonal wetlands, which have been cultivated. The Alberta Biodiversity Monitoring Institute (ABMI) indicates that this species is known to occur in cultivated lands, and is typically found within wetlands in the Northern Fescue Grassland, Foothills Fescue Grassland, and Mixedgrass Natural Subregions. The identification of this rare plant species has a low potential to require avoidance during construction as the species is not listed under the *Wildlife Act* or the SARA.

The requirement to strip the majority of the existing vegetation within the Project footprint will have a low impact on the natural vegetation/suitable habitat as there is limited natural vegetation remaining at the Project footprint as a result of agricultural activities. The majority of the Project footprint is cultivated resulting in a low habitat potential for all plant species, including species at risk. The Deciduous Forest – Disturbed has higher habitat potential, however, is common within the region and only 5% of the Project footprint and therefore removal will overall have a low impact.

Through the desktop study and field assessment, no listed species of concern under SARA were found to be present or have the potential to be present within the Project footprint.

5.1.2 Wetlands

A total of 45 wetlands were identified within the Project footprint and were classified as ephemeral marsh (1 wetland), temporary marsh (30 wetlands), seasonal marsh (13 wetlands) and shallow open water semi-permanent (1 wetland). The wetlands identified were all classified as mineral wetlands, with the dominant permanency being temporary in nature. Wetland disturbance was observed in all wetlands, with ongoing agricultural disturbance observed in 2017 and 2018 in the majority of the wetland areas for lower permanence wetlands (i.e. ephemeral and temporary), and throughout the drier fringes in the higher permanence wetlands (i.e. seasonal and semi-permanent). Wetland vegetation communities, as a result, showed high presence of invasive vegetation species. Where cultivation avoidance was more frequent, the wetlands showed more intact wetland vegetation communities. Ephemeral and temporary wetlands may be used as resting habitat for migrating waterfowl. Moreover, unimpacted seasonal and semi-permanent wetlands may be used as breeding habitat for amphibians and birds (e.g. songbirds and marshbirds). Although, cultivation and the presence of invasive species lowers the habitat quality of these wetlands.

Typical wetland vegetation communities found include:

- Ephemeral Marsh: Saturated conditions are not present long enough to have wetland soil or vegetation established. Typical vegetation observed within the Wetland Study Area were dominated by agronomic weeds and annual crop vegetation.

- Temporary Marsh: Typical vegetation observed included foxtail barley (*Hordeum jubatum* L.), slough grass (Beckmannia syzigachne (Steud.) Fern.), lamb's-quarters (*Chenopodium album* L.), golden dock

(*Rumex maritima* L.). Actively cultivated areas of the wetlands were dominated by agronomic weeds and annual crop vegetation.

- Seasonal Marsh: Typical vegetation observed included common cattail (*Typha latifolia* L.), slough grass, wire rush (*Juncus balticus* Willd.), water smartweed (*Persicaria amphibia* (L.) Gray p.p)., lamb's-quarters (*Chenopodium album* L.), creeping spike-rush (*Eleocharis palustris* (L.) Roemer & J.A. Schultes), and golden dock. Actively cultivated areas of the wetlands were dominated by agronomic weeds and annual crop vegetation.

- Shallow Open Water Semi-Permanent: Typical vegetation observed included awned sedge, common cattail, water smartweed along wetland edges, with central submergent vegetation zone with limited vegetation establishment including turion duckweed (*Lemna turion* Landolt), and green algae.

As detailed in the Section 5.1.1, one provincially listed rare plant species was observed during wetland assessments. Clammy hedge-hyssop (*Gratiola neglecta* Torr.) was observed in six wetlands, and is a provincially tracked rare plant species with S3 conservation rank. This species was found within the Project footprint primarily in temporary and seasonal wetlands, which have been cultivated. Clammy hedge-hyssop is not a federally listed Species at Risk under the *Species at Risk Act*, nor listed under the Alberta *Wildlife Act*.

A search of the potential tracked and watched vegetation elements within the Dry Mixedwood Natural Subregion (ACIMS 2017) resulted in a total of 42 rare vascular (e.g. grasses, forbs, trees, shrubs), and 101 rare non-vascular plant species (e.g. mosses, lichens, liverworts) with habitat ranges that overlap the Project footprint. A total of 9 rare vegetation communities have habitat ranges within the Project footprint. None of the potential rare plants or communities are federally listed Species at Risk under the *Species at Risk Act*, or listed under the Alberta *Wildlife Act*.

A *Water Act* application package was submitted on August 20, 2018 and prepared to fulfill all requirements to obtain *Water Act* approvals for all wetlands anticipated to be disturbed. Mitigation measures will incorporate applicable compensation measures for potentially affected wetlands.

5.1.3 Habitat and Wildlife

The Project is located within the AIH where native habitat has been fragmented due to agriculture, urbanization, industrial development and transportation infrastructure. The Project footprint is situated on land currently developed for agriculture and is approximately 3.0 km from the NSR.

According to data retrieved from the Fish and Wildlife Management Information System (FWMIS), a total of 20 species of management concern (one amphibian, 18 bird, and one mammal species) have historical occurrence records within 6 km of the Project (Table A3-1, Appendix 3; AEP 2018b). The northern leopard frog (*Lithobates pipiens*) and peregrine falcon (*Falco peregrinus*) are provincially-listed as "At Risk" and federally-listed as "Special Concern" (AEP 2018a; Government of Canada 2017). The horned grebe (*Podiceps auritus*) and North American badger (*Taxidea taxus*) are provincially-listed as "Sensitive" and federally-listed as "Special Concern" (AEP 2018a; Government of Canada 2017). The barn swallow (*Hirundo rustica*) is provincially-listed as "Sensitive" and federally-listed as "Threatened" (AEP 2018a; Government of Canada 2017). An additional 15 species were provincially-listed as "Sensitive" (Table A3-1, Appendix 3). A search of the FWMIS revealed that the Project footprint is approximately 1 km from a Key Wildlife Biodiversity zone (along the NSR) and 4 km from a sharp-tailed grouse (*Tympanuchus phasianellus*) survey zone. Sharp-tailed

grouse are provincially-listed as "Sensitive" and have not been assessed federally (AEP 2018a; Government of Canada 2017).

In addition to data from FWMIS, data collected as part of several citizen science initiatives (ABMI, eBird, North American Breeding Bird Survey, and Christmas Bird Count) were surveyed to obtain additional data on potential wildlife (i.e. birds) that may inhabit the Project footprint (ABMI 2017; Audubon and Cornell Lab of Ornithology 2017; Bird Studies Canada 2017; United States Geological Survey [USGS] and ECCC 2017). Survey locations were between 7 and 40 km away from the Project footprint.

Data from citizen science indicated the presence of an additional four at-risk bird species. Two are provincially-listed as "May be at Risk" (short-eared owl [*Asio flammeus*] and western wood-pewee [*Contopus sordidulus*]), and one as "Undetermined" [yellow rail (*Coturnicops noveboracensis*)]. Federally, two are listed as "Threatened" (common nighthawk [*Chordeiles minor]* and short-eared owl) and one as "Special Concern" (yellow rail).

According to the ABMI (2017), the region is low to moderately intact[2]: 20 to 50% intact for all species, 50 to 80% intact for birds, and 40 to 60% intact for mammals (ABMI 2017). The Project location has a relatively higher species richness[3] and is considered to be moderately rich for mammals (50-70%) and birds (60-80%), and low to moderate richness for all species (30-50%) within the Dry Mixedwood Natural Subregion (ABMI 2017). The Project location has low uniqueness[4]: 0-10% unique for all species (ABMI 2017).

On July 13, 2006 a reconnaissance and an amphibian survey were completed as part of the Fort Hills Sturgeon Upgrader Project EIA (Petro-Canada Oil Sands Inc. 2006). Subsequently, in 2007, a number of targeted wildlife surveys were conducted, including winter track count, owl call-playback, breeding bird point counts, amphibian call and visual surveys, and a peregrine falcon nest reconnaissance survey. The surveys for this EIA included portions of the present Project footprint (Sections 10-15 and 22-24, Township 56, Range 22, West of the Fourth Meridian as well as Sections 7 and 18, Township 56, Range 24, West of the Fourth Meridian). Although the surveys were conducted over 10 years ago, and some uncertainty exists given the natural variability in wildlife occupancy and abundance, the data is likely still considered to be relevant as little has changed in the Project Footprint. As such, the wildlife community is likely similar to what has been previously reported. The Project is located adjacent to several large industrial facilities, which have been undergoing long term expansions or development. The noise from these developments would likely result in less wildlife occurrences within this area. Additionally, on May 18, 2018, Inter Pipeline Propylene Ltd conducted a wildlife survey with no reported occurrences of species listed under SARA. The IPL project site is also located within the AIH, however is closer to the NSR.

During the reconnaissance and amphibian surveys completed as part of the Fort Hills Sturgeon Upgrader Project EIA, two amphibian, 46 avian, and 11 mammal species were observed or detected (Petro-Canada Oil

[2] **Intactness**: a reflection of how modifications to habitat as a result of human activities have resulted in changes to species abundance.
[3] **Richness**: a relative measure of the number of common native species within 1 km^2 grid across the province.
[4] **Uniqueness**: a relative measure that identifies the degree to which a species composition in a 1 km^2 grid is distinct compared to other grid cells within a Natural Region.

Sands Inc. 2006 and 2007). Most of the species observed or detected are common to the area and are provincially-listed as "Secure" (Table A3-2, Appendix 3).

Six species observed during the survey are provincially-listed as "Sensitive" (Baltimore oriole [*Icterus galbula*], common yellowthroat [*Geothlypis trichas*], eastern kingbird [*Tyrannus tyrannus]*, least flycatcher [*Empidonax minimus*], pileated woodpecker [*Dryocopus pileatus]*, and sora [*Porzana Carolina]*) and one species (western wood-pewee) is provincially-listed as "May be at Risk". No species observed or detected are federally-listed.

Most mammals observed or detected are common in agricultural environments including coyote (*Canis latrans*), deer (*Odocoileus* sp.), ground squirrels (*Spermophilus* sp.), moose (*Alces americanus*), and weasels (*Mustela* spp.). Other species such as porcupine (*Erethizon dorsatum*), red squirrel (*Tamiasciurus hudsonicus*) and snowshoe hare (*Lepus americanus*) are commonly encountered in wooded environments. Other than a few limited windrows, wooded environments are absent from the Project footprint. The highest number of bird species occurred in deciduous forest; however, most of the point count locations were at a distance from the Project footprint, including near the NSR. The most common species observed were yellow warbler (*Dendroica petechia*), red-eyed vireo (*Vireo olivaceus*), yellow-rumped warbler (*Dendroica coronata*), and clay-colored sparrow (*Spizella pallida*). Again, deciduous forests in the Project footprint are limited to windrows between agricultural fields and were identified as disturbed.

Some federally-listed species with historical observations within 3 km of the Project location are unlikely to be present. For example, peregrine falcons typically nest on cliffs close to riparian or wetland habitats, especially near major river systems such as the NSR. Buildings and other man-made structures are also often chosen as nesting sites (Rowell and Stepnisky 1997). Given the lack of cliffs and buildings within the Project footprint, it is unlikely that this species utilizes the Project location for nesting, though individuals could nest along the NSR (3.0 km away). There is the potential for species to utilize Project footprint for feeding and other uses, but it is unlikely. Birds are frequently preyed upon by peregrine falcons, and pigeons (e.g. rock doves [*Columba livia*]) are arguably the most important biomass (White et al. 2002). Peregrine falcons generally search for prey in a perched position with high vantage point (e.g. cliffs on the NSR) before capturing prey in the air (White et al. 2002). In fall and winter, peregrine falcons may hunt from lower perches such as trees but these are uncommon in the Project footprint (White et al. 2002). Given that cliffs are absent and trees are limited, there is low likelihood of peregrine falcons foraging in the Project footprint.

Similarly, barn swallows are known to inhabit agricultural environments and presently, largely nest on artificial structures such as buildings and bridges (Brown and Brown 1999); however, nesting structures are largely absent from the Project footprint. Yellow rail breed in sedge meadows (Leston and Bookhout 2015) and this type of habitat is not available at the Project footprint. Moreover, northern leopard frogs are now generally thought to be extirpated from central and western portions of their historical range (such as Fort Saskatchewan) and now appear to be restricted to the Grassland Natural Region in the Oldman, lower Red Deer, Milk, South Saskatchewan, and lower Bow Rivers (ESRD 2012b).

Horned grebes breed in small to moderate sized, shallow wetlands that have emergent vegetation. This type of habitat may be present within the Project footprint. Similarly, North American badgers are most often found in treeless habitats with an available food source such as Richardson's ground squirrels (Scobie 2002). They have been found to roam in a variety of habitats in Alberta, including pastures, in search for prey (Scobie 2002). Badger occurrence in the Project footprint, if any, is likely to be transitory in nature and dependent on food availability. Badgers are nomadic (Messick and Hornocker 1981) and their occurrence is largely driven by prey availability (Hoodicoff 2006). Though the North American badger is provincially-listed as "Sensitive" and federally-listed as "Special Concern", the setback requirement of 200 m relates to natal dens, only. Any risk to

badgers can be avoided by completing wildlife sweeps and selective timing for construction. Wildlife sweeps will be conducted prior to initiating any site clearing or construction. Site clearing and wetland removal are to be completed outside of the migratory bird nesting season.

In addition to the species with historical occurrences, three federally-listed species have potential to occur at the Project footprint. Common nighthawks nest and forage in open, cleared areas such as pastures and roads; similarly, short-eared owls use a wide variety of open habitats, including old pastures and agricultural fields for nesting and foraging [Committee on the Status of Endangered Wildlife in Canada (Committee on the Status of Endangered Wildlife in Canada [COSEWIC] 2007; 2011)]. Given their requirements and the available habitat, it is possible common nighthawks could nest and forage within the current Project footprint. The likelihood of short-eared owls nesting is low given the lack of abundant vegetation cover; however, it is possible this species could use the Project location for foraging. The little brown bat (*Myotis lucifugus*) is provincially-listed as "Secure" but is federally-listed as "Endangered" (AEP 2018a; Government of Canada 2017) and could potentially roost in windrows between agricultural fields (COSEWIC 2017). However, the Project footprint contains minimal windrows between agricultural fields and, more suitable roosting habitat is likely to be located near the NSR.

Wildlife sweeps will be conducted prior to construction startup to identify wildlife features (e.g. dens, mineral licks, roosts, nests) that require setbacks or other mitigation measures in order to prevent negative impacts. Construction activities will not be initiated during critical timing periods (mid-April to late-August), however, any construction started prior to the timing period will be ongoing. A wildlife specialist will be onsite site during all site clearing activities. The Project is not anticipated to significantly contribute to local wildlife mortality.

5.1.4 Soils

The field soil survey was conducted from October 24-26, 2017. A total of 16 soil inspection locations were advanced within the Project footprint. Soil surveys have previously been completed in the region and in the Project footprint (Shell Canada Ltd. 2005; North West Upgrading Inc. 2006; Petro-Canada Oil Sands Inc. 2006).

The baseline soil assessment found that Chernozems with deep Ah-horizons dominated the Project footprint. Accumulation of organic matter from the root decomposition of grassland communities dominated the soil genesis and created the diagnostic dark coloured Ah horizons. Many small sloughs and depressions were observed where periodic saturated soil conditions have influenced the soil genesis as evidenced by diagnostic gley features and the established vegetation communities. The saturated soil conditions likely resulted from the presence of clayey till restricting drainage through the profile (Advisian 2018a).

Generally, the mineral soils in the Project footprint do not require any special handling during salvage activities. During site construction, all topsoil and a portion of the subsoil will be salvaged and stockpiled separately for use in final footprint reclamation.

5.1.5 Hydrology

The Project is located approximately 3.0 km west of the NSR. The closest surface water features are two Unnamed creeks (21989 and 25433), located approximately 0.5 km north/NE and 1.3 km east/SE, respectively. Both of these Unnamed creeks have been deemed to be non-fish bearing.

Stormwater from the Project footprint will be collected in two stormwater ponds located on the PDH/PP Facility (North and South pond). Water will be tested prior to release and, if compliant with allowable discharge requirements to be provided by AEP in the EPEA Approval (pending), will be released to the Sturgeon County ditching system along RR 221. The ponds will be designed for a 1 in 100 year, 24 hour rainfall event. The Project footprint straddles two watershed basins, water released from the North pond flows north within the RR 221 ditch. Stormwater released from the South pond flows south within the RR 221 ditch.

In this area, unnamed creek 21989 is located on the North side of Highway 643 and is not directly connected to the ditching network along RR 221, as the stormwater will flow into the ditch along the south side of Highway 643. All stormwater from this watershed basin eventually flows to the NSR, however by using Sturgeon County's allowable discharge rate of no greater than of 1 litre per second per hectare (l/s/ha) of land (as per Sturgeon County requirements) (CKPC 2018) basin flows are consistent with undeveloped runoff. This rate of discharge is low and has been developed by Sturgeon County to allow for their ditching network and release points to NSR to receive and convey flows that are consistent with undeveloped basin flow and do not require upgrades to their stormwater management network or outfall construction. The stormwater runoff must meet AEP criteria before it is released to Sturgeon County's ditch network and will not be impacted. If the stormwater contents do not meet the EPEA Approval limits, then the water will be tested again if there is sufficient capacity to warrant a settling period. If immediate discharge is required, the water will be removed from site by a licensed disposal contractor.

Unnamed creek 25433 is east of the site and unlikely to be connected to the RR221 ditching network. However similar with the stormwater released from the North pond, the stormwater released from the South Pond could potentially reach the NSR through Sturgeon County's stormwater management system. The release rate of 1 l/s/ha of land will maintain basin flows consistent with undeveloped runoff. This rate of discharge is low and has been developed by Sturgeon County to allow for their ditching network and release points to NSR to receive and convey flows that are consistent with undeveloped basin flow and do not require upgrades to their stormwater management network or outfall construction.

5.1.6 Groundwater

The surficial geology underlying the majority of the Project footprint is mapped as Pleistocene stagnation moraine with undulating topography consisting of till of uneven thickness, and local water-sorted material. The southeastern corner of the site is mapped as Pleistocene and Holocene lacustrine deposits consisting of silt and clay, with a flat or gently undulating topography (Shetsen 1990).

More recent mapping describes the surficial geology from ground surface as topsoil, aeolian sand, clay and clayey deposits, and till (Petro-Canada Oil Sands Inc. 2006). The till is described as continuous and includes rafted bedrock, sand lenses, and sand and gravel lenses (Advisian 2018b).

According to Prior et al. (2013), the Project footprint is underlain by bedrock of the Upper Cretaceous Belly River Group. This group is described as fine- to coarse-grained sandstone, grey to brown carbonaceous siltstone, and coal deposited in a marginal marine to non-marine environment. The Belly River Group is underlain by the Upper Cretaceous Lea Park Formation, which is described as medium to dark grey mudstone with thin stringers of fine-grained, tan siltstone to fine-grained sandstone (Prior et al. 2013).

The bedrock surface in the vicinity of the Project is mapped as approximately 610 metres above sea level (masl), (MacCormack et al. 2015) and is characterized by pre-glacial fluvial channels, with linear bedrock lows

(Petro-Canada Oil Sands Inc. 2006). More recent mapping indicates the bedrock surface elevation is approximately 630 to 640 masl and slopes towards the east (Petro-Canada Oil Sands Inc. 2006). Regionally, the Beverly Channel is a significant subsurface drainage feature and is roughly aligned with the NSR (Petro-Canada Oil Sands Inc. 2006).

The Beverly Channel represents a pre-glacial valley which geographically parallels the present day NSR valley, and has been infilled with sands and gravels overlying bedrock. These pre-glacial sand and gravel deposits are regional aquifers which affect both groundwater availability and flow distribution (Stantec Consulting Ltd. 2004).

The Beverly Channel deposits are known to be in direct hydraulic connection with the NSR, and the water levels in the channel vary with river water levels. The regional direction of groundwater flow is toward both the Beverly Channel and the NSR. The sand and gravel deposits of the Beverly Channel form an important regional aquifer (Stantec Consulting Ltd. 2004).

Groundwater testing was undertaken in 2017 (Advisian 2018b). Samples were collected and analyzed for routine chemistry, dissolved metals and hydrocarbons. All parameters were reported below the reliable detection limit (RDL) with the exception of toluene, ethylbenzene and xylenes at the majority of the monitoring wells with generally low concentrations, close to the RDL. Such hydrocarbon detections were previously reported and documented to have originated from bituminous siltstone/sandstone (Slaine and Barker 1990). Another possible reason for the presence of these hydrocarbon detections was reported as the minimal development of the newly installed monitoring wells after drilling due to the tight nature of the till (Advisian 2018b).

In addition, CKPC has committed to developing a groundwater monitoring program for the Project, the PDH/PP Facility and surrounding lands. CKPC will submit the proposed groundwater monitoring program to AEP once the EPEA Approval is issued.

5.1.7 Aquatics

An aquatics assessment of the NSR was completed in September of 2016 that included a study area approximately within a 5 km radius from the Project footprint (Advisian 2016). A search of the FWMIS for the Unnamed Creeks 21989 and 25433 showed that neither water body is fish bearing (FWMIS; AEP 2016). Unnamed Creek 21989 was assessed several times between 2001 and 2016 by various consultants, and where water was present, electrofishing yielded no fish, and the channel was characterized as having little or no habitat for fish. Unnamed Creek 25433 was sampled in 2008 and was characterized as having no connectivity with the NSR and poor habitat quality (FWMIS; AEP 2016). The NSR is known to host several aquatic species, five of which are provincially listed as either Threatened, Endangered or Sensitive (AEP 2016). Of those five species, only two have been identified within a 5 km radius of the Project site, the lake sturgeon (*Acipenser fulvescens*) and the sauger (*Sander canadensis*).

5.1.8 Air Quality

Air quality within the Capital Region is monitored by a number of different organizations, including ESRD and the Fort Air Partnership (FAP). CKPC will ensure compliance with the Capital Region Air Quality Framework through existing ambient air quality monitoring. Air quality in the region is monitored by the FAP, which currently operates nine continuous and 63 passive air monitoring stations. CKPC will work with the FAP to

ensure appropriate air monitoring is conducted in the vicinity of the Project. Data from the FAP (FAP 2009; 2010; 2011; 2014) can be evaluated to determine compliance with the Alberta Ambient Air Quality Objectives (AAAQOs; ESRD 2012a).

An Air Quality Assessment (RWDI 2018a) was conducted for the PDH/PP Facility and included the emissions from the Project footprint. Results reported predicted ground level maximum concentrations well below AAAQO for the all CAC evaluated. These include SO_2, NO_2 as NO_x, NO_2, CO, $PM_{2.5}$, Cl_2, HCl, ethylene, n-hexane, acetic acid and acetone. The assessment results indicate that the Project is a negligible contributor to the modelled maximum concentrations in the study area (RWDI 2018a).

5.1.9 Noise

The Project falls under the guidelines set out by two agencies: NCIA and Alberta Energy Regulator (AER).

A qualitative noise assessment has been conducted for the Project (RWDI 2018b). The assessment identified four dwelling receptor locations in close proximity to the 1.5 km noise assessment boundary, as defined by AER Directive 038 (AER 2007), of the Project which includes three permanent residences located approximately 1.2 km, 1.5 km, and 1.7 km from the Project footprint. The assessment found that the Project will comply with the noise goals set out by the NCIA according to the RNMP and approved by the AER. The Project is expected to be in operation throughout the day and night; therefore, the noise sources included were modelled as operating continuously throughout the daytime and nighttime hours. As per Section 4.1.1 of *Alberta Energy Regulator Directive* 038: Noise Control (AER 2007), there is no potential for Low Frequency Noise because the Noise Impact Assessment shows that the difference between C-weighted decibels (dBC) and A-weighted decibels (dBA) levels is less than 20 decibels (dB) at the receptors assessed (RWDI 2018b).

5.1.10 Historical Resources

ACT granted a *Historical Resources Act* Approval for the PDH/PP Facility, including the Project footprint, on December 7, 2017.

Prior to certain types of development in Alberta, ACT must provide a *Historic Resources Act* Approval, which reviews the relationship of proposed developments to known historical resources or areas of potential historical resources. Under the *Historic Resources Act* a historic resource is defined as "any work of nature or of humans that is primarily of value for its palaeontological, archaeological, prehistoric, historic, cultural, natural, scientific or esthetic interest including, but not limited to, a palaeontological, archaeological, prehistoric, historic or natural site, structure or object" (Government of Alberta 2000).

A SoJ was prepared by a professional archeologist, Lifeways of Canada Ltd., and submitted along with a *Historic Resources Act* Clearance application form for the Project on November 3, 2017. The SoJ stated that "all historic resource concerns within the Project lands have been previously addressed. All lands have been previously investigated and there are no recorded Historic Resource sites that have outstanding requirements. No Historic structures remain. As a result, *Historical Resources Act* Approval is recommended for the Canada Kuwait Petrochemical Corporation Propane Dehydrogenation-Polypropylene Production Facility Project" (Lifeways of Canada 2017).

In the event that a historical resource is found during the construction, operation or decommissioning of the Project, CKPC will complete the following as per Section 31 of the *Historical Resources Act*:

- Stop work
- Notify ACT
- Wait for ACT permission to restart work

The Approval includes consideration and assessment of the presence of structures, sites or things that are of historical, archeological, paleontological, or architectural significance to Indigenous Peoples.

5.2 Potential Changes to the Environment

This section provides a more detailed description of the potential environmental effects on fish and fish habitat as defined under the *Fisheries Act* (Government of Canada 1985b), aquatic species as defined under the SARA (Government of Canada 2002), and migratory birds as defined in the *Migratory Birds Convention Act, 1994* (Government of Canada 1994).

5.2.1 Fish and Fish Habitat (*Fisheries Act*)

The Project footprint does not constitute suitable habitat for aquatic species and no works associated with the Project will be constructed in an area containing fish habitat. There were no aquatic species or habitat, as defined under SARA or the *Fisheries Act*, observed during previous wildlife surveys conducted at the Project site.

The Project has no direct discharge to the NSR or any fish bearing waterbody. Surface runoff from the Project site will be routed to the PDH/PP Facility stormwater ponds. After water testing and ensuring compliance with the EPEA Approval discharge conditions, the water will be released to the Sturgeon County stormwater ditch network at a release rate calculated to maintain baseline basin flows. The drainage from the Sturgeon County stormwater ditch along RR221 could potentially flow towards Unnamed Creeks 21989 and 25433. Neither Unnamed Creek 21989 or 25433 are fish bearing and have limited to no connectivity to the NSR (FWMIS; AEP 2016). While some species reported in the NSR are of special conservation or management concern, these would be limited by the lack of habitat availability in the Unnamed Creeks 21989 or 25433. Any possible Project influences on these unproductive (dry) channels will have no effect on the fish community in the NSR.

As a result, no adverse effects are expected from the Project on fish in the NSR or fish in the NSR that are part of a commercial, recreational or Indigenous Peoples fishery, or their habitat.

The Project will maintain the natural topography of the area and stormwater discharge consisting of unimpacted rainfall runoff will be managed through the existing Sturgeon County stormwater ditch network at a release rate that is consistent with predevelopment runoff. The Project is therefore not expected to adversely affect surface hydrology or the patterns of flow in the unnamed creeks, which currently have minimal fish habitat value. As such, the Project is not anticipated to impact fish or fish habitat.

5.2.2 Marine Plants (*Fisheries Act*)

The Project is not located in an area where marine plants occur and therefore there will be no effect on marine plants as a result of this Project.

5.2.3 Migratory Birds (Migratory Birds Convention Act, 1994)

Due to limited historical evidence of use of the Project footprint by migratory birds, preference for more suitable habitat outside of the Project footprint and habituation of migratory birds to long-term sensory disturbances in the AIH area, adverse effects on migratory birds are unlikely to occur as a result of the Project. Any wetland habitat lost during the construction of the Project will be replaced type-for-type (same size and value of wetland), ideally in the same area, according to Alberta's Wetland Policy (Government of Alberta 2013).

During bird surveys as part of the Fort Hills Sturgeon Upgrader Project EIA, a total of 46 bird species in the vicinity of the Project footprint were detected or observed (Table A3-2; Appendix 3). Further details including information on the likelihood of species at risk occurring in the Project footprint can be found in Section 5.1.3. The most common species observed in the EIA included yellow warbler, red-eyed vireo, yellow-rumped warbler and clay-colored sparrow (Petro-Canada Oil Sands Inc. 2007). However, these were found in deciduous forests at point count locations outside the Project footprint (including along the NSR). Point counts located in pasture type habitats had the lowest abundance and diversity of species (Petro-Canada Oil Sands Inc. 2007). Given that deciduous forest is limited to windrows between fields and that the majority of the Project Footprint is cultivated, bird abundance and diversity is expected to be low compared to surrounding communities. Species typical or this area that are common in cultivated fields include American crow (*Corvus brachyrhynchos*), black-billed magpie (*Pica hudsonia*), Brewer's blackbird (*Euphagus cyanocephalus*), brown-headed cowbird (*Molothrus ater*), savannah sparrow (*Passerculus sandwhichensis*) and vesper sparrow (*Pooecetes gramineus*) (Table A3-2; Appendix 3). These birds and others, will occupy and use the area to complete their life history (e.g. breeding, foraging, resting). As such, the Project has the potential to impact birds through sensory disturbances, direct and indirect mortality, and habitat loss or modification. Despite potential affects, and given anticipated low abundance and diversity of bird species, adverse impacts as a result of the Project are anticipated to be minor and can be mitigated. Although the surveys were conducted over 10 years ago, and some uncertainty exists given the natural variability in wildlife occupancy and abundance, the data is likely still considered to be relevant as little has changed in the Project Footprint. As such, the bird community is likely similar to what has been previously reported.

5.2.3.1 Noise and Vibrations

Sensory disturbances such as noise and vibrations will increase as a result of Project construction and operation. Noise can mask or lead to modification of signals used for communication, mating, and hunting (Siemers and Schaub 2010, Mason et al. 2016) altering foraging or mating success or impacting physiology (e.g. stress or hearing loss; Shannon et al. 2016). These impacts can ultimately change bird communities (Bayne et al. 2008, Francis et al. 2009). That said, birds can become tolerant to long-term, continuous noise (Shannon et al. 2016) such as contributed by industrial facilities. The Project is expected to be in operation throughout the day and night; therefore, the noise sources included were modelled as operating continuously throughout the daytime and nighttime hours. The Project is located within the AIH and is industrial; thus, is can be expected that birds inhabiting the wider region are tolerant of current noise levels. The noise assessment completed by RWDI found that the Project will comply with the noise goals set out by the NCIA according to the RNMP and approved by the AER. Only one trip per day is anticipated by CNR to the rail yard. Similarly, the Project footprint is already subjected to vibrations from adjacent CNR traffic at the RFS complex, which see trail traffic of three trips daily from CNR. Although, there will be a brief increase in noise and vibration during construction, it is likely to have minimal to no impact on migratory birds.

5.2.3.2 Light

Light can also lead to sensory disruption for migratory birds: light can attract and disorient birds disrupting flight paths or inducing behaviours such as territorial singing, thereby increasing energy expenditure leading to reduced survivability, health and fecundity (Longcore and Rich 2004). Lighting is not anticipated to be required on the Pembina Rail Line. For the remainder of the Project footprint, the number and intensity of outdoor light fixtures will be minimized to provide only what is required for safety and security. Low intensity LED lighting will be used with limited use of wide area flood lighting. In all, there will be negligible increase to light, particularly considering the adjacent industrial facilities and the City of Edmonton and the Town of Fort Saskatchewan occur nearby.

5.2.3.3 Vehicle Collisions

Direct and indirect mortality could also affect birds as part of Project construction and operations. For example, vehicle collisions or interactions with construction equipment could lead to mortality (Bishop and Brogan 2013). During the construction of the Project, buses will be used to transport construction workers to the site. This will not only reduce the number of vehicles on the adjacent Highway, but buses travel at a lower rate of speed which could result in a lower incidents of migratory bird fatalities. During operation, there will be minimal vehicle traffic associated with Project employees and CNR will complete only one trip per day along the Pembina rail line. As such, vehicle collisions are not anticipated to have an impact on migratory birds.

5.2.3.4 Air and Water

Contaminated air and water could lead to direct and indirect mortality or health and fitness consequences for birds (*sensu* Cox 1991). For example, stormwater ponds built to manage surface runoff have the potential to attract migratory birds. However, in Pembina's experience, at the adjacent RFS Complex, few migratory birds are observed within the seven ponds (two stormwater and five brine ponds). In the instances where birds may be attracted to the PDH/PP Facility stormwater ponds, the water within these ponds is inert runoff from the PDH/PP Facility. Areas where chemicals will be stored will have sumps and emergency response plans to contain potential spills. The PDH/PP Facility will operate under EPEA Approval that will provide the stormwater release criteria. It is expected that when tested, water quality will meet EPEA discharge limits, as the water is primarily unimpacted rainfall runoff. Moreover, deterrents such as fladry and predator effigies will be installed to prevent waterfowl utilizing these ponds and regular, random inspections will take place to confirm waterfowl use. Few waterfowl species were identified during avian surveys for the Fort Hills Sturgeon Upgrader Project EIA: those that were observed or detected included common species such as Canada geese (*Branta canadensis*), mallards (*Anas platyrhynchos*), and snow geese (*Chen caerulescens*) (Table A3-2; Appendix 3).

Air pollution could similarly contribute to direct (acute or chronic toxicity) or indirect mortality (e.g. predation or starvation) and sublethal effects (*sensu* Cox 1991); however, an Air Quality Assessment (RWDI 2018a) was conducted for the PDH/PP Facility and included the emissions from the Project footprint. For Project operation results reported predicted ground level maximum concentrations well below AAAQO for the all CAC evaluated. These include SO_2, NO_2 as NO_x, NO_2, CO, $PM_{2.5}$, Cl_2, HCl, ethylene, n-hexane, acetic acid and acetone. The assessment results indicate that the Project is a negligible contributor to the modelled maximum concentrations in the study area. Similarly, dust emission during construction will be suppressed using water trucks and other mitigation measures established through the Environmental Protection Plan and a CKPC

environmental representative will be on-site during all site clearing and grading to ensure dust is minimized. Dust, which can damage vegetation (Forman and Alexander 1998) leading to an effective loss of habitat, is not anticipated to be emitted during operation as the Project footprint will be graveled or paved. Finally, the total amount of GHG emissions during the construction phase is estimated to account for 0.0073% of the 2016 Alberta GHG emissions (ECFR 2018b). The total amount of GHG emissions during the operation phase is estimated to be approximately 20.6 t/a of CO_2e, which accounts for 0.00001% of the 2016 Alberta GHG emissions (ECFR 2018b). The air emissions from the Project are negligible and are not anticipated to have an impact on migratory birds.

5.2.3.5 Habitat

Habitat loss or modification can negatively affect biodiversity, including birds (Fischer and Lindenmayer 2007). However, the Project footprint has undergone previous habitat modification: it has been disturbed by cultivation and is surrounded by agriculture and heavily industrialization. Although the ABMI has modeled the intactness and richness for this area (between 50% and 80%), the habitat that is present at the Project footprint is not limiting on the landscape and is considered to have low uniqueness. The habitat available is of low quality and suitable only for those species that regularly use agricultural areas and are tolerant of noise from continuous plant and rail operations. Species previously detected during Fort Hills Sturgeon Upgrader EIA that are typically associated with cultivated fields and are often tolerant of human activities include non-migratory species such as American crow, black-billed magpie, Brewer's blackbird, and brown-headed cowbird in addition to migratory species such as savannah and vesper sparrows (Table A3-2; Appendix 3). As such, while there may be some limited removal of vegetation and soil leading to a reduction in habitat as part of the development of the Project, this habitat is not limited and surrounding areas will continue to provide space for these species.

With respect to loss of wetlands, habitat will be replaced type-for-type (same size and value of wetland), ideally in the same area, according to Alberta's Wetland Policy (Government of Alberta 2013). Most of the 45 wetlands that were identified in the Project footprint have temporary or ephemeral permanence. For most migratory waterfowl (e.g. Canada geese, mallard, and snow geese), there may be minor, short-term loss of stop-over habitat in the spring until compensation habitat is constructed and fully functional. Similarly, most wetlands were disturbed by cultivation and all were situated in agriculture. Little nesting habitat is available; nevertheless, there may be temporary, short-term disruption to nesting habitat for wetlands species (e.g. common yellowthroat, mallard, song sparrow (Melospiza melodia), and sora (Porzana carolina) until replacement habitat is functional. Wetland clearing will be avoided within the migratory bird breeding season and migratory bird surveys and nests searches will be conducted prior to and during clearing and construction. CKPC is working with AEP to obtain Water Act approval prior to the start of the breeding season; thus, reducing the potential for birds to establish nests in the Project footprint. Additionally, a wildlife monitor will be present during wetland removal and Project construction to monitor potential wildlife occurrences.

5.2.4 Species at Risk (Species *at Risk Act, 2002*)

No adverse effects to species at risk as a result of the Project are anticipated. Using the most current available data (approximately 10 years old) for the Project footprint, no species observed or detected are federally-listed.

There is potential for five federally-listed species (common nighthawk, horned grebe, little brown myotis, North American badger, and short-eared owl) that have historical occurrences within 6 km to inhabit the Project footprint. However, due to the limited suitable habitat present within the Project footprint, the likelihood of occupancy for these species has been assessed as low to moderate.

5.2.5 Wildlife and Habitat

Similar to migratory birds and species at risk, no adverse effects to other wildlife and habitat are anticipated as a result of the Project. Overall, the habitat is not considered unique, and only moderately intact. The amphibians and mammals observed or detected during regional surveys are provincially-listed as "Secure". Moreover, many of these species were detected in riparian woodlands and upland woodlands and these vegetation communities are lacking in the Project footprint (Petro-Canada Oil Sands Inc. 2007).

The agricultural land use lowers the quality of available habitat and habitat is not limited in the region. That said, pre-construction wildlife sweeps will be conducted to identify any sensitive wildlife or protected wildlife features which will subsequently be buffered with an appropriate setback or other mitigation measure.

5.3 Potential Effects Related to Interprovincial/Federal/International Lands

No environmental effects of the Project on federal lands or on other provinces or countries are expected. The Project is not located on federal land and there is no federal land within approximately 20 km of the Project site. The Project is not located near a provincial or international border. The location of the Project in relation to provincial and international boundaries is shown in Figure 2. The distance to the boundaries are as follows:

- Alberta-Saskatchewan border: 207 km
- Alberta-British Columbia border: 325 km
- Alberta-Northwest Territories border: 686 km
- Canada-USA border: 534 km

The closest federal lands are Elk Island National Park, approximately 21 km SE of the Project and Canadian Forces Base Edmonton located 24 km west of the Project (Figure 3). Given the distance of the Project from federal lands, it is not anticipated that the off-site dispersion of noise or air emissions will affect those federal lands. Adverse environmental effects are also not anticipated on lands outside of Alberta or Canada.

5.4 Potential Effects on Indigenous Peoples from Changes to the Environment

The nearest First Nation Reserves are the Alexander First Nation (Treaty 6) on Indian Reserves 134, 134A and 134B (located west of Morinville, Alberta, approximately 47 km west of the Project), and the Enoch Cree Nation (Treaty 6) located approximately 49 km SW of the Project (Figure 6). The Buffalo Lake Métis Settlement, Kikino Métis Settlement and Saddle Lake 125 Reserve are located approximately 77, 81 and 86 km NE of the Project, respectively (Figure 6).

No effects on Indigenous Peoples due to changes in the environment are anticipated. These include effects on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes or any structure, site or thing that is of historical, archeological, paleontological or architectural significance.

The land is privately owned (currently by Pembina) and located within the AIH on industrial zoned (heavy industrial, IH) lands with extensive long term industrial development occurring and planned immediately surrounding the Project footprint. Therefore, there are likely no current or known traditional uses of the Project footprint by Indigenous Peoples or groups. Further, CKPC likely does not require access to, use of, or the exploration, development, and production of resources or lands currently used for traditional purposes by Indigenous Peoples for the proposed Project.

In addition, the Project footprint and PDH/PP Facility will be fenced to ensure safety of the public. The fencing is not anticipated to impact access to traditional use areas for Indigenous Peoples as the land is privately owned land and there are no current or known traditional uses of the Project site by Indigenous Peoples or groups.

No adverse effects from air and noise emissions are anticipated given that the nearest Indigenous community is 47 km away from the Project. A qualitative noise assessment found that the Project will comply with the noise goals set out by the NCIA according to the RNMP and approved by the AER (RWDI 2018b). The ambient air quality monitoring assessment results indicate that the Project is a negligible contributor to the modelled maximum concentrations in the study area (RWDI 2018a).

Further, as per Section 5.1.5, no adverse effects are expected on the water quality and quantity in the NSR and therefore impacts to water quality and quantity availability within the NSR for Indigenous Peoples are not anticipated. Likewise, as discussed in Section 5.2.1, no adverse effects are expected to result from the Project on fish in the NSR that are part of a commercial, recreational or Indigenous Peoples fishery, or their habitat.

In addition, no adverse effects are anticipated on the availability of wildlife for Indigenous Peoples as no adverse effects to wildlife and habitat are anticipated as a result of the Project. Overall, the habitat is not considered unique, and only moderately intact. The agricultural land use lowers the quality of available habitat and habitat is not limited in the region.

As discussed in Section 5.1.10, ACT granted a *Historical Resources Act* approval for the PDH/PP Facility, including the Project footprint, on December 7, 2017. Prior to certain types of development in Alberta, ACT must provide a *Historic Resources Act* Approval, which reviews the relationship of proposed developments to known historical resources or areas of potential historical resources. Under the *Historic Resources Act* a historic resource is defined as "any work of nature or of humans that is primarily of value for its palaeontological, archaeological, prehistoric, historic, cultural, natural, scientific or esthetic interest including, but not limited to, a palaeontological, archaeological, prehistoric, historic or natural site, structure or object" (Government of Alberta 2000).

The Project footprint is located within Historic Resource Value listed lands which may have the potential to contain historic resources. However, as stated in the SoJ submitted by Lifeways of Canada Ltd., on November 3, 2017, "all historic resource concerns within the Project lands have been previously addressed. All lands have been previously investigated and there are no recorded Historic Resource sites that have outstanding requirements. No Historic structures remain. As a result, *Historical Resources Act* Approval is recommended

for the Canada Kuwait Petrochemical Corporation Propane Dehydrogenation-Polypropylene Production Facility Project" (Lifeways of Canada 2017).

In the event that a historical resource is found during the construction, operation or decommissioning of the Project, CKPC will complete the following as per Section 31 of the *Historical Resources Act*:

- Stop work
- Notify ACT
- Wait for ACT permission to restart work

The Approval includes consideration and assessment of the presence of structures, sites or things that are of historical, archeological, paleontological, or architectural significance to Indigenous Peoples.

Any potential effects to Indigenous Peoples not yet considered by CKPC may be identified as an outcome of the Indigenous Peoples Engagement Process (currently underway), at which time CKPC will work to mitigate effects.

6. Proponent Engagement with Indigenous Groups

6.1 Potentially Interested or Affected Groups

Based on discussions with CEAA, CKPC has identified 27 Indigenous Groups (Figure 6) as potentially interested in the Project based on Indigenous Peoples engagement efforts of other recently proposed projects in the AIH region:

- Alexander First Nation
- Alexis Nakota Sioux Nation
- Beaver Lake Cree Nation
- Blood Tribe
- Buffalo Lake Métis Settlement
- Chipewyan Prairie Dene First Nation
- Enoch Cree Nation
- Ermineskin Cree Nation
- Foothills Ojibway First Nation
- Fort McMurray #468 First Nation
- Gunn Métis Local #55
- Kikino Métis Settlement
- Louis Bull Tribe
- Métis Nation of Alberta – Region 1
- Métis Nation of Alberta – Region 2
- Métis Nation of Alberta – Region 4
- Montana First Nation
- Paul First Nation
- Piikani Nation
- Saddle Lake Cree Nation
- Samson Cree Nation
- Siksika Nation
- Stoney (Bearspaw) Band
- Stoney (Chiniki) Band
- Stoney (Wesley) Band
- Tsuut'ina Nation
- Whitefish Lake #128 First Nation

6.2 Indigenous Peoples Engagement

On May 15, 2018, information packages, which outlined the project details and location (cover letter, figure and brochure) were delivered via registered mail to the Indigenous groups suggested by CEAA. The brochure is available to the public on CKPC's website: https://www.ckpcpolymers.com/. Section 6.4 describes CKPC's forward plan with regards to Indigenous engagement.

6.3 Indigenous Peoples Concerns

At the time of submission of this Project Description, no concerns regarding impacts to Treaty or Aboriginal Rights or traditional uses have been expressed by the Indigenous groups identified for engagement. In order to understand any potential concerns, all comments or concerns received in response to the notification

package will be logged by CKPC and follow-up discussions and engagement will be completed as required to address the concerns.

On April 24, 2018, an Adequacy Assessment was received from the Aboriginal Consultation Office that confirmed that no consultation is required for the proposed PDH/PP Facility lands, including the Project footprint, for the EPEA and *Water Act* applications (wetlands).

6.4 Indigenous Peoples Engagement Program

CKPC has willingly accepted the opportunity to develop and implement an Indigenous Peoples Engagement Program based on CEAA's recommendation. CKPC has provided Project information packages to the 27 Indigenous Groups suggested by CEAA.

The Project is located within Treaty 6. CKPC recognizes that First Nation signatories to Treaty 6, as well as Métis communities and First Nations from Treaties 7 and 8 may have traditional territories that overlap the Project footprint and may practice Treaty rights, Aboriginal rights and traditional uses in proximity to or within the Project site on unoccupied Crown land, as per the *Natural Resources Transfer Act*. As the Project is located on freehold land that has been privately owned and farmed since 1950 (Integrated Environments Ltd. 2016), and the Project location is within the AIH on industrial-zoned (heavy industrial, IH) land, it is not anticipated that the Project will impact lands where Treaty rights, Aboriginal rights or traditional land use is currently exercised. However, CKPC recognizes that Indigenous communities may have practiced their Treaty and Aboriginal rights in the area overlapping with the Project footprint prior to 1950. The Indigenous community engagement process currently underway will provide opportunity for concerns regarding traditional land use to be brought forward.

CKPC has sent by Canada Post registered mail, a cover letter, figure and information package with Project specific details to the 27 identified Indigenous Groups, to inform as well as to provide them with an opportunity to voice their issues or concerns with the proposed Project.

If an Indigenous Group identifies specific issues and concerns with the Project, CKPC will document and respond to these issues, with the potential for in person engagement as required. Additionally, as part of ongoing engagement, CKPC is committed to providing regular project updates to the Indigenous Groups suggested by CEAA.

7. Engagement with the Public and Other Parties

7.1 Key Comments and Concerns

No concerns have been noted at the time of the submission of this document.

7.2 Overview of Ongoing or Proposed Stakeholder Engagement

CKPC has initiated community and stakeholder engagement for the CKPC PDH/PP Facility, which includes the Project. The approach to community and stakeholder engagement implementation was and will be delivered in a manner that enhances the understanding by CKPC of community and stakeholder issues and concerns, identifies options for their resolution, and allows the company to make future choices in the design of the PDH/PP Facility and the Project to mitigate potential adverse effects.

The following points summarize the phased initiatives of the engagement activities:

- engagement with federal, provincial and municipal governments have been ongoing;
- engagement with local communities through industrial open houses within the AIH; and
- the CKPC PDH/PP Facility Information Package including the CKPC PDH/PP Facility description, location, timelines and, environmental and safety measures will be sent, by registered mail to all relevant stakeholders as described below.

Extensive stakeholder mapping was undertaken prior to commencing community and stakeholder engagement. As required by other regulatory bodies, all interested parties within 2,000 m will be engaged by CKPC. This engagement will begin in late 2018 as the provincial regulatory package is currently being prepared for the cogeneration unit. A Project Information Package will be sent by postal mail to all landowners, urban residents and businesses located within this radius.

Engagement with members of the public has been ongoing through presentations on the Project and the proposed PDH/PP Facility at several public events. Each event provided opportunities for questions and comments following.

- Alberta's Industrial Heartland Association Board Meeting, November 2017;
- Redwater Mixer, November 2017; and
- Heartland Stakeholder Event, January 2018.

CKPC is committed to maintaining and documenting the public consultation and stakeholder engagement process throughout the life of the Project, and recognizes that engagement is an on-going process.

7.3 Engagement with Other Jurisdictions

Discussions with the CEAA began in February 2018. Early discussions focused on introducing CKPC and the Project and obtaining information on the regulatory processes that should be followed.

The following is a list of engagement activities held by CKPC, including the associated PDH/PP Facility, in the planning of the Project:

- August 24, 2016: In-person meeting with Sturgeon County regarding the Project overview and update;
- November 16, 2016: In-person meeting with Sturgeon County to provide Project update;
- June 8, 2017: In-person meeting with Sturgeon County to provide Project update;
- September 11, 2017: Historic Resources Application was submitted to ACT for a *Historical Resources Act* Approval;
- November 30, 2017: In-person meeting with AEP and presentation about the Project;
- February 7, 2018: In-person meeting with CEAA (Anna Kessler and Susan Tiege) to introduce Project;
- March 27, 2018: In-person meeting with Sturgeon County to provide Project update; and
- May 7, 2018: In-person meeting with Alberta Transportation and Sturgeon County to discuss road improvements and closures required for the Project

Sturgeon County is responsible for regulatory decisions pertaining to Sturgeon County Management Plans such as the AIH Area Structure Plan Bylaw, Municipal Addressing System, Capital Region Land Use Plan, and the Land Use Bylaw and for the approval of the Project Development Permit.

AEP is responsible for regulatory decisions pertaining to the EPEA – EIA, EPEA - Industrial Approval, and *Water Act* approvals. ACT is responsible for regulatory decisions pertaining to the *Historical Resources Act*. Alberta Transportation is responsible for issuing permits for roadside developments.

The Canadian Environmental Assessment Agency (CEAA) is responsible for regulatory decisions pertaining to the *Canadian Environmental Assessment Act, 2012*.

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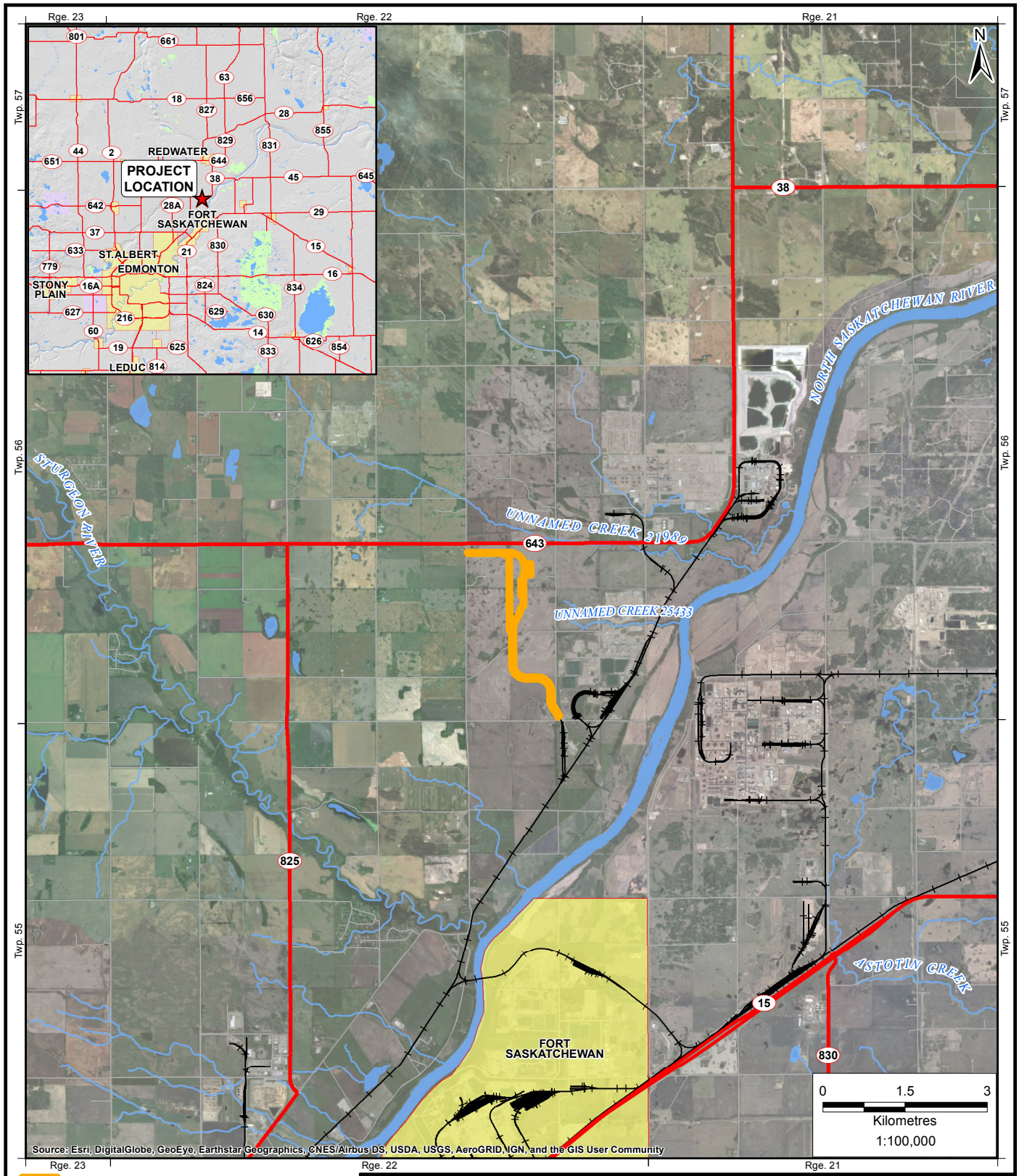
Personal Communication

S.Tiege, Section Team Lead, Canadian Environmental Assessment Agency, personal communication, February 7, 2018.

Figures



Proposed Project Footprint
Community
Waterbody
Watercourse
Major Road
Rail
Road

Basedata Source:
IHS Markit / AltaLIS Ltd.
Alberta Environment and Parks

CANADA KUWAIT PETROCHEMICAL CORPORATION
STURGEON PETROCHEMICAL RAILYARD PROJECT
PROJECT SUMMARY

SITE LOCATION MAP

Date:	Drawn by:	Edited by:	App'd by:
30-AUG-18	T.G.	T.G.	J.M.

WorleyParsons Project No.
207011-00007-1500

FIG No 1
REV 5

CKPC

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National Park
Waterbody
Watercourse
Major Highway

CANADA KUWAIT PETROCHEMICAL CORPORATION
STURGEON PETROCHEMICAL RAILYARD PROJECT
PROJECT SUMMARY

PROJECT LOCATION IN RELATION TO PROVINCIAL AND INTERNATIONAL BOUNDARIES

Date:	30-AUG-18	Drawn by:	T.G.	Edited by:	T.G.	App'd by:	J.M.

CKPC

WorleyParsons Project No. 207011-00007-1500

FIG No 2

REV 1

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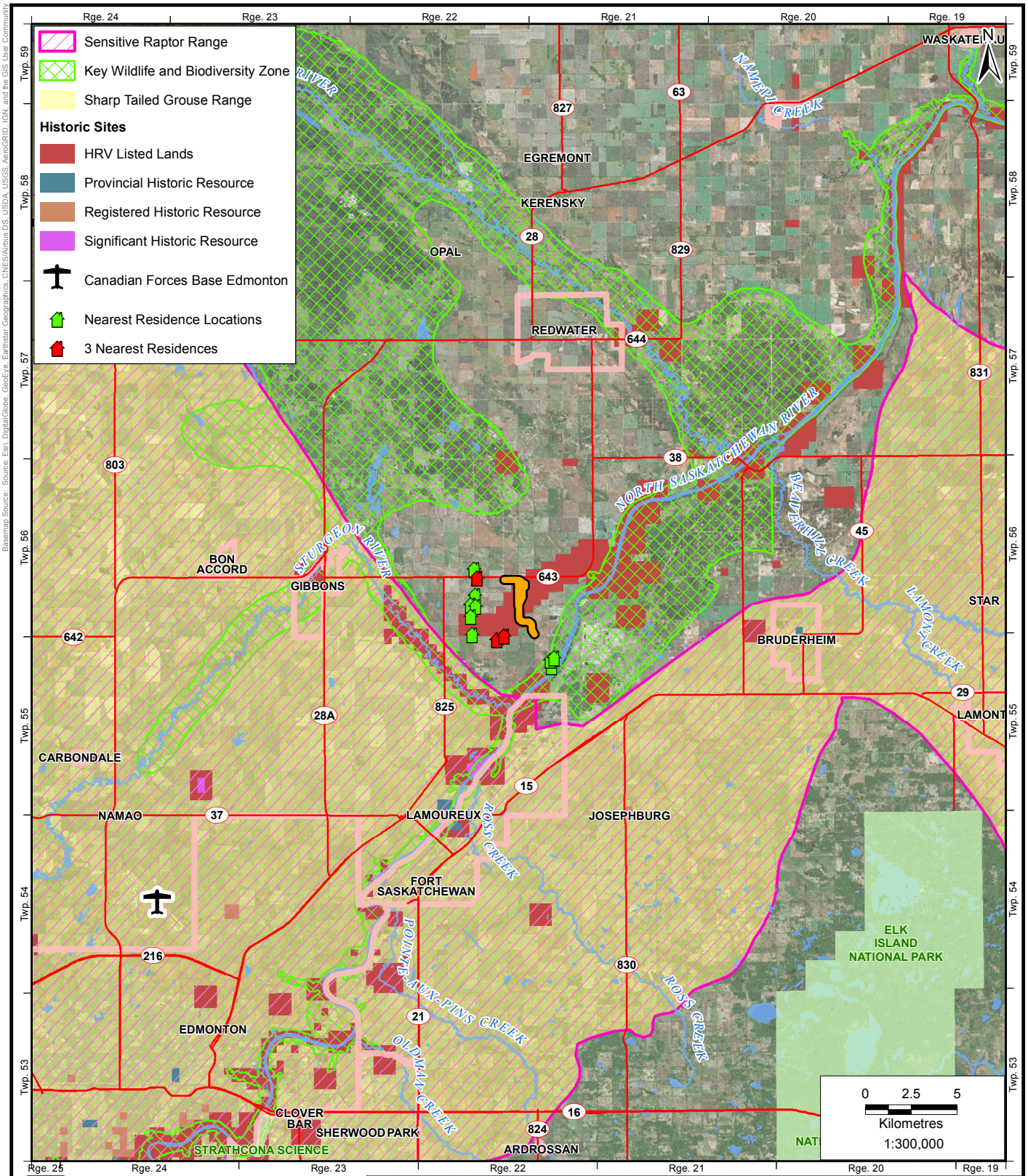

Proposed Project Footprint
Community
National Park
Waterbody
Watercourse
Major Road

Basedata Source:
IHS Markit / AltaLIS Ltd.
Alberta Environment and Parks

CANADA KUWAIT PETROCHEMICAL CORPORATION
STURGEON PETROCHEMICAL RAILYARD PROJECT
PROJECT SUMMARY

KEY REGIONAL FEATURES

Date:	30-AUG-18	Drawn by:	T.G.	Edited by:	T.G.	App'd by:	J.M.

CKPC

WorleyParsons Project No.
207011-00007-1500

FIG No 3 | REV 1

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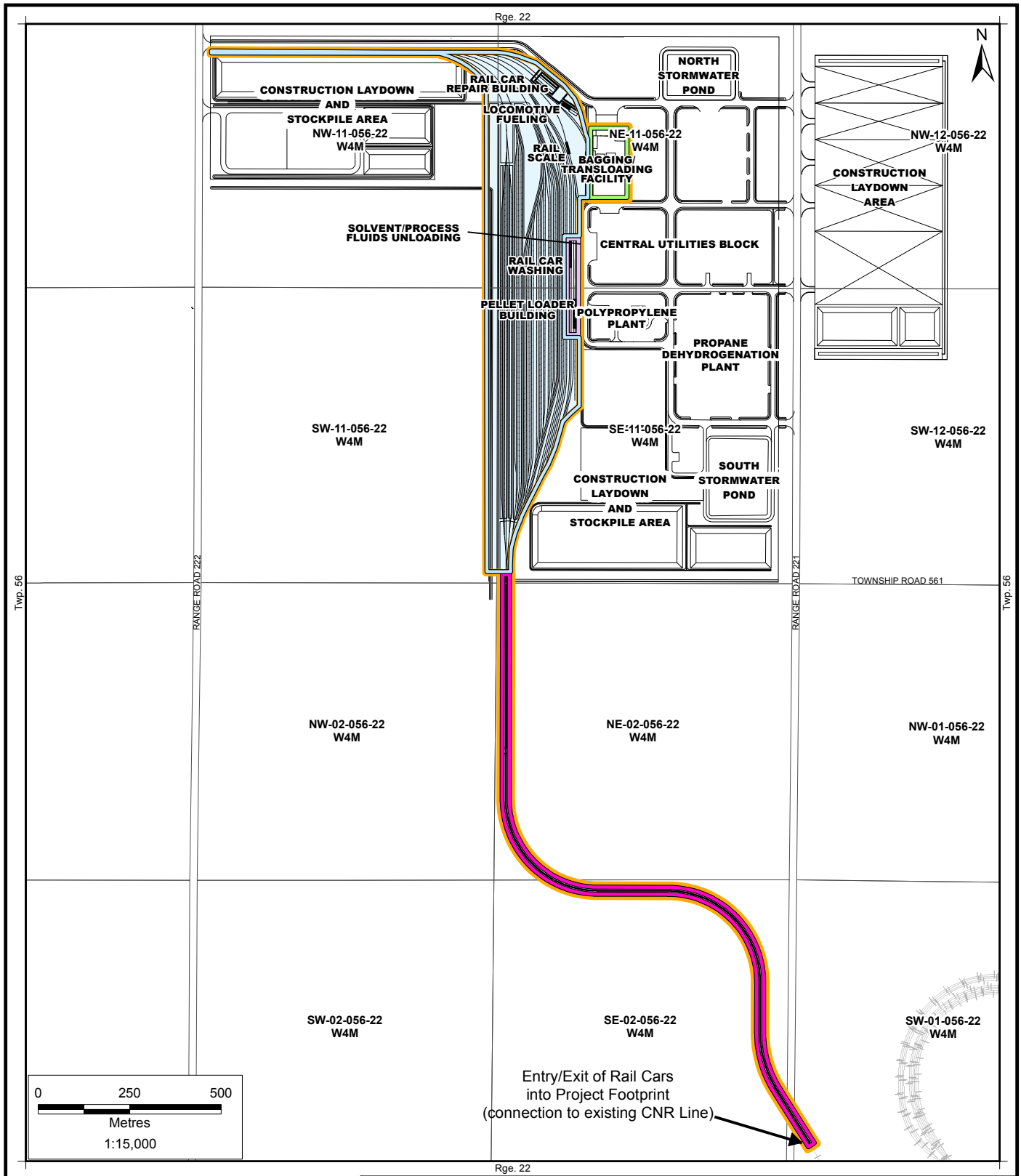

Proposed Project Footprint

Proposed Rail Track

Area 1: Storage, Maintenance and Fueling

Area 2: Loading and Washing

Area 3: Transloading / Bagging

Area 4: Pembina Rail Line

CANADA KUWAIT PETROCHEMICAL CORPORATION
STURGEON PETROCHEMICAL RAILYARD PROJECT
PROJECT SUMMARY

PROJECT LAYOUT

Date:	30-AUG-18	Drawn by:	T.G.	Edited by:	T.G.	App'd by:	J.M.

CKPC

WorleyParsons Project No.
207011-00007-1500

FIG No 4

REV 4

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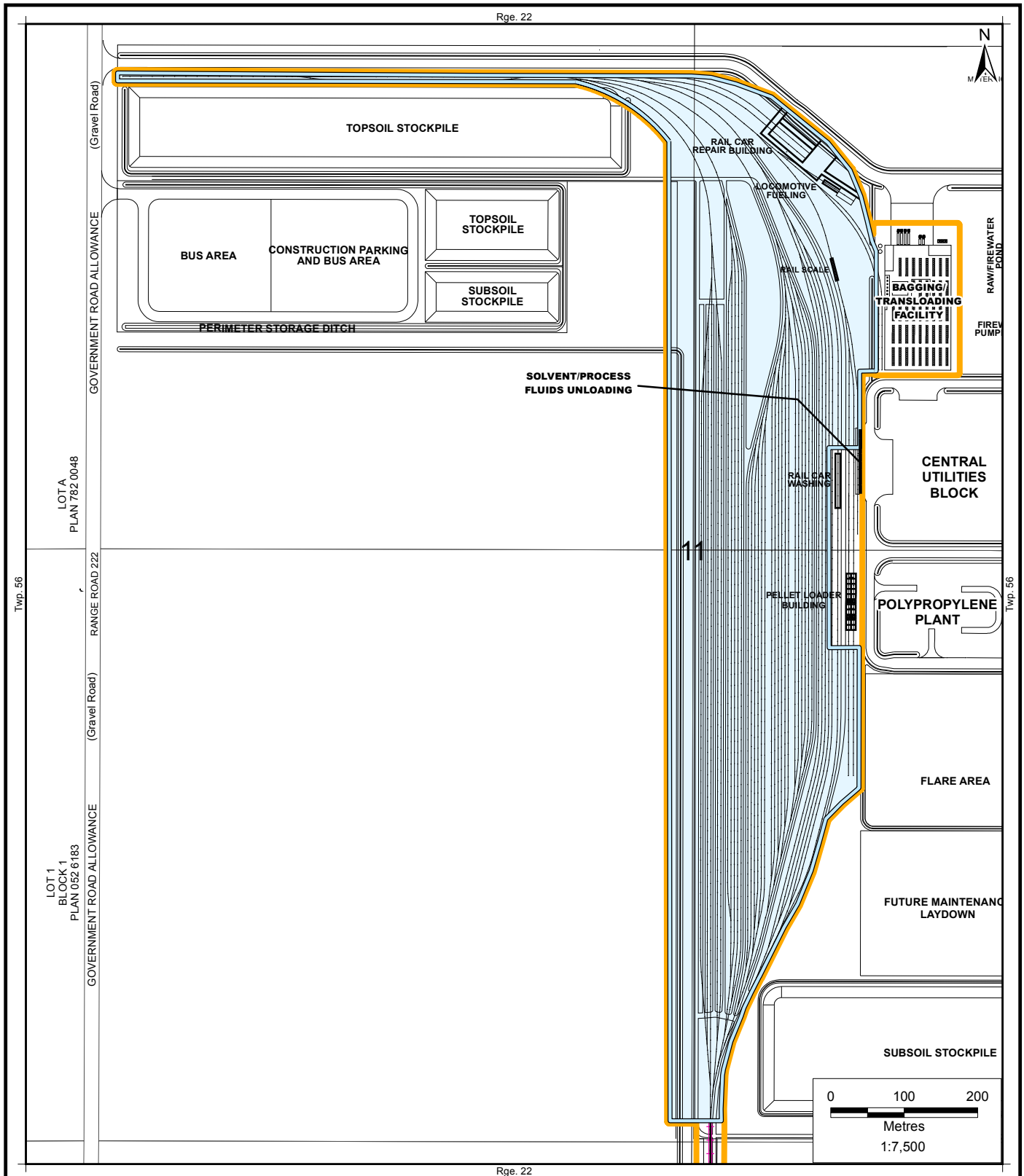

Proposed Project Footprint

Proposed Rail Track

Area 1: Storage, Maintenance and Fueling

Pembina Rail Line

CANADA KUWAIT PETROCHEMICAL CORPORATION
STURGEON PETROCHEMICAL RAILYARD PROJECT
PROJECT SUMMARY

AREA 1: STORAGE, MAINTENANCE AND FUELING

Date:	30-AUG-18	Drawn by:	T.G.	Edited by:	T.G.	App'd by:	J.M.

CKPC

WorleyParsons Project No.
207011-00007-1500

FIG No **4A**

REV 1

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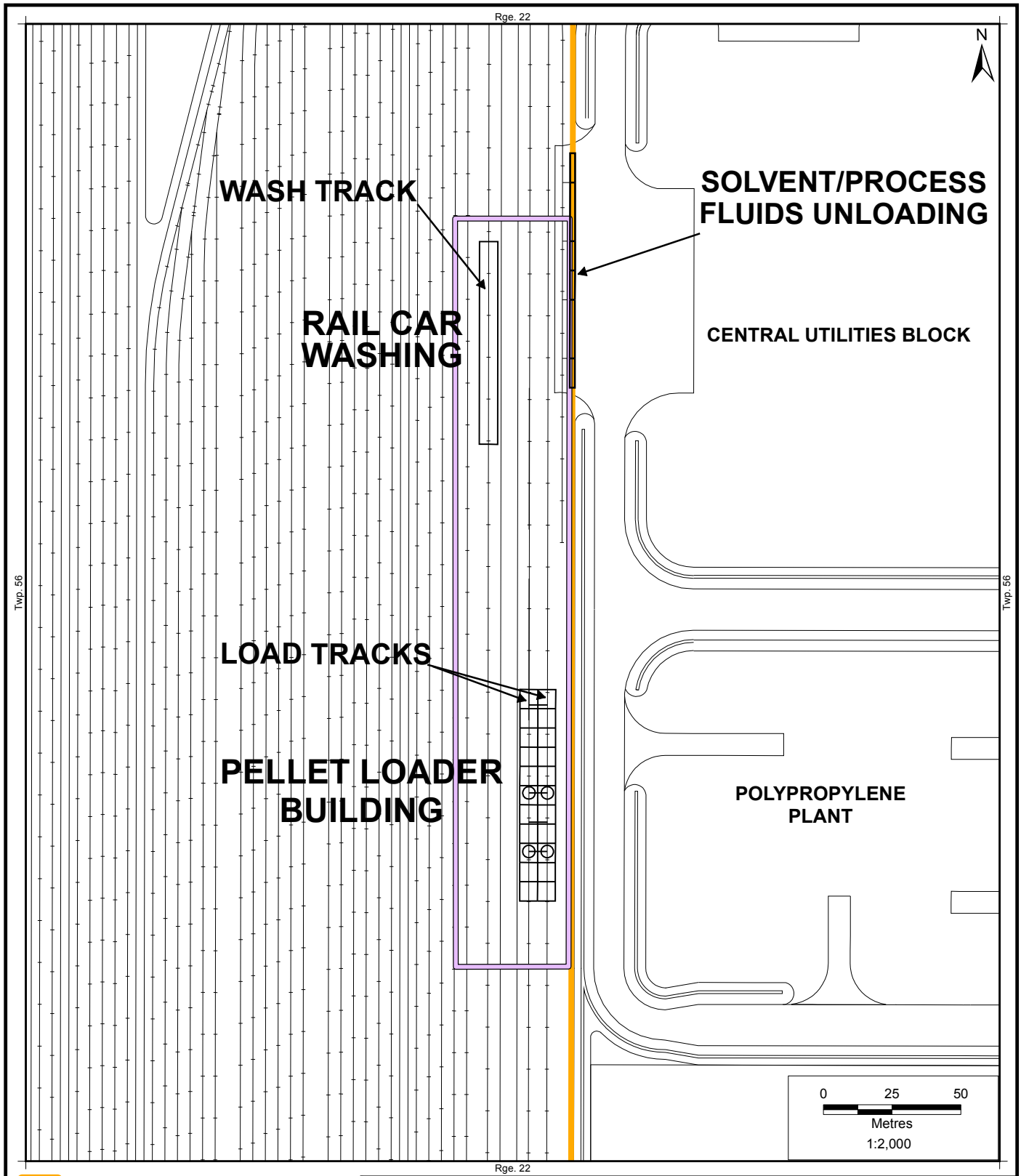

Proposed Project Footprint

Proposed Rail Track

Area 2: Loading and Washing

CANADA KUWAIT PETROCHEMICAL CORPORATION
STURGEON PETROCHEMICAL RAILYARD PROJECT
PROJECT SUMMARY

AREA 2: LOADING AND WASHING

Date:	30-AUG-18	Drawn by:	T.G.	Edited by:	T.G.	App'd by:	J.M.

CKPC

WorleyParsons Project No.
207011-00007-1500

FIG No **4B**

REV 1

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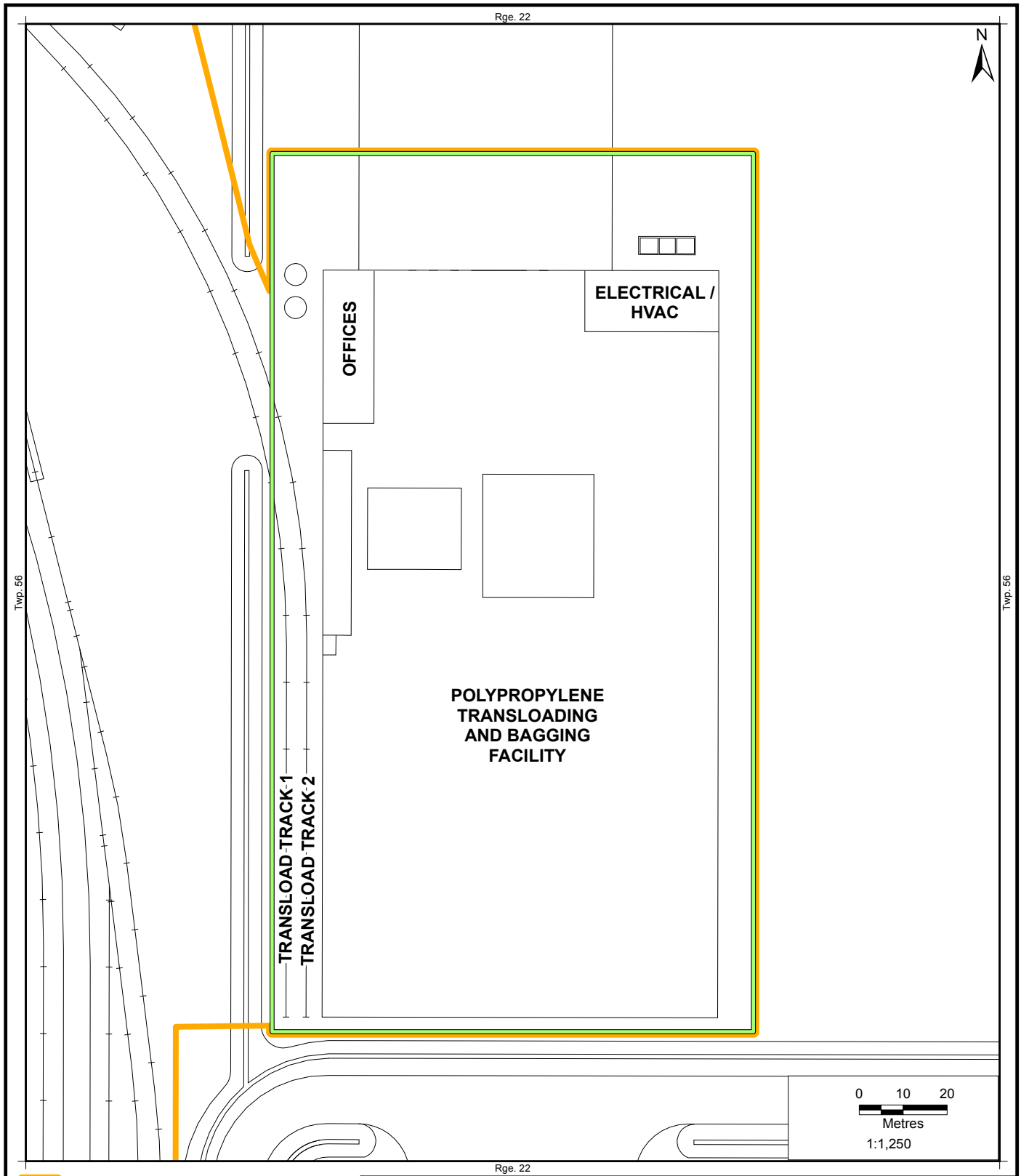

Proposed Project Footprint

Proposed Rail Track

Area 3: Transloading / Bagging

CANADA KUWAIT PETROCHEMICAL CORPORATION
STURGEON PETROCHEMICAL RAILYARD PROJECT
PROJECT SUMMARY

AREA 3: TRANSLOADING / BAGGING

Date:	30-AUG-18	Drawn by:	T.G.	Edited by:	T.G.	App'd by:	J.M.

WorleyParsons Project No.
207011-00007-1500

FIG No **4C**

REV 1

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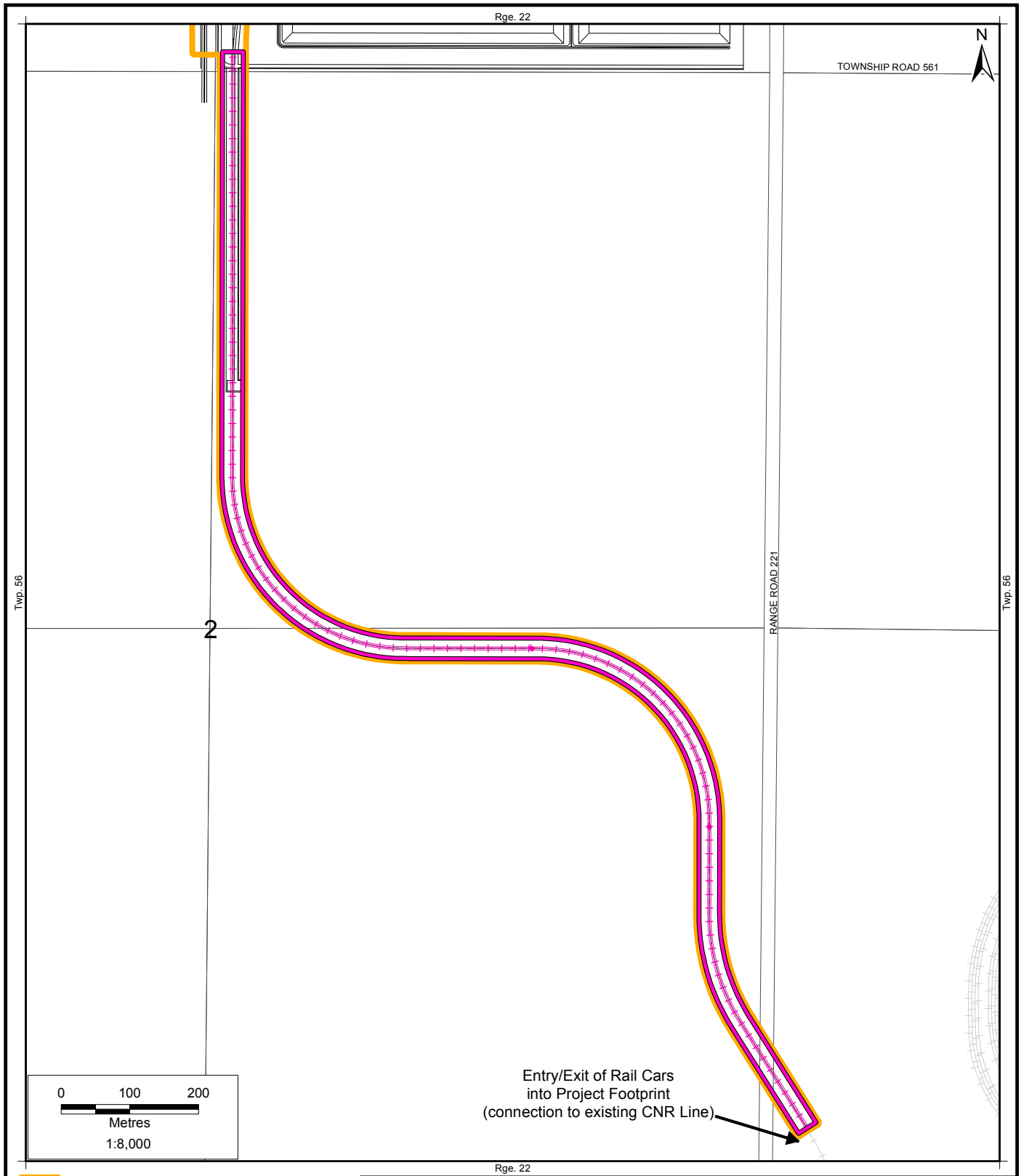

Proposed Project Footprint

Proposed Rail Track

Area 4: Pembina Rail Line

Pembina Rail Line

CANADA KUWAIT PETROCHEMICAL CORPORATION
STURGEON PETROCHEMICAL RAILYARD PROJECT
PROJECT SUMMARY

AREA 4: PEMBINA RAIL LINE

Date:	30-AUG-18	Drawn by:	T.G.	Edited by:	T.G.	App'd by:	J.M.

CKPC

WorleyParsons Project No.
207011-00007-1500

FIG No
4D

REV
1

PLOT DATE & TIME: never never
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USER NAME: tom.graham
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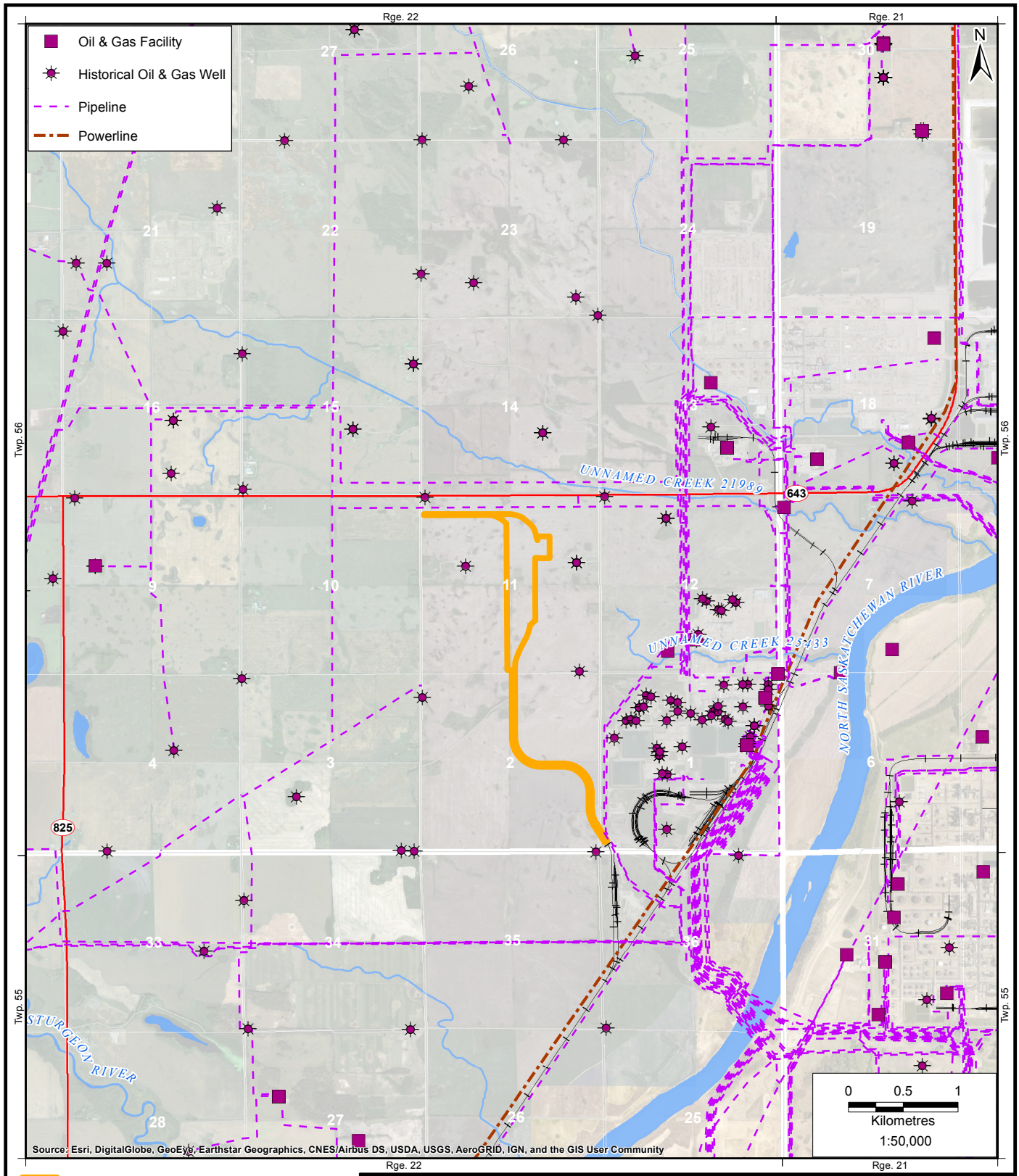
FILE LOCATION: N:\PROJECTS\Canada Kuwait Petrochemical Corporation\PDH-PP\MXDs\207011-00007.1500\Project Summary\Area4_Rev1.mxd



Proposed Project Footprint
Waterbody
Watercourse
Major Road
Rail
Road

Basedata Source:
IHS Markit / AltaLIS Ltd.
Alberta Environment and Parks

CANADA KUWAIT PETROCHEMICAL CORPORATION
STURGEON PETROCHEMICAL RAILYARD PROJECT
PROJECT SUMMARY

LOCAL INFRASTRUCTURE

Date:	Drawn by:	Edited by:	App'd by:
30-AUG-18	T.G.	T.G.	J.M.

WorleyParsons Project No.
207011-00007-1500

FIG No 5

REV 1

CKPC

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USER NAME: tom.graham
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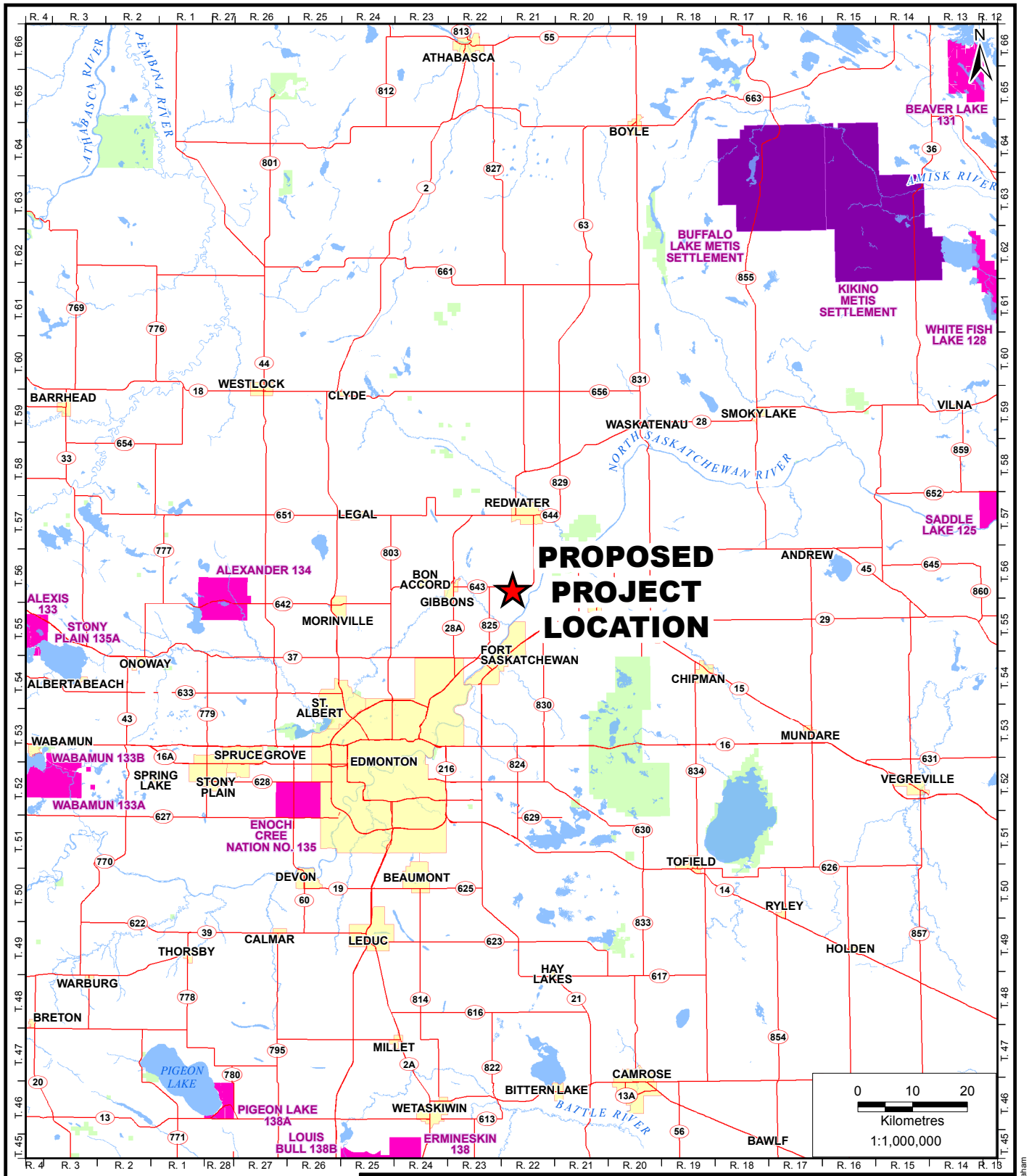

First Nation Reserve
Métis Settlement
Parks and Protected Areas
Community
Waterbody
Watercourse
Major Road

Basedata Source:
IHS Markit / AltaLIS Ltd.
Alberta Environment and Parks

CANADA KUWAIT PETROCHEMICAL CORPORATION
STURGEON PETROCHEMICAL RAILYARD PROJECT
PROJECT SUMMARY

LOCATION OF INDIGENOUS GROUPS RELATIVE TO THE PROPOSED PROJECT FOOTPRINT

Date:	30-AUG-18	Drawn by:	T.G.	Edited by:	T.G.	App'd by:	J.M.

CKPC

WorleyParsons Project No.
207011-00007-1500

FIG No 6 | REV 1

PLOT DATE & TIME: never never
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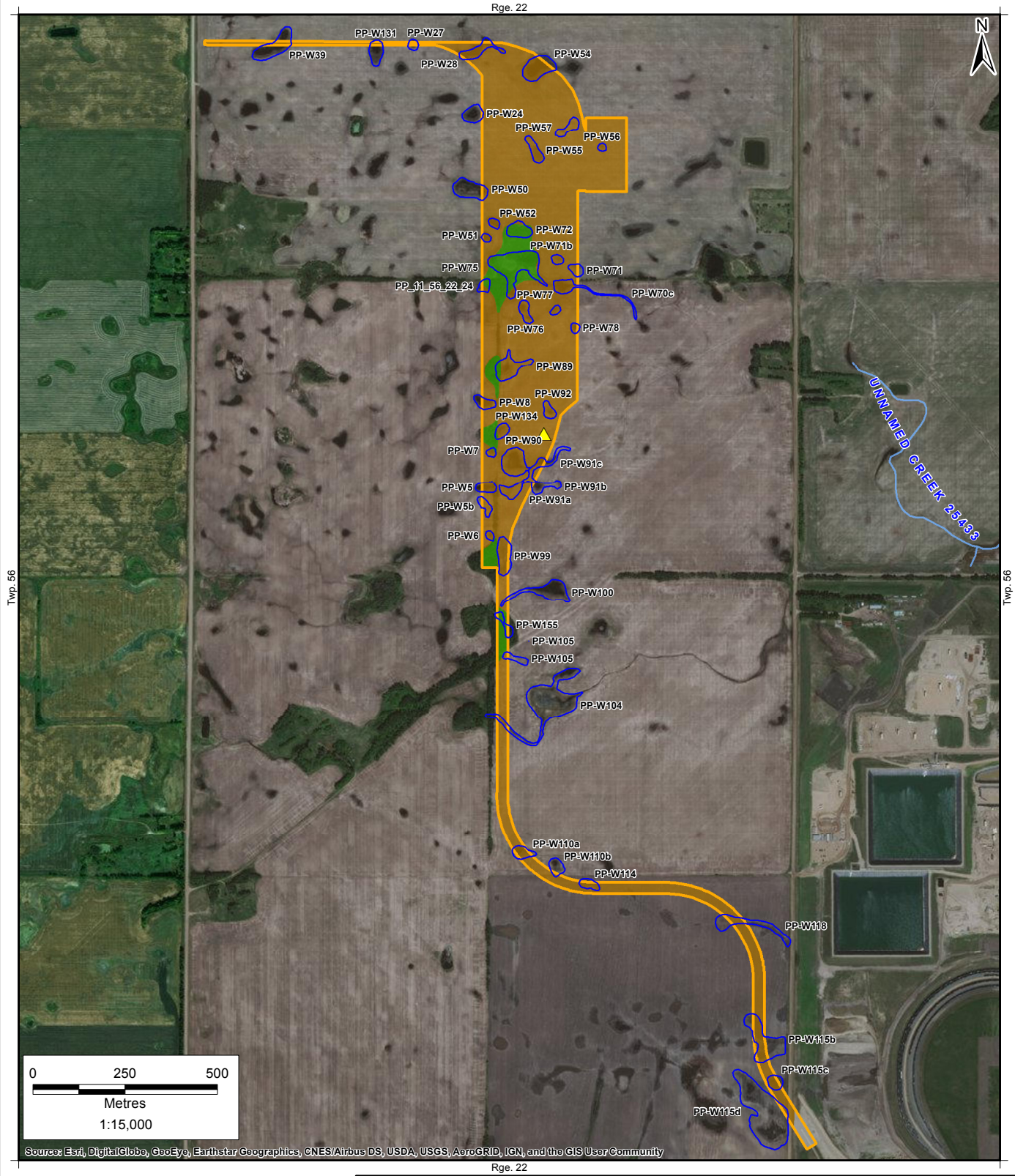
FILE LOCATION: N:\PROJECTS\Canada Kuwait Petrochemical Corporation\PDH-PP\MXDs\207011-00007.1500\Project Summary\IndigenousGroups_Rev1.mxd



Proposed Project Footprint

Wetland Boundary

Vegetation Community Mapping

Deciduous Forest - disturbed

Cultivated

Industrial

Ephemeral Wetlands

CANADA KUWAIT PETROCHEMICAL CORPORATION
STURGEON PETROCHEMICAL RAILYARD PROJECT
PROJECT SUMMARY

VEGETATION AND WETLANDS ASSESSMENT

Date:	30-AUG-18	Drawn by:	T.G.	Edited by:	T.G.	App'd by:	J.M.

WorleyParsons Project No.
207011-00007-1500

FIG No 7

REV 1

CKPC

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SAVE DATE & TIME: 30/08/2018 1:11:53 PM
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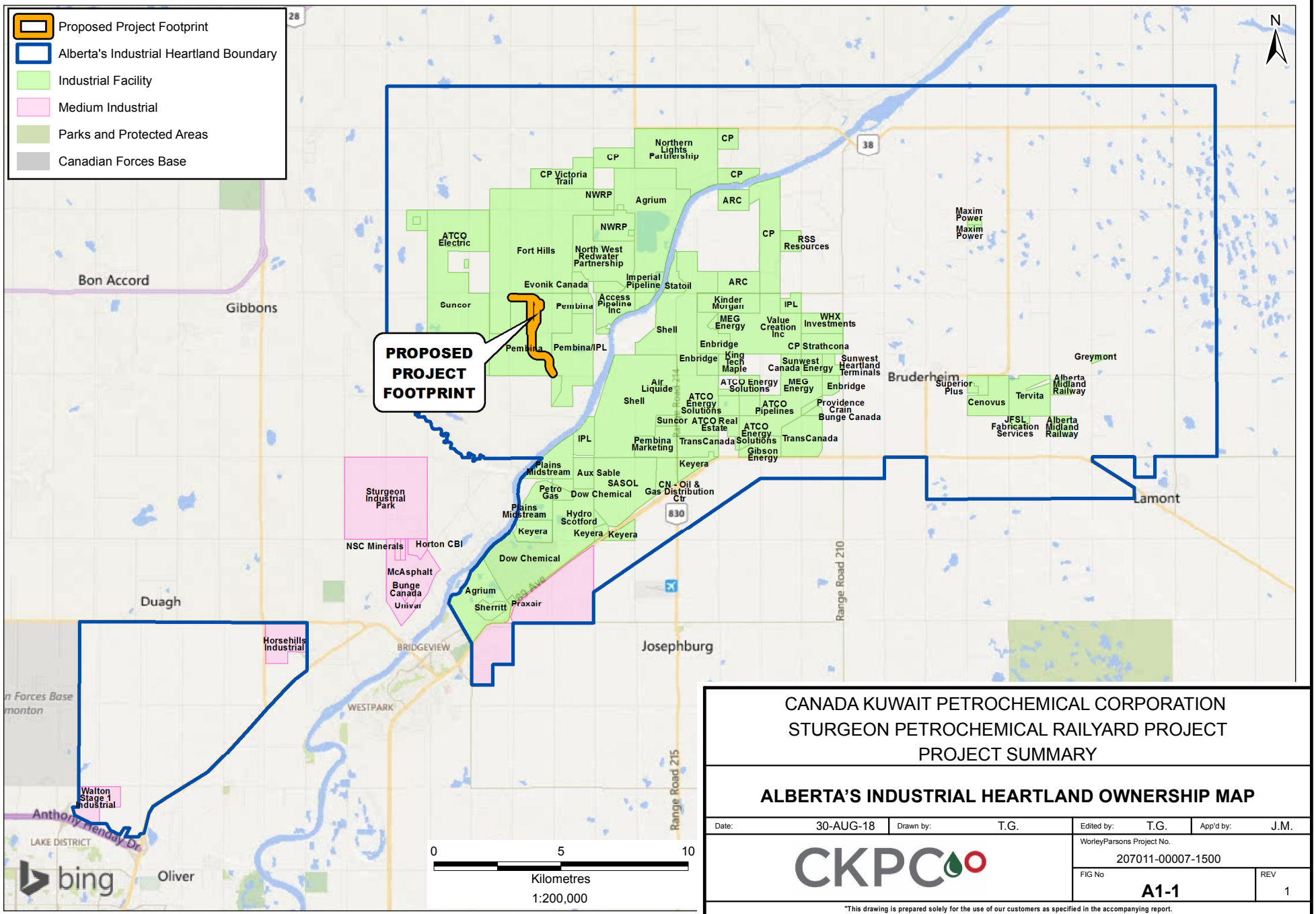
ISSUING OFFICE: CALGARY GIS

FILE LOCATION: N:\PROJECTS\Canada Kuwait Petrochemical Corporation\PDH-PP\MXDs\207011-00007.1500\Project Summary\VegetationWetlands_Rev1.mxd

Appendices

Appendix 1 Alberta's Industrial Heartland Ownership Map

FILE LOCATION: N:\PROJECTS\Canada Kuwait Petrochemical Corporation\PDH-PP\MXDs\207011-00007.1500\Project Summary\Appendix 1\IndustrialHeartland_Rev1.mxd



CANADA KUWAIT PETROCHEMICAL CORPORATION
STURGEON PETROCHEMICAL RAILYARD PROJECT
PROJECT SUMMARY

ALBERTA'S INDUSTRIAL HEARTLAND OWNERSHIP MAP

Date:	30-AUG-18	Drawn by:	T.G.	Edited by:	T.G.	App'd by:	J.M.

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WorleyParsons Project No.
207011-00007-1500

FIG No **A1-1**

REV 1

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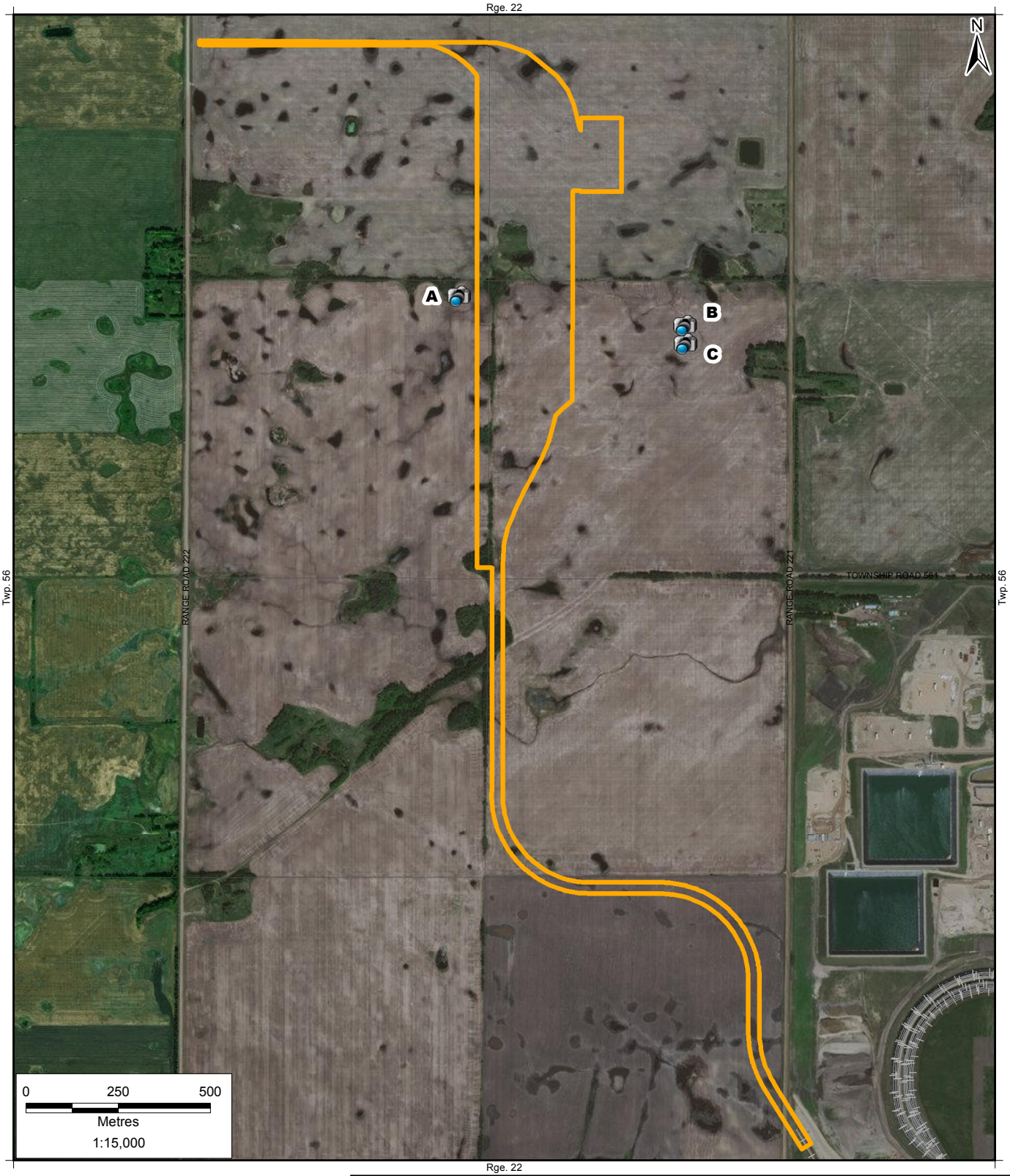
Appendix 2 Photographs



Proposed Project Footprint

Photo Location

CANADA KUWAIT PETROCHEMICAL CORPORATION
STURGEON PETROCHEMICAL RAILYARD PROJECT
PROJECT SUMMARY

PHOTO LOCATIONS

Date:	30-AUG-18	Drawn by:	T.G.	Edited by:	T.G.	App'd by:	J.M.

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WorleyParsons Project No.
207011-00007-1500

FIG No
A2-1

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1

FILE LOCATION: N:\PROJECTS\Canada Kuwait Petrochemical Corporation\PDH-PP\MXDs\207011-00007.1500\Project Summary\Appendix 2\PhotoLocations_Rev1.mxd

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ISSUING OFFICE: CALGARY GIS

Appendix 2 Photographs

Photo A Facing east

Photo B Facing northwest

Photo C Facing east

Appendix 3 Historical Wildlife Occurrences

Appendix 3 Historical Wildlife Occurrences

Table A3-1 Occurrence records housed in the Fish and Wildlife Management Information System (FWMIS; Alberta Environment and Parks 2018)

Common Name	Scientific Name	AB Status[1]	COSEWIC Status[2]	SARA Status[3]
Amphibians and Reptiles				
Northern Leopard Frog	*Lithobates pipiens*	At Risk	Special Concern	Schedule 1
Birds				
Alder Flycatcher	*Empidonax alnorum*	Sensitive	Not Assessed	-
American Kestrel	*Falco sparverius*	Sensitive	Not Assessed	-
American White Pelican	*Pelecanus erythrorhynchos*	Sensitive	Not at Risk	-
Bald Eagle	*Haliaeetus leucocephalus*	Sensitive	Not at Risk	-
Baltimore Oriole	*Icterus galbula*	Sensitive	Not Assessed	
Barn Swallow	*Hirundo rustica*	Sensitive	Threatened	No Schedule
Black-throated Green Warbler	*Dendroica virens*	Sensitive	Not Assessed	-
Common Yellowthroat	*Geothlypis trichas*	Sensitive	Not Assessed	-
Eastern Kingbird	*Tyrannus tyrannus*	Sensitive	Not Assessed	-
Eastern Phoebe	*Sayornis phoebe*	Sensitive	Not Assessed	-
Great Gray Owl	*Strix nebulosa*	Sensitive	Not at Risk	No Schedule

Common Name	Scientific Name	AB Status[1]	COSEWIC Status[2]	SARA Status[3]
Horned Grebe	*Podiceps auritus*	Sensitive	Special Concern	Schedule 1
Least Flycatcher	*Empidonax minimus*	Sensitive	Not Assessed	-
Osprey	*Pandion haliaetus*	Sensitive	Not Assessed	-
Peregrine Falcon	*Falco peregrinus*	At Risk	Special Concern	Schedule 1
Pileated Woodpecker	*Dryocopus pileatus*	Sensitive	Not Assessed	-
Prairie Falcon	*Falco mexicanus*	Sensitive	Not at Risk	-
Sora	*Porzana carolina*	Sensitive	Not Assessed	-
Mammals				
Badger	*Taxidea taxus*	Sensitive	Special Concern	No Schedule

Notes:
1. Provincial status according to Alberta Environment and Parks (AEP) General Status of Alberta Wildlife Species (Alberta Environment and Parks 2018).
2. Federal status according to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Wildlife Species Search (Government of Canada 2018).
3. Legal status under the *Species at Risk Act* (SARA), according to the Species at Risk Public Registry (Government of Canada 2018).

Table A3-2 Species Occurrences Collected during Wildlife Surveys for an Environmental Impact Assessment (Petro-Canada Oil Sands Inc. 2006)

Common Name (ACIMS)	Latin Name	AB Status[1]	COSEWIC Status[2]	SARA Status[3]
Amphibians				
Boreal Chorus Frog	*Pseudacris maculata*	Secure	Not evaluated	Not listed
Wood Frog	*Lithobates sylvatica*	Secure	Not evaluated	Not listed
Birds				
American Crow	*Corvus brachyrhynchos*	Secure	Not evaluated	Not listed
American Robin	*Turdus migratorius*	Secure	Not evaluated	Not listed
American Widgeon	*Anas Americana*	Secure	Not evaluated	Not listed
Baltimore Oriole	*Icterus galbula*	Sensitive	Not evaluated	Not listed
Black-billed Magpie	*Pica hudsonia*	Secure	Not evaluated	Not listed
Black-capped Chickadee	*Poecile atricapillus*	Secure	Not evaluated	Not listed
Blue-headed Vireo	*Vireo solitaries*	Secure	Not evaluated	Not listed
Blue-winged Teal	*Anas discors*	Secure	Not evaluated	Not listed
Bohemian Waxwing	*Bombycilla garrulous*	Secure	Not evaluated	Not listed
Brewer's Blackbird	*Euphagus cyanocephalus*	Secure	Not evaluated	Not listed
Brown-headed Cowbird	*Molothrus ater*	Secure	Not evaluated	Not listed
Canada Goose	*Branta canadensis*	Secure	Not evaluated	Not listed

Common Name (ACIMS)	Latin Name	AB Status[1]	COSEWIC Status[2]	SARA Status[3]
Clay-coloured Sparrow	*Spizella pallida*	Secure	Not evaluated	Not listed
Common Yellowthroat	*Geothlypis trichas*	Sensitive	Not evaluated	Not listed
Unidentified Dabbling Ducks	-	-	-	-
Downy Woodpecker	*Picoides pubescens*	Secure	Not evaluated	Not listed
Eastern Kingbird	*Tyrannus tyrannus*	Sensitive	Not evaluated	Not listed
Great Horned Owl	*Bubo virginianus*	Secure	Not evaluated	Not listed
Unidentified Grouse	-	-	-	-
Hairy Woodpecker	*Picoides villosus*	Secure	Not evaluated	Not listed
Hermit Thrush	*Catharus guttatus*	Secure	Not evaluated	Not listed
House Wren	*Troglodytes aedon*	Secure	Not evaluated	Not listed
Killdeer	*Charadrius vociferous*	Secure	Not evaluated	Not listed
Least flycatcher	*Empidonax minimus*	Sensitive	Not evaluated	Not listed
Lincoln's Sparrow	*Melospiza lincolnii*	Secure	Not evaluated	Not listed
Mallard	*Anas platyrhynchos*	Secure	Not evaluated	Not listed
Northern Saw-Whet Owl	*Aegolius acadicus*	Secure	Not evaluated	Not listed
Northern Waterthrush	*Parkesia noveboracensis*	Secure	Not evaluated	Not listed
Pileated Woodpecker	*Dryocopus pileatus*	Sensitive	Not evaluated	Not listed

Common Name (ACIMS)	Latin Name	AB Status[1]	COSEWIC Status[2]	SARA Status[3]
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	Secure	Not evaluated	Not listed
Red-eyed Vireo	*Vireo olivaceus*	Secure	Not evaluated	Not listed
Red-tailed Hawk	*Buteo jamaicensis*	Secure	Not at Risk	Not listed
Savannah Sparrow	*Passerculus sandwichensis*	Secure	Not evaluated	Not listed
Song Sparrow	*Melospiza melodia*	Secure	Not evaluated	Not listed
Sora	*Porzana carolina*	Sensitive	Not evaluated	Not listed
Snow Goose	*Chen caerulescens*	Secure	Not evaluated	Not listed
Swainson's Hawk	*Buteo swainsoni*	Secure	Not evaluated	Not listed
Tennessee Warbler	*Oreothlypis peregrine*	Secure	Not evaluated	Not listed
Vesper Sparrow	*Pooecetes gramineus*	Secure	Not evaluated	Not listed
Warbling Vireo	*Vireo gilvus*	Secure	Not evaluated	Not listed
Western Wood-pewee	*Contopus sordidulus*	May be at Risk	Not evaluated	Not listed
Wilson's Snipe	*Gallinago delicate*	Secure	Not evaluated	Not listed
Wilson's Warbler	*Wilsonia pusilla*	Secure	Not evaluated	Not listed
White-breasted Nuthatch	*Sitta carolinensis*	Secure	Not evaluated	Not listed
White-throated Sparrow	*Zonotrichia albicollis*	Secure	Not evaluated	Not listed
Woodpecker species	*Picoides sp.*	-	Not evaluated	Not listed

Common Name (ACIMS)	Latin Name	AB Status[1]	COSEWIC Status[2]	SARA Status[3]
Yellow-bellied Sapsucker	*Sphyrapicus varius*	Secure	Not evaluated	Not listed
Yellow-rumped Warbler	*Setophaga coronate*	Secure	Not evaluated	Not listed
Yellow warbler	*Dendroica petechia*	Secure	Not evaluated	Not listed
Mammals				
Beaver	*Castor canadensis*	Secure	Not evaluated	Not listed
Coyote	*Canis latrans*	Secure	Not evaluated	Not listed
Deer	*Odocoileus spp.*	Secure	Not evaluated	Not listed
Ground squirrel	*Spermophilus* spp.	-	Not evaluated	Not listed
Moose	*Alces americanus*	Secure	Not evaluated	Not listed
Porcupine	*Erethizon dorsatum*	Secure	Not evaluated	Not listed
Red Squirrel	*Tamiasciurus hudsonicus*	Secure	Not evaluated	Not listed
Small Mammals	-	-	-	-
Snowshoe Hare	*Lepus americanus*	Secure	Not evaluated	Not listed
Weasel	*Mustela sp.*	-	-	-
White-tailed Deer	*Odocoileus virginianus*	Secure	Not evaluated	Not listed

Notes:
1. Provincial status according to the General Status of Alberta Wild Species (Alberta Environment and Parks 2018).
2. Federal status assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) according to the Species at Risk Public Registry (Government of Canada 2018).
3. Legal status under the *Species at Risk Act* (SARA), according to the Species at Risk Registry (Government of Canada 2018).