

March 23, 2016

File: 0125 036 06

Saskatchewan Ministry of Environment
Environmental Protection Branch
Hazmat and Impacted Sites Unit
102 -112 Research Drive
Saskatoon, Saskatchewan
S7N 3R3

Attention: Mr. Ralph Bock, Manager

Submitted via Online Business Portal

**RE: Corrective Action Plan and Application to Decommission a Storage Facility
Underground Storage Tank Decommissioning / Soil Remediation
Royal Canadian Mounted Police - Prince Albert Hangar
Prince Albert, Saskatchewan**

EGE Engineering Ltd. (EGE) is pleased to submit the following Corrective Action Plan (CAP) for the removal of a 45,460 litre fibreglass underground storage tank (UST) containing Jet A fuel, along with the limited remediation of soil impacted with petroleum hydrocarbons (PHCs), from the Royal Canadian Mounted Police (RCMP) Hangar located at 190 Veterans Way in Prince Albert, Saskatchewan. Included with this CAP is the completed CAP form, along with a completed Application to Decommission a Storage Facility form.

Following completion of the UST decommissioning and limited soil remediation, a new aboveground storage tank (AST) and fuel dispensing system will be constructed on-site. An Application for Approval to Construct or Operate a Storage Facility has already been filed with the Saskatchewan Ministry of Environment (SK MOE) by Associated Engineering (Sask) Ltd. (AE) on behalf of the RCMP for the new AST fuelling system.

1.0 OBJECTIVE

The RCMP has retained Public Works and Government Services Canada (PWGSC) Environmental Services (ES) to coordinate the UST decommissioning, soil remediation and new AST construction program on its behalf. PWGSC-ES has retained EGE to provide engineering services for the design, specifications and site supervision of the project activities at the RCMP Hangar.

The objective of this CAP is to document the proposed remediation activities that will be implemented during the UST removal and limited remediation of PHC impacted soil at the RCMP Hangar in Prince Albert.

2.0 CONTACT INFORMATION

Facility Owner and/or Operator Name of Landowner	RCMP City of Prince Albert (leased by Government of Canada)
Facility Name Facility Address	RCMP Hangar 190 Veterans Way Prince Albert, Saskatchewan, S0J 2Z0
Phone Number (RCMP Environmental Manager)	(639) 625-3330 (off-site)

3.0 FACILITY AND SITE INFORMATION

3.1 Facility and Site History

The RCMP Hangar is located at the Prince Albert Airport at 190 Veterans Way. The property consists of a 45.70 by 97.50 m rectangular shaped lot, with an area of 4,457 m². The property is currently occupied by a 980 m² single-storey building, reportedly constructed in 1973. The building has a slab-on-grade foundation and is situated in the center of the site. A 16 m² storage shed is located adjacent to the northeast corner of the building. A 45,460 litre Jet A fuel fibreglass UST is located near the northeast corner of the building and is connected by underground double-walled fuel lines to a dispensing cabinet located on the east edge of the concrete apron north of the building.

The property is accessed via Veterans Way from the south, which leads to an asphalt parking area along the south side of the building, an asphalt access road along the west side of the building and an asphalt tarmac on the north side of the property. The west access road is an emergency access point leading airside to Taxiway B.

A concrete apron is present between the north side of the building and the asphalt tarmac. Grassed areas are present at the southeast and southwest corners of the property, along the east side of the property, and between the asphalt pavement and west property line on the west side of the site.

Surrounding land use consists of the Prince Albert Airport property to the north, east and south, including the main terminal building, runway, taxiways, airport garage and undeveloped grassed areas. Directly west of the property is the Prince Albert Shopper building (a newspaper publishing business), an airplane maintenance building (Elite Aero) and an aviation business (National Aviation).

A location and area plan are presented as Figure 01, the adjacent lands are illustrated on Figure 02 and a plan of the site is illustrated on Figure 03. The limits of the property can be seen on Figures 02 and 03, and the property is legally described by Title Number 113657946 as:

- *Lot 2, Block 103, Plan 78PA07887, Surface Parcel Number 133978102, Prince Albert, Saskatchewan - NE ¼ Section 11, Township 49, Range 26 West of the 2nd Meridian.*

There is some uncertainty as to the exact location of the property since two global positioning satellite (GPS) location services (<http://www.lsdfinder.com> and <http://www.baseloc.com>) show the RCMP Hangar property to be located in legal subdivision (LSD) 12 (corresponding to the northwest quarter section) of Section 12, Township 49, Range 26, W2M, whereas the land title information indicates the Hangar location to be in the northeast quarter of Section 11. The Prince Albert area is located in an area where numerous corrections are made to the Section-Township-Range grid, both on the north and south sides of the North Saskatchewan River.

The property is owned by the City of Prince Albert and leased to Her Majesty the Queen in Right of Canada, care of the RCMP.

The property is gently sloped from the north to the southwest and is at a similar grade to the surrounding properties. A network of ditches and swales provide stormwater collection for the site. Stormwater running south from the property enters a ditch along the main site access road (Veterans Way). Stormwater from the north side of the property crosses the taxiway (Taxiway Bravo) and enters a swale that extends away from the site in a northwest direction. The swale eventually terminates at a ditch located along the main site access road. The ditches and swale appear to be constructed of in-situ materials. Flow in the ditches eventually terminates at outfalls to the North Saskatchewan River. There was no evidence of standing water noted on the property during the previous site investigation programs.

The local topography at the site is relatively flat and is situated at an elevation of approximately 429 m above sea level (asl).

The nearest surface water body to the RCMP Hangar is the North Saskatchewan River, located 430 m to the southwest. Spruce River is located about 3 km north of the site and flows into the North Saskatchewan River. Coubeaux Lake is located about 3.3 km to the northwest. A large number of small depressional ponds are also located south and southeast of the North Saskatchewan River, starting about 2 km south of the site.

3.2 Current Land Use

The project location is an aircraft hangar used by the RCMP to store, maintain and operate aircraft. The land use is industrial in nature; however, given the regular presence of employees on the site, commercial land use guidelines are considered applicable for the site.

3.3 Future Land Use

The project location is intended to remain as an operational aircraft hangar.

3.4 Water Well Search

The general direction of groundwater flow in the area is assumed to follow the local topography. On this basis the regional groundwater flow direction at the RCMP Hangar site would be to the southwest towards the North Saskatchewan River valley.

The RCMP Hangar is located in the northwest quarter (LSD 12) of Section 12, Township 49, Range 26, west of the second meridian (12-49-26 W2M). A search of groundwater well records published by the Saskatchewan Water Security Agency identified no wells within 12-49-26 W2M. Six wells were noted in 11-49-26 W2M, which is the section immediately west of the property. Eight well records were also found for 13-49-26 W2M, which is the section immediately north of the property. An additional ten wells are located in the two sections immediately south of the property (and south of the North Saskatchewan River), in 2-49-26 W2M and 19-48-25 W2M. One well record was found in the adjacent section to the east.

Of the six wells located west of the RCMP Hangar in 11-49-26 W2M, two were identified as the recovery wells installed by EGE at the RCMP Hangar. These wells are registered to EGE and are mistakenly included in 11-49-26 W2M instead of 12-49-26 W2M.

One of the remaining four wells in 11-49-26 W2M is listed as a municipal well owned by the City of Prince Albert, in the northeast quarter section. The location of this well is shown by the red circle on Plate 01 below. The well is 13.7 m deep and has a recommended pumping rate of 6.8 litres per second and a static water level of 7.6 m below ground. The lithology at this location is noted to be sandy clay from 0.0 to 0.6 m below ground, followed by sand to 4.3 m, and sand and gravel to 13.7 m. The well was drilled in 1940.

The three remaining wells in this section are private wells, with two wells listed to one property owner (the two records are for the same well, the second record was issued to correct the lithology listed in the first record). These wells range in depth from 9.8 to 17.4 m below ground and are also screened within the deeper water bearing granular deposits. The well locations are highlighted on Plate 01 below by the orange circle, containing the number five.

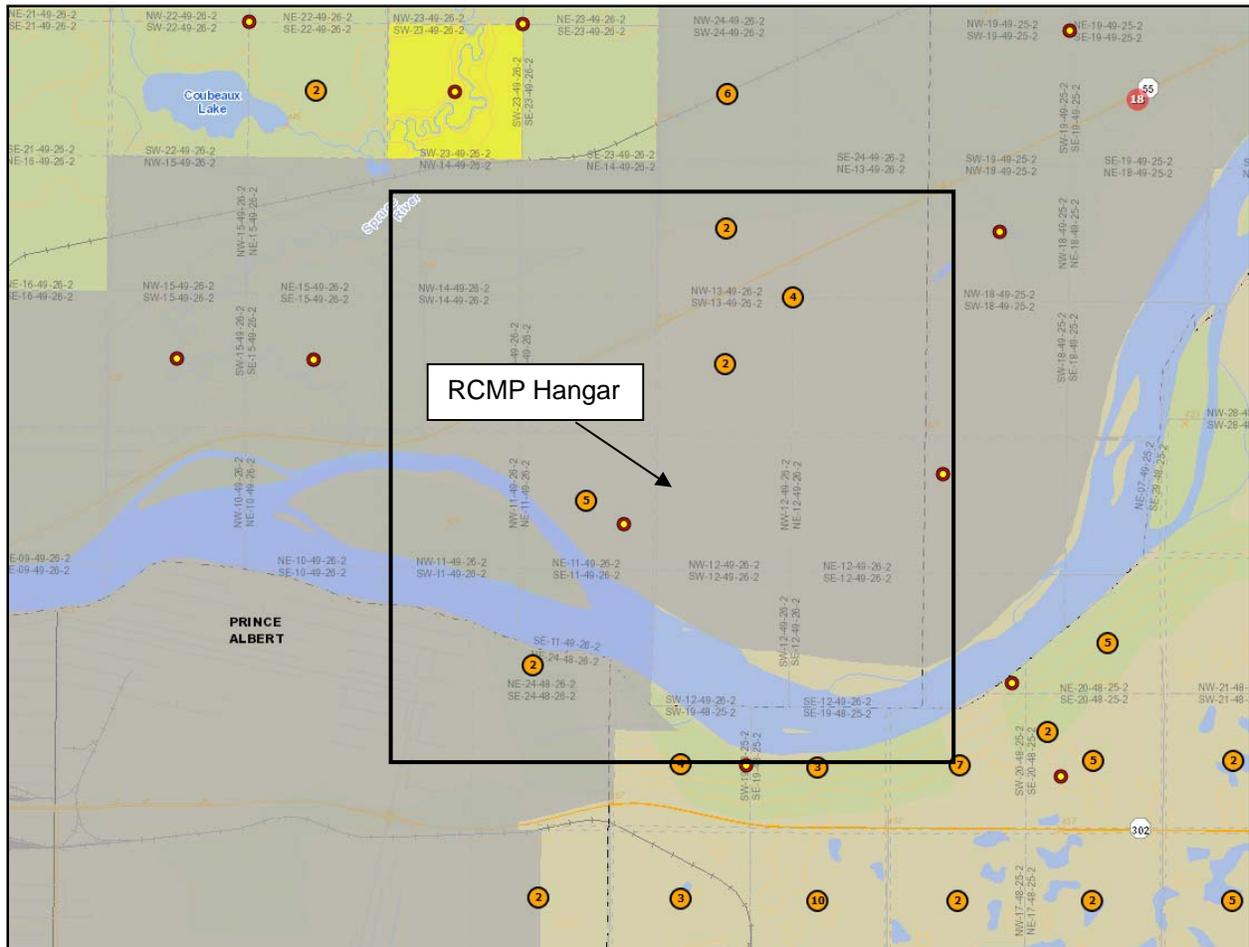


Plate 01: Location of the nearest potable groundwater wells to the RCMP Hangar (SWA, 2015).

Eight well records were found north of the RCMP Hangar in 13-49-26 W2M. All eight records are for private wells used for domestic purposes, including one at a church. These wells range in depth from 12.5 to 20.4 m below ground, with water levels ranging from 6.1 to 9.8 m below ground, where recorded. Typical recommended pumping rates for these wells are between 0.76 and 1.14 litres per second.

Ten well records were found south of the North Saskatchewan River in the adjacent sections south of the RCMP Hangar (2-49-26 W2M and 19-48-25 W2M). These wells ranged in depth from 7.3 to 70.1 m below ground, with water levels ranging from 3.67 to 25.9 m below ground where recorded. Recommended pumping rates ranged from 0.3 to 0.4 litres per second.

One well record was located east of the RCMP Hangar within 7-49-25 W2M. This record indicates a soil test hole used for research was drilled at this location by Saskatchewan Highways and Transportation. The hole was drilled to a depth of 134.1 m below ground and there is no indication that it was completed as a well.

Information obtained from the City of Prince Albert internet page indicates that potable water for the city is drawn from the North Saskatchewan River, approximately 4.8 km upstream of the city. The water treatment plant is located at the southwest corner of 6th Avenue West and River Street West. The internet

page also references that about 600 rural area farms are serviced by treated water from the water treatment plant through the municipal piped water distribution system.

The City of Prince Albert Airport Authority representative indicated that all airport properties are serviced by piped municipal water and that the 1940 well is likely associated with the airport when it was constructed by the Department of National Defence, as a flying training school under the British Commonwealth Air Training Program. The representative also reported that the well is still located at the airport; however, is reportedly dry. On this basis, it is unlikely that the eight identified wells in the immediate area of the RCMP Hangar are currently being used for potable water; however, without contacting the individual users, groundwater use within the region cannot be entirely excluded.

The calculated piezometric elevations, based on the February 11, 2015 water level measurements, indicate flow is generally to the north at a gradient of 0.0012 to 0.0025 m/m. The interpretation is reflective of the regional groundwater flow regime. The results are also consistent with the previous monitoring data (2011 - 2014). The vertical gradient, based on the water level measurements recorded at the two nested well pairs PA-01/02 and PA-03/04 in January 2015, appears to be upward at 0.05 m/m at each well, which is slightly lower than the previous results that were in the 0.07 to 0.08 m/m range.

In-situ hydraulic conductivity testing was completed at well PA-04, the deeper of the nested well pair at this location. This well is screened entirely within the fine grained material found below the upper sand unit. A bail down test was completed, and the recovery data was plotted against time and matched to the Bouwer-Rice Slug Test Solution (1976) for an unconfined aquifer. The estimated hydraulic conductivity for this fine grained soil was calculated to be 4.1×10^{-07} m/s. The Phase II ESA reported a hydraulic conductivity of 3.9×10^{-05} m/s for the sand unit at well MW2. This is the unit in which the LNAPL, impacted soil and impacted groundwater are present. The above values are consistent with the coarse and fine grained materials encountered on-site.

3.5 Previous Reports

The RCMP Hangar project site has been the subject of numerous soil and groundwater assessments since 2010. The CAP has been prepared based on the site-specific information presented in the following previous reports:

- Phase I Environmental Site Assessment, RCMP Hangar, 190 Veterans Way, Prince Albert, Saskatchewan (PHH ARC Environmental Ltd., January 2010);
- Phase II Environmental Site Assessment, RCMP Hangar, 190 Veterans Way, Prince Albert, Saskatchewan, (Kontzamanis Graumann Smith MacMillan Inc., April 2011);
- Phase III Environmental Site Assessment, RCMP Hangar, 190 Veterans Way, Prince Albert, Saskatchewan (EGE Engineering Ltd., February 2012);
- 2011-2012 LNAPL Recovery and Groundwater Monitoring, RCMP Hangar, 190 Airport Road, Prince Albert, Saskatchewan (EGE Engineering Ltd., March 2012);
- 2012-2013 LNAPL Recovery and Groundwater Monitoring, RCMP Hangar, 190 Veterans Way, Prince Albert, Saskatchewan (EGE Engineering Ltd., March 2013);
- 2013-2014 LNAPL Recovery and Groundwater Monitoring, RCMP Hangar, 190 Veterans Way, Prince Albert, Saskatchewan (EGE Engineering Ltd., May 2014);
- Results of LNAPL Characterization and Soil Vapour/Indoor Air Quality Assessment, RCMP Hangar, 190 Veterans Way, Prince Albert, Saskatchewan (EGE Engineering Ltd., February 26, 2015);
- Detailed Quantitative Human Health Risk Assessment, RCMP Hangar, Prince Albert, Saskatchewan (Millennium EMS Solutions Ltd., February 2015);
- 2014-2015 LNAPL Recovery and Groundwater Monitoring, RCMP Hangar, Prince Albert, Saskatchewan (EGE Engineering Ltd., March 2015);

- Preliminary Design and Remedial Action Plan for Modifications to Aircraft Fuelling System, RCMP Hangar, Prince Albert, Saskatchewan (EGE Engineering Ltd., September 2015); and
- Geotechnical Investigation Proposed Shored Excavation, RCMP Hangar, Prince Albert, Saskatchewan (P. Machibroda Engineering Ltd., November 2015).

Based on the findings from the above investigations, a fully delineated area of PHC impacted soil and groundwater has been identified on-site along with a stable area of light non-aqueous phase liquids (LNAPL). Clean perimeter test holes and groundwater monitoring wells have been located around the entire extent of the impacted area.

The historical source of these impacts is the existing UST and associated underground piping leading to the dispensing cabinet. LNAPL recovery and groundwater monitoring has been underway at the site since 2011 and to date, approximately 10,300 litres of product has been recovered from the ground. The LNAPL plume is stable at approximately 1,100 m² in area with non-LNAPL wells located around all sides of the plume. The current LNAPL recovery methods have reached their technical limits and a review of the decline curve (in which the LNAPL recovery rates are plotted against the cumulative recovery volume) indicates that the majority of the mobile LNAPL has been recovered and there is limited potential to recover more than small quantities of product from the current recovery system configuration.

The total area of PHC impacted soil is estimated at 1,500 m² and contains a volume of 1,800 m³ of impacted soil. The total area of PHC impacted groundwater is estimated at 1,500 m². Further information on the impacted areas is provided in Section 5.0 below.

The Detailed Quantitative Human Health Risk Assessment (DQHHRA) completed for the project site in 2015 identified operable exposure pathways associated with indoor and outdoor vapour inhalation, and potentially operable pathways that included dermal soil contact, dermal water contact and vapour inhalation in trenches and excavations. The most sensitive exposure pathways were indoor vapour inhalation (worker) and dermal soil contact (excavation construction worker). For indoor vapour inhalation the predicted hazard quotient and incremental cancer risk were both below the target values. For the excavation worker, the dermal soil contact target hazard quotient was exceeded for the PHC F2 Fraction, for a fully exposed worker without protective gear, using chronic exposure and maximum concentrations found below 3.0 m. Given that the worker exposure would only be short-term, the calculated risk was considered overly conservative. Potential off-site migration was modelled and showed low to no mobility for the LNAPL, indicating the LNAPL has been successfully controlled on-site.

Based on these findings, the RCMP implemented a risk management strategy on-site that has included LNAPL recovery and annual groundwater monitoring and sampling. As part of the Preliminary Design for the new AST fuelling system, a Remedial Options Assessment (ROA) was completed and a Remedial Action Plan (RAP) prepared for the UST decommissioning and associated impacted soil remediation. Remedial options assessed included ex-situ options only, consisting of: limited excavation (tank backfill and small area of native soil around and under the UST totaling approximately 185 m³); hot-spot excavation (tank backfill and larger area surrounding tank); majority excavation (tank backfill and all impacted soil totaling 1,035 m³, except under the Hangar building and under the concrete apron, tarmac and Taxiway Bravo); and full excavation (all impacted soil, totaling 1,765 m³).

Since the DQHHRA found that there are no unacceptable human health risks present on-site, the UST removal will include limited soil remediation in order to minimize the disruption to site operations and the airport property. The RCMP will continue to implement risk management post-construction to monitor the remaining PHC impacted soil and groundwater, including the residual LNAPL plume. The site will continue to operate as an aircraft fuelling location once the project is completed and the new AST fuelling system is commissioned.

3.6 Location of Underground Services

Underground utilities have been identified during the course of the previous environmental site investigations. Utility clearances will be completed through Sask 1st Call, and a private locator/RCMP, as necessary, prior to undertaking any site excavation work.

4.0 ASSESSMENT CRITERIA

The site is located on land leased from the City of Prince Albert by the federal government and has therefore previously been assessed on behalf of the RCMP using the environmental soil quality guidelines provided under the Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG) and the CCME Canada Wide Standards (CWS) for PHCs. The commercial land use guidelines are applicable for the site since RCMP staff is normally present during working hours and site visitors are occasionally present.

The soil stratigraphy generally consists of a layer of fine grained silt (0.9 to 1.3 m) above a coarse grained water-bearing sand extending to a depth of about 3.8 to 5.0 m below ground. The sand is medium grained, poorly graded and loose to compact in density. Below the sand are layers of highly plastic clay and low to medium plastic silt extending to the maximum depth of investigation (11.0 m below ground surface).

A combined Tier 2 and Tier 3 (human risk assessment) approach (Endpoint Selection Standard under the Saskatchewan Environmental Code) is being implemented at the site. Overall, the site is being risk managed (Tier 3) based on the results of the DQHHRA, as previously discussed. The decommissioning of the existing UST and replacement with a new AST fuelling system has provided an opportunity for limited soil remediation on-site. To minimize site disruption, and due to nearby buildings and aprons, the excavation and soil remediation for the UST decommissioning will be limited to the immediate UST tank backfill and will not proceed to clean limits laterally. The depth of the excavation will proceed to clean soil and this will be determined by applying Tier 2 levels for the base excavation samples only. This will ensure that the excavation reaches clean soil so that impermeable barriers may be installed to prevent recontamination of the backfill soil. The Tier 2 approach is based on pathway elimination of the potable groundwater and aquatic life pathways and is based on the perimeter groundwater wells around the impacted media, which show no migration of contaminants beyond the immediate vicinity of the UST.

To assess the verification samples from the base of the excavation, the federal environmental quality guidelines and Saskatchewan Tier 2 guidelines will be adopted.

For the federal guidelines, the remediation target levels have been selected using the lowest numerical value from the CCME CEQG and CWS for PHCs, with pathway elimination of the potable groundwater and protection of aquatic life exposure routes based on multi-year monitoring data showing clean groundwater wells around the perimeter of the impacted media.

Based on this assessment, the applicable federal remediation target levels for the contaminants of concern at the RCMP Hangar are shown in Table 4-1 below, along with the corresponding limiting exposure pathway.

Table 4-1: Federal Remediation Target Levels (CCME CEQG and CWS for PHCs)

Parameter	Coarse Surface Soil (mg/kg)	Fine Surface Soil (mg/kg)	Coarse Subsoil (mg/kg)	Fine Subsoil (mg/kg)
Benzene	0.30 (INH)	2.8 (INH)	0.32 (INH)	2.9 (INH)
Toluene	250 (SC)	330 (SC)	500 (SC)	660 (SC)
Ethylbenzene	300 (SC)	430 (SC)	600 (SC)	860 (SC)
Xylenes	160 (INH)	230 (SC)	170 (INH)	460 (SC)
PHC F1 Fraction	320 (SC)	320 (SC)	320 (INH)	800 (ML)
PHC F2 Fraction	260 (SC)	260 (SC)	1,000 (ML)	1,000 (ML)
PHC F3 Fraction	1,700 (SC)	2,500 (SC)	3,500 (ML)	5,000 (ML)
PHC F4 Fraction	3,300 (SC)	6,600 (SC)	10,000 (ML)	10,000 (ML)

Notes: INH = vapour inhalation (slab on grade)
 SC = ecological soil contact
 ML = management limits
 Values shown in bold are the adopted remediation target levels (lowest federal guideline)

For compliance with the Saskatchewan Environmental Code and consistent with Section 8 of the Endpoint Selection Standard under the Code, Tier 2 endpoint values have been selected for the remediation target levels with pathway elimination of the potable groundwater and protection of aquatic life exposure routes based on multi-year monitoring data showing clean groundwater wells around the perimeter of the impacted media.

The applicable Tier 2 provincial remediation target levels for the contaminants of concern are shown in Table 4-2 below, along with the corresponding limiting exposure pathway. These values were obtained from the current Saskatchewan Environmental Quality Standards (SEQS).

Table 4-2: Provincial Remediation Target Levels - Tier 2 Endpoints (SEQS)

Parameter	Coarse Surface Soil (mg/kg)	Fine Surface Soil (mg/kg)	Coarse Subsoil (mg/kg)	Fine Subsoil (mg/kg)
Benzene	0.9 (INH)	11 (INH)	1.2 (INH)	11 (INH)
Toluene	250 (SC)	330 (SC)	500 (SC)	660 (SC)
Ethylbenzene	300 (SC)	430 (SC)	600 (SC)	860 (SC)
Xylenes	140 (INH)	230 (SC)	210 (INH)	460 (SC)
PHC F1 Fraction	320 (SC)	320 (SC)	320 (INH)	640 (SC)
PHC F2 Fraction	260 (SC)	260 (SC)	1,000 (ML)	520 (SC)
PHC F3 Fraction	1,700 (SC)	2,500 (SC)	3,400 (SC)	5,000 (ML)
PHC F4 Fraction	3,300 (SC)	6,600 (SC)	6,600 (SC)	10,000 (ML)

Notes: INH = vapour inhalation, slab on grade
 SC = ecological soil contact
 ML = management limits
 Values shown in bold are the adopted remediation target levels (lowest provincial guideline)

The values shown in bold text in Tables 4-1 and 4-2 above are the adopted remediation target levels for this CAP and were selected from the lowest of the federal and provincial guidelines. Where the values are the same, they are shown in bold in both tables.

5.0 DESCRIPTION OF IMPACTED SITE

The RCMP Hangar UST is located near the northeast corner of the building on the east side of the concrete apron and tarmac. The fibreglass UST is 45,460 litres in size and contains Jet A fuel. The Environment Canada registration number is EC#0001328 and the Saskatchewan Operating Identification Number is 8763. Underground lines from the UST feed a dispensing cabinet located on the east edge of the concrete apron. A previous puncture of the line near the dispensing cabinet was the source of the PHC impacted soil and groundwater found on the property.

The area of PHC impacted soil was delineated in the Phase III ESA and includes a 1,500 m² area surrounding the UST, including off-site areas to the east and north (on land owned by the Prince Albert Airport). The area is shown on Figure 04. The soil exceedances are primarily for the PHC F1 and F2 Fractions with limited exceedances of the benzene and xylene components. The average thickness of the impacted soil was 1.2 m, with the upper boundary at 3.2 m below ground and the lower boundary at the interface between the sand and silt or clay soil units, about 4.2 to 4.5 m below ground. A cross-section through the impacted area is provided on Figure 05. The volume of impacted soil was estimated to total 1,800 m³ and the volume of clean overburden soil is estimated to total 4,800 m³. Test holes with clean soil samples have been obtained around the impacted soil for full lateral delineation and vertical delineation has also been obtained at depth.

Within the impacted soil plume is a plume of LNAPL (approximately 1,000 m²). The LNAPL has been recovered and monitored since 2011 with approximately 10,300 litres removed for off-site disposal. Recovery has been through manual and automated pumping of two large diameter recovery wells installed in the LNAPL plume. A temporary AST has been installed on-site to store the recovered LNAPL until it is removed for off-site disposal. The current LNAPL plume (as of January 2016) is shown on Figure 06. The current LNAPL thickness ranges from 0.018 to 0.549 m. Monitoring wells that have shown no LNAPL over a multi-year period are present around the entire perimeter of the LNAPL plume area indicating the plume is stable and there is no migration away from the UST.

The piezometric surface is shown on Figure 07, based on the February 2015 groundwater monitoring data. The PHC impacted groundwater plume is shown on Figure 08 (also based on the February 2015 groundwater sampling data) and generally corresponds to the PHC impacted soil area, at 1,500 m². As with the PHC impacted soil and LNAPL plumes, monitoring wells that do not exceed the Health Canada Guidelines for Canadian Drinking Water Quality (HC-GCDWQ) or the Federal Contaminated Sites Action Plan (FCSAP) Federal Interim Groundwater Quality Guidelines (FIGQG) are present around the perimeter of the impacted groundwater for full delineation of the area. There is also evidence that natural attenuation is occurring based on the decreasing concentration of the contaminants in the groundwater wells.

The limited soil remediation area of 170 m² is shown on Figure 09. This includes the UST backfill material and a minor amount of soil to the south, east and north. The depth of the excavation will be at least 0.3 m into the underlying fine grained silt/clay soil and confirmed by verification samples. The estimated excavation depth is 4.5 m and the estimated volume of soil requiring excavation is 765 m³.

6.0 REMEDIATION/MANAGEMENT PLAN

6.1 Qualified Persons and Companies Performing the Work

Owner

Royal Canadian Mounted Police
6101 Dewdney Avenue
Bag Service 2500
Regina, Saskatchewan
Contact: Mr. Joel Brimacombe, RCMP Environmental Manager
Phone: (639) 625-3330

Owner Representative

Public Works and Government Services Canada (PWGSC) Environmental Services
100-167 Lombard Avenue
Winnipeg, Manitoba
Contact: Ms. Joan La Rue van Es, PWGSC Project Manager
Phone: (204) 509-2334

General Contractor

Not selected (project to be tendered in May / June 2016 with construction to begin in August / September 2016)

Environmental Consultant

EGE Engineering Ltd.
511 Pepperloaf Crescent
Winnipeg, Manitoba

Project Lead: Mr. David Klassen, P.Geo.
Phone: (204) 612-0944

Project Engineer: Mr. Andrew Passalis, P.Eng.
Phone: (204) 791-4938

6.2 UST Decommissioning, Soil Excavation, Disposal and Backfilling

Once the Approval to Decommission a Storage Facility is received from SK MOE, standard construction techniques to remove the UST will be employed, consisting of:

- Removing all liquids from the tank by vacuum extraction;
- Purging all vapours from the tank using dry ice (< 10% of the lower explosive limit);
- Excavation of the overburden soil, stockpiling clean overburden for reuse, to expose the top of the UST;
- Excavation of the backfill materials around the tank and properly disposing of impacted soil from the excavation;
- Lifting the tank out of the excavation using the lifting lugs;
- Rendering the tank unfit for reuse by cutting a hole in the tank; and
- Placing the tank on a transport vehicle for removal and off-site disposal.

The site excavation will be completed using a rubber tired excavator or tracked excavator. Impacted soil will be excavated and loaded directly into tandem end-dump trucks for off-site disposal. As noted earlier, UST area will be remediated to pre-defined limits (limited excavation) based on the previous risk assessment findings indicating no operable exposure pathways with unacceptable risks and the intended future use of the site for aircraft maintenance and fuelling. Contaminated soil will not be permitted to be stockpiled on-site.

Clean overburden soil above the UST will be excavated and stockpiled on-site for re-use as backfill, where suitable. Once the UST is exposed, it will be pumped out (if any residual liquids are present), purged, the combustible vapours checked to ensure they meet the requirements for tank removal (< 10% of the lower explosive limit) and the tank will be brought to the surface where it will be rendered unusable and transported off-site for final disposal. Approximately 765 m³ of soil will be excavated, with the upper 510 m³ retained for reuse as clean fill, and 255 m³ of PHC impacted soil transported off-site for disposal.

Standard construction excavation techniques to remove the UST will need to be modified to provide safe and stable side slopes around the excavation. Since the ratio required for sandy subsoil would need to be a minimum of 3:1 for open excavations, it is not possible to excavate the impacted soil around the UST based on the distances to the concrete apron and Hangar building. The only feasible option for removal of the UST and backfill soil is to install sheet piling around the perimeter of the excavation.

EGE has estimated approximately 60 lineal metres of sheet pile shoring will be required to surround the excavation. Groundwater control will consist of a vacuum truck on standby to remove any accumulated LNAPL and groundwater from the excavation, with the shoring acting as the primary barrier to groundwater seepage.

An impermeable barrier will be placed around the perimeter of the final excavation to prevent re-contamination of the clean backfill. This will involve placing high-density polyethylene (HDPE) panels around the perimeter of the excavation, just inside the sheet piling and anchored into the underlying clay at the base of the excavation, followed by backfilling with granular fill to near grade. Once the excavation has been backfilled to a stable depth, the sheet piling will be removed leaving the HDPE panels in place to create the impermeable barrier. The upper fill would then be compacted to meet the structural requirements of the new AST foundation (structural concrete slab).

Confirmatory sampling of the side walls and end walls of the excavation is not required since the excavation is not intended to reach clean limits. A minimum of three samples will be collected from the base of the excavation as it is intended to remove all of the impacted soil below the UST. Once the confirmatory sampling results are received and it is determined that the remedial excavation is completed vertically, clean backfill will be placed in the excavation and compacted.

Two samples of the clean imported backfill will be submitted for analysis of PHCs and metals. The Contractor will be required to pre-submit one backfill sample in advance of the work being undertaken. The second backfill sample will be collected from material brought to the site.

All PHC impacted soil will be transported to an approved treatment/disposal facility. EGE has identified that the City of Prince Albert Landfill is able to accept petroleum impacted soil; however, the Contractor may identify other suitable disposal facilities for approval by RCMP and PWGSC.

Temporary site works will also include relocation of the airside fence to permit the work to proceed, as well as relocation of an existing RCMP storage shed and the temporary AST used for the LNAPL recovery. Standard erosion and sedimentation control measures will also be used so that sediment laden runoff does not leave the work site.

Since some PHC impacted soil will be left in place, the RCMP will continue to risk manage the site by conducting groundwater monitoring and sampling to confirm that the impacted soil and groundwater plumes remain stable. Final site closure involving remediation of the remaining impacted soil will not occur as long as the site remains an active aircraft fuelling operation.

As noted earlier, once the UST decommissioning and soil excavation is completed, and the excavation backfilled and compacted, construction will start for the installation of a new AST fuelling system, which will be located over the backfilled area for the former UST.

6.3 Reporting

The UST decommissioning and limited remediation of the impacted soil is tentatively scheduled to be undertaken in August and September of 2016. EGE personnel will be on-site during all remediation activities, as representatives of the RCMP and PWGSC, to coordinate the work and to collect the required verification samples from the final limits of the excavation. A CAP Closure Report, detailing the remediation activities, will be provided to the RCMP, through PWGSC, once all site work is complete and all confirmatory laboratory data has been received. The CAP Closure Report will be forwarded to SK MOE by the RCMP.

We would appreciate your review and approval of this CAP. Should you have any questions or require additional information please contact either Mr. David Klassen at (204) 612-0944 or Mr. Larry Bielus at (204) 226-7378.

Sincerely,

EGE ENGINEERING LTD.

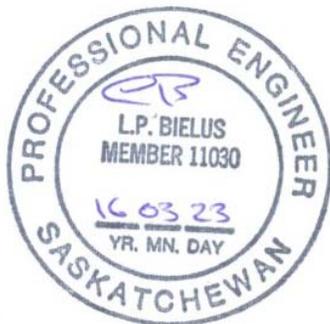


David Klassen, P.Geo.
Project Geoscientist
DK/dk



Larry Bielus, M.Sc., P.Eng.
Manager

cc: Joan La Rue-van Es - PWGSC
Joel Brimacombe - RCMP

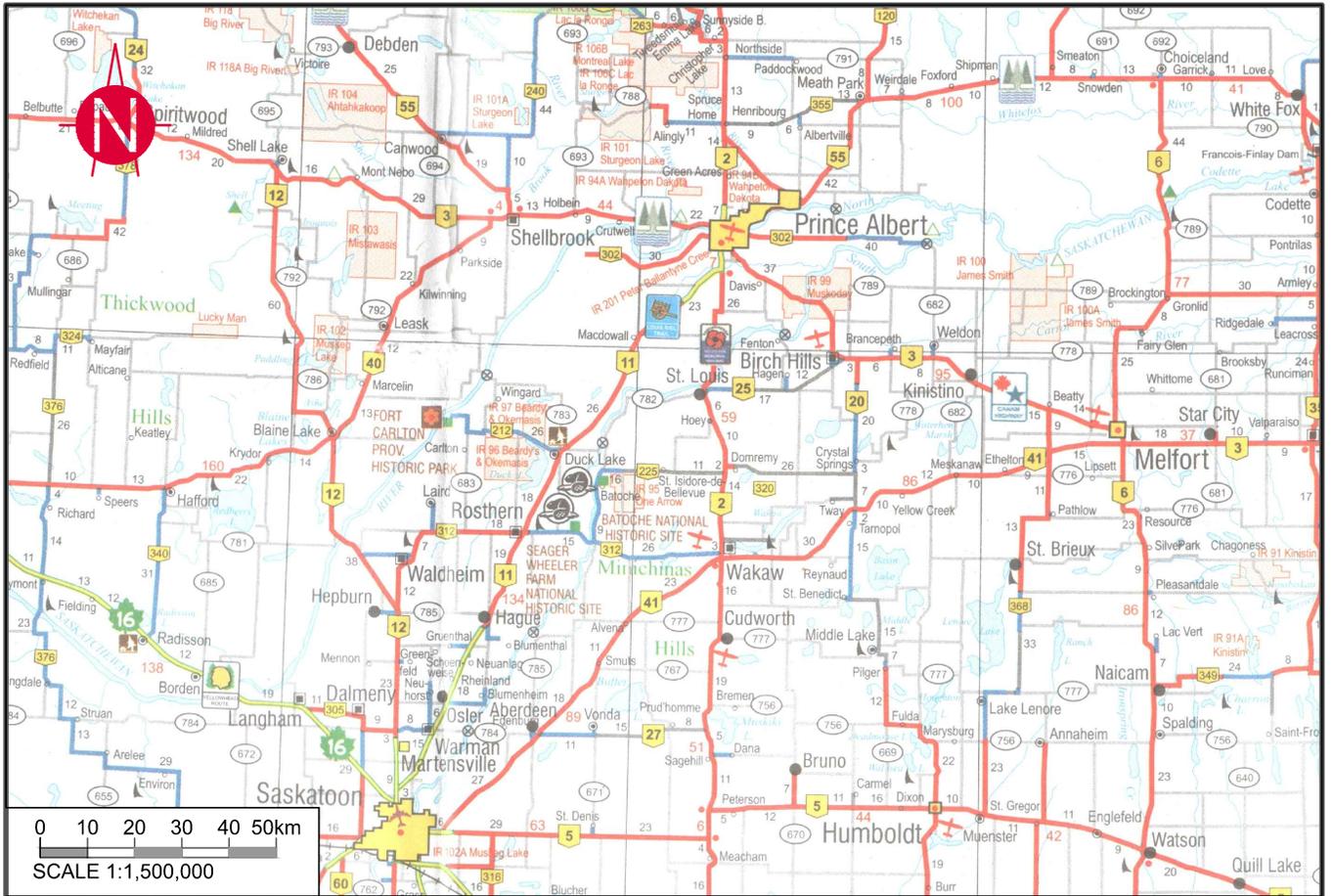


FIGURES

8.5" x 11"

PLOT: 2/26/2016 2:44:21 AM

EGE FILE NAME: 0125 036 06- Figure 01.dwg



EGE

Public Works & Government Services Canada
 RCMP Hangar - 190 Veterans Way, Prince Albert, SK
 Corrective Action Plan

Location
Plan

Figure 01

8.5" x 11"

PLOT: 2/26/2016 2:45:17 AM

EGE FILE NAME: 0125 036 06- Figure 02.dwg



EGE

Public Works & Government Services Canada
 RCMP Hangar - 190 Veterans Way, Prince Albert, SK
 Corrective Action Plan

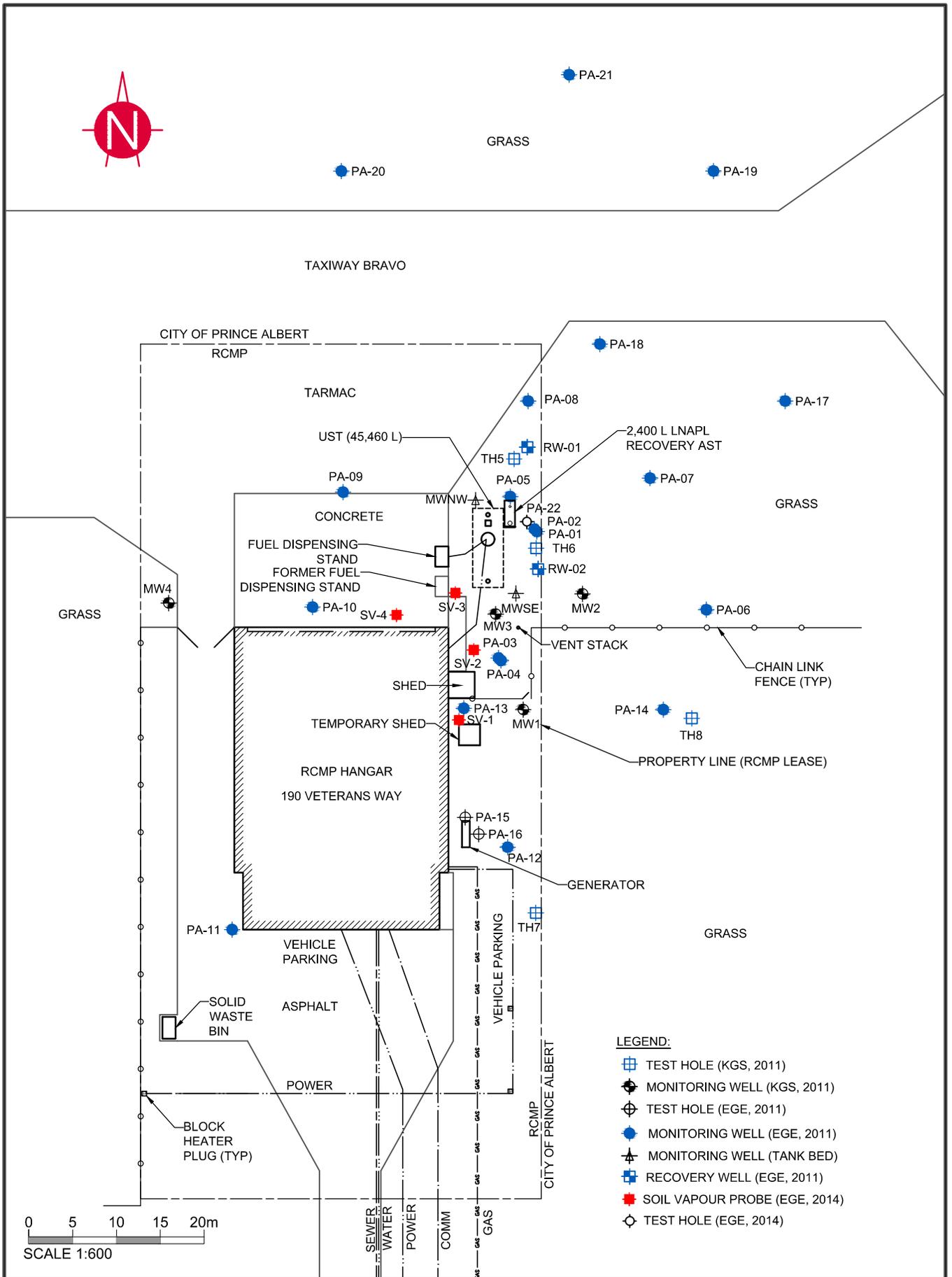
Surrounding
Land Use

Figure 02

8.5" x 11"

PLOT: 2/26/2016 2:47:22 AM

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EGE

Public Works & Government Services Canada
 RCMP Hangar - 190 Veterans Way, Prince Albert, SK
 Corrective Action Plan

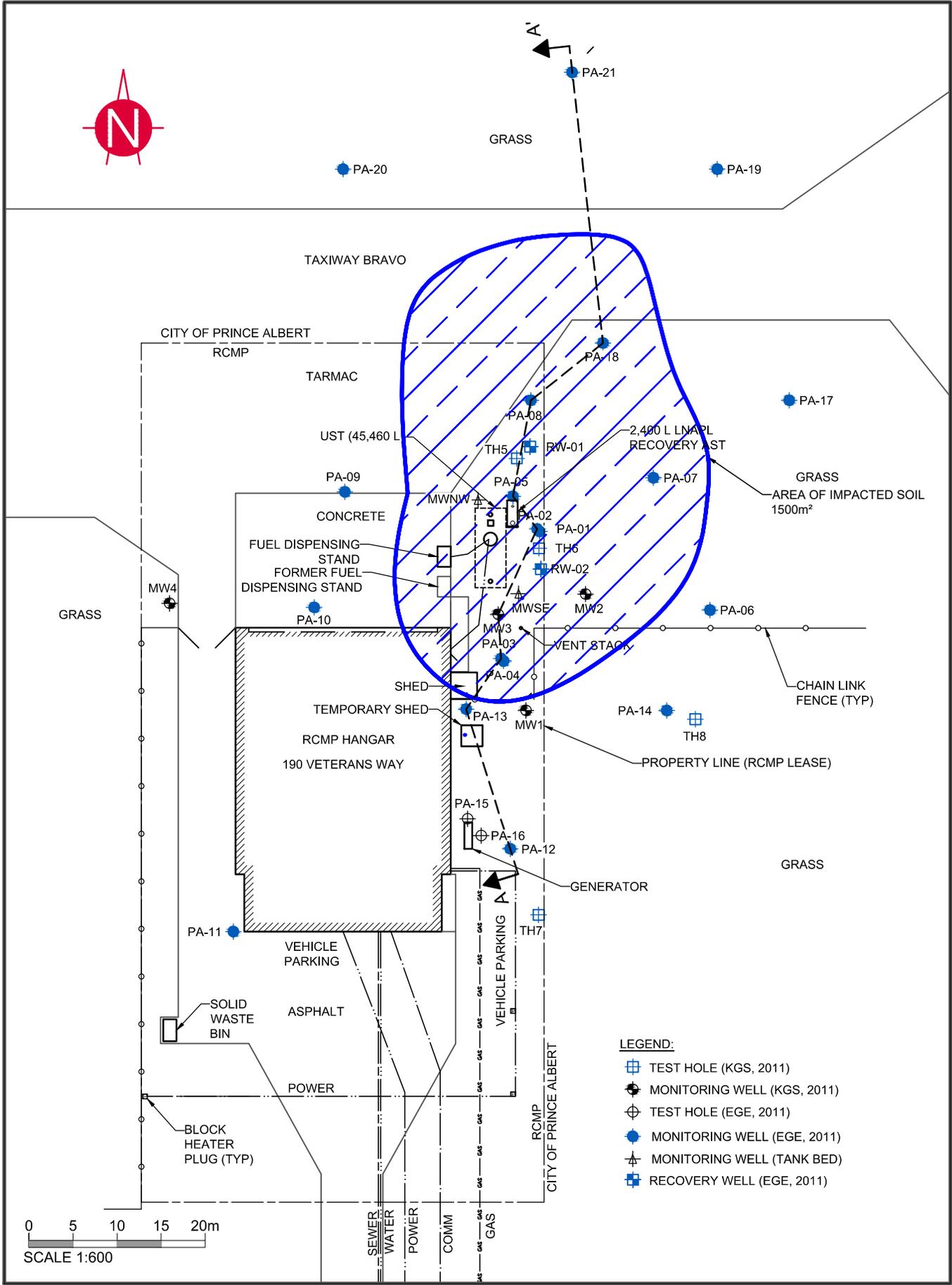
Site Plan

Figure 03

8.5" x 11"

PLOT: 2/27/2016 9:18:17 AM

EGE FILE NAME: 0125 036 06- Figure 04.dwg



EGE

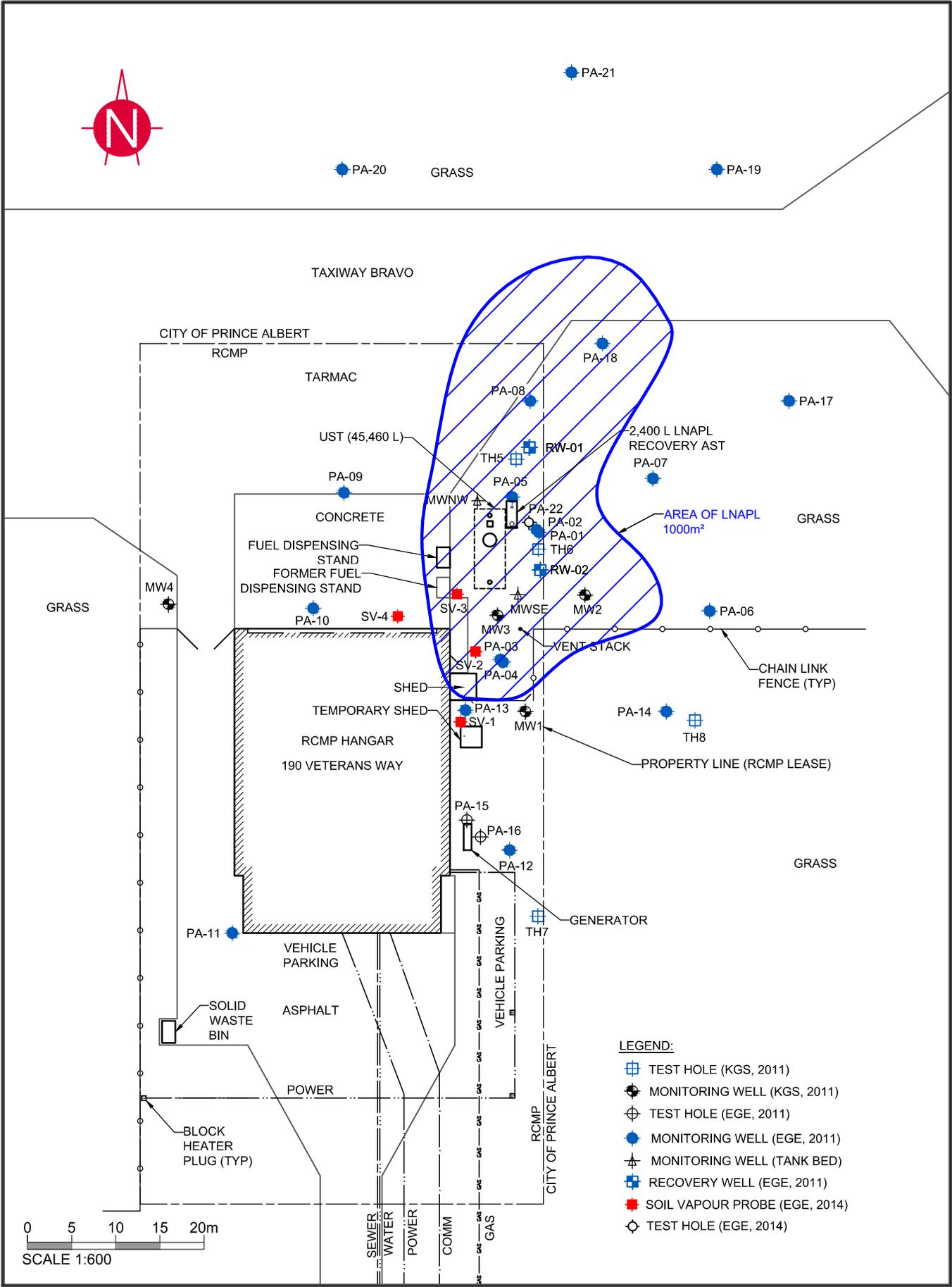
Public Works & Government Services Canada
 RCMP Hangar - 190 Veterans Way, Prince Albert, SK
 Corrective Action Plan

Impacted Soil
(Oct 2011)
Figure 04

8.5" x 11"

PLOT: 2/26/2016 3:05:34 AM

EGE FILE NAME: 0125 036 06- Figure 06.dwg



EGE

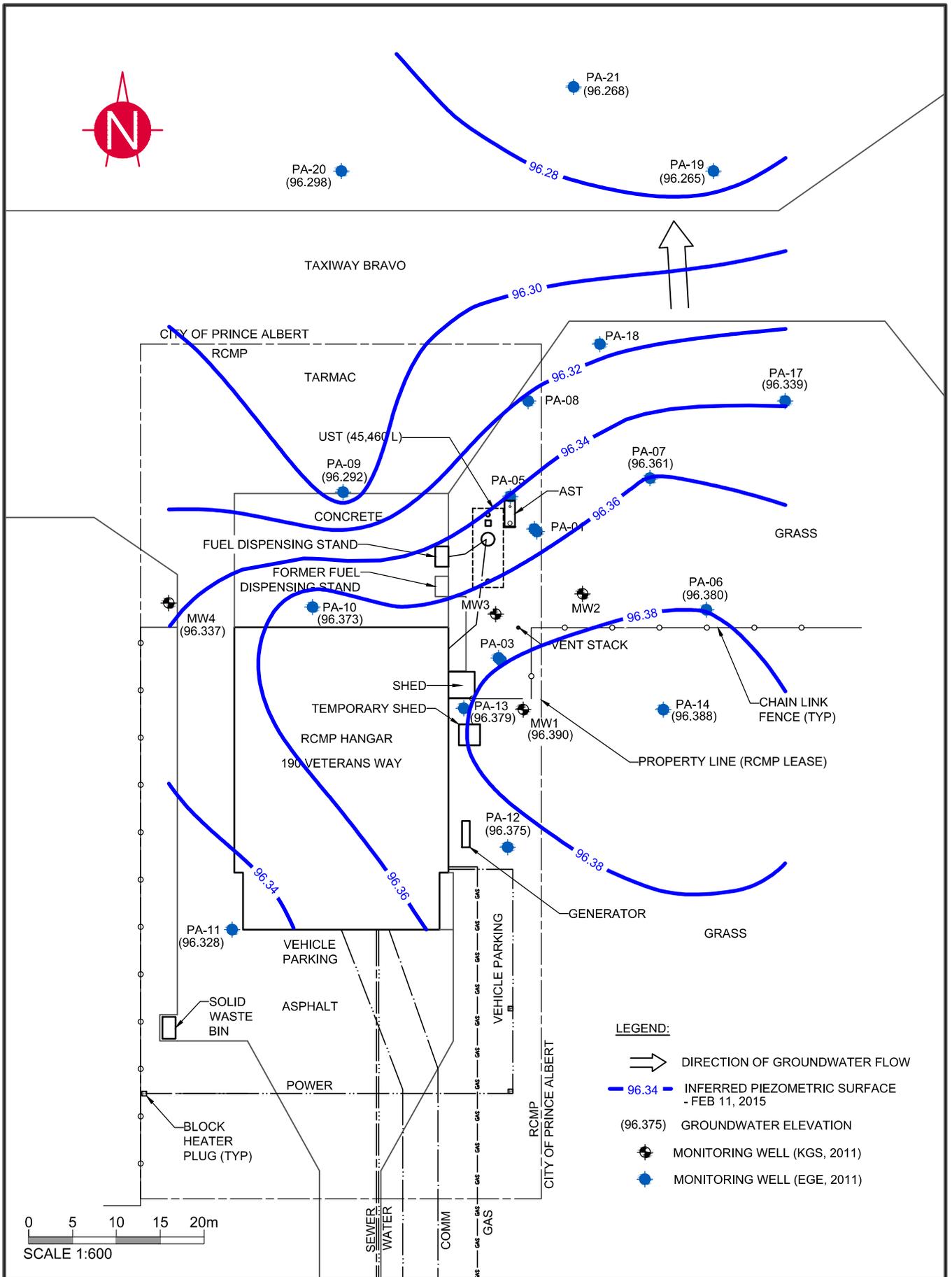
Public Works & Government Services Canada
RCMP Hangar - 190 Veterans Way, Prince Albert, SK
Corrective Action Plan

Area of LNAPL
(Jan 2016)
Figure 06

8.5" x 11"

PLOT: 2/26/2016 3:08:02 AM

EGE FILE NAME: 0125 036 06- Figure 07.dwg



EGE

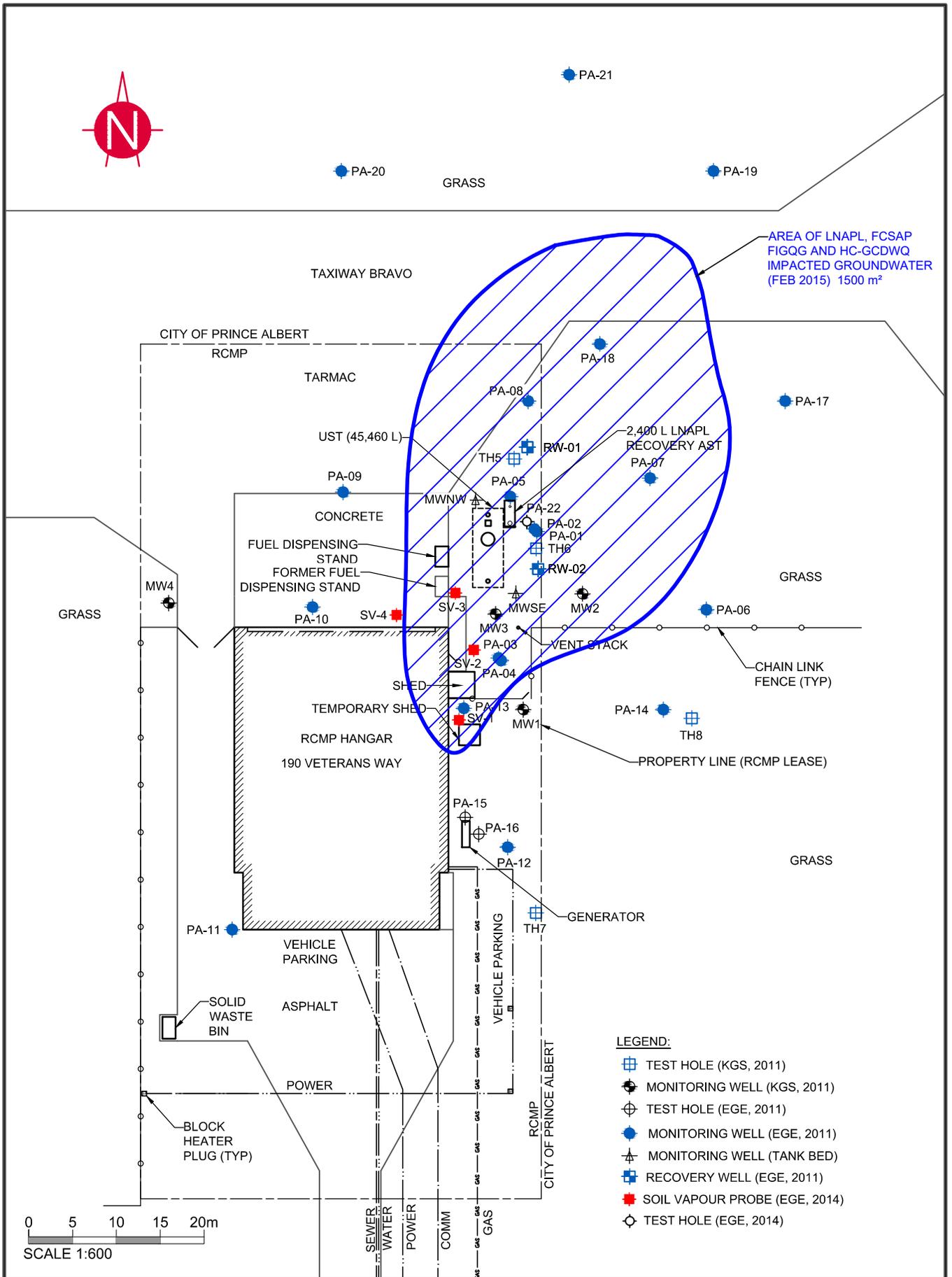
Public Works & Government Services Canada
RCMP Hangar - 190 Veterans Way, Prince Albert, SK
Corrective Action Plan

Piezometric
Surface (Non
LNAPL Wells)
Figure 07

8.5" x 11"

PLOT: 2/26/2016 3:15:24 AM

EGE FILE NAME: 0125 036 06- Figure 08.dwg



LEGEND:

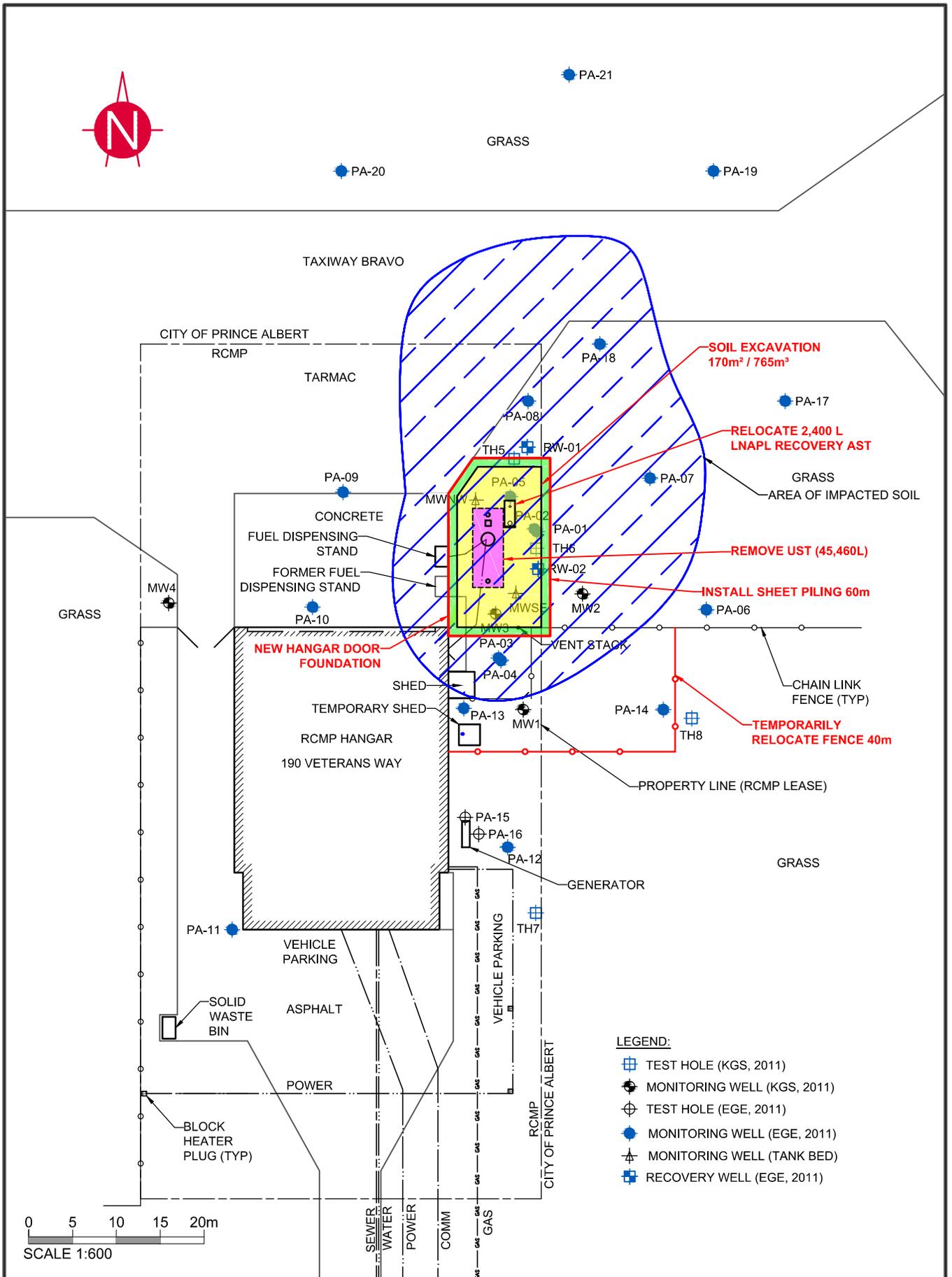
- ☒ TEST HOLE (KGS, 2011)
- ⊗ MONITORING WELL (KGS, 2011)
- ⊕ TEST HOLE (EGE, 2011)
- MONITORING WELL (EGE, 2011)
- ⊕ MONITORING WELL (TANK BED)
- ☒ RECOVERY WELL (EGE, 2011)
- SOIL VAPOUR PROBE (EGE, 2014)
- ⊕ TEST HOLE (EGE, 2014)

EGE

8.5" x 11"

PLOT: 2/26/2016 3:21:23 AM

EGE FILE NAME: 0125 036 06- Figure 09.dwg



EGE

Public Works & Government Services Canada
RCMP Hangar - 190 Veterans Way, Prince Albert, SK

**UST Decommissioning
and Soil Remediation**

Corrective Action Plan

Figure 09

ATTACHMENT A

**COMPLETED CORRECTIVE ACTION PLAN AND
APPLICATION TO DECOMMISSION A STORAGE FACILITY FORMS**



Corrective Action Plan

June 2015 | CSB | CSB21003

A. Application Requirements

Corrective Action Plan (CAP) should provide general information, facility and site information, assessment criteria/objectives with respect to the governing pathway and remediation/management plans. Ministry approval of the application/cap shall be obtained prior to initiating any remediation work.

All submissions shall be consistent with the *Corrective Action Plan Code Chapter Standards and Guide to Impacted Sites*. The ministry will review the plan, in consultation with the owner and local officials in some cases. If the plan is not acceptable, the ministry will identify deficiencies and require that the plan be upgraded. When the plan is acceptable, the ministry will approve the proposal in writing and the project can begin.

How do I submit the application? You can submit this form along with the Closure Report to the Ministry of Environment using our online services or by mailing a hard copy.

- **Web:** the preferred method is to sign in to our Online Services and submit it through your company's business portal. In the portal you can apply for and receive permission, fill out forms and submit documents online, review documents, and track your interactions with the ministry. Please visit the website: <http://www.environment.gov.sk.ca/online-services>.
- **Mail:** you can complete the report, save and print it, and mail the hard copy to:
Environmental Protection Branch
Hazmat and Impacted Sites Unit
102 - 112 Research Drive
Saskatoon, SK S7N 3R3

What if I have questions? For assistance completing this application or for more information, please contact our Client Service Office:

Email: centre.inquiry@gov.sk.ca
Tel (toll free in North America): 1-800-567-4224
Tel (Regina): 306-787-2584

B. Type of Report

Is this report as status Update Or a New Corrective Action Plan Please Check one Below.

 New Corrective Action Plan

 Alteration of Existing

 Status Update

 Site Monitoring

 Progress Report

 Monitoring Report

C. Person Applying

Company Name

Last Name

First Name Middle Name

Address

Address

City Province Postal Code

Country

Mailing Address Same as above Different from above:

Address

Address

City Province Postal Code

Country

Contact Details

Phone (main) Phone (work)

Phone (mobile) Email

Preferred Method of Contact

 Phone

 Email

 Mail

D. Facility Owner Information

Legal Name	<input type="text"/>		
Business Name	<input type="text"/>	Corporate Branch # / GST #	<input type="text"/>
Address	<input type="text"/>		
Address	<input type="text"/>		
City	<input type="text"/>	Province	<input type="text"/>
		Postal Code	<input type="text"/>
Country	<input type="text"/>		
Mailing Address	Same as above	Different from above:	
Address	<input type="text"/>		
Address	<input type="text"/>		
City	<input type="text"/>	Province	<input type="text"/>
		Postal Code	<input type="text"/>
Country	<input type="text"/>		
Contact Details			
Phone (main)	<input type="text"/>	Phone (work)	<input type="text"/>
Phone (mobile)	<input type="text"/>	Email	<input type="text"/>
Preferred Method of Contact	Phone	Email	Mail

E. Facility Operation Information (if known)

Facility Code	<input type="text"/>
Operation Identification #	<input type="text"/>

F. Facility Location Information

Legal Name	<input type="text"/>		
Business Name	<input type="text"/>		
Enter the Latitude/Longitude for center of the site in degrees, minutes, seconds			
<u>Latitude</u>		<u>Longitude:</u>	
Deg: <input type="text"/>	Min: <input type="text"/>	Sec: <input type="text"/>	Deg: <input type="text"/>
			Min: <input type="text"/>
			Sec: <input type="text"/>
Address	<input type="text"/>		
Address	<input type="text"/>		
City	<input type="text"/>	Province	<input type="text"/>
		Postal Code	<input type="text"/>
Country	<input type="text"/>		
Primary Contact			
Last Name	<input type="text"/>	First Name	<input type="text"/>
Emergency Phone	<input type="text"/>	Business Phone	<input type="text"/>

G. Corrective Action Plan

Please ensure that you have included the following information before submission of your corrective action plan.

Objective

Contact Information

Facility and Site Information

Chosen End Point (choose from list)

Proposed Corrective Actions (choose from list)

Proposed Schedule

Start Date

End Date

H. Conditions

I have read and I fully understand that these conditions must be met before the Ministry of Environment can accept, assess and process my application;

I have read and I fully understand the requirements of this application, and wish to continue with my application and formally apply for this permission, and

I certify that the information I have provided in this application is true and accurate in every respect.

By checking this box I accept these conditions.

Signature of Applicant



Date of Application



Application to Decommission a Storage Facility

May 2015 | CSB | CSB13002

A. Application Requirements

This application is used when applying for Approval to Decommission a Storage Facility or when applying to decommission a portion of a storage facility which may include a warehouse, yard, storage tank, container, stockpile or equipment used for the storage and handling of hazardous substances and waste dangerous goods at an existing site.

An Approval to Decommission a Storage Facility must be issued by the ministry prior to undertaking any decommissioning activities at a storage facility. A completed application with the information outlined herein shall be submitted to the ministry 30 days prior to undertaking the work. To ensure a timely response, it is important that applications include all necessary information.

To complete this application you will need the following information:

- Proponent's complete contact information
- Site information including latitude and longitude for the center of the site
- Decommissioning information
- Sampling information
- Proof of Qualification to complete this work
- Site drawings

This application will provide approval to remove the tanks and associated infrastructure. The limited soil excavation must be done by a Qualified Person and the sampling methodology must be stated. If contamination is found, the owner shall report it to the ministry, further assessment and corrective action may be necessary.

Before decommissioning a storage site or any portion of a storage site that was used for storage and handling of hazardous substances or waste dangerous goods, an applicant shall submit an **Application to Decommission a Storage Facility**. If the application is satisfactory, the ministry will grant an Approval to Decommission a Storage Facility to the facility owner.

How do I submit the application? You can submit this application to the Ministry of Environment using our online services, by email or by mailing a hard copy.

- **Web:** the preferred method is to sign in to our Online Services and submit it through your company's business portal. In the portal you can apply for and receive permission, fill out forms and submit documents online, review documents, and track your interactions with the ministry. Please visit the website: <http://www.environment.gov.sk.ca/online-services>.
- **Mail:** you can complete the report, save and print it, and mail the hard copy to:
Environmental Protection Branch
Hazmat and Impacted Sites Unit
102 - 112 Research Drive
Saskatoon, SK S7N 3R3

What if I have questions? For assistance completing this application or for more information, please contact our Client Service Office:

Email: centre.inquiry@gov.sk.ca
Tel (toll free in North America): 1-800-567-4224
Tel (Regina): 306-787-2584

B. Person Applying

Company Name

Last Name

First Name Middle Name

Address

Address

City Province Postal Code

Country

Mailing Address

Same as above Different from above:

Address

Address

City Province Postal Code

Country

B. Person Applying *(continued)*

Contact Details

Phone (main) Phone (work)

Phone (mobile) Email

Preferred Method of Contact Phone Email Mail

C. Facility Owner Information

Company Legal Name

Business Name

Address

Address

City Province Postal Code

Country

Mailing Address Same as above Different from above:

Address

Address

City Province Postal Code

Country

Primary Contact

Last Name First Name

Phone (main) Phone (work)

Phone (mobile) Email

Preferred Method of Contact Phone Email Mail

D. Facility Operation Information *(if known)*

Facility Code

Operation Identification Number

E. Facility Location Information

Enter the Latitude/Longitude for center of the site in degrees, minutes, seconds.

Latitude:

Longitude:

Deg: Min: Sec: Deg: Min: Sec:

Company Legal Name

Business Name

Address

Address

City Province Postal Code

Country

Mailing Address

Same as above

Different from above:

Address

Address

City Province Postal Code

Country

Phone (Business) Phone (emergency)

F. Kind and Type of Work

Kind of work being applied for

Petroleum and Allied

Other Hazardous Substance

Type of work being applied for

Above Ground Storage (AST)

Underground Storage Tanks (UST)

Warehouse & Outdoor Storage Yard

Brief summary of the work being applied for:

Please attach any additional information as a separate document. Also, attach the site drawing.

G. Tank Information

Enter the information below for all storage tanks (including pressure vessels) that are to be decommissioned at the site.

If more are required, please copy this section and enter the required information until all tanks to be decommissioned have been added.

Type of Tank (above ground / under ground)

Tank Name or Number	<input type="text"/>				
Pressure Vessel	<input type="text"/> Yes <input type="text"/> No				
Substance in Tank	<input type="text"/>				
Volume of Tank (litres)	<input type="text"/>				

H. Warehouse/Storage Yard Information

Enter the information below for the warehouses and/or storage yards that are to be decommissioned at the site. If more areas are being decommissioned, please copy this section and enter the required information until all warehouses/storage yards have been identified.

Storage Area Name	Storage Type	Storage Area Size (in m²)
<input type="text"/>		<input type="text"/>
Storage Area Name	Storage Type	Storage Area Size (in m²)
<input type="text"/>		<input type="text"/>
Storage Area Name	Storage Type	Storage Area Size (in m²)
<input type="text"/>		<input type="text"/>
Storage Area Name	Storage Type	Storage Area Size (in m²)
<input type="text"/>		<input type="text"/>
Storage Area Name	Storage Type	Storage Area Size (in m²)
<input type="text"/>		<input type="text"/>
Storage Area Name	Storage Type	Storage Area Size (in m²)
<input type="text"/>		<input type="text"/>
Storage Area Name	Storage Type	Storage Area Size (in m²)
<input type="text"/>		<input type="text"/>
Storage Area Name	Storage Type	Storage Area Size (in m²)
<input type="text"/>		<input type="text"/>

I. Qualified Persons

Company Name	<input type="text"/>		
Last Name	<input type="text"/>		
First Name	<input type="text"/>	Middle Name	<input type="text"/>
Address	<input type="text"/>		
Address	<input type="text"/>		
City	<input type="text"/>	Province	<input type="text"/>
		Postal Code	<input type="text"/>
Country	<input type="text"/>		

What is your qualification to perform this kind of work? (attach scanned copy of qualification document)

Will confirmation samples be done upon completion? Yes No

Who will be performing the sampling?

Name	<input type="text"/>
Company Name	<input type="text"/>

J. Legal Questions

Have you ever had any permissions revoked, suspended or deficiencies within the last 12 months? Yes No

Have you had any orders, notices of violation or prosecutions within the last 12 months? Yes No

I hereby acknowledge that I am qualified to perform the work described herein and the work shall be directly supervised by a certified/qualified person, and acknowledge it is an offence to make a false or misleading statement in this application. Yes No

K. Certification

I, _____ certify that the information provided on this form is correct to the best of my knowledge.

Signature of Applicant

Date of Application