

November 3, 2023

Peace River Regional District
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ISSUED FOR USE
FILE: 704-SWM.SWOP04805-01
Via Email: gerritt.lacey@prrd.bc.ca

Attention: Gerritt Lacey, Solid Waste Manager

Subject: New Landfill Feasibility – Site Selection - Landfill Siting Memo

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was retained by the Peace River Regional District (PRRD) to conduct a new landfill feasibility study (study) with the goal of siting a new landfill in the Chetwynd area.

The current Chetwynd Landfill (site or Landfill) received an operating permit in 1977. The 2021 Design, Operating, and Closure Plan (DOCP) indicates that the estimated closure date is 2030 while the 2021 Annual Report (Sperling Hanson 2022) indicates an estimated closure date of 2029. Based on the most conservative closure date of 2029, a new landfill cell will be required by 2028.

The scope of work for the study is divided into three stages:

- Stage 1:
 - Site Selection.
 - Feasibility Study:
 - Site Reconnaissance; and
 - Preliminary Technical Investigation.
- Stage 2:
 - Permitting; and
 - Detailed Design.
- Stage 3:
 - Construction; and
 - Commissioning.

This memo undertakes Stage 1: Site Selection to complete a desktop evaluation of potential areas around Chetwynd. The purpose of the work is to identify locations that, based on desktop study, have technical characteristics that appear favourable for development of a Municipal Solid Waste (MSW) Landfill in accordance with the British Columbia Ministry of Environment and Climate Change Strategy (BCMECCS) Landfill Criteria for Municipal Solid Waste (the Criteria) (2016). More specifically, this initial scope of work is intended to filter out areas that would not be favourable for landfill development based on regulatory and operational constraints. The proposed scope of work assumed that up to three (3) potentially feasible sites would be recommended for field reconnaissance in the Fall of 2023 to confirm key non-intrusive technical requirements.

For the duration of the study, the PRRD is leading and initiating public and stakeholder consultation with support from Tetra Tech. As such, the PRRD has provided current existing information on potential stakeholder concerns during this desktop evaluation. However, this study has focussed on technical constraints to siting.

2.0 SITING EXERCISE

The purpose of the work is to:

- Eliminate locations in the Chetwynd area that, based on desktop study, would not meet regulatory requirements (e.g., set-backs from water bodies); and
- Preliminary identification of locations in the Chetwynd area that, based on desktop study, have characteristics that may allow them to be considered for the development of a MSW landfill in accordance with the Criteria.

Further to the technical requirements, the siting exercise also evaluated operational considerations such as available road access and siting within a reasonable haul distance from Chetwynd.

The work undertaken for this site selection has included:

Task 1: Project Kickoff and Confirmation of Study Areas; and

Task 2: Desktop Siting Analysis.

The results for these tasks are presented in the following sections. The recommended sites to conduct the site reconnaissance portion of the feasibility study are presented in Section 4.0.

2.1 Landfill Siting – Overview

Tetra Tech met with the PRRD on June 28, 2023, to initiate work on the site selection. During the meeting, the PRRD indicated that there were no pre-determined locations and that it was a fresh slate for the evaluation process. The PRRD further indicated the following:

- The preference is for one landfill in the Chetwynd area;
- There is a previously closed landfill (Moberly Lake); and
- Believed that geology (shallow rockhead) and set-backs are not favourable to expansion of current site.

The PRRD further indicated that a previous evaluation was completed to evaluate the feasibility of transfer stations vs a new landfill and that based on the outcome of the landfill siting, there may be a need to update the transfer station evaluation for current day. However, there would also be concern about the remaining capacity of the other landfills within the PRRD to accept the waste from the Chetwynd area.

During the meeting, it was proposed that the study area would initially be a circular zone with a radius of 50 km. For initial study purposes, the 50 km radius would be narrowed down to focus on areas within a 15 km to 20 km distance from the existing landfill location and adjacent to existing roads. The study would only extend beyond the 20 km radius if potentially feasible sites were not identified within the 20 km radius.

2.2 Siting Criteria and Constraints Applied

The siting criteria outlined in the Criteria as well as our experience in siting landfills were used to outline a series of conditions (selection criteria) that would range from unfavourable to favourable for development of a landfill in a particular location. Some selection criteria are considered 'hard constraints' (e.g., the presence of a water body within 300 m) whereas some constraints are considered 'soft constraints' (e.g., proximity of a location to an existing roadway). 'Hard constraints' as referenced from Section 3.0 "Siting Criteria" of the Criteria are listed below in Table 2-1: Selection Criteria: Hard Constraints. The 'soft constraints', as identified in Table 2-2, have been considered by Tetra Tech and/or the PRRD with rationale provided.

Tetra Tech used a GIS-based mapping system to evaluate various selection criteria for the siting of a landfill. This approach is advantageous because the procedures can be clearly documented, and the data can be stored for future use, making the analyses repeatable and enabling future refinement during future more detailed investigation or prior to regulatory application submission.

The following selection criteria were considered for this preliminary siting evaluation. The selection criteria listed below appear in hierarchical order based on potential impacts, and not in the order laid out in the Criteria.

Table 2-1: Selection Criteria: Hard Constraints

Selection Criteria	Criteria Reference	Requirement	Note/Consideration
Water Features	Section 3.9	A landfill shall not be located within 100 m of surface water.	
Water Features	Section 3.11	A landfill footprint shall not be located within 100 m of the sea level maximum high tide or seasonal high watermark of an inland lake shoreline.	
Water Wells	Section 3.5	The landfill footprint shall be a minimum of 300 m from a water supply well or water supply intake and a minimum 500 m from municipal or other high capacity water supply wells.	
Biophysical	Section 3.8	<p>The landfill footprint must not be located within 100 m of an environmentally sensitive area such as:</p> <ul style="list-style-type: none"> ▪ A national, provincial, or regional park. ▪ A wildlife management area as designated under Section 4 of the provincial Wildlife Act. ▪ A critical wildlife area or wildlife sanctuary designated under Section 5 of the provincial Wildlife Act. ▪ A land acquired and administered under Section 3 of the provincial Wildlife Act. ▪ An ecological reserve designated under the provincial Ecological Reserve Act. ▪ A bird sanctuary designated under the regulations pursuant to the federal Migratory Birds Convention Act. ▪ A wildlife area designated under the federal Wildlife Act. ▪ A marine sanctuary. ▪ A wetland. ▪ The habitat of rare, threatened, or endangered species under federal and/or provincial Species at Risk legislation. 	
Land Use	Section 3.1	The landfill footprint must not be located within 500 m of an existing or planned sensitive land use. A planned sensitive land use is one that has been identified as an allowed use in a regional growth management plan, official community plan, or zoning by-law but has not yet been built/established. Sensitive land uses include, but are not limited to, schools, residences, hotels, restaurants, cemeteries, food processing facilities, churches, and municipal parks. Land uses such as heavy industry, forestry operations, aggregate extraction/mining, railways/rail yards, etc. are not considered sensitive land uses.	

Selection Criteria	Criteria Reference	Requirement	Note/Consideration
	Section 3.2	Heritage and Archeological Sites: <ul style="list-style-type: none"> The landfill footprint is recommended not to be located within 100 m of a heritage or archaeological site. Landfill siting is also subject to the requirements of the BC Heritage Conservation Act administered by the Archaeology Branch of the British Columbia Ministry of Forests, Lands and Natural Resource Operations. The Branch and website should be consulted for requirements 	It should be noted that an evaluation of the heritage and archeology has not yet been conducted but the desktop evaluation will occur during the feasibility study of the recommended locations.
	Section 3.10	Floodplains: A landfill footprint shall not be located in a floodplain.	
Geological and Hydrogeological: <ul style="list-style-type: none"> Bedrock Geology Surficial Geology Presence of Aquifers Faults and Unstable Areas 	Section 3.7	The landfill footprint shall not be located within 100 m of a geologically unstable area. A geologically unstable area is defined as a location where natural or man-made features pose a substantial risk to the integrity of the landfill environmental control systems or global stability of the fill. Specifically, the landfill footprint must not be located within 100 m of: <ul style="list-style-type: none"> A Holocene fault. A known or active or historic landslide. Areas underlain by weak or collapsible soils, karst limestone, frozen mineral soil or muskeg with an active layer, or underground mine workings. Areas prone to debris movement (landslide paths, avalanche paths, alluvial fans). A location at risk of being impacted by tsunamis." 	
Airports	Section 3.3	<ul style="list-style-type: none"> NAV CANADA must assess and approve all proposals for land use near airports and air navigation infrastructure before construction begins to ensure that air navigation system safety and efficiency are not compromised by proposed land development. NAV CANADA recommends consulting Transport Canada policies for land use in the vicinity of airports. As a rule of thumb, Transport Canada generally require that a landfill footprint be located no closer than 8 km from airports. This is due to the propensity for landfills to attract birds, thereby creating potential hazards to aircraft, especially during take-off and landing. That minimum separation distance may be reduced to 3.2 km if bird control measures acceptable to NAV CANADA are implemented at the landfill site, and the reduction in the necessary buffer is approved by the airport authority. The NAV CANADA assessment does not replace approvals or permits required by other federal, provincial or municipal authorities. Where airport zoning regulations require longer buffer zones, the provisions of those regulations shall prevail. The zoning and separation conditions included in this section refer to NAV CANADA controlled airports only, as not all airports are controlled by NAV CANADA but by local authorities or other bodies. Nonetheless, Transport Canada guidelines represent the recommended zoning and separation conditions for all other airports. 	

Other sections of the Criteria that refer to Siting Criteria not referenced above will be considered in future stages of the project. For example:

- Section 3.6 – Gullies and Depressions: The landfill footprint shall not be located in a gully or depression that acts as a point of water collection during rainfall events unless acceptable diversion works are provided such as interception ditching or other diversion measures are undertaken. Diversion of water through culverts beneath the landfill footprint is not allowed.
 - During site reconnaissance at the recommended locations in this report, the potential sites can be vetted for the presence of gullies and depressions.
- Section 3.12 – Depth to Water Table: The landfill base shall be a minimum 1.5 m above “groundwater” at all times. The separation distance shall consider the hydrogeologic conditions at the site including the hydraulic capacity of the underlying soils.
 - This will be considered as part of the future design following geotechnical investigation at the site(s) chosen for advancement as a possible new landfill location.

Table 2-2: Selection Criteria: Soft Constraints

Selection Criteria	Criteria Reference	Requirement	Note/Consideration
Distance from Existing Chetwynd Landfill	N/A	Initially a 50 km travel distance was utilized.	After initial review lowered to a 20 km radius from the current Landfill.
Existing Road Access	N/A	All site locations have been chosen in part due to their proximity to existing roads.	
Municipal and First Nations District Boundaries	N/A	The potential sites were screened for proximity to First Nations and municipal boundaries.	
Private Land Ownership	N/A	Private Land Ownership was taken into account during the siting screening.	
Agricultural Land Reserves	N/A	Proximity to areas allocated as Agricultural Land Reserves has been considered.	
Development and Utilities	N/A	Locations of existing facilities, pipelines, roads, oil, and gas wells and other developments/infrastructure must be considered.	

2.3 Additional Evaluation Measures

Further to the GIS-mapping based evaluation identified in Section 2.2, Tetra Tech referenced our in-house borehole database for stratigraphic information from the region. The review of the database showed that there are no boreholes directly in the study area. Existing boreholes in the region can be utilized during the technical phase of the landfill feasibility study to assist in geological and hydrogeological assessment.

3.0 DISCUSSION OF PROSPECTIVE SITES

Based on initial evaluation of the selection criteria, Tetra Tech identified the prospective sites on Table 3-1 below and identified on Figure 1.

Table 3-1: Initially Identified Prospective Sites

Area Name	Northing (centre point)	Easting (centre point)	Comments
A	6181702.60	587980.82	This site was proposed due to good transport links, lack of water supply permits, and water wells in the vicinity. Water features are present, but not in such a great number to preclude siting.
B	6176746.71	589312.44	Area directly to the north of the existing landfill. Potential expansion may be an easier path to approval.
C1	596612.76	6162284.73	This site was proposed due to good transport links, lack of water supply permits, and water wells in the vicinity, and proximity to closed landfill.

Tetra Tech presented the prospective sites above to the PRRD during a meeting on August 8, 2023. Based on the meeting, the following selection criteria were added/confirmed:

- Reduced the radius for preferred site consideration to 15 km around Chetwynd; and
- Confirmation land adjacent to the existing Landfill would remain within consideration.

During the meeting, the PRRD also suggested the locations in Table 3-2 and Figure 1 for further evaluation.

Table 3-2: Prospective Sites Identified by the PRRD

Area Name	Northing (centre point)	Easting (centre point)	Comments
D	6174656.31	598822.33	Proposed as the site has excellent road access and is within reasonable travel distance from Chetwynd.
E / C2	6163741.02 / 6163868.13	593807.23 / 593797.64	Proposed as an option as to ensure the site is to the west of existing pipeline infrastructure. 'Area C2' was applied by Tetra Tech within the Area E provided by the PRRD.

Tetra Tech presented initial recommendations of Area A, Area B, and Area C2 to the PRRD on August 29, 2023. The PRRD indicated a limited interest to further investigate Area C2 due to potential concerns and challenges with a steep section of the road that leads to the site and proximity of residents. The PRRD requested Tetra Tech complete an additional evaluation for an additional site. Tetra Tech undertook this evaluation with the results presented in Table 3-4. These results were presented to the PRRD on September 12, 2023, at which time the PRRD requested Tetra Tech to further evaluate sites north along Jackfish Lake Road with the indication that the distance from the current Chetwynd Landfill could be increased from 15 km to 20 km or slightly further if required. The results of this evaluation are presented in Table 3-5.

3.1 Evaluation of Prospective Sites

Based on the sites discussed during the August 8, 2023 meeting, and identified above, four potential locations were further evaluated. These locations are shown on Table 3-3 and Figure 1. These sites were evaluated relative to available species at risk, borehole, water well information, and surface conditions / development from aerial imagery.

Table 3-3: Initially Evaluated Locations

Area Name	Northing (centre point)	Easting (centre point)	Approximate Study Area Size(m ²)	Comments
A	6181702.60	587980.82	4,000,000	Approximately 6.5 km to the north of the existing Chetwynd landfill.
B	6176746.71	589312.44	90,000	This would be an expansion to the north at the existing Chetwynd landfill.
C1	596612.76	6162284.73	4,000,000	Approx 10.6 km to the south of the existing Chetwynd landfill. Based on discussion with the PRRD this site is in close proximity to a former closed landfill that had been previously considered for a transfer station location; however, the closed site itself would not be a suitable location. Indicated by PRRD that there is a steep section in the road access and a location closer to the main Highway should be considered.
D	6174656.31	598822.33	4,000,000	Proposed by PRRD as a potential location. Approx 10.6 km east of the existing Chetwynd landfill. It was noted during the meeting of August 8 that there were numerous water features including watercourses, waterbodies, and groundwater wells in the Area. Other observations included the presence of numerous private landowners.
E / C2	6163741.02 / 6163868.13	593807.23 / 593797.64	8,988,484	Proposed by PRRD as a potential location due to the presence of existing pipeline infrastructure in the Lone Prairie location. Approximately 10.6 km south of existing Chetwynd landfill. It was noted that Area E overlaps Area C. The sections of Area E that lie outside of the proposed Area C boundary have numerous limitations as a siting option: multiple private landowners to the west, multiple packets of Provincial Crown land, water features that with the 100 m buffer would preclude construction in the southern section of Area E, and the western part of the study area is situated within an alluvial fan.

Figures 2a, 2b, 2c, and 2d, show water features including watercourses and waterbodies, and groundwater wells. A 100 metre buffer has been applied to water features.

- **Figure 2a** shows that Area A has watercourses present that likely preclude the possibility of siting a landfill to the west of Highway 29; however, to the east of the highway there is enough space to potentially site a landfill between two of the water bodies. No water wells are present in the study area.
- **Figure 2b** shows the location of a potential expansion to the north of the existing Chetwynd landfill, note that there is a water feature mapped that runs through the existing site. There are also three water wells present on private land to the west, east, and northeast of the existing site, the wells are sufficiently distant, and beyond the Criteria siting requirement limits.

- **Figure 2c** Within the Area C2 boundary, there is a water feature present to the south of Lone Prairie Road, and further water features on the eastern and northeastern boundary of the potential siting area. The area to the north of Lone Prairie Road is a potentially favorable location in this study area. No water wells are present in the study area. Within the Area E boundary, there are water features present in the northwest, west, south, and east sections.
- **Figure 2d** shows that there are water features, largely watercourses and wetland, present in approximately 50% of the potential siting area (Area D).

Figures 3a, 3b, 3c, and 3d show an overlay of environmental searches, land use, and surficial geology. Environmental searches considered included the presence of sensitive species, historical resources, parks, and protected areas.

- **Figure 3a** shows that there are no known habitats of sensitive species, historical resources or parks and protected areas within Area A. Surficial geology present in the study area is largely “streamlined till ridges” with an area of glaciolacustrine veneer running along the Highway 29 in a north to south alignment for much of the central part of the study area. An alluvial plain associated with a water feature is present in the northwest corner of the study area. Figure 1 shows that Moberly Lake Park is present to the northwest of Area A; however, it is approximately 4 km away from the study area.
- **Figure 3b** shows that there are no known habitats of sensitive species, historical resources or parks and protected areas within Area B. There is an agricultural land reserve approximately 350 m to the east of the current landfill site (shown in the southeast corner of Figure 3b). Surficial geology present in the study area is largely streamlined till ridges with a glaciolacustrine plain to the east, and an alluvial fan to the east-northeast. It should be noted that landfills cannot be sited within 100 m of alluvial fans; however, the potential site is greater than 250 m away from the 100 m buffer applied to the closest alluvial fan deposit.
- **Figure 3c** shows that there are no known habitats of sensitive species, historical resources, or parks and protected areas within the Area C2. Surficial geology present in the study area is largely till veneer. There is an alluvial fan present to the west of the study area that removes a portion of Area E as a potential siting option, and the 100 m buffer zone would extend into the potential siting area. However, this is largely to the south of Lone Prairie Road, and combined with the presence of the water feature mentioned above, would make this part of the study area less desirable for landfill siting.
- **Figure 3d** shows that there are no known habitats of sensitive species, historical resources, or parks and protected areas within the Area D. The Area is within an Agricultural Land Reserve and has numerous private landowners present. Surficial geology present in the study area is largely glaciolacustrine veneer in the southern portion, and glaciofluvial ridge deposits, including eskers, and streamlined till ridges in the northern portion of the study area. Figure 1 shows that the Pine River Breaks Park is present to the southeast of Area D; however, it is approximately 1 km away from the study area.

Figures 4a, 4b, 4c, and 4d show bedrock geology. In all four of the study areas the bedrock primarily belongs to the Dunvegan Formation, with the underlying Fort St John Group also present. The Dunvegan Formation, of the middle Cenomanian (lower Upper Cretaceous), is described as being composed of coarse clastic sedimentary rocks including interbedded sandstones, siltstones, and shales. In the Peace River Valley, the Dunvegan Formation dips gently to the southwest. The Fort St John Group is composed of five formations, with the Cruiser Formation (the uppermost) being present in study Area B and Area C2. The Cruiser Formation is argillaceous, composed largely of shale, with interbedded mudstone and siltstone.

In terms of landfill siting, these bedrock formations as described do not present obvious hard constraints, although it should be noted that the Dunvegan Formation description of being composed of coarse clastic sedimentary rocks that would require further investigation at the intrusive stage. Hydraulic conductivity values for the coarse grained rocks could be evaluated. This concern is somewhat negated by the presence of the shales of the Fort St John Group underlying the Dunvegan Formation, and the presence of fine-grained surficial deposits above.

Based on the information and considered constraints, the following locations were deemed less favourable due to the following limitations:

- Area D has been removed from further consideration as a potential site for a new landfill due to following reasons: the presence of water features, largely watercourses and wetland, present in approximately 50% of the potential siting area; the fact that it is within an area of Agricultural Land Reserve; the proximity of Pine River Breaks Park to the southeast; and the presence of numerous private landowners in the area.
- The sections of Area E that are outside the boundaries of proposed Area C2 have been also been removed from further consideration due to the following reasons: the western segment overlies an alluvial fan; there are numerous water features in the west, south, and eastern sections of Area E; slopes appear to be steep in the north, south, and west sections.

Following the August 29, 2023 meeting with the PRRD presenting Areas A to Area E, Tetra Tech undertook an evaluation for a further third potential siting location. The assessment of further options was carried out with the siting criteria methodology described in Section 2. As part of this, ease of access from main travel routes was considered as a key factor in evaluating potential sites, and as such the search areas are described as per the road corridors they lie along. The results of this further evaluation are presented in Table 3-4.

Table 3-4: Evaluation After August 29, 2023 Meeting

Search Area	Road Corridor	Direction from Chetwynd	Comments
F	Highway 97	East	To the southeast of town, and to the west of Area D. Limiting factors for siting in this area include being within the 8 km setback of the NAV CANADA setback from airports, a site located in this area would likely be on the landing/takeoff flight path for the airport. Acreages are present to the south of the highway and have water well licenses. Watercourses and other surface water features are present to the north and south of Highway 97 further limiting siting potential.
G	Highway 97	East	To the southeast of town, and to the east of Area D. There are many surface water features north and south of the highway. There are also various wells and water licenses associated with acreages and farms. East of Area D, the area becomes part of the Agricultural Land Zone, this would make obtaining siting approval more problematic.
H	Highway 97	West	To the southwest of town. Topography is a limiting factor in this area, north of the highway ground is very steep, development of a landfill would not be advisable. The valley floor is largely set in alluvial fan deposits which are a hard constraint for landfill siting. Water features including Pine River, and numerous water wells are present.
I	Highway 29	South	To the south of town. In this area alluvial fan deposits are present along the valley floor. To the east of the highway the topography is very steep, and therefore unsuited to landfill development. Water features including the river and water wells associated with private residences are present.
J	Highway 29	North	To the north of town, and Area A. Similar to Area A; however, topography is steeper and therefore siting would be more difficult to achieve. This area is closer to Moberly Lake First Nation. As with Area A there are some water features present, but not enough to preclude construction.
K	Jackfish Lake Road	Northeast	To the northeast of town and Area B. Topography to the north of the road is steep and therefore unfavourable for landfill construction. Numerous private and Crown land packages to southeast of the road. Numerous water features present within the area that limit potential siting locations. Note that this area would also be within the (outer) 8 km NAV CANADA setback, however, less likely to be on a direct flightpath for takeoff/landing. The surficial geology is shown to be Glaciolacustine Plain in the flat areas and Streamlined Till Ridges in the forested areas.

Area F to Area K have various limiting factors that either rule out siting completely or would render siting unfavourable. Tetra Tech recommends removing Area F to Area K from further consideration.

Based on a meeting presenting Area F to Area K on September 12, 2023, the PRRD requested that Tetra Tech further evaluate sites north along Jackfish Lake Road based on a distance from Chetwynd up to 15 km to 20 km or slightly further if required. Based on this evaluation, Area L in Table 3-5 was identified.

Table 3-5: Evaluation After September 12, 2023 Meeting

Area Name	Northing (centre point)	Easting (centre point)	Approximate Study Area Size(m ²)	Comments
L	6188388.93	597107.11	4,397,203	Approximately 18 km northeast of Chetwynd on Jackfish Lake Road. Airphoto resolution is poor, but the area appears flat with little grade. It is Crown Land but 500 m residential buffer reduces potential developable area. Relatively complex pattern of development constraints. There are no groundwater abstraction wells in proximity to the candidate area. Surficial geology is predominantly Glaciofluvial Plain and Glaciofluvial Hummocky Terrain.

4.0 RECOMMENDATIONS AND NEXT STEPS

Based on the evaluation completed, Tetra Tech recommends the preliminary field reconnaissance portion of the Feasibility Study be undertaken for the sites in Table 4-1. Based on discussion with the PRRD on September 14, 2023, it was agreed that Area A, Area B, and Area L would be investigated and, if there was time, remaining Area C2 would also be investigated noting that the original scope was for three sites.

Table 4-1: Recommended Sites for Site Reconnaissance

Area Name	Location
A	Approximately 6.5 km to the north of the existing Chetwynd landfill.
B	Expansion to the north at the existing Chetwynd landfill.
C2	Approximately 10.6 km to the south of the existing Chetwynd landfill.
L	Approximately 15.5 km to the north of the existing Chetwynd Landfill

The site reconnaissance will be completed to get an overview of the land, and to identify features such as springs, small waterbodies, the potential presence of gullies, or depressions. The field work is preliminary in nature and will be used to further recommend sites to undergo a more in-depth technical investigation. The following field work will be completed:

- Incidental wildlife sweep to identify the presence of any sensitive habitat features such as dens, or species-at risk which may require specific consideration in design, regulatory dealings, as well as prior to construction activity.
- Confirmation of wetland presence, classification, and desktop-delineated wetland and watercourse boundaries.
- Visual assessment of the site from a geotechnical/landform standpoint and overall site suitability for landfill operations.

A desktop Archeological Overview Assessment (AOA) will be completed of the candidate areas.

Tetra Tech will prepare a technical memo outlining the results of the site reconnaissance and AOA for the three or four potential sites. From these three potential locations, a recommendation on sites deemed feasible and warranting further in-depth technical investigation will be made.

It should be noted that no specific surveys for rare plants or wildlife (i.e., breeding birds) are recommended at this time and a topsoil assessment is not included. These tasks would be completed as part of further in-depth technical investigation.

4.1 Preliminary Technical Investigation

Tetra Tech recommends that once the technical memo has been reviewed, that a preliminary technical investigation be advanced. It is anticipated that the technical investigation would be undertaken in Spring 2024 and depending on the site and available information include:

- Advancement of up to eight (8) geotechnical boreholes with Standard Penetration Test (SPT) testing to a maximum depth of 10 m.
- Installation of three (3) groundwater piezometers to characterize depth to groundwater within the cell design or waste footprint area.
- Laboratory testing to determine the engineering properties of the site's soils. This allows a preliminary assessment to determine the required liner systems and identify conditions that may inhibit landfill construction.
- Interpretation of the data and preparation of a summary geotechnical report.

5.0 CLOSURE

We trust this document meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.



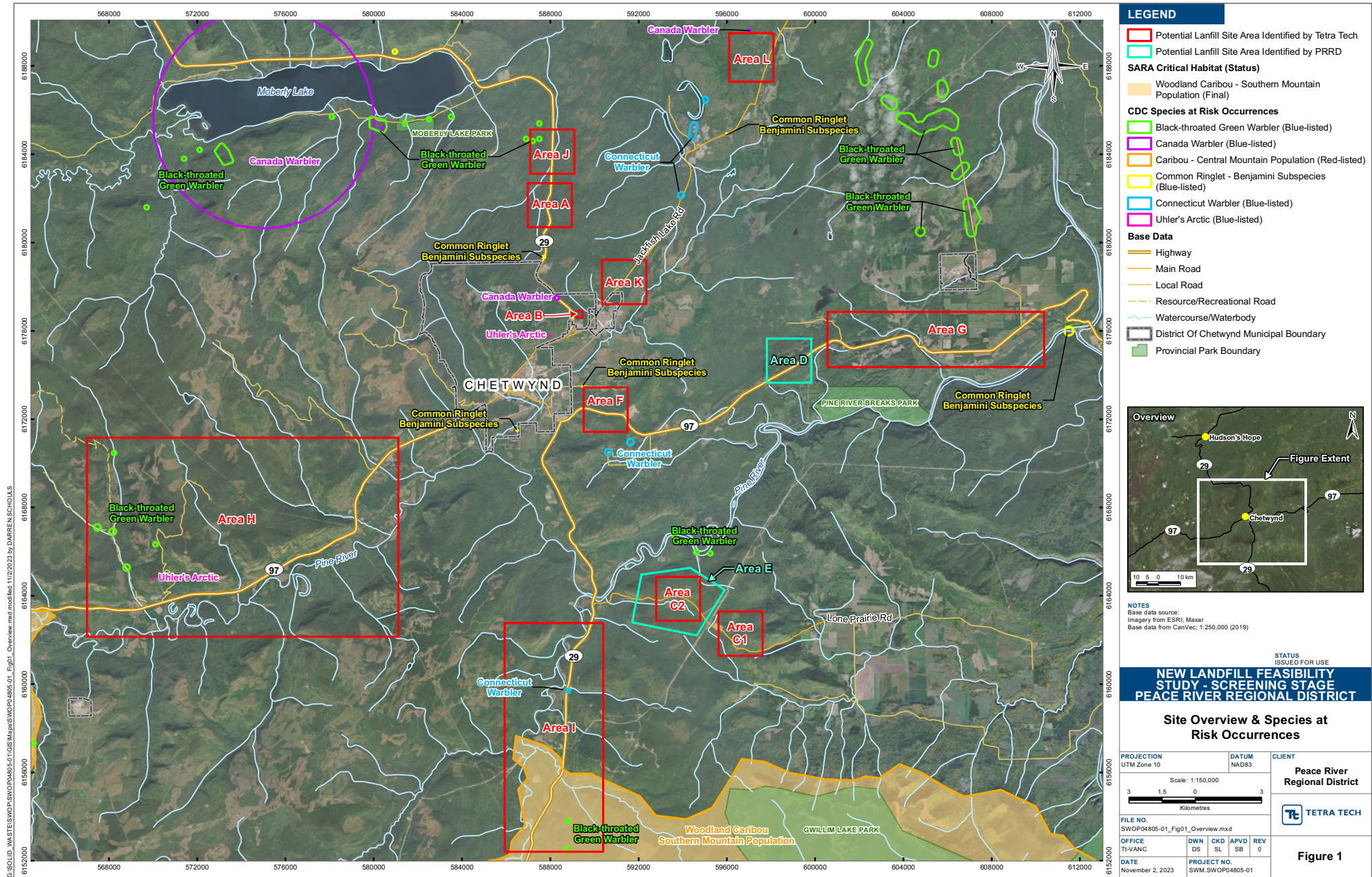
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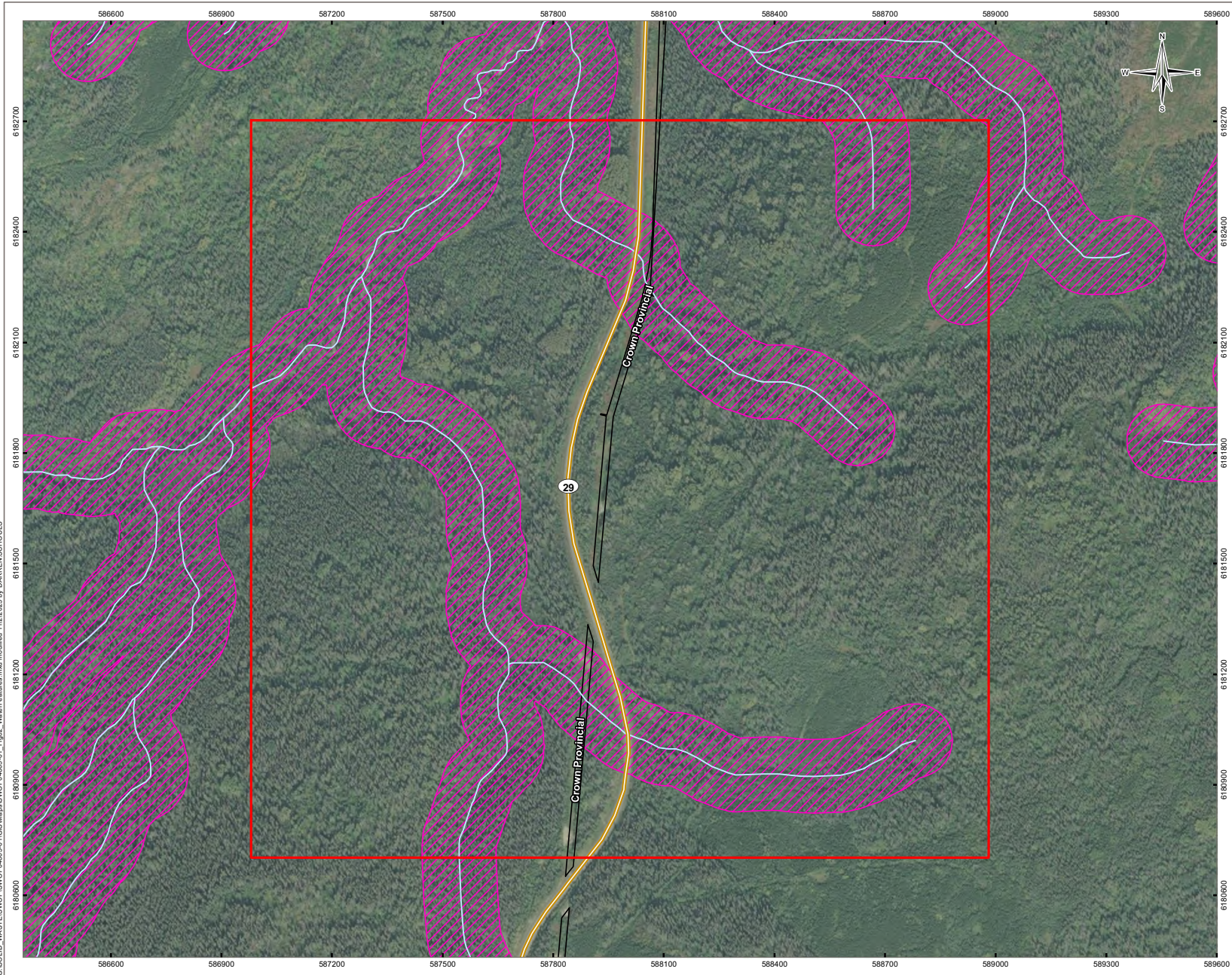
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TETRA TECH CANADA INC.
PERMIT NUMBER: 1001972

FIGURES

Figure 1	Site Overview & Species at Risk Occurrences
Figure 2a	Area A Water Features
Figure 2b	Area B Water Features
Figure 2c	Area C2 & E Water Features
Figure 2d	Area D Water Features
Figure 3a	Area A Environmental Searches & Surficial Geology
Figure 3b	Area B Environmental Searches & Surficial Geology
Figure 3c	Area C2 & E Environmental Searches & Surficial Geology
Figure 3d	Area D Environmental Searches & Surficial Geology
Figure 4a	Area A Bedrock Geology
Figure 4b	Area B Bedrock Geology
Figure 4c	Area C2 & E Bedrock Geology
Figure 4d	Area D Bedrock Geology
Figure 5	Area F Overview
Figure 6	Area G Overview
Figure 7	Area H Overview
Figure 8	Area I Overview
Figure 9	Area J Overview
Figure 10	Area K Overview
Figure 11	Area L Overview



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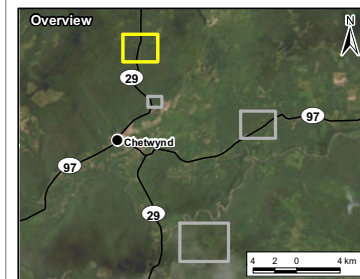


LEGEND

- Potential Landfill Site Area Identified by Tetra Tech
- 100 m Water Feature Buffer
- Parcel Boundary

Base Data

- Highway
- Watercourse/Waterbody



NOTES

Base data source:
Water features from Fresh Water Atlas (2023)
Groundwater Wells from DataBC (2023)
Parcels from DataBC (2023)

STATUS
ISSUED FOR USE

**NEW LANDFILL FEASIBILITY
STUDY - SCREENING STAGE
PEACE RIVER REGIONAL DISTRICT**


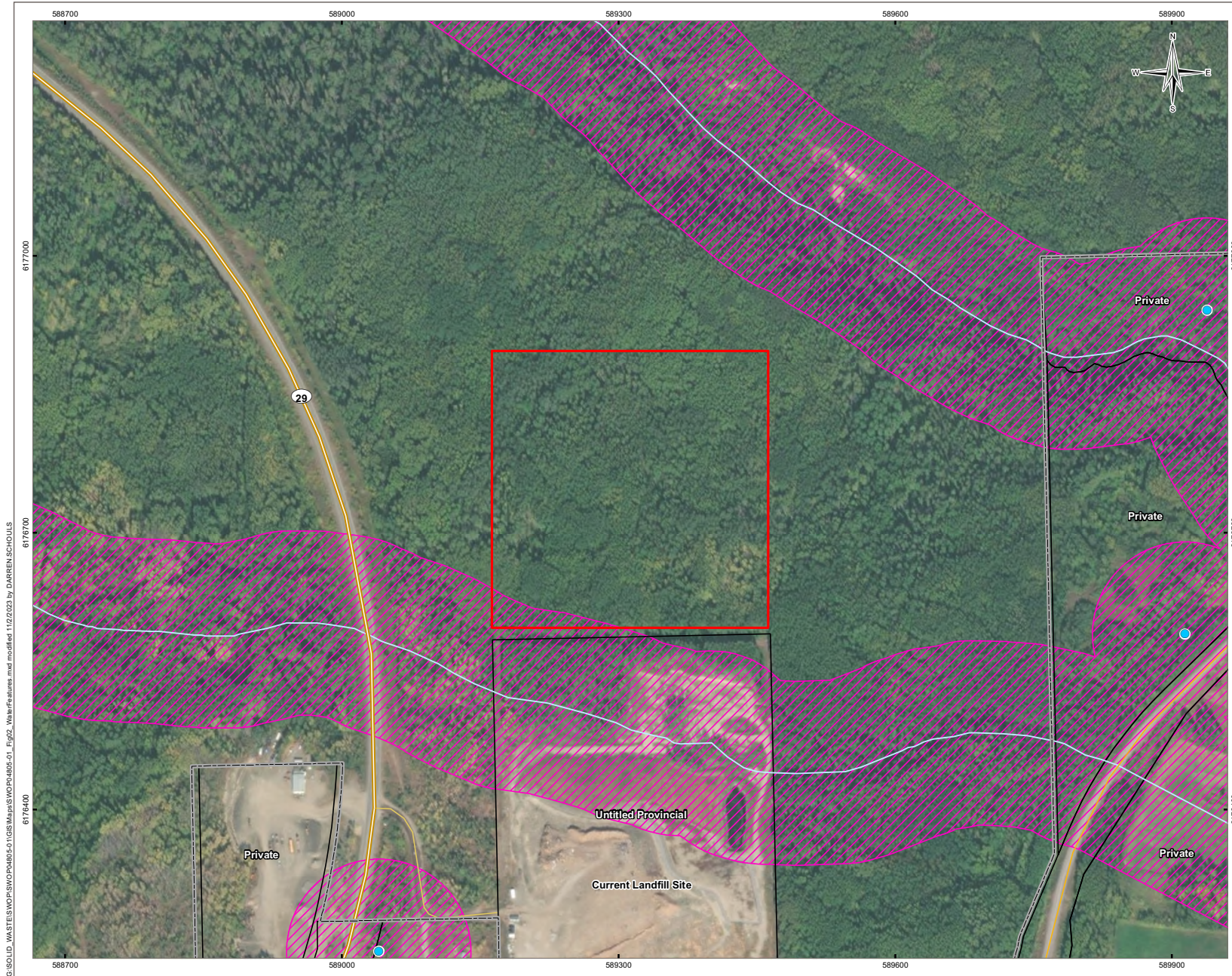
Area A Water Features					
PROJECTION UTM Zone 10		DATUM NAD83		CLIENT Peace River Regional District	
Scale: 1:10,000 <div><div>8040080</div><div>Metres</div></div>		<div><div></div><div>TETRA TECH</div></div>			
FILE NO. SWOP04805-01_Fig02_WaterFeatures.mxd					
OFFICE TI-VANC	DWN DS	CKD SL	APVD SB	REV 0	Figure 2a
DATE November 2, 2023	PROJECT NO. SWM.SWOP04805-01				



Figure 2a

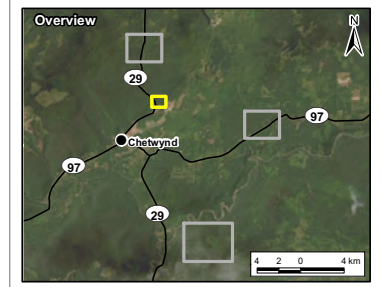


LEGEND

- Groundwater Well
- Potential Landfill Site Area Identified by Tetra Tech
- 100 m Water Feature Buffer
- Parcel Boundary

Base Data


- Highway
- Main Road
- Local Road
- Watercourse/Waterbody
- District Of Chetwynd Municipal Boundary

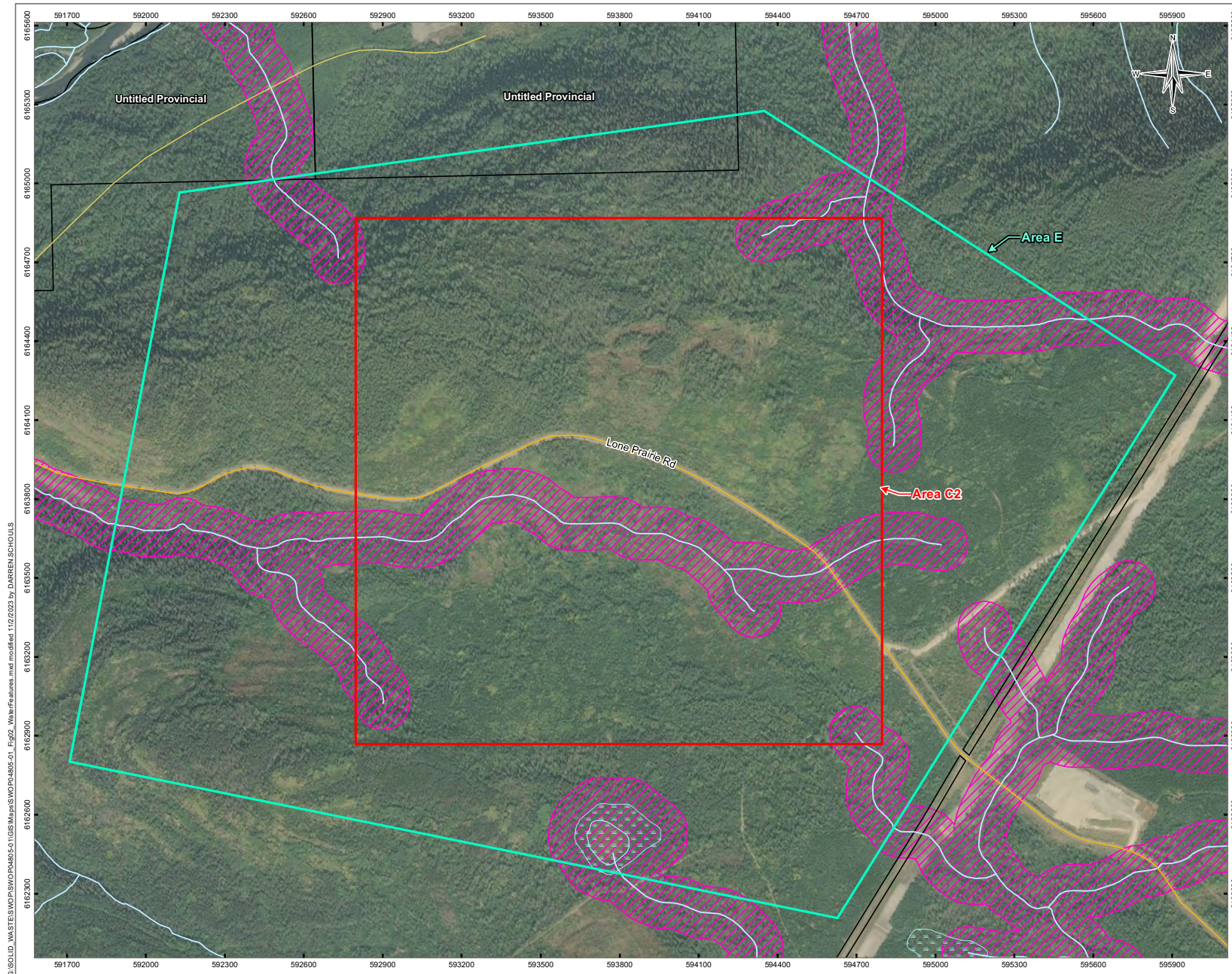


NOTES
Base data source:
Water features from Fresh Water Atlas (2023)
Groundwater Wells from DataBC (2023)
Parcels from DataBC (2023)

**STATUS
ISSUED FOR USE**

**NEW LANDFILL FEASIBILITY
STUDY - SCREENING STAGE
PEACE RIVER REGIONAL DISTRICT**

Area B Water Features				
PROJECTION UTM Zone 10		DATUM NAD83	CLIENT Peace River Regional District	
Scale: 1:4,000  Metres				
FILE NO. SWOP04805-01_Fig02_WaterFeatures.mxd				
OFFICE TI-VANC	DWN DS	CKD SL	APVD SB	REV 0
DATE November 2, 2023	PROJECT NO. SWM.SWOP04805-01			
Figure 2b				



LEGEND

- Potential Landfill Site Area Identified by Tetra Tech
- Potential Landfill Site Area Identified by PRRD
- 100 m Water Feature Buffer
- Parcel Boundary

Base Data

- Main Road
- Local Road
- Watercourse/Waterbody
- Wetland

Overview

NOTES

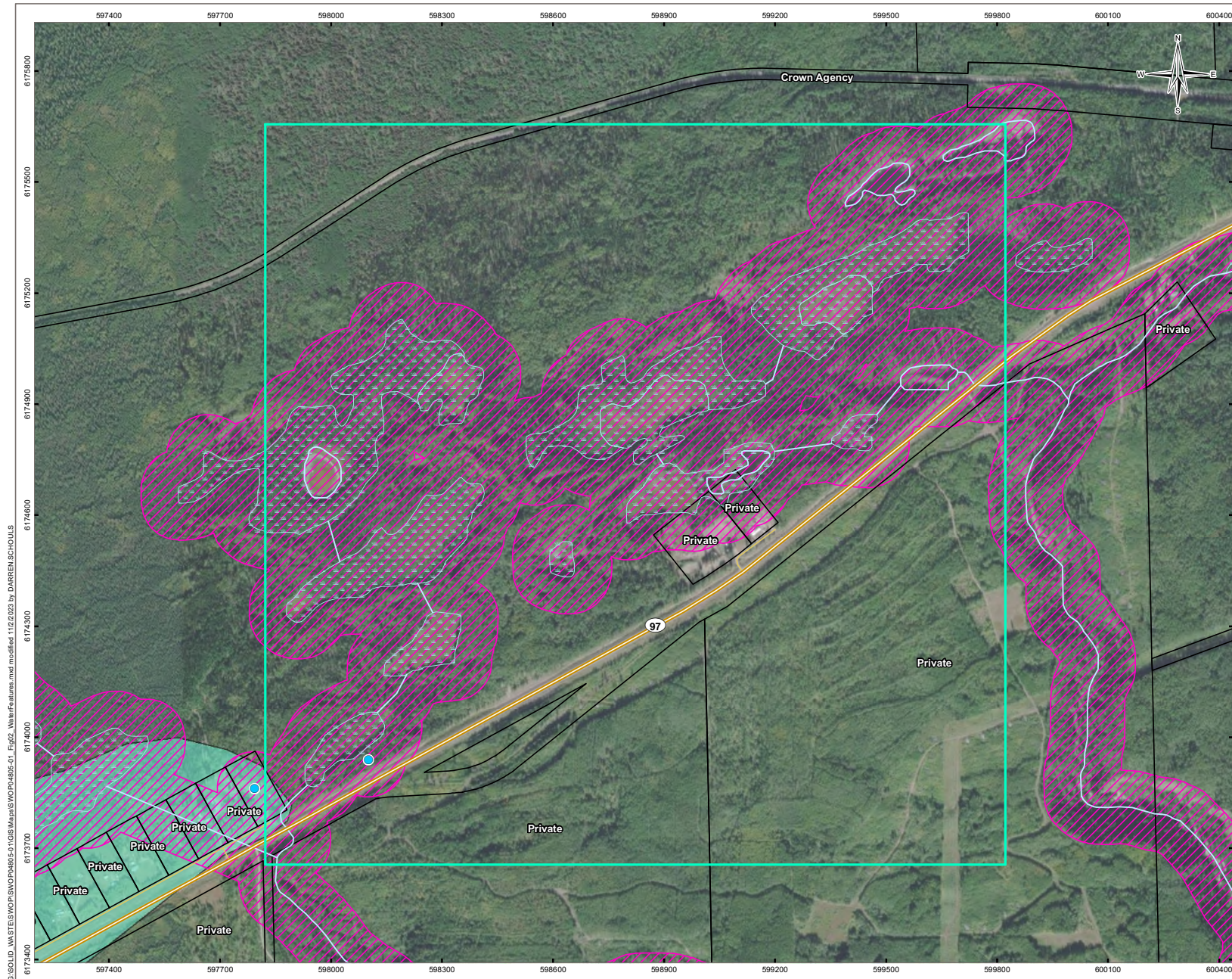
Base data source:
Water features from Fresh Water Atlas (2023)
Groundwater Wells from DataBC (2023)
Parcels from DataBC (2023)

STATUS
ISSUED FOR USE

NEW LANDFILL FEASIBILITY STUDY - SCREENING STAGE
PEACE RIVER REGIONAL DISTRICT

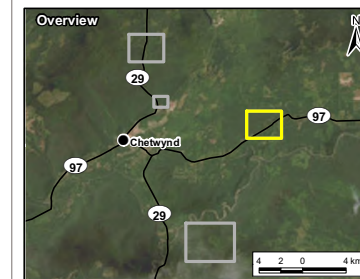
Area C2 & E Water Features

PROJECTION UTM Zone 10	DATUM NAD83	CLIENT Peace River Regional District
Scale: 1:14,000 80 40 0 80 Metres		
FILE NO. SWOP04805-01_Fig02_WaterFeatures.mxd	TETRA TECH	
OFFICE TV-VANC	DWN DS	CKD SL
DATE November 2, 2023	APVD SB	REV 0
PROJECT NO. SWM.SWOP04805-01		Figure 2c



LEGEND

- Groundwater Well
- Potential Landfill Site Area Identified by PRRD
- 100 m Water Feature Buffer
- Parcel Boundary
- Groundwater Aquifer Material**
- Bedrock
- Base Data**
- Highway
- Local Road
- ~ Watercourse/Waterbody
- ~ Wetland



NOTES
 Base data source:
 Water features from Fresh Water Atlas (2023)
 Groundwater Wells from DataBC (2023)
 Parcels from DataBC (2023)

STATUS
ISSUED FOR USE

NEW LANDFILL FEASIBILITY STUDY - SCREENING STAGE PEACE RIVER REGIONAL DISTRICT

Area D Water Features



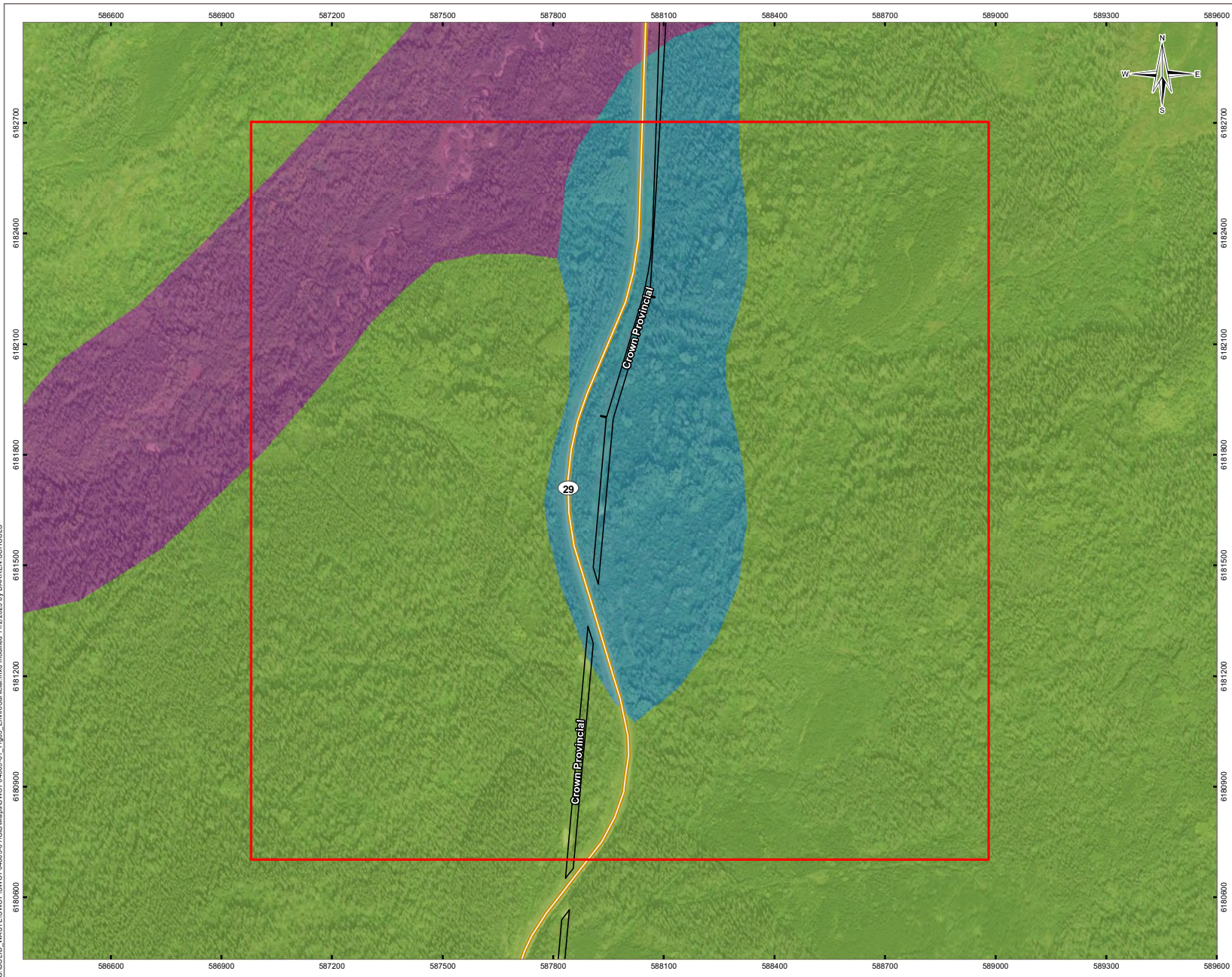
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Scale: 1:10,000  Metres					 TETRA TECH
FILE NO. SWOP04805-01_Fig02_WaterFeatures.mxd					
OFFICE Tl-VANC	DWSN	CKD SL	APVD SB	REV 0	
DATE November 2, 2023	PROJECT NO. SWM.SWOP04805-01				

Figure 2d

G:\SOLID_WASTE\SWOP\SWOP04805-01\GIS Maps\SWOP04805-01_Fig03_EnviroSurficial.mxd modified 11/2/2023 by DARREN_SCHOOLS



LEGEND

- Potential Landfill Site Area Identified by Tetra Tech
- Parcel Boundary
- Surficial Geology**
 - Alluvial Plain
 - Glaciolacustrine Veneer (thin, less than 2 m)
 - Streamlined Till Ridges
- Base Data**
 - Highway

Overview

NOTES

Base data source:
Surficial Geology from Geoscience BC (2011)
ALR, Remediation Sites, and Parcels from DataBC (2023)

STATUS

ISSUED FOR USE

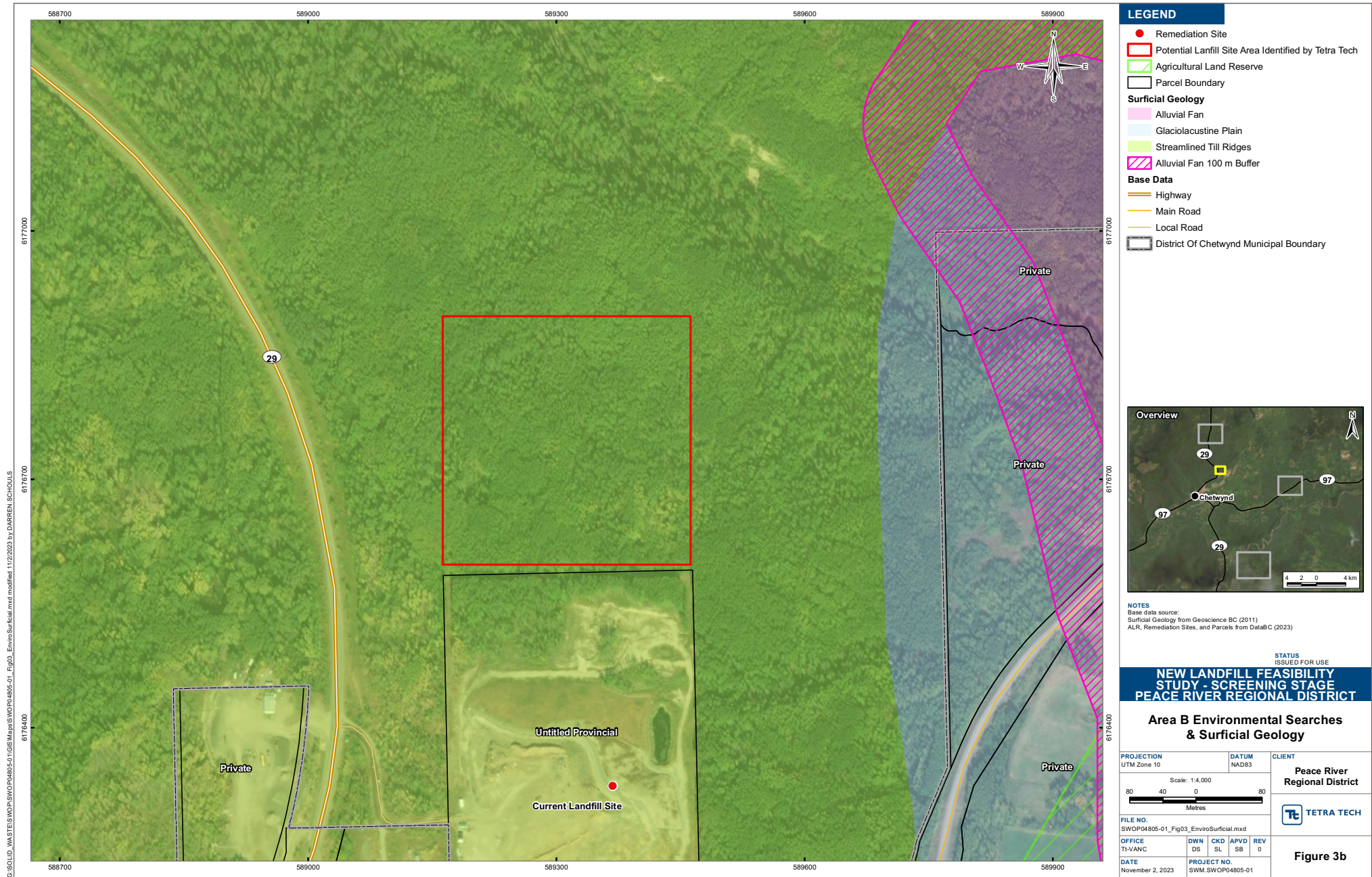
NEW LANDFILL FEASIBILITY STUDY - SCREENING STAGE

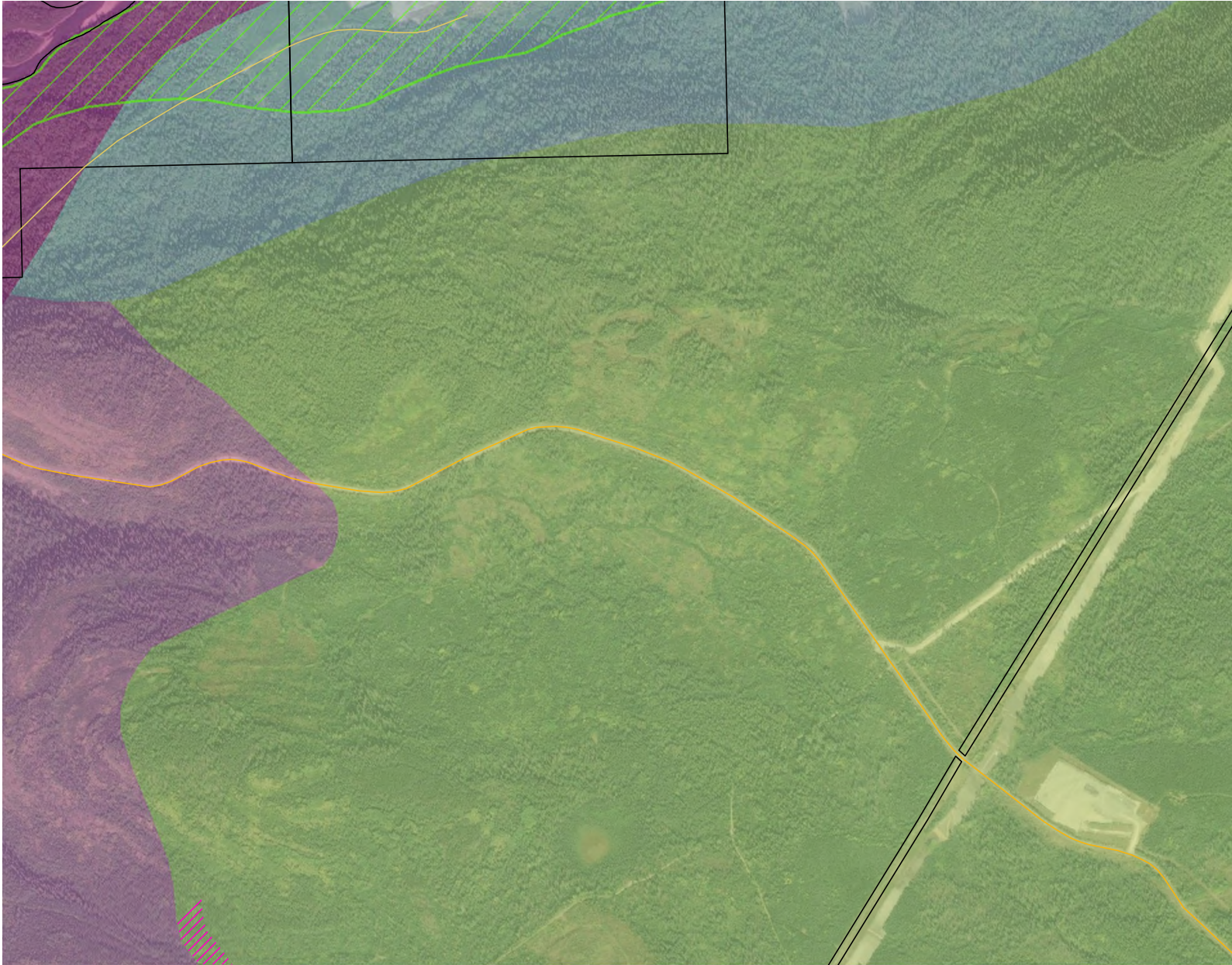
PEACE RIVER REGIONAL DISTRICT

Area A Environmental Searches & Surficial Geology

PROJECTION UTM Zone 10	DATUM NAD83	CLIENT Peace River Regional District		
Scale: 1:10,000 80 40 0 80 Metres				
FILE NO. SWOP04805-01_Fig03_EnviroSurficial.mxd				
OFFICE TI-VANC	DWN DS	CKD SL	APVD SB	REV 0
DATE November 2, 2023	PROJECT NO. SWM.SWOP04805-01			

Figure 3a





ISSUED FOR USE

PROJECTION		DATUM		CLIENT	
FILE NO.					
OFFICE	DWN	CKD	APVD	REV	Figure 3c
DATE	PROJECT NO.				