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Superintendent

Date: April 11, 2023

From: Ryan Miller, B.Sc.
Frans Hettinga, B.Sc.

File: 704-SWM.SWOP04071-03.001

Subject: Great West Adventure Park 2022 Site Walkover

1.0 INTRODUCTION

The City of Red Deer (The City) retained Tetra Tech Canada Inc. (Tetra Tech) to conduct an annual site check in 2022 of Great West Adventure Park (GWAP), located within Lot 1 MR Plan 8322386, within the north half of Section 17-038-27 W4M, in Red Deer, Alberta, hereafter referred to as the Site. The objective of the site check was to verify site drainage, integrity of landfill cover, and a visual inspection of monitoring wells and vapour probes at the Site.

In 2021, Tetra Tech conducted semi-annual groundwater and soil vapour monitoring and sampling to identify potential environmental concerns related to former operations at the Site. The results were presented and discussed in the 2021 Groundwater and Soil Vapour Monitoring Report – Great West Adventure Park¹. Key findings and recommendations of the 2021 monitoring program are summarized in Section 1.1, and the objectives and scope for 2022 are presented in Section 1.2.

1.1 2021 Report – Key Findings and Recommendations

The 2021 report identified no significant impacts related to the former landfill operations at most monitoring well locations. However, the presence of residual impacts in the groundwater and buried landfill waste remaining beneath the Site require ongoing risk management. Key findings included:

- The groundwater elevations in 2021 indicated that the inferred groundwater flow direction was to the northeast and towards the Red Deer River.
- Parameters that exceeded the Alberta Tier 1 Soil and Groundwater Remediation Guidelines (Tier 1 Guidelines) at one or more groundwater monitoring wells in 2021 included total dissolved solids (TDS), chloride, and dissolved metals including arsenic, iron, and manganese. The measured concentrations of these parameters were generally consistent with previous results and background/up-gradient concentrations and may reflect natural groundwater quality.
- The BMX Club well is not used as a source of potable water but used for dust control and watering grass. The water quality of the BMX Club well was similar to the water quality of the on-site monitoring wells with concentrations of TDS, chloride, and dissolved manganese exceeding the Tier 1 Guidelines. Overall, groundwater quality at the BMX well was very similar to shallow groundwater quality in the area (particularly MW-03) despite being installed in a deeper unit (greater than 30 m deep). There are no obvious leachate impacts in this well based on the sampling results.

¹ Tetra Tech Canada Inc. 2022. 2021 Groundwater and Soil Vapour Monitoring Report – Great West Adventure Park. Prepared for The City of Red Deer. June 15, 2022. Project Number: 704-SWM.SWOP04071-02.001.

- Methane concentrations measured in headspace of the groundwater monitoring wells and at the soil vapour probes, including the results of newly installed probe VW-03 near Riverbend Village Apartments, were consistent with results obtained in 2013 and 2019 and do not indicate obvious impacts related to the buried wastes. Methane concentrations measured during the first two monitoring events at newly installed VW-03 were non-detect. The results suggest that the risk for vapour migration from the Site to the Riverbend Village Apartments is low.

Based on these findings, the recommendations for the Site going forward were as follows:

- Continuation of a groundwater or vapour monitoring program is not warranted; however, the vapour and groundwater monitoring wells should be maintained for potential future assessments. It is recommended to conduct an annual site check to verify site drainage and the integrity of the landfill cover, monitoring wells, and vapour probes.
- In consideration that buried waste remains beneath the Site, and as recommended in the risk management plan (RMP) prepared by Tiamat Environmental Consultants Ltd. (Tiamat) in 2014², the risk management approach for the Site should be periodically reviewed and updated, if necessary.
- Ensure that the Site is clearly identified within The City's Land Use Bylaw and appropriate administrative requirements are met for the Site in accordance with City policies.

1.2 Scope of Work

Based on the 2021 findings and recommendations³, the 2022 scope of work at the Site was outlined in the proposal titled 2022 and 2023 Work Scope and Cost Estimate and was sent to The City of Red Deer on October 21, 2022⁴. The work conducted in 2022 included the following activities:

- Conduct an annual site check to verify site drainage and the integrity of the landfill cover, monitoring wells, and vapour probes.

2.0 SUMMARY OF SITE IN 2022

2.1 General Information

The Site is located within the north half of Section 17-038-27 W4M, within Lot 1 MR Plan 8322386. The Site is zoned P1 – Parks and Recreation and is located within the community of Riverside Meadows. The Site is located on the west bank of the Red Deer River, east of Kerry Wood Drive and North of Taylor Drive. The Red Deer River is adjacent to the southeastern portion of the Site and flows in a northeasterly direction. A general site location plan is shown on Figure 1. The Site has been developed and includes a BMX biking track, a small building, a parking lot, a boat launch, and a pedestrian/biking trail. The surrounding land use consists of residential housing, Fairview Elementary School, as well as commercial land use. Natural areas of the Site consist of grasses and trees. Figure 2 shows the Site location with surrounding land use.

2 Tiamat Environmental Consultants Ltd. 2014. Environmental Risk Management Plan, Historic Waste Disposal Sites, Great West Adventure Park, The City of Red Deer. December 3, 2014.

3 Tetra Tech Canada Inc. 2022. 2021 Groundwater and Soil Vapour Monitoring Report – Great West Adventure Park. Prepared for The City of Red Deer. June 15, 2022. Project Number: 704-SWM.SWOP04071-02.001.

4 Tetra Tech Canada Inc. 2022. 2022 and 2023 Work Scope and Cost Estimate. Prepared for The City of Red Deer. October 21, 2022. Project Number: 704-PSWM.SWOP04071-02.

2.2 Monitoring Well Network

The groundwater monitoring network at the Site consists of five monitoring wells (MW-01 to MW-05). All of the monitoring wells are screened to the bottom of the well through the native sand and gravel into the shale bedrock. MW-03 is also screened through sand fill. The vapour monitoring network consists of three vapour monitoring wells; VW-01 located near the north end of the Site, VW-02 in the southwest corner of the Site, and VW-03 located in the northeast portion of the Site near the Riverbend Village Apartments. Vapour monitoring well VW-03 was installed in 2021. Groundwater and vapour monitoring well locations are shown on Figure 2.

The Site Walkover at the Site was conducted on November 6, 2022 and December 9, 2022. On November 6, the Site was walked over by field staff, all stickup monitoring wells were assessed and were locked and determined to be in good condition. The flush mount wells (MW-02 and VW-03) could not be located on November 6 and field staff returned on December 9 and located the flush mount wells and they were determined to be in good condition. The Site was unchanged in 2022 from 2021, and the Site had no noticeable damage to the cover or exposed waste. Both on November 6 and December 9, the Site was snow covered. Pictures of most of the monitoring wells and the Site are included below. It was noted that MW-05 was missing a lid on the casing; however, the well is locked with a locking j-plug and lock.



Photo 1: Monitoring Well MW-01



Photo 2: Monitoring Well MW-02



Photo 3: Monitoring Well MW-03



Photo 4: Monitoring Well MW-04



Photo 5: Monitoring Well MW-05 and Vapour Well VW-02



Photo 6: Vapour Well VW-03

3.0 KEY FINDINGS

Key findings of the 2022 Site Walkover include the following:

- All groundwater and vapour wells were in good condition, the Site was unchanged from 2021 and there was no noticeable damage or exposed waste to the cover. However, future site walkovers should be conducted in the summer or early fall prior to snowfall to fully assess the cover.
- While monitoring well MW-05 was capped and locked with a J-plug, it is recommended that a lid be added to the steel protective casing of the well.

4.0 LIMITATIONS OF REPORT

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5.0 CLOSURE

We trust this technical memo 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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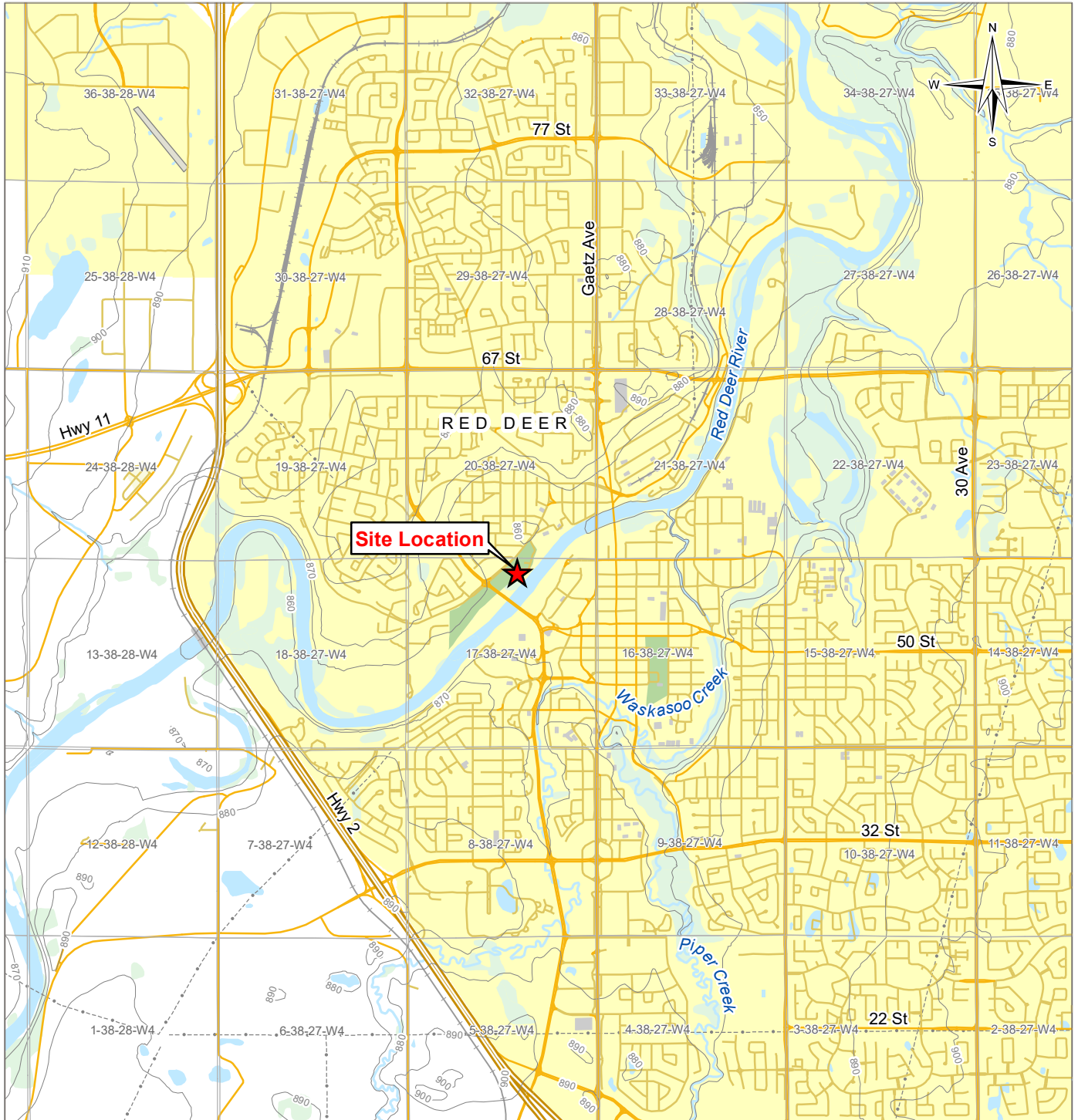
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Attachments (3):
Figure 1: Site Location Plan
Figure 2: Site Plan and Surrounding Land Use
Tetra Tech's Limitations on the Use of this Document



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LEGEND

- Site Location
- Highway
- Main Road
- Local Road
- Resource/Recreational Road
- Railway
- Power Line
- Runway
- Building
- Park
- Residential Area
- Contour (10 m)
- Watercourse
- Waterbody
- Wooded Area
- Urban Area

NOTES
Base data source: CanVec 1:50,000.

STATUS
ISSUED FOR USE

**2022 SITE CHECK MEMO
GREAT WEST ADVENTURE PARK**

Site Location Plan

PROJECTION 3TM 114		DATUM NAD83		CLIENT THE CITY OF Red Deer	
Scale: 1:50,000					
				TETRA TECH 	
FILE NO. SWOP04071-03_FIG01_SiteLocation.mxd					
OFFICE Tl-EDM	DWN MRV	CKD SL	APVD RM		REV 0
DATE January 20, 2023	PROJECT NO. SWM.SWOP04071-03.001				

Figure 1



LEGEND

- Monitoring Well
- Vapour Well
- Historic Waste Disposal (Provided by Tiamat, 2014)
- Site Boundary
- Lot Boundary
- Utilities**
 - Electrical
 - Sanitary
 - Storm
 - Water

NOTES
 Base data source: Imagery provided by ESRI; City of Red Deer (2020)
 Roads from City of Red Deer Open Data, 2018
 Utilities provided by City of Red Deer.
 Locations have not been field verified, and should not be used for construction or other intrusive field activities.

STATUS
 ISSUED FOR USE

Scale: 1:3,500

80 40 0 80
 Metres

PROJECTION 3TM 114	DATUM NAD83
FILE NO. SWOP04071-03_FIG02_LandUse.mxd	
CLIENT	
CITY OF Red Deer	TETRA TECH

2022 SITE CHECK MEMO
GREAT WEST ADVENTURE PARK

Site Plan and Surrounding Land Use

OFFICE TL-EDM	DWN MRV	CKD SL	APVD RM	REV 0
DATE January 20, 2023		PROJECT NO. SWM.SWOP04071-03.001		

Figure 2

LIMITATIONS ON USE OF THIS DOCUMENT

GEOENVIRONMENTAL

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The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary exploration, investigation, and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

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In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.