

Memo

То:	MGM Energy	From:	James Hymers, Project Manager K'alo-Stantec Ltd.
	2800, 421 - 7 Avenue SW Calgary, AB T2P 4K9		Tulita, NT, Canada X0E 0T0
File:	123514551	Date:	January 22, 2024

Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area

The East Mackay I-78 Wellsite Area (Wellsite Area) and the East Mackay I-78 Staging Area (Staging Area), collectively referred to as the "Site", are located in the Sahtu Settlement Area (SSA), Northwest Territories (NT). The Wellsite Area is located approximately 110 kilometres (km) southeast of Norman Wells. The Staging Area is located approximately 22 km north of the Wellsite Area along the banks of the Mackenzie River (Attachment A: Figure A.1). The Wellsite Area is approximately 2.7 hectares (ha) in size and includes a Wellhead, Recovered Wellhead Bare Area, and groundwater monitoring wells (Attachment A: Figure A.2 and Figure A.3). The Staging Area is a 0.80 ha parcel of land and includes an area containing a third-party construction trailer, outbuildings, and debris (Attachment A: Figure A.4). Photos of the Site are provided in Attachment B as Photo B.1 to Photo B.9.

Site	East Mackay I-78 Wellsite and Staging Area	Coordinates (centre point)	Staging Area:	" N and 125° 43' 24.840" ' " N and 125° 53' 06.599" '	
Permittee	MGM Energy		Contractor	K'alo-Stantec Ltd.	vv
Land Use Permit #	S22A-002	Expiry Date August 14, 2028	Water License #	S22L1-002	Expiry Date August 14, 2028
Site Assessors	Lionel Borges, E	3.Sc.	Monitoring Date	August 30, 2023	
Type of Inspection	☐ Ground ⊠ Aerial	Current Stage of Remediation/ Reclamation	 ☑ In progress ☑ Planned ☑ Complete 	Locations Inspected	⊠ Well Site □ Sump ⊠ Staging Area
Summary of Ongoing Work Completed to Date	 Decommissi Erosion Con Excavation/(Phytoremed Seeded Planted Other 	trol Capping	Key Issues	 No issues On Site Materials Wastes/Spills Erosion Terrain Conditions Soil Exceedances Water Exceedances Vegetation Wildlife Signs 	Recommended for: □ Closure □ No further environmental monitoring or remediation/ reclamation treatments until closure ⊠ Additional monitoring only (see Table 3) □ Additional treatment and monitoring

Table 12023 Site Specifications

Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area

1 Key Findings and Recommendations

In 2023, an aerial reconnaissance of the Wellsite Area and Staging Area was conducted. Upon arrival, the field team visually assessed the Site and took photographs (Attachment B) to document site conditions as the helicopter circled above the Wellsite Area and Staging Area.

A summary of observed conditions in 2023 are provided in Table 2, below. Key findings and recommendations are summarized in Table 3.

Table 2 Summary of 2023 Environmental Monitoring

	Observation		
Parameter	Well Site	Staging Area	
On-Site Materials	A ^a	IP	
Erosion Control/Drainage	A	A	
Terrain conditions	A	A	
Soil	IP	NI	
Standing Water	NI	N/A	
Vegetation Cover	IP ^b	IP	
Invasive Plants/Weeds	A	A	
Wildlife Signs of Use	А	А	

Notes:

'A' = Acceptable – meeting permit/license conditions, no further work required at this time

- Water at or below Canadian Council of Ministers of the Environment (CCME) Freshwater Guidelines¹
- Soils at or below Government of Northwest Territories (GNWT) CSR Guidelines² and Alberta Environment, Salt Contamination Assessment and Remediation Guidelines³
- Vegetation 70% vegetation cover and no weed treatment
- 'IP'= In Progress Further work required

'N/A' = Not Applicable

- 'NI' = Not Inspected, planned for future work
- ^a A wellhead was still present on the Site. It appeared to be in acceptable condition, as per permit requirements, at the time of the site visit.
- ^b At the time of the 2023 site visit, a wildfire was actively burning in the Wellsite Area. Vegetation in approximately 50% of the area was burned/damaged (Attachment B: Photo B.1). The remaining vegetation cover appeared to be in good condition.

³ Alberta Environment, 2001. *Salt Contamination Assessment and Remediation Guidelines*. Table 2.2. Soil Quality Guidelines for Unrestricted Land Use – Topsoil



¹ CCME, 2022. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health. Available from <u>http://ceqg-rcqe.ccme.ca/</u>. Last checked on May 2023

² Government of Northwest Territories (GNWT), 2003. *Environmental Guideline for Contaminated Site Remediation*. November 2003

MGM Energy Page 3 of 10

Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area

Parameters	Qualitative Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
On-Site	Wellsite Area:	Not applicable for this parameter.	Wellsite Area:
Materials	 This area contained a wellhead and three groundwater monitoring wells (GW001, GW002, and GW003) (Attachment A: 		 Check on the condition of the wellhead and groundwater monitoring wells for any fire damage.
	Figure A.2 and Figure A.3; Attachment B: Photo B.1 and Photo B.3). On-site materials were observed to be in good condition during the site vicit: however, the adjacent vegetation		 Re-attach the GW001, GW002, and GW003 identification signs to the monitoring well posts, if required.
	 the site visit; however, the adjacent vegetation had been burned by a wildfire. No other surface structures, materials, or waste were observed within the remainder of the Site during the site visit. 		No further work related to on-site materials
			recommended until the wellhead is cut, capped, and abandoned.
			Staging Area:
	Staging Area (Attachment B: Photo B.2):		No physical/operation work required related to third marty materials at this time.
	• The previously documented third-party trailer, wooden outbuilding, scrap wood and metal wastes remained in the southwest corner of the Staging Area (Attachment A: Figure A.4; Attachment B: Photo B.4).		 third-party materials at this time. Continue monitoring third-party materials and activity in Staging Area and continue communication with the regulator regarding the activity occurring at the Staging Area by
	• Materials present at the Staging Area are not the property of MGM Energy. The ownership of these materials is unknown.		the unknown third-party.
Terrain	No terrain stability concerns were observed at the Wellsite Area or Staging Area during the	Not applicable for this parameter.	Continue visual monitoring for potential signs of instability at the Wellsite Area.
	site visit. Terrain conditions appeared to be stable.		• No monitoring of terrain conditions required at the Staging Area at this time.

Table 3 2023 Summary of Key Findings and Recommendations



MGM Energy Page 4 of 10

Parameters	Qualitative Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Standing Water	 Wellsite Area: No standing water was sampled during the site visit. Standing water was not observed around the wellhead. Staging Area: No standing water was sampled during the site visit. No standing water was observed at the Staging Area during the site visit. 	Surface water samples were not collected in this area during the 2023 site visit.	 Wellsite Area: Standing water sample collection at the wellhead location, if water is present for petroleum hydrocarbons (PHCs), total metals and extractable barium for confirmation of exceedances and chemistry trending. Collect reference water sample for routine parameters, PHCs, and total metals, if standing water is observed off-site. Staging Area: No sampling of standing water recommended unless visible evidence⁴ triggers sample collection during a future site visit.

⁴ Evidence that would trigger the collection of soil and/or standing water samples may include: crust formation on exposed soil surfaces, vegetation changes (discoloration, decline in health, or lack of vegetation), discolored soil surfaces (e.g., staining), presence of a hydrocarbon-like sheen on the surface of standing water, standing water on the sump cap or slopes, or reasonably proximate to the sump and perceived to be possibly related to sump changes.



MGM Energy Page 5 of 10

Parameters	Qualitative Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Soils	Wellsite Area:	Wellsite Area:	Wellsite Area:
	 Soil was not sampled during the 2023 site 	• Soil samples were not collected in this area	During the well abandonment program:
 visit. during The 2019 soil samples from five locations around the wellhead reported petroleum hydrocarbon (PHC) exceedances with the highest concentrations reported at SS19-03⁵. Additional sampling during the 2022 program reported PHC fraction 3 (F3) exceedances that may be attributed to biogenic interference⁶. Staging Area: No soil samples were collected during the site visit. Previous programs reported that a third-party trailer located in the southwest corner of the Site had surface staining (oily residue) on the ground underneath a kerosene/fuel tank⁶. The status of the third-party trailer was not confirmed during the 2023 program. 	 The 2019 soil samples from five locations around the wellhead reported petroleum hydrocarbon (PHC) exceedances with the highest concentrations reported at SS19-03⁵. 	during the 2023 site visit.	 Collect up to six soil samples from three reference upgradient soil locations and conduct salinity analysis for background reference soil chemistry. Samples should be collected from surface (0-0.25 m) and 0.25-0.5 m depths at each location.
		• Soil sample collection at the wellhead location will be completed during the wellhead abandonment program to confirm the area	
			meets the permit requirements.
	 visit. Previous programs reported that a third-party trailer located in the southwest corner of the Site had surface staining (oily residue) on the 		 Samples collected from the wellhead location should be submitted for benzene, toluene, ethylbenzene, xylenes (BTEX), PHC F1-F4 and polycyclic aromatic hydrocarbons (PAHs) to confirm the biogenic sourced hydrocarbons.
			Staging Area:
	confirmed during the 2023 program.		 No additional sampling required recommended, unless visible evidence⁴ not associated with the third-party trailer triggers sample collection during a future site visit.

⁶ K'alo-Stantec, 2023. *MGM Energy – 2022 Environmental Site Monitoring Report: East Mackay I-78 Wellsite and Staging Area*. Prepared for MGM Energy, May 2023, File No. 123513945



⁵ K'alo-Stantec, 2019. *MGM Energy – 2019 Environmental Site Monitoring Report: East Mackay I-78 Wellsite and Staging Area*. Prepared for MGM Energy, November 2019, File No. 123513162

MGM Energy Page 6 of 10

Parameters	Qualitative Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Vegetation	Wellsite Area (Attachment A: Figure A.3; Attachment B: Photo B.5 and Photo B.6):	Not applicable for this parameter.	Wellsite Area:No reclamation treatments recommended
	 The Wellsite Area had revegetated with naturally established trees, shrubs, and forbs. 		until the wellhead is cut, capped, and abandoned.
	• At the time of the site visit, a wildfire was actively burning in the Wellsite Area. The vegetation in approximately 50% of the area was completely burned/damaged.		• Reconnaissance level vegetation monitoring only at the Site to assess growth and establishment of vegetation.
sections appea	 The vegetation in the remaining unburned sections appeared in healthy condition and had approximately 95% cover. 		
	 Overall, vegetation cover was not meeting permit requirements (i.e., did not meet >70% cover and healthy condition) due to the wildfire burning a large portion of the pre- existing vegetation cover. Prior to the wildfire occurring, the Wellsite Area had revegetated very well, and had 95% cover of naturally established trees, shrubs, and forbs in healthy condition. 		
	 No invasive plants/weeds were observed within the Site during the site visit. 		



MGM Energy Page 7 of 10

Parameters	Qualitative Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Vegetation (cont'd)	 Staging Area (Attachment A: Figure A.4; Attachment B: Photo B.7): West end of Staging Area was naturally revegetated with trees, shrubs, and forbs (Attachment B: Photo B.8). Vegetation cover met the permit requirements (i.e., >70% cover and healthy condition). 	Not applicable for this parameter.	 Staging Area: No reclamation treatments recommended at this time. Defer reclamation treatments until the thirdparty use of the Staging Area and responsibility for site reclamation is resolved with the GNWT regulators.
	 Central and east sections had revegetated with seeded agronomic grasses and legumes and naturally established trees, shrubs, and forbs (Attachment B: Photo B.9). Vegetation cover in the central and east portion of the Staging Area had approximately 65% to 70% cover. Vegetation appeared healthy and no health issues were observed. 		 Monitor for invasive plants in previously identified infestation locations⁷. Carry out invasive plant/weed control treatments if infestations reach a density that prohibits vegetation establishment and growth, including pulling plants, storing in garbage bags, and disposing off-site at an approved facility.
	 Overall, vegetation cover in the central and east sections met the land use permit conditions for vegetation health but did not meet the permit requirements for vegetation cover (i.e., had <70% cover). 		
	 No invasive plants/weeds were observed within the Staging Area during the site visit. 		

⁷ K'alo-Stantec, 2017. *MGM Energy – 2017 Environmental Site Monitoring Report: East Mackay I-78 Wellsite and Staging Area*. Prepared for MGM Energy, November 2017, File No. 123512383



MGM Energy Page 8 of 10

Parameters	Qualitative Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Wildlife Signs	 Wellsite Area: Bird droppings were observed on the wellhead. No other wildlife signs of use were observed within the Wellsite Area during the site visit. Staging Area: No wildlife signs of use were observed within the Staging Area during the site visit. 	• Not applicable for this parameter.	 No treatment work is recommended for the Wellsite Area or Staging Area at this time. Continue monitoring for wildlife use whenever at the Wellsite Area and Staging Area.



Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area

2 Limitations and Closure

This document entitled 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area was prepared by K'alo-Stantec Ltd. (K'alo-Stantec) for the account of MGM Energy (the "Client") to support the regulatory review process for its Annual Site Monitoring Report (the "Report") for the East Mackay I-78 Wellsite Area and Staging Area (the "Site"). In connection therewith, this document may be reviewed and used by the Government of Northwest Territories participating in the review process in the normal course of its duties. Except as set forth in the previous sentence, any reliance on this document by any other party or use of it for any other purpose is strictly prohibited. The material in it reflects K'alo-Stantec's professional judgment in light of the limited scope, schedule and other limitations stated in the document and in the contract between K'alo-Stantec and the Client. The information and conclusions in the document are based on the conditions existing at the time the document was published and does not take into account any subsequent changes. In preparing the document, K'alo-Stantec did not verify information supplied to it by the Client or others, unless expressly stated otherwise in the document. Any uses which another party makes of this document is the responsibility and risk of such party. Such party agrees that K'alo-Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other party as a result of decisions made or actions taken based on this document.

K'alo-Stantec Ltd.

Tamara Tiessen, M.Sc. Environmental Scientist **Olivier Piraux,** M.Sc. Terrain Scientist

Lionel Borges, B.Sc. Senior Biologist / Reclamation Specialist



January 22, 2024 MGM Energy Page 10 of 10

Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area

This report was reviewed and approved for transmittal by:

Lindsay van Noortwyk, P.Geo. Environmental Geoscientist Amin Kassam, B.Sc. Senior Principal, Environmental Scientist

Attachments: Attachment A: Figures

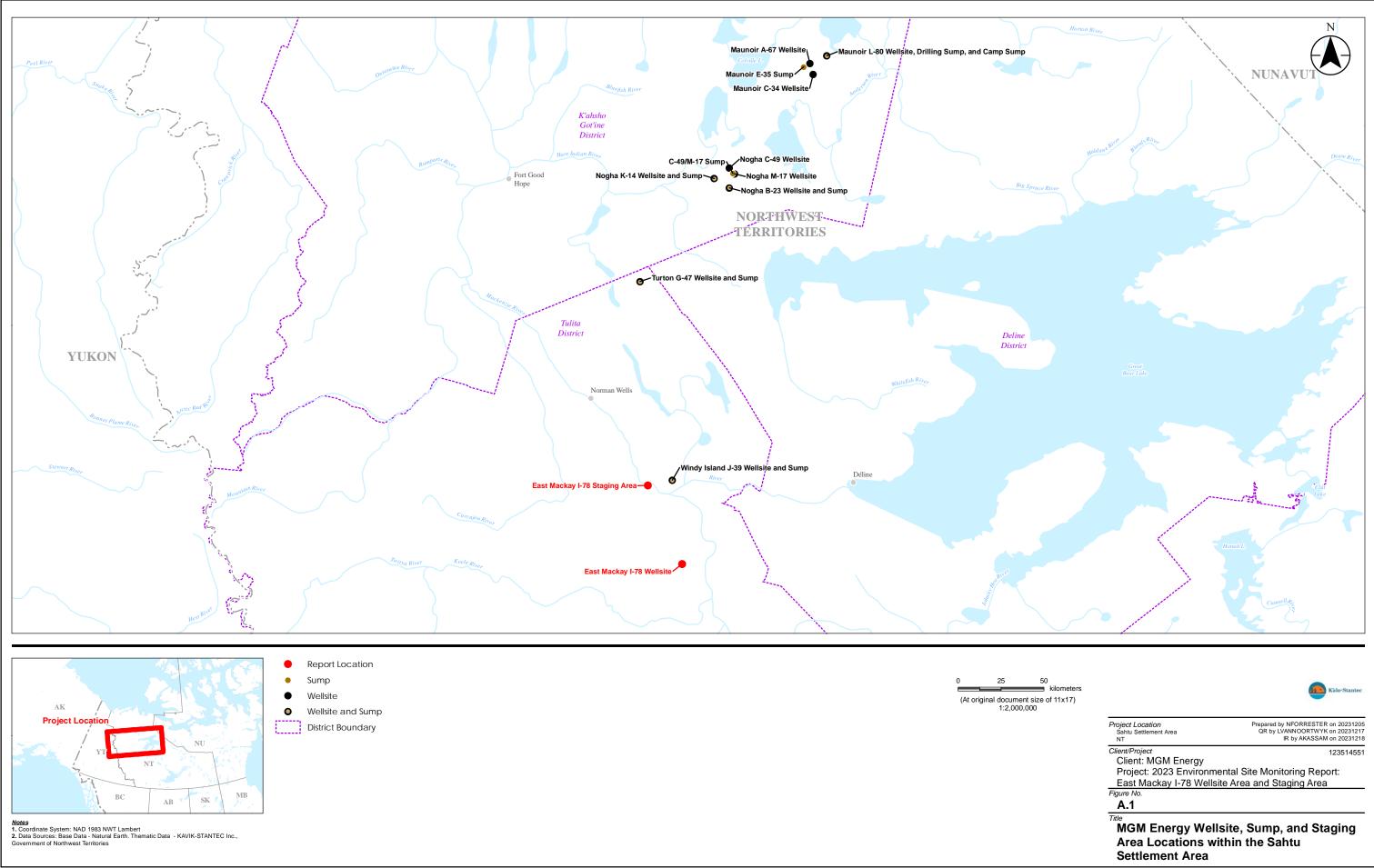
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Figure A.1	MGM Energy Wellsite, Sump, and Staging Area Locations within the Sahtu Settlement Area
Figure A.2	East Mackay I-78 Wellsite Area – Soil and Water Sample Locations
Figure A.3	East Mackay I-78 Wellsite Area – Reclamation Assessment
Figure A.4	East Mackay I-78 Staging Area – Reclamation Assessment
Attachment B: Site	Photographs



Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area

Attachment A Figures





Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and/or completeness of the data.



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Notes
1. Coordinate System: NAD 1983 UTM Zone 8N
2. Data Sources: Base Data - Natural Earth, Thematic Data - KAVIK-STANTEC Inc.,
Government Northwest Territories
3. GPS coordinates for sampling locations were recorded in the field by an iPad collector tool.
Acouracy of GPS coordinates may vary plus or minus 5 metres
4. Service Layer Credits:

Project Location

- Ground Monitoring Well Location
- Wellhead Location
- Recovered Wellhead Bare Area
- Wellsite Area

MB

SK

AB

NT

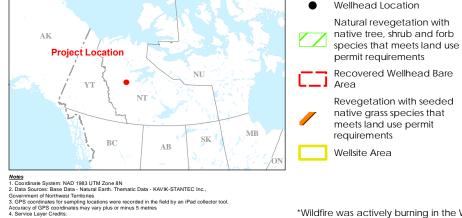
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Prepared by NFORRESTER on 20230328 QR by LVANNOORTWYK on 20231217 IR by AKASSAM on 20231218 Project Location Sahtu Settlement Area NT Client/Project 12351 Client: MGM Energy Project: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area 123514551 Figure No. A.2 Title East Mackay I-78 Wellsite Area – Soil and Water Sample Locations





*Wildfire was actively burning in the Wellsite Area at the time of the 2023 site visit. Approximately 50 percent of the area was completely burned/damaged.

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permit requirements

meets land use permit

requirements

Wellsite Area

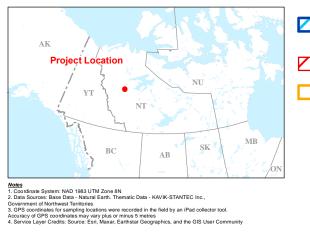
Recovered Wellhead Bare



Prepared by NFORRESTER on 20230328 QR by LVANNOORTWYK on 20231217 IR by AKASSAM on 20231218 Project Location Sahtu Settlement Area NT Client/Project 1235 Client: MGM Energy Project: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area 123514551 Figure No. A.3 East Mackay I-78 Wellsite Area – **Reclamation Assessment**

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Area containing third-party construction trailer, outbuildings and debris

- Further Treatment Required -Defer reclamation treatments. Monitoring only
- Staging Area

50 25 (At original document size of 11x17) 1:1,750

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Prepared by NFORRESTER on 20230328 QR by LVANNOORTWYK on 20231217 IR by AKASSAM on 20231218 Project Location Sahtu Settlement Area NT Client/Project 1235 Client: MGM Energy Project: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area 123514551 Figure No. A.4 Title East Mackay I-78 Staging Area – **Reclamation Assessment**

Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area

Attachment B

Site Photographs



Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area



Photo B.1 I-78 Wellsite Area: Overview

Note: Overview of the Wellsite Area and surrounding area (facing north) showing overall terrain and vegetation conditions (August 30, 2023). A wildfire was actively smoldering at the time of 2023 site visit. Note extent of burned vegetation cover in the Wellsite Area.



Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area



Photo B.2 I-78 Staging Area: Overview

Note: Overview of the Staging Area and surrounding area (facing northeast) showing overall terrain, water, and vegetation conditions (August 30, 2023).



Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area

Photo B.3 I-78 Wellsite Area: On-Site Materials



Note: Aerial view of on-site materials (facing north) showing the wellhead (August 30, 2023). Note the wildfire had burned vegetation immediately adjacent to the wellhead approximately 1 to 2 m away from the wellhead.



Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area



Photo B.4 I-78 Staging Area: Third-Party On-Site Materials

Note: Overview facing southwest at the Staging Area showing third-party trailer, outbuildings, and debris located in the southwest corner of the Staging Area (August 30, 2023).



Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area



Photo B.5 I-78 Wellsite Area: Vegetation Cover

Note: Aerial view facing northwest of the ground and vegetation conditions in the Wellsite Area. Wellsite Area had previously revegetated with naturally established trees, shrubs, and forbs. At the time of the site visit, a wildfire was actively burning in the Wellsite Area. The vegetation in approximately 50% of the area was completely burned/damaged. The vegetation cover in the remaining unburned sections appeared to be in healthy condition and had approximately 95% cover. Overall, vegetation cover was not meeting the permit requirements (i.e., did not meet >70% cover and healthy condition) due to the wildfire (August 30, 2023).



Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area



Photo B.6 I-78 Wellsite Area: Vegetation Cover

Note: Aerial view facing southeast of the ground and vegetation conditions in the Wellsite Area. The Wellsite Area had previously revegetated with naturally established trees, shrubs, and forbs. At the time of the site visit, a wildfire was actively burning in the Wellsite Area. The vegetation in approximately 50% of the area was completely burned/damaged. The vegetation cover in the remaining unburned sections appeared to be in healthy condition and had approximately 95% cover. Overall, vegetation cover was not meeting permit requirements (i.e., did not meet >70% cover and healthy condition) due to the wildfire (August 30, 2023).



Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area



Photo B.7 I-78 Staging Area: Vegetation Cover

Note: View of vegetation conditions in the Staging Area (facing west). The west section of the Staging Area was naturally revegetated with trees, shrubs and forbs; central and east sections had revegetated with seeded agronomic legumes and grasses and naturally established trees, shrubs, and forbs (August 30, 2023). The vegetation cover in the west section met the permit requirements (i.e., >70% cover and healthy condition). The vegetation cover in the central and east sections met the land use permit conditions for vegetation health but not for vegetation cover (i.e., had <70% cover).



Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area

Photo B.8 I-78 Staging Area: Vegetation Cover



Note: View of ground and vegetation conditions in the west end of the Staging Area looking southwest. This portion of the Staging Area was naturally revegetated with trees, shrubs and forbs. The vegetation cover in the west end was meeting the permit requirements (i.e., >70% cover and healthy condition) (August 30, 2023).



Reference: 2023 Environmental Site Monitoring Report: East Mackay I-78 Wellsite Area and Staging Area



Photo B.9 I-78 Staging Area: Vegetation Cover

Note: View of ground and vegetation conditions in the central and east sections of the Staging Area looking southwest. These sections were revegetated with seeded agronomic legumes and grasses and naturally established trees, shrubs, and forbs. The vegetation cover in the east portion had approximately 65% to 70% cover and appeared healthy, but was not meeting the permit requirements for cover (i.e., had <70% cover) (August 30, 2023).

