



**Contaminated Soil and Water Management Plan for
Flowline Upgrades: Pads Kenai Gas Field 34-31 and
Kenai Gas Field 14-6**

Kenai Gas Field

Prepared by Jacobs Engineering
949 East 36th Ave., Suite 500
Anchorage, Alaska 99508

This document has been prepared by Jacobs. The material and data in this report were prepared under the supervision and direction of the undersigned.

Gregory Rutkowski

**Gregory Rutkowski, PMP
Jacobs' Project Manager**

Andrew Tarnas-Raskin

**Andrew Tarnas-Raskin
Jacobs' Qualified Environmental Professional**

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2021 Flowline Upgrade SWMP

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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
bgs	below ground surface
BMP	best management practices
BTEX	benzene, toluene, ethylbenzene, and xylenes
CS	(ADEC) Contaminated Sites
DRO	diesel-range organics
ft	feet
GAC	granular activated carbon
GRO	gasoline-range organics
Hilcorp	Hilcorp Alaska, LLC
HVE	high-vacuum extraction
ID	identification
KGF	Kenai Gas Field
LNAPL	light non-aqueous phase liquid
LP	low pressure
Marathon	Marathon Oil Company
MP	medium pressure
NGC	natural gas condensate
PAH	polynuclear aromatic hydrocarbon
PID	photoionization detector
ppmV	parts per million by volume
PPR	(ADEC) Prevention Preparedness and Response
QEP	qualified environmental professional
RRO	residual range organics
SWMP	Soil and Water Management Plan
UOCC	Union Oil Company of California
VOC	volatile organic compound



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1 INTRODUCTION

This plan provides information to assist in the management of contaminated soil and water, if encountered, during excavation activities associated with flowline construction at the Hilcorp Alaska, LLC (Hilcorp) operated Kenai Gas Field (KGF). Originally developed in 1959 by Union Oil Company of California (UOCC), Marathon Oil Company (Marathon) acquired the KGF facilities in 1994. Hilcorp took over the KGF pads in 2013 and is the current operator. The KGF pads are located approximately 60 miles southwest of Anchorage, Alaska, and 10 miles south of Kenai (Figure A-1).

The KGF low pressure (LP) & medium pressure (MP) Flowline Upgrade Project, will follow a direct route between pads KGF 14-6 and KGF 34-31 (Figure A-2). Flowline upgrade construction will include the installation of a 24-inch LP line and a 20-inch MP line running alongside two existing lines: a 12-inch LP line and a 16-inch high pressure (HP) line. The flowline route is approximately 5,600 feet (ft) in length between the two pads, traversing Kenai Peninsula Borough and private land. As part of flowline installation, trenches will be excavated to approximately 6.3 ft wide and 6.1 ft deep.

Excavation of trenches for flowline construction will occur within 1,500 ft of two Alaska Department of Environmental Conservation (ADEC) Contaminated Sites (CS) designated as Active; Kenai Gas Field Pad 14-6 (Hazard Identification [ID]: 2434/File Number: 2320.38.029) and Kenai Gas Field Pad 34-31 (Hazard ID: 3331/File Number: 2320.38.031), and two sites designated as cleanup complete (CC); UNOCAL K-B Gas Field (Hazard ID: 23442 / File Number: 2333.26.044) and Old Keener Property (Hazard ID: 476 / File Number: 2320.38.041). All ADEC contaminated sites within 1500 feet of planned trenching activities are detailed in Section 2 of this management plan.

The primary objective of this contaminated soil and water management plan (SWMP) is to ensure contaminated soil and water, if encountered during flowline construction-related excavation activities, are managed to achieve the following:

- Protection of human health and the environment
- Minimization of waste generation to the extent practicable in compliance with applicable regulations
- Prevention of delays to construction activities

Activities to meet this objective include the following:

- Identifying areas with known contamination in the project vicinity
- Monitoring for contamination
- Segregation, investigation, and treatment and/or disposal of contaminated soil and water



2 CONTAMINATED SITES WITHIN 1,500 FEET OF FLOWLINE TRENCHING ACTIVITIES

Four ADEC contaminated sites are present within 1,500 ft of flowline trenching activities as determined through a record search of the ADEC CS database (ADEC 2021). The following sections detail the contaminated sites listed in the ADEC CS Database within 1,500 ft of the proposed flowline construction activities. Two sites within 1,500 ft of planned excavation locations are active (red triangle) and two are cleanup complete (green triangle), as presented on Figures A-3 and A-4. However, the ADEC locations for sites presented on the figures are approximate and may not align with the actual release locations.

2.1 KENAI GAS FIELD PAD 14-6

Site Name: Kenai Gas Field Pad 14-6 / ADEC CS Hazard ID: 2434 / File Number: 2320.38.029 / CS Status: Active

Kenai Gas Field Pad 14-6 (Figure A-3) was constructed in the late 1950s and consists of a 3-to 4-foot thick gravel pad placed over native tundra, wetland, and spruce bog of the Kenai lowlands. A hydrocarbon sheen was observed on the western edge of Kenai Gas Field Pad 14-6 in 1995 following a season of abnormally high precipitation. The incident was reported to ADEC by Marathon as a historical release; Marathon elected to initiate remedial efforts. Site assessment activities in 1996 and 1997 indicated the source of the sheen was natural gas condensate (NGC) associated with an unrecorded release (SLR 2014a). The ADEC CS Database lists a historical leak at the Arctic Pipeline Building as a potential source of contamination at this site.

Additional investigations at Kenai Gas Field Pad 14-6 have been conducted to delineate the impacted area and perform remedial actions. A light non-aqueous phase liquid (LNAPL) plume was discovered off the pad, south and west of the former Retention Basin. Between 1996 and 2006, 41 monitoring and recovery wells were installed at the site, with groundwater monitored at varying frequencies. In 1998, approximately 1,100 cubic yards of LNAPL-impacted soil was excavated from the source area and thermally treated. High-vacuum extraction (HVE) systems were installed to recover LNAPL in the source area and operated from 1998 to 2001 and 2003 to 2007. LNAPL-absorbent socks were installed in six wells in 2004 and 2005. Groundwater monitoring, surface water monitoring, and an HVE recoverability assessment between 2010 and 2019 concluded that the LNAPL plume is no longer migrating laterally, is naturally attenuating, and is not migrating to the ground surface in the wetland.

In 2017, groundwater analytical results indicated exceedances of ADEC Table C groundwater cleanup levels (ADEC 2018) for diesel range organics (DRO), residual range organics (RRO), 1,2,4-trimethylbenzene, benzene, ethylbenzene, naphthalene, and/or 1-methylnaphthalene and



in 2019, groundwater monitoring results identified concentrations of DRO, RRO, 1,2,4 trimethylbenzene, 1,3,5 trimethylbenzene, benzene, ethylbenzene, total xylenes, naphthalene, 1 methylnaphthalene, and 2-methylnaphthalene above ADEC Table C groundwater cleanup levels (ADEC 2018). Results for all other analytes were either non-detect or were detected below ADEC Table C groundwater cleanup levels (Hilcorp 2019).

Proposed trenching will occur to a depth of approximately 6 ft below ground surface (bgs) to the north and to the east of the most recently detected groundwater contamination plume at this active CS. All trenching will be conducted at least 300 ft from the plume. Contaminated groundwater, including LNAPL, remains on the CS site at approximately 4 ft bgs. Historical sampling has delineated and confirmed that the contaminated groundwater plume is located at the southwest corner of the pad, downgradient and crossgradient of the proposed trenching locations (Figure A-3). Groundwater flow direction and the distance separating the plume from trenching areas indicates that contaminated water and soil associated with this active CS will not be encountered.

2.2 KENAI GAS FIELD PAD 34-31

Site Name: Kenai Gas Field Pad 34-31 / ADEC CS Hazard ID: 3331 / File Number: 2320.38.031 / CS Status: Active

In 1999, a NGC hydrocarbon sheen and odor were observed at the water injection building along the southwest side of the pad, and in 2000 a soil and groundwater assessment detected concentrations of DRO in soil and groundwater exceeding the ADEC cleanup levels published at the time. A 2007 site assessment determined that areas of concern were related to historical operations at Kenai Gas Field Pad 34-31, including produced fluid and diesel fuel impacts to the pad surface and subsurface (SLR 2014b).

Historically, DRO has been the only contaminant detected at concentrations exceeding the ADEC Table C groundwater cleanup levels. Annual monitoring of DRO conducted between 2010 and 2015 reported similar observations, with DRO as the only analyte with results exceeding the ADEC Table C groundwater cleanup levels.

In 2017 and 2019, petroleum-related volatile organic compounds (VOCs) (including BTEX) and polynuclear aromatic hydrocarbons (PAH) were added to the analytical suite. Concentrations of DRO exceeded the ADEC Table C groundwater cleanup level in both years, but the petroleum-related VOC and PAH concentrations were less than the Table C cleanup levels (ADEC 2018). DRO is the only contaminant of concern at Kenai Gas Field Pad 34-31 (Hilcorp 2019).

Proposed trenching will occur southwest and crossgradient of the two cleanup complete CS's, and within 1,500 feet southeast and upgradient of the single active CS (Figure A-4). During



groundwater sampling in 2019, the contaminate plume was limited to the western area of the pad with multiple clean monitoring wells delineating a clean boundary between impacted groundwater and the proposed trenching area. Trenching will be conducted to a depth of approximately 6 ft bgs, groundwater is located at approximately 15 ft bgs, and contaminated soil has not been identified on site since 1999. It is unlikely soil or groundwater contamination will be encountered during trenching activities at Kenai Gas Field Pad 34-31.

2.3 UNOCAL K-B GAS FIELD

Site Name: UNOCAL K-B Gas Field / ADEC CS Hazard ID: 23442 / File Number: 2333.26.044 / CS Status: Cleanup Complete

During the removal of a 2,000-gallon gasoline underground storage tank on November 2, 1989, petroleum hydrocarbon contamination was encountered in soil and groundwater. The contaminated soil was reused in a cold emulsion asphalt mix and used in a slurry seal coat. The drinking water well from KGF Pad 34-31 was monitored for contamination and the site was subsequently granted a Cleanup Complete designation in October, 1997. The ADEC requires advanced approval to transport soil or groundwater off this site. The proposed project will not include the transport of soil or groundwater from this site.

2.4 OLD KEENER PROPERTY

Site Name: Old Keener Property / ADEC CS Hazard ID: 476 / File Number: 2320.38.041 / CS Status: Cleanup Complete

Site investigations and long-term groundwater monitoring have been conducted at Kenai Gas Field Pad 34-31 (Figure A-4) in association with the eastern reserve pit since the 1980s. In 1986 disposal of unknown amount of drilling muds (with possible NGC) occurred in wetlands adjacent the pad while a private person owned the site. The responsible party, Union Oil Company of California (UOCC), said materials were tested prior to disposal and weren't contaminated. Site closure was approved in September, 1990.

UOCC initiated cleanup of the reserve pit and drilling muds in 1992, resulting in the removal of 12,000 cubic yards of soil. An unknown quantity of impacted soil was left in place along the western wall of the excavation due to existing active gas wells and infrastructure (SLR 2014b). As part of site closure stipulations, the ADEC requires advanced approval to transport soil or groundwater off this site. The proposed project will not include the transport of soil or groundwater from this site.



3 EXCAVATION MONITORING

Based on the proximity of flowline installation to the active ADEC CSs, Kenai Gas Field Pad 14-6 and Kenai Gas Field Pad 34-31, contamination is unlikely to be encountered during planned trenching activities at KGF Pads 14-6 and 34-31; however, field personnel will monitor for evidence of contaminated soil and/or water during trenching. Monitoring will include visual and olfactory observations. Evidence of contamination may include a hydrocarbon/chemical odor, stained soil, free product, or hydrocarbon sheen on water. If contamination is encountered, a third-party qualified environmental professional (QEP) will be brought to the site to conduct screening and, potentially, analytical characterization sampling.

Soil from excavated areas where no indications of contamination are observed may be staged adjacent to the excavation or other staging area; however, if evidence of contaminated soil and/or groundwater is observed, soil will be segregated and stockpiled as described in Section 4.1 and then sampled as described in Section 3.1. Evidence of potential contamination via photoionization detector (PID) monitoring will be considered PID readings greater than 20 part per million by volume (ppmV). The procedure for excavation dewatering (if needed) is described in Section 4.2.

Excavation activities will comply with the *Hilcorp Pipeline System Cook Inlet Area Best Management Practice (BMP) Plan for Discharges and Disposals under Alaska Department of Environmental Conservation General Permit for Statewide Oil and Gas Pipelines (BMP Plan)*, and the Alaska Pollutant Discharge Elimination System (APDES) Statewide Oil and Gas Pipeline General Permit AKG320000.

3.1 SOIL SCREENING AND SAMPLING

Due to the lack of evidence to suggest that the proposed trenching activities will encounter known contaminated soil or groundwater, the initial visual and olfactory monitoring activities will not require a third-party QEP. A third-party QEP will be brought to site to characterize soil and/or water if evidence of contamination is identified. The QEP will conduct field screening and analytical sampling as needed. Hilcorp will have spill response materials on hand and the QEP will have a PID for field screening as well as the necessary items to collect, package, and ship soil and water samples to SGS laboratory in Anchorage, Alaska for the following analyses:

- DRO/RRO by Method AK102/103
- GRO by Method AK101
- Petroleum-related VOCs by Method SW8260
- PAH-selective ion monitoring by Method SW8270-SIM
- Resource Conservation and Recovery Act Metals
- If non-petroleum-related contamination is suspected additional analytical methods may be required and will be determined in coordination with ADEC.



The QEP will use a PID to perform headspace organic vapor monitoring on field screening samples collected from within and adjacent to the impacted area in accordance with the procedure outlined in ADEC's *Field Sampling Guidance* (ADEC 2019). These field screening samples will be collected from freshly uncovered soil when it is available. When not available, the samples will be collected from at least 6 inches below the soil surface to minimize the potential for volatilization of the sample prior to monitoring. Each screening sample location will be documented on a field sketch and screening results documented in a field logbook. Soil may be collected from the trench floor or sidewall or from the stockpiled soil. Stockpile screening locations will be marked in the field with a numbered pin flag. The field screening sampling frequency will be determined based on Tables 2A and 2B in ADEC's *Field Sampling Guidance* (ADEC 2019).

Results of the headspace screening efforts will inform analytical sample collection. No soil samples will be collected for laboratory analysis if all PID readings are below 20 ppmV, the QEP determines no sampling is needed based on field observations and professional judgement, and ADEC concurs that the PID readings and field observations do not warrant additional investigation. Observations and supporting evidence for not collecting analytical samples will be documented in a field logbook.

A PID reading of 20 ppmV or higher will trigger segregation of soil, and the collection of one or more laboratory analytical samples. Analytical sample collection frequency will be determined by the QEP based on field observations and PID screening results and in accordance with ADEC's *Field Sampling Guidance* (ADEC 2019).

3.2 NOTIFICATIONS

The proposed trench locations are outside of areas where previous spills were reported or known contaminated sites exist, and therefore will require notification to the ADEC's Prevention, Preparedness, and Response Program as a newly discovered spill. The site will be added to the PPR spill program database and issued a spill number. Hilcorp will work with ADEC to achieve a Case Closed designation from the PPR Program. If only an interim remedial action is possible due to weather, logistics, or other factors, the spill will be transferred from PPR to the CS Program. The CS Program will add the contaminated site to their database and Hilcorp will coordinate further remedial activities with the CS Program. The onsite QEP will track the location and quantity of contaminated soil and groundwater generated, document the results of the analytical samples collected, and summarize them in a report of the 2021 excavation activities (see Section 5.0 for additional details).

In the event there is a new release caused by the flowline construction activities, the standard reporting procedures will be followed, and the necessary spill response activities will be employed.



4 CONTAINMENT OF CONTAMINATION

Hilcorp will implement the BMP Plan to mitigate the spread of contamination. Standard soil and wastewater management procedures for construction, utility excavation, and trenching will be implemented to prevent the spread of contaminated soil and water beyond the immediate work area from storm water runoff, erosion, spillage from loads, or tracking of soils by heavy equipment. The practices will be outlined in the project's BMP Plan (Hilcorp 2020) and associated permits for proposed activities. Soil and water will be contained and transported as described in Sections 4.1 and 4.2, respectively. If necessary, stockpiles will be covered, water will be removed from the stockpile containment area, and erosion control measures including silt fence, straw wattles, or similar will be installed to minimize runoff and erosion. Once flowline construction and trench backfill are complete, excess soil piles will be spread to match the existing grade or will be transported offsite for disposal or reuse.

4.1 CONTAMINATED SOIL STORAGE AND TRANSPORT

Soil that is known or suspected to be contaminated will be segregated and stockpiled in accordance with the ADEC *Field Sampling Guidance* (ADEC 2019) and Title 18 of the Alaska Administrative Code, Chapter 75 (18 Alaska Administrative Code [AAC 75]) (ADEC 2018). Soil believed to be contaminated will be staged adjacent to the trench or at a nearby staging area in lined and bermed soil stockpiles or other suitable waste storage containers. Special precautions will be needed for saturated soils. If necessary, the lined staging area will be retrofitted with a sump to prevent pooling of water within the storage area and potential spills of contaminated water to the ground surface.

Soil that had been excavated adjacent to potentially contaminated soils, but that did not initially display evidence of contamination, shall be investigated to verify that contamination is not present using a PID and analytical sampling if PID readings exceed 20 ppmV. If contamination is found in this soil, the soil will also be transferred to the contaminated soil stockpiles or other suitable waste storage container.

In the event that contaminated soil was placed directly onto the ground surface, the QEP will conduct field screening once the contaminated soil has been transferred to containment to verify that the native ground surface was not impacted. The sample frequency will follow specifications provided in Table 2B of the *Field Sampling Guidance* (ADEC 2019). If all field screening samples have PID readings less than 20 ppmV and there are no other indications of potential contamination, the native soil will be considered clean and no analytical samples will be collected. If the PID readings exceed 20 ppmV, analytical samples will be collected following the specifications provided in Table 2B of the *Field Sampling Guidance* (ADEC 2019). Additional



removal will be needed if the samples from the native soil have concentrations exceeding the ADEC cleanup levels.

Contaminated soil stockpiles will be constructed in accordance with 18 AAC 75.370 Soil storage and Disposal (ADEC 2018). Stockpiles will be located 100 ft or more from surface water bodies and any drinking water supply wells. The construction materials will meet the specifications listed in Table D of 18 AAC 75.370 (ADEC 2018). The stockpile will be covered when soil is not being added or removed and will be constructed to minimize water accumulation on the top cover.

If soil is suspected to be contaminated with a chemical other than hydrocarbons, that soil will be segregated into a separate stockpile or other suitable waste storage container. Waste characterization samples will be collected to determine what chemicals are present and the proper disposal/treatment method.

If no evidence of contamination (visual, olfactory, and PID less than 20 ppmV) is identified during the excavation activities, the soil can be used to backfill the excavation and/or reused onsite.

4.2 EXCAVATION DEWATERING

Excavation dewatering will be conducted as needed using a vac truck or other suitable pump(s). Water removed from the trenches during flowline construction suspected to contain contamination may be transported to the Grind and Inject facility at KGF or may be treated on site using a granular activated carbon (GAC) system and, if there is no longer a sheen present, discharged to the ground surface at or near the point of generation and at least 100 feet from any surface water body. If water is suspected to be contaminated with a chemical other than hydrocarbons, additional waste characterization samples may be needed to determine the proper disposal/treatment method. Uncontaminated water removed during KGF flowline construction may also be discharged to the ground surface at the locations presented in the BMP Plan (Hilcorp 2020).

Excavation dewatering will be performed in accordance with the APDES Statewide Oil and Gas Pipeline General Permit AKG320000 and the *Hilcorp Pipeline System Cook Inlet Area Best Management Practice Plan for Discharges and Disposals under Alaska Department of Environmental Conservation General Permit for Statewide Oil and Gas Pipelines*. Dewatering will also be conducted in accordance with the Temporary Water Use Authorization (TWUA) obtained from the Alaska Department of Natural Resources (ADNR).



5 DOCUMENTATION AND REPORTING

No documentation or reporting in association with this plan will occur unless contamination is encountered and a QEP is called to the site. When onsite, the project QEP will maintain a field logbook to document daily project activities related to this plan. The QEP will take digital photographs to document site activities and conditions. When possible, the QEP will collect latitude and longitude coordinates around the perimeter of the excavation to document excavation dimensions of impacted areas. Approximate locations of analytical samples will be measured from the excavation perimeter and documented in the field logbook. Following completion of applicable earthwork, sampling, and receipt of the analytical results, the QEP will prepare a summary report. The report will include field screening and sampling results (including the laboratory reports) and figures with trenching and sampling locations. The report will also contain the analytical data, field notes, waste tracking, and photograph log. An ADEC Laboratory Data Review Checklist and assurance report will be prepared for all analytical data used for site characterization purposes following ADEC *Field Sampling Guidance* (ADEC 2019).



6 REFERENCES

- Alaska Department of Environmental Conservation (ADEC). 2007 (October). *Kenai Gas Field Pad 33-1: ADEC Spill #2000230921601 Conditional Closure Approved*.
- ADEC. 2019 (October). *Field Sampling Guidance*.
- ADEC. 2020 (November). Title 18 of the Alaska Administrative Code, Chapter 75 (18 AAC 75), *Oil and Other Hazardous Substances Pollution Control*, as amended through November 7, 2020.
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- SLR International Corporation (SLR). 2014a (November). 2013 Groundwater and Surface Water Monitoring Report, Kenai Gas Field Pad 14-6, Kenai, Alaska.
- SLR. 2014b (November). 2013 Groundwater and Surface Water Monitoring Report, Kenai Gas Field Pad 34-31, Kenai, Alaska.

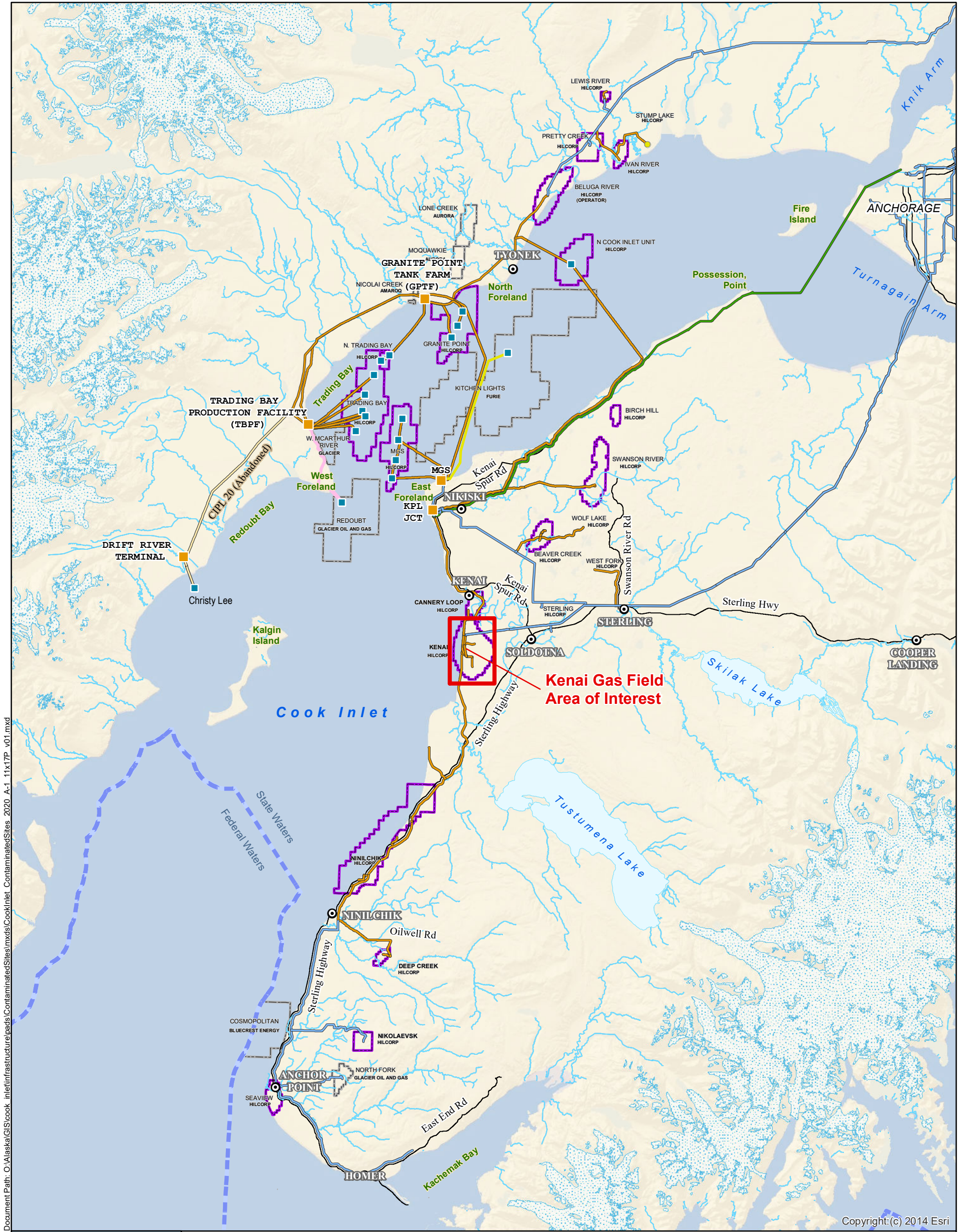


2021 Flowline Upgrade SWMP

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Attachment A

Figures



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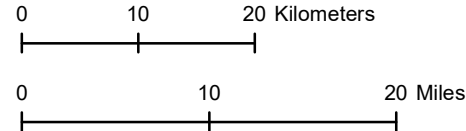
Copyright: (c) 2014 Esri



Legend

- Onshore Facilities
 - Offshore Platforms
 - State/Federal Boundary (3 Mile Limit)
 - Oil and Gas Units Operated by HAK
 - Oil and Gas Units - Other
 - Major Roads
- Hilcorp/Harvest
 - Glacier Oil and Gas
 - ENSTAR
 - Furie
 - Tesoro

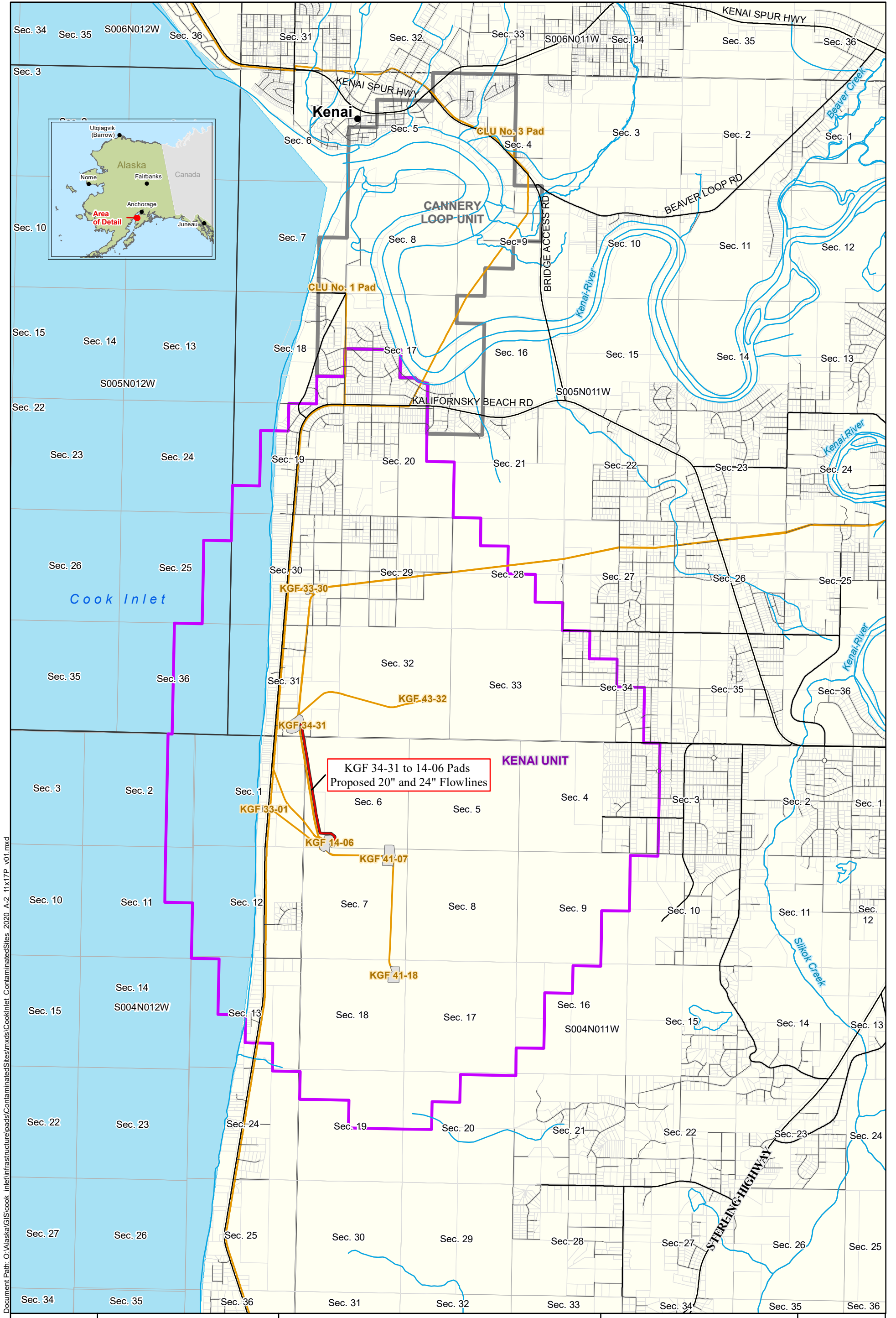
Alaska State Plane Zone 4 NAD 1983 (feet)



Date Prepared: 9/8/2020	Company Name: Hilcorp Alaska, LLC.	Drawn By: HAK - MRA
LOCATION AND VICINITY		
KENAI UNIT, COOK INLET, ALASKA		
Scale: @ 11x17 map size 1 in = 10 miles	Figure No: A-1	




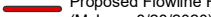

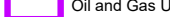
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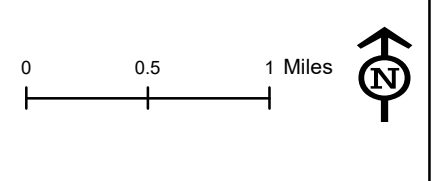


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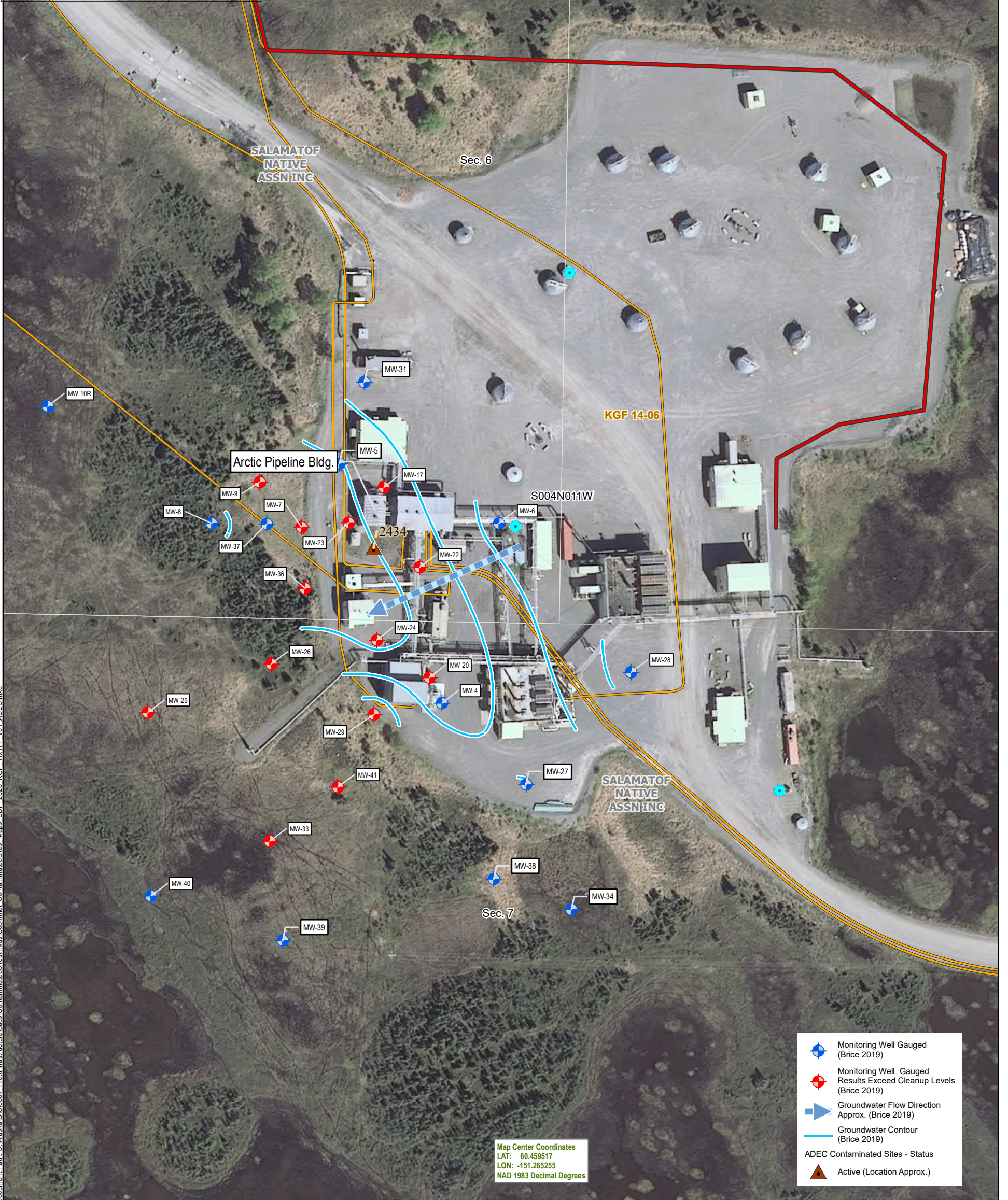
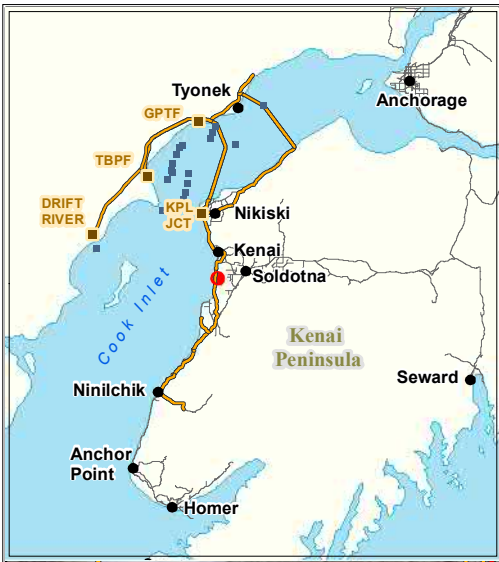


**KENAI UNIT
KENAI GAS FIELD (KGF)
Site Map**

Legend	
	Existing Pipelines
	Proposed Flowline Route (McLane 8/28/2020)
	KPB Parcels
	Oil and Gas Unit Boundaries

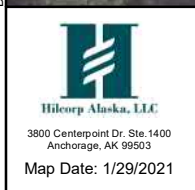


**FIGURE:
A-2**



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- Monitoring Well Gauged (Brice 2019)
- Monitoring Well Gauged Results Exceed Cleanup Levels (Brice 2019)
- Groundwater Flow Direction Approx. (Brice 2019)
- Groundwater Contour (Brice 2019)
- ADEC Contaminated Sites - Status
- Active (Location Approx.)



KENAI UNIT
Kenai Gas Field
KGF 14-06
Facility Overview

- Pipelines
- Proposed Flowline Route (McLane 8/28/2020)
- KPB Parcels
- Water Well Location

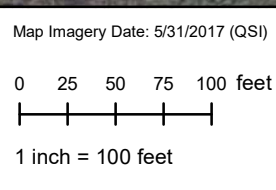
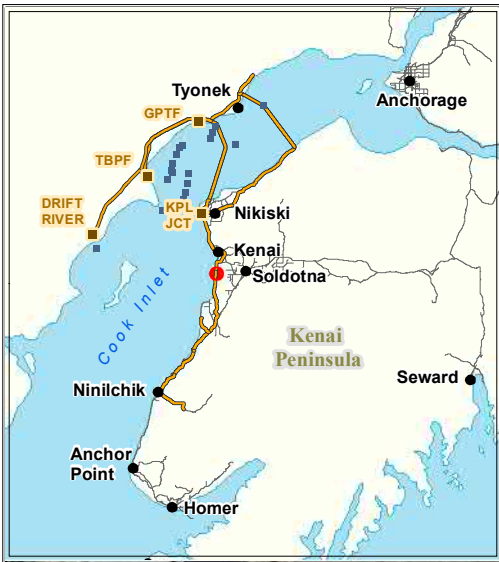


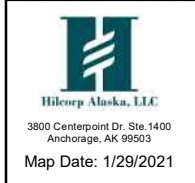
FIGURE:
A-3



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- Monitoring Well Gauged (Brice 2019)
- Monitoring Well Gauged Results Exceed Cleanup Levels (Brice 2019)
- Groundwater Flow Direction Approx. (Brice 2019)
- Groundwater Contour (Brice 2019)
- ADEC Contaminated Sites - Status**
- Active (Location Approx.)
- Cleanup Complete

Map Center Coordinates
 LAT: 60.474862
 LON: -151.274115
 NAD 1983 Decimal Degrees



KENAI UNIT
Kenai Gas Field
KGF 34-31
Facility Overview

- Pipelines
- Proposed Flowline Route (McLane 8/28/2020)
- KPB Parcels
- Water Well Location
- Historic Reserve Pit Area

Map Imagery Date: 5/31/2017 (QSI)

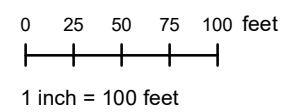


FIGURE:
A-4