

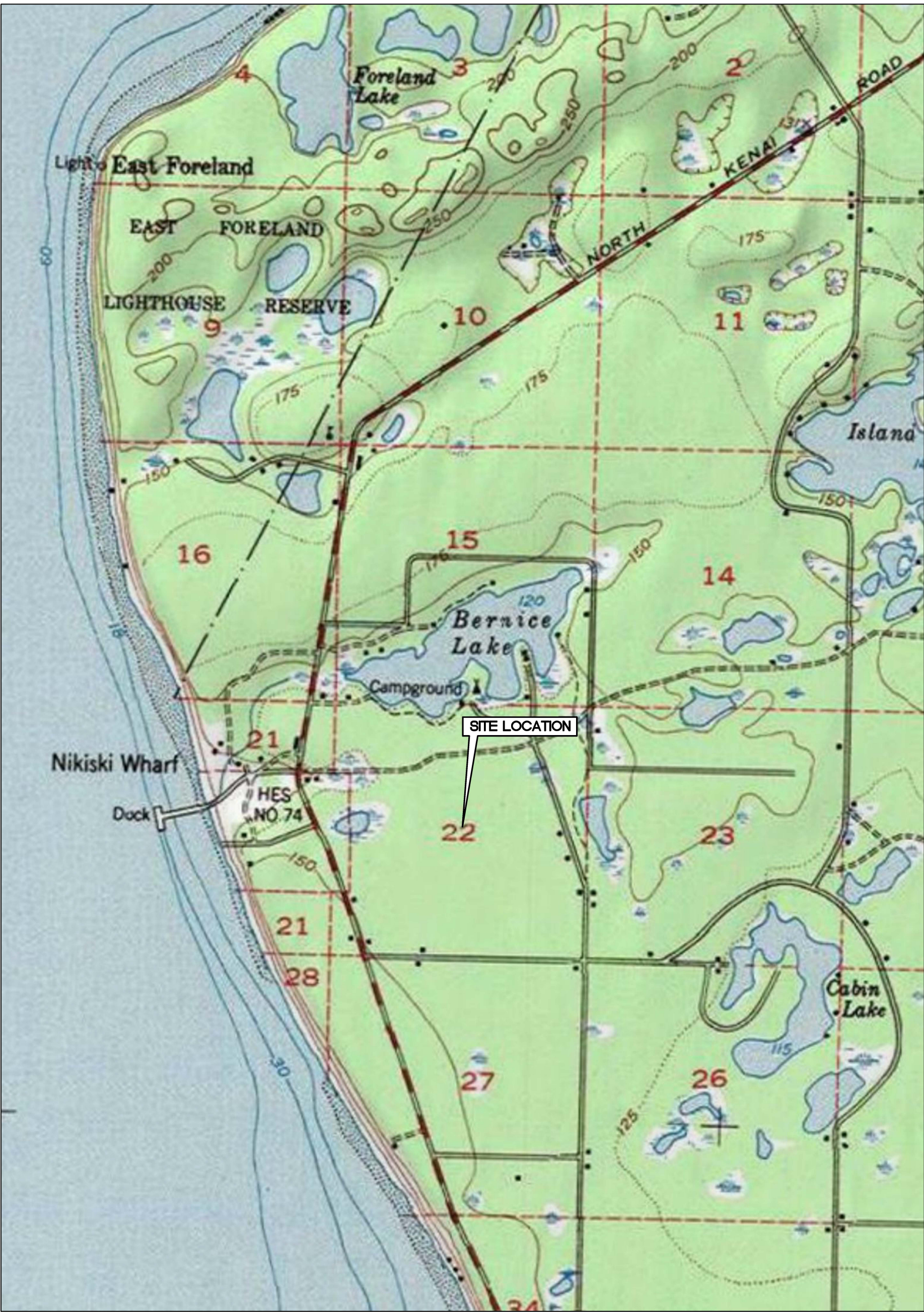
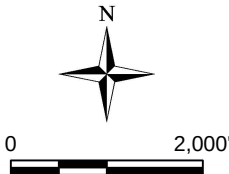


Image Cite: ESRI ArcGIS, USA Topographic Map, 2013



ALASKA

QUADRANGLE LOCATION



1252 Commerce Drive
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FIGURE 1

SITE LOCATION MAP

TESORO KENAI REFINERY
KENAI, ALASKA

Drawn By: RJ

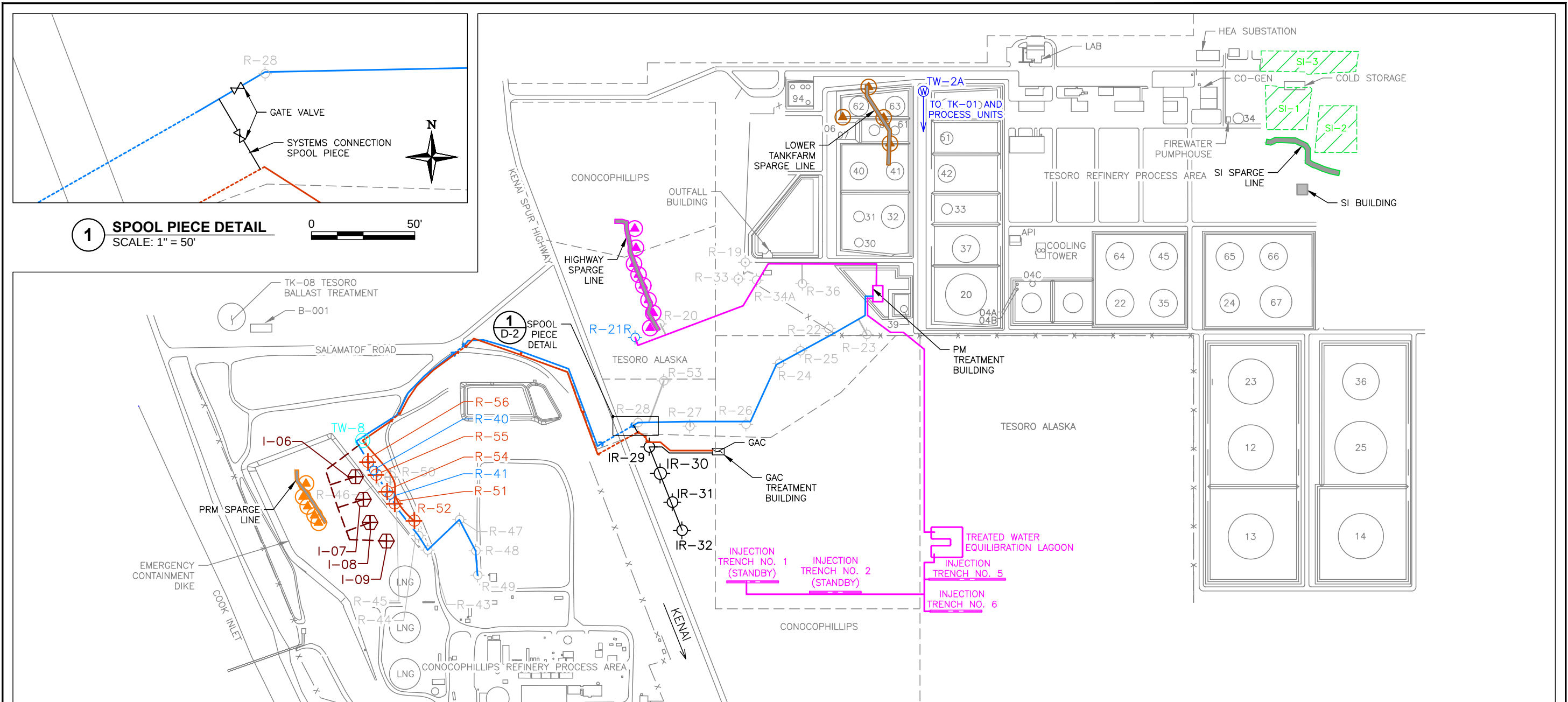
Checked By: SP

Scale: 1" = 2,000'

Date: 3/24/2017

File: 36C-KENAI-SITELOCATIONMAP

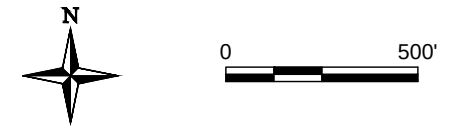
\\TRIHYDRO.COM\CLIENTS\STOV\TESORO\CADD\KENAIREFINERY\RESOURCECONSERVATIONANDRECOVERYACT_PERMIT\PERMIT_VS-SUBMITTED_201705\TESORO_KENAI_PERMIT_398-KR_CORRECTIVEMEASURESYS_20170509



Source Drawing From: Kent & Sullivan Inc., Circa 2007

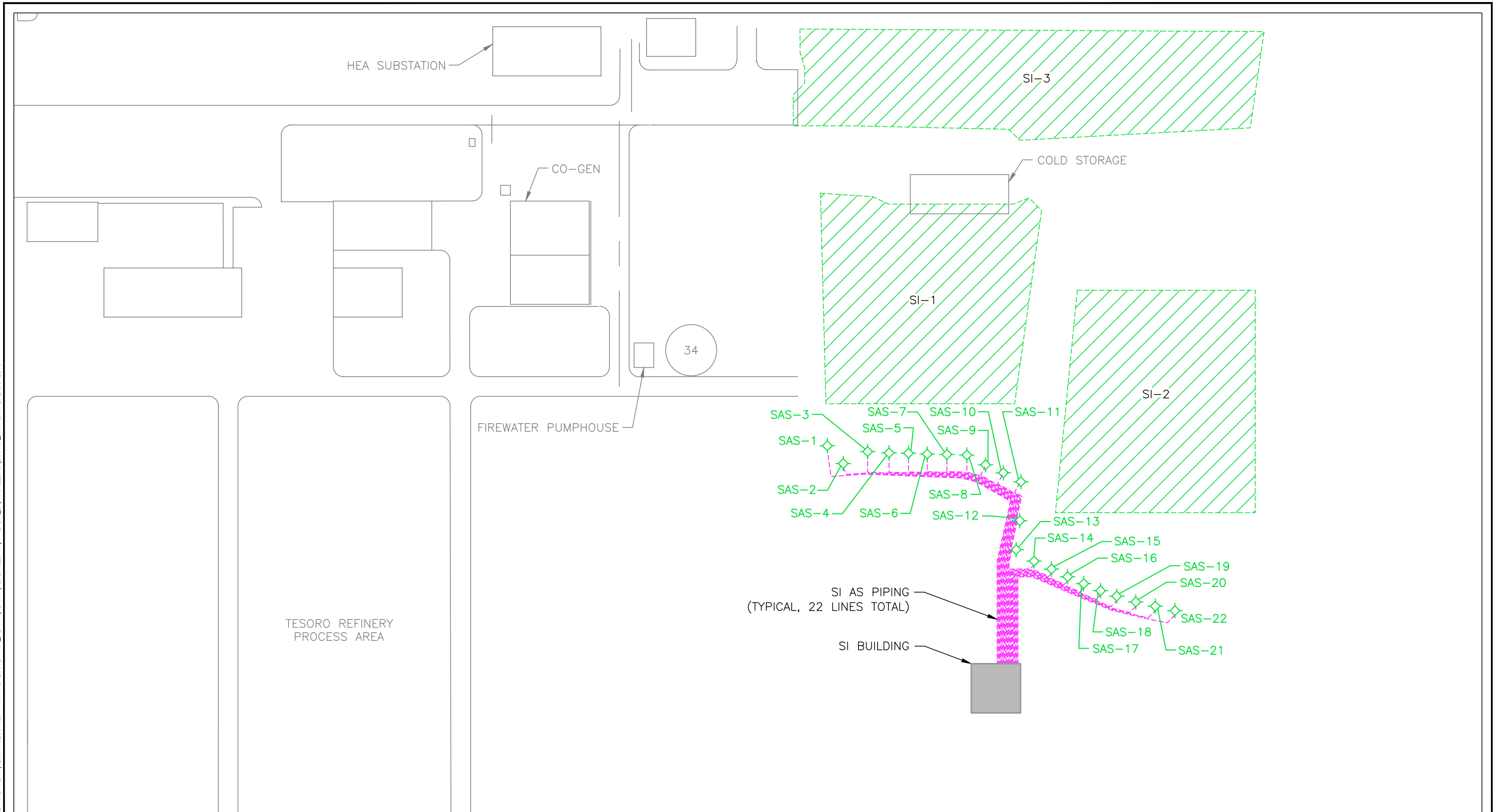
EXPLANATION

	PRM VAPOR EXTRACTION WELL		PRM AIR SPARGE LINE		PM INJECTION TRENCH
	HIGHWAY VAPOR EXTRACTION WELL		HIGHWAY AIR SPARGE LINE		SI CLOSED SURFACE IMPOUNDMENT
	LOWER TANKFARM VAPOR EXTRACTION WELL		LOWER TANKFARM AIR SPARGE LINE	AS	AIR SPARGE
	PRODUCTION WELL AND DESIGNATION FOR PRM AND B-AQUIFER INJECTION SYSTEM		SI AIR SPARGE LINE	GAC	GRANULAR ACTIVATED CARBON
	PRM RECOVERY WELL AND DESIGNATION		PRM RECOVERY WELL PIPELINE (DASHED WHERE SEGMENTS ARE UNDERGROUND)	HEA	HOMER ELECTRIC ASSOCIATION
	B-AQUIFER RECOVERY WELL AND DESIGNATION		PM RECOVERY WELL PIPELINE	LNG	LIQUID NATURAL GAS
	B-AQUIFER INJECTION WELL AND DESIGNATION		B-AQUIFER RECOVERY WELL PIPELINE (DASHED WHERE SEGMENTS ARE UNDERGROUND)	NO.	NUMBER
	PRM RECOVERY WELL AND DESIGNATION		B-AQUIFER INJECTION WELL PIPELINE	PRM	PHILLIPS REMEDIAL MEASURE
	INJECTION WELL AND DESIGNATION		GAC TREATMENT PIPELINE	PM	PHILLIPS MARATHON
	OFFLINE B-AQUIFER RECOVERY WELL AND DESIGNATION			SI	SURFACE IMPOUNDMENT
				VE	VAPOR EXTRACTION



 1252 Commerce Drive Laramie, Wyoming 82070 www.trihydro.com (P) 307/745.7474 (F) 307/745.7729	FIGURE D-2			
	CORRECTIVE MEASURE SYSTEMS			
	KENAI TESORO REFINERY NIKISKI, ALASKA			
Drawn By: RJ	Checked By: SP	Scale: 1" = 500'	Date: 5/9/2017	File: 398-KR_CORRECTIVEMEASURESYS_20170509

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EXPLANATION

-  SAS-1
-  SI AIR SPARGE LINE
-  SI CLOSED SURFACE IMPOUNDMENT

- AS AIR SPARGE
- HEA HOMER ELECTRIC ASSOCIATION
- SI SURFACE IMPOUNDMENT

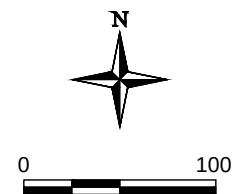
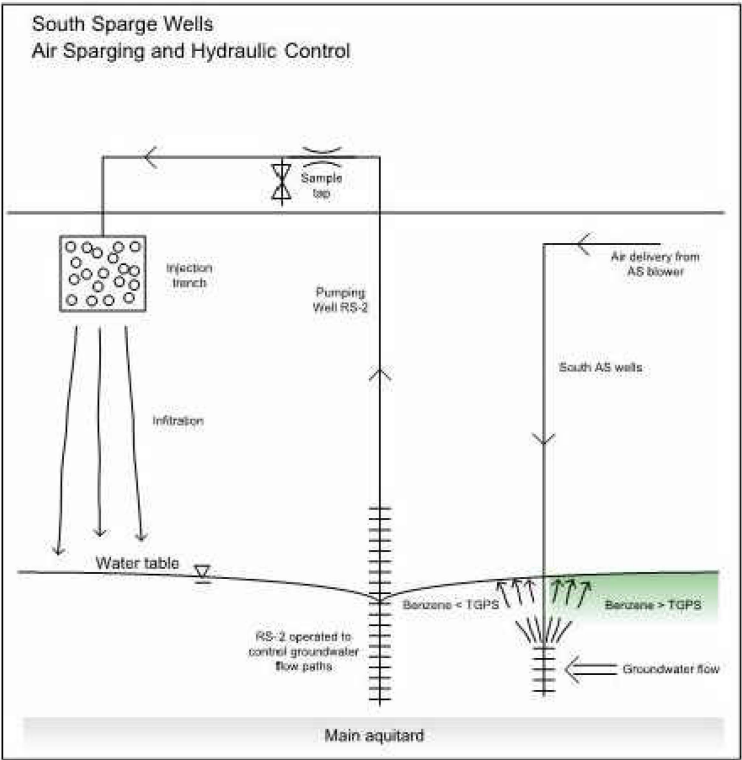
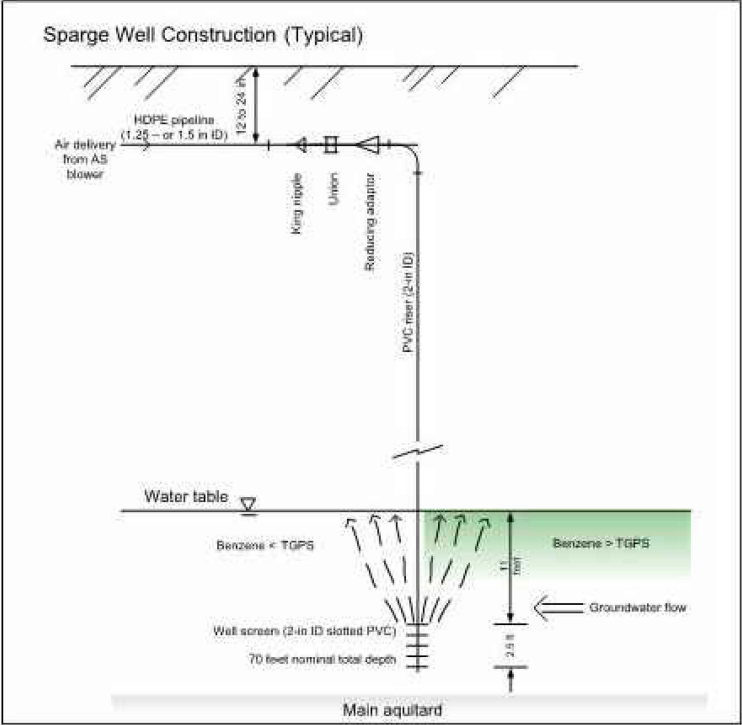
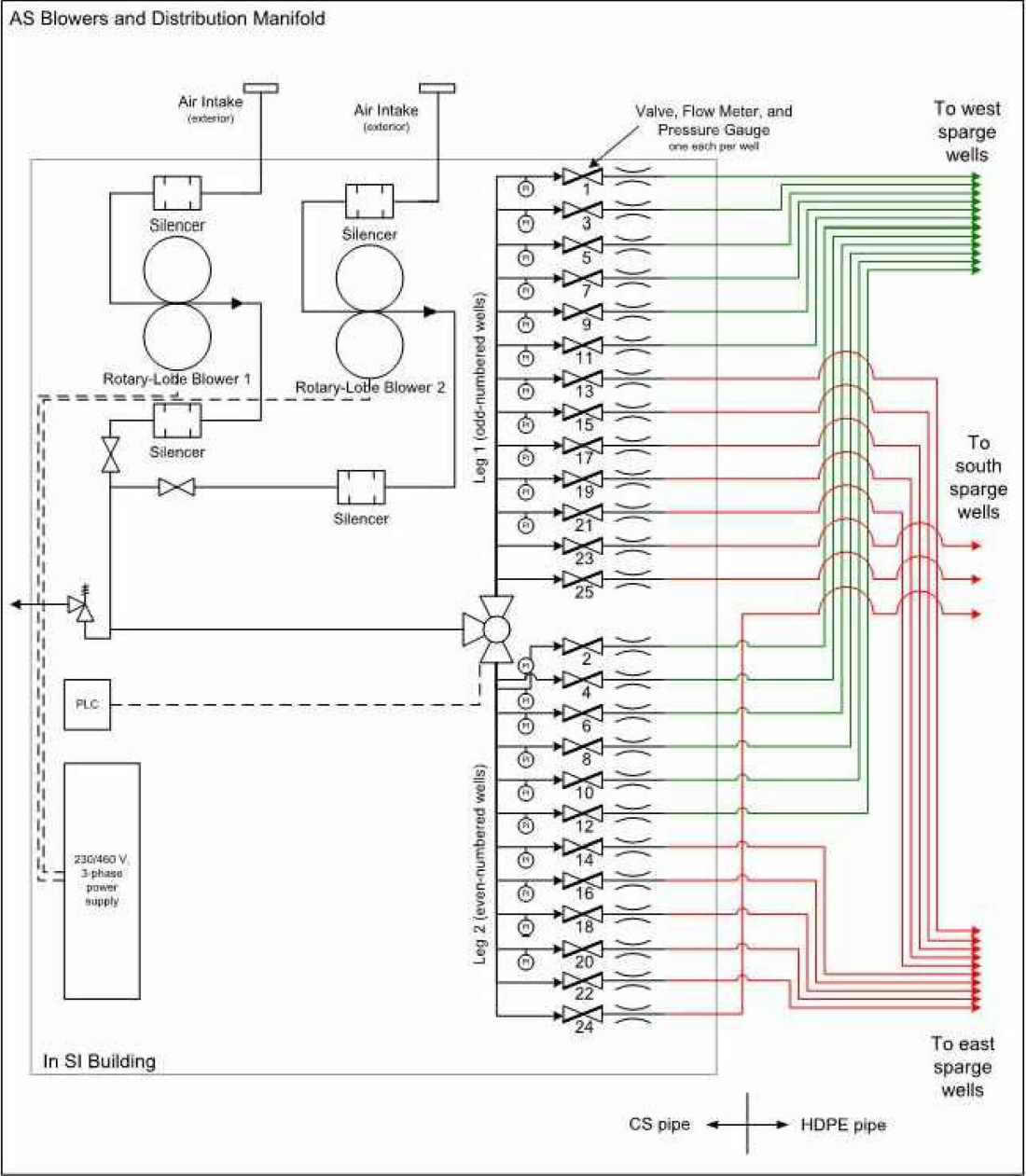


FIGURE D-3

SI CORRECTIVE MEASURE
SITE MAP

KENAI TESORO REFINERY
NIKISKI, ALASKA

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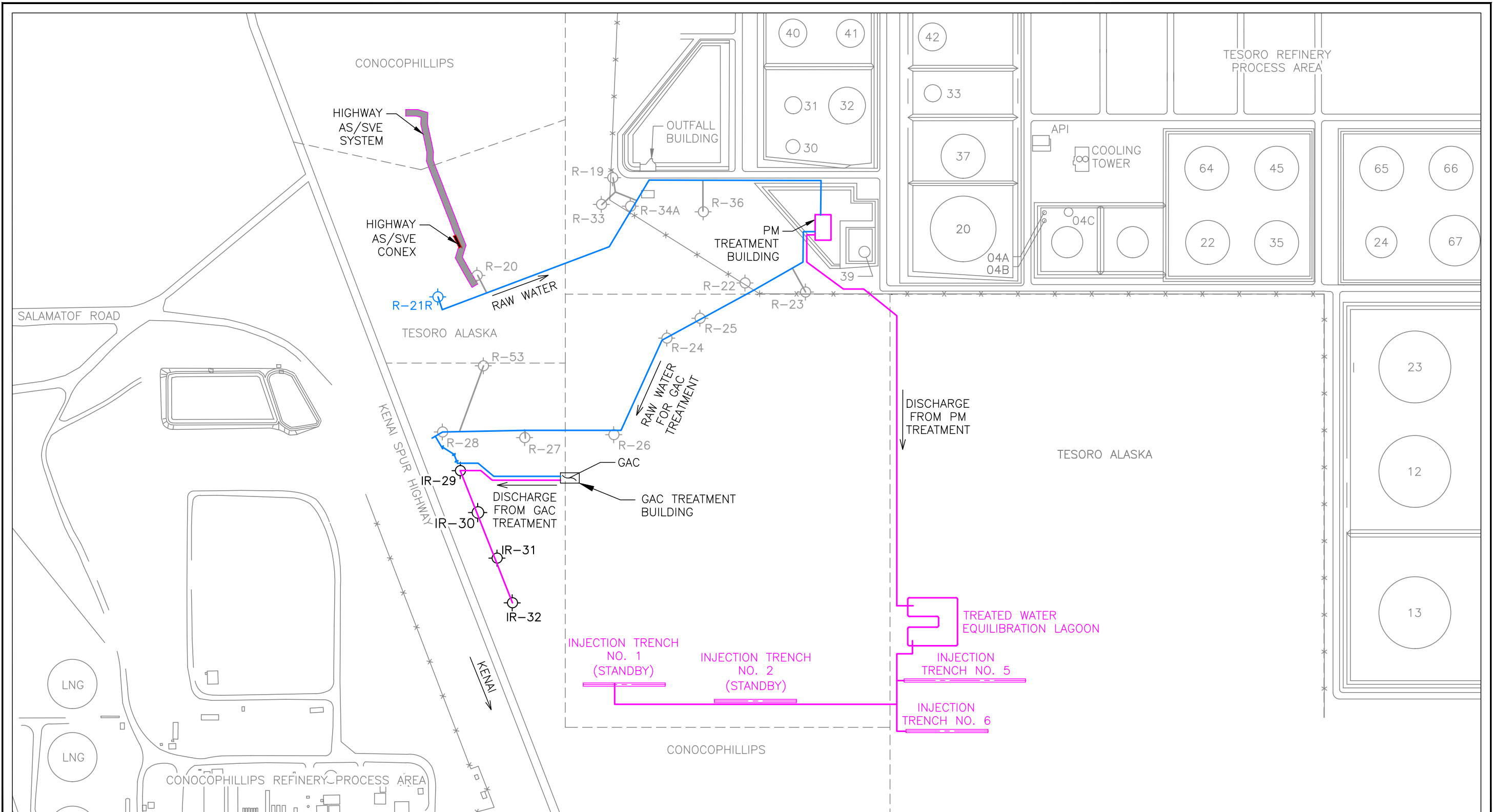
EXPLANATION

AS	AIR SPARGE
CS	CARBON STEEL
HDPE	HIGH-DENSITY POLYETHYLENE
ID	INNER DIAMETER
PLC	PROGRAMMABLE LOGIC CONTROLLER
PVC	POLYVINYL CHLORIDE
SI	SURFACE IMPOUNDMENT
TGPS	TARGET GROUNDWATER PROTECTION STANDARD
V	VOLT OR VOLTS

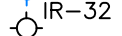
Source Drawing From: Kent & Sullivan Inc., 4/1/2007

 1252 Commerce Drive Laramie, Wyoming 82070 www.trihydro.com (P) 307/745.7474 (F) 307/745.7729	FIGURE D-4			
	SI CORRECTIVE MEASURE PROCESS FLOW DIAGRAM			
	KENAI TESORO REFINERY NIKISKI, ALASKA			
Drawn By: RJ	Checked By: SP	Scale: NONE	Date: 6/28/2017	File: 36C-KR_PANDID_20170628

M:\STOV\TESORO\CAO\KENAIREFINERY\RESOURCECONSERVATION\RECOVERYACT_PERMIT\AS-SUBMITTED_201707\TESORO_KENAI_PERMIT\39B-KR-PM_CORRECTIVEMEASURESYS_20170628



EXPLANATION

	RECOVERY WELL AND DESIGNATION		PM AIR SPARGE AND SVE LINE (HIGHWAY SYSTEM)
	INJECTION WELL AND DESIGNATION	AS	AIR SPARGE
	OFFLINE RECOVERY WELL AND DESIGNATION	GAC	GRANULAR ACTIVATED CARBON
	RECOVERY WELL RAW WATER PIPELINE	NO.	NUMBER
	TREATED WATER PIPELINE	PM	PHILLIPS MARATHON
	PM INJECTION TRENCH	SVE	SOIL VAPOR EXTRACTION

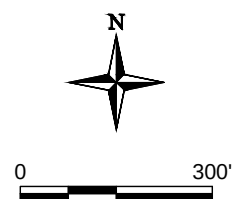
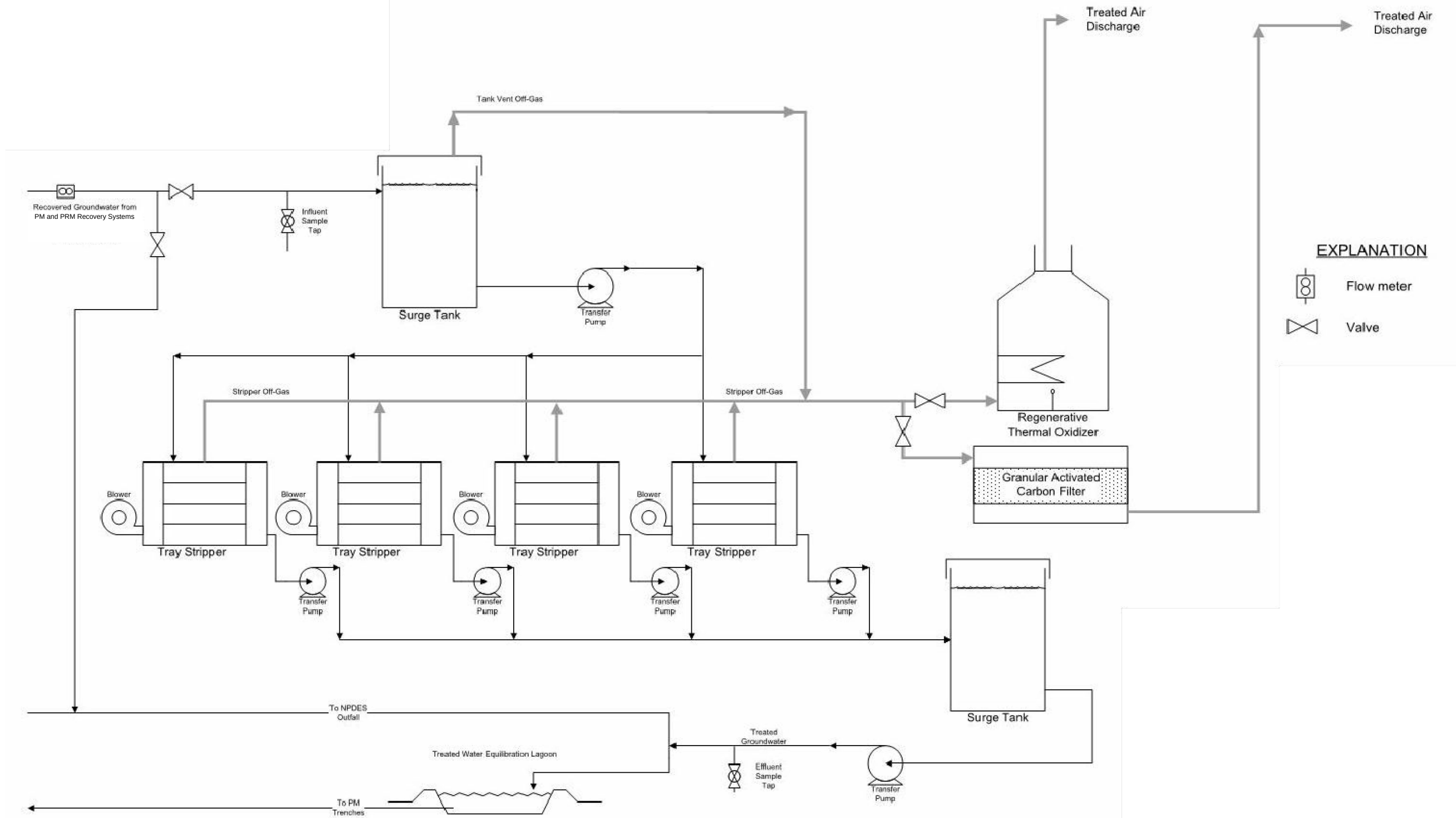


FIGURE D-5

**PM CORRECTIVE MEASURE
SITE MAP**

**KENAI TESORO REFINERY
NIKISKI, ALASKA**

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ABBREVIATIONS

LNAPL	LIGHT NON-AQUEOUS PHASE LIQUID	OWS	OIL WATER SEPARATOR
NPDES	NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	PRM	PHILLIPS REMEDIAL MEASURE
		PM	PHILLIPS MARATHON

Source Drawing From: Kent & Sullivan Inc., 4/1/2007

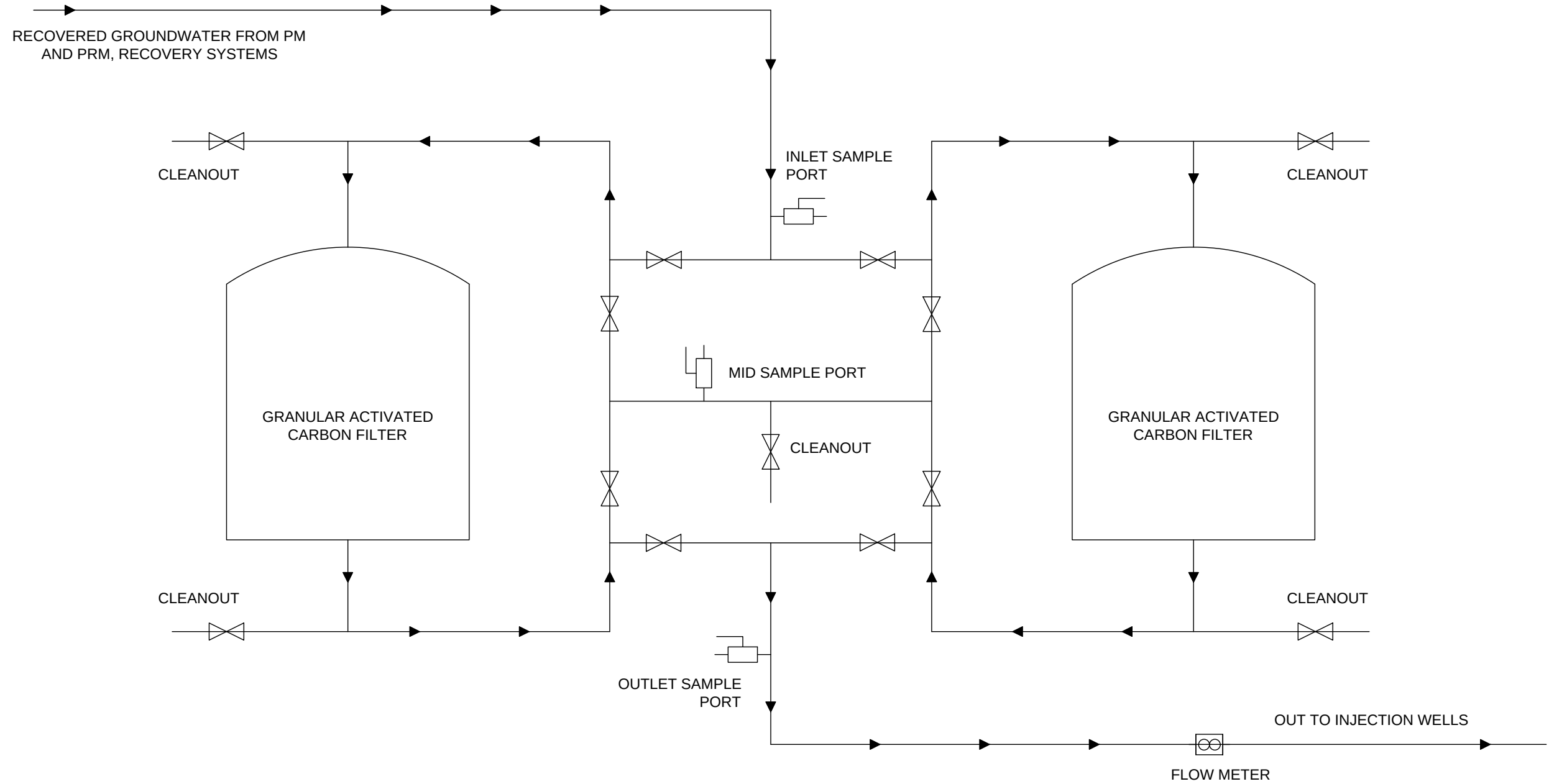


FIGURE D-6
PM TREATMENT SYSTEM
PROCESS FLOW DIAGRAM

KENAI TESORO REFINERY
NIKISKI, ALASKA

Drawn By: RJ Checked By: SP Scale: NONE Date: 9/7/2016 File: 36C-KR_PM-PANDID_20170628

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ABBREVIATIONS

PRM PHILLIPS REMEDIAL MEASURE
PM PHILLIPS MARATHON



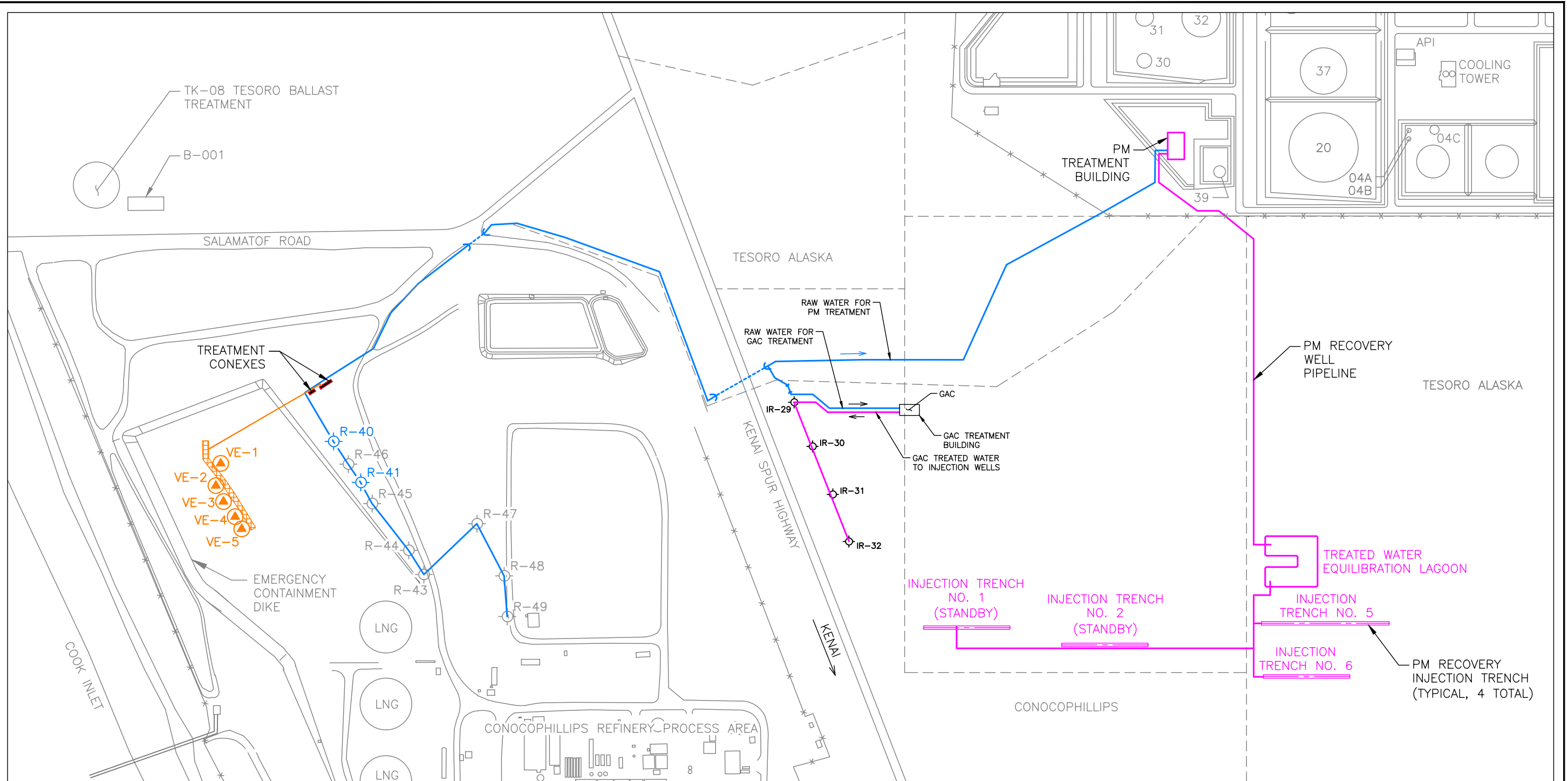
FIGURE D-7

**CALGON UNIT TREATMENT SYSTEM
PROCESS FLOW DIAGRAM**

**KENAI TESORO REFINERY
NIKISKI, ALASKA**

Drawn By: RJ	Checked By: SP	Scale: NONE	Date: 6/30/2017	File: 36C-KR_CANYONPANDID_20170628
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EXPLANATION

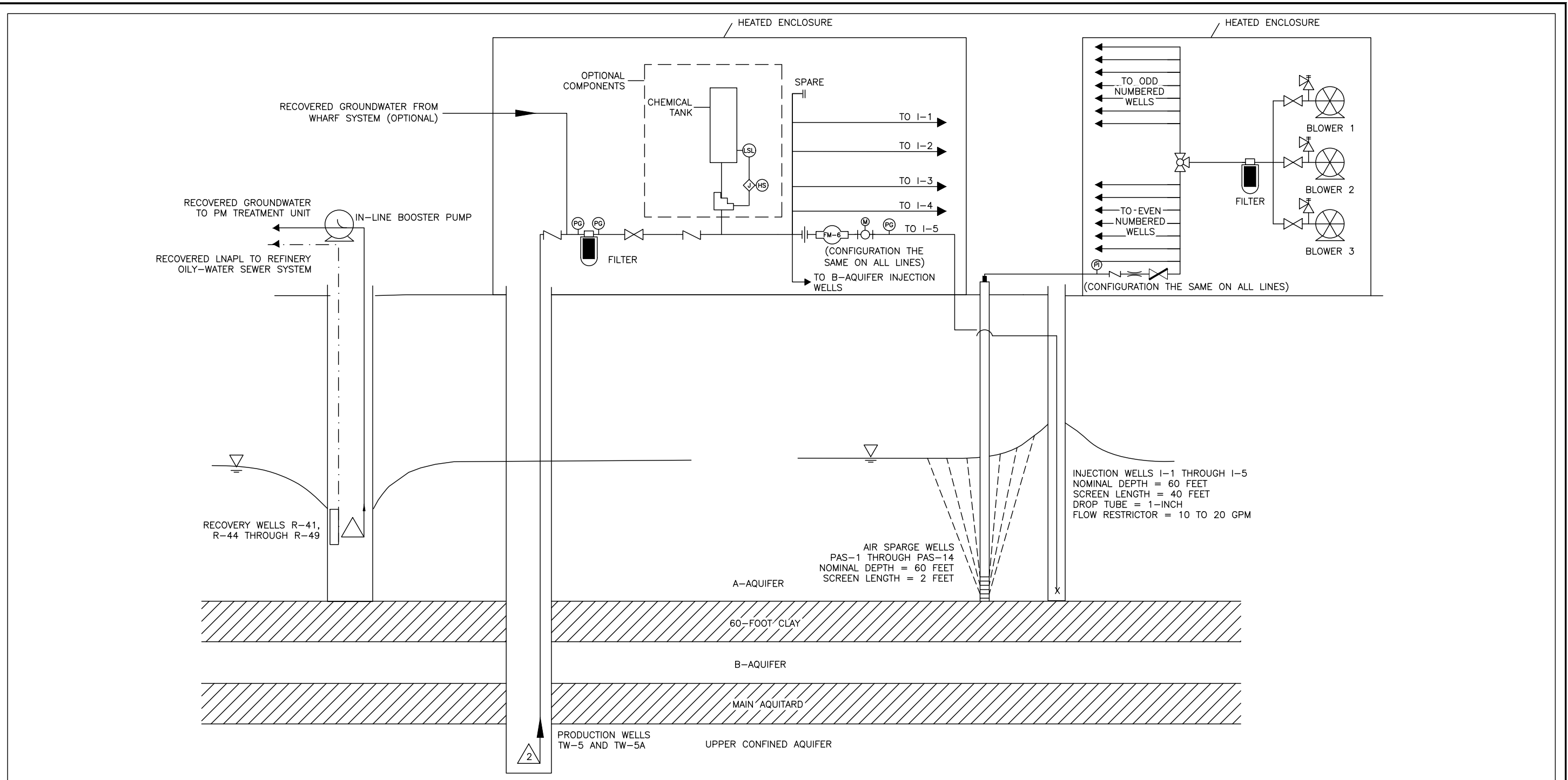
- VE-5 PRM VAPOR EXTRACTION WELL AND DESIGNATION
- R-41 PRM RECOVERY WELL AND DESIGNATION
- R-43 OFFLINE RECOVERY WELL AND DESIGNATION
- IR-32 INJECTION WELL AND DESIGNATION
- AS / VE PIPELINES
- PRM RECOVERY WELL RAW WATER PIPELINE (DASHED WHERE SEGMENTS ARE UNDERGROUND)
- TREATED WATER PIPELINE

- AS AIR SPARGE
- GAC GRANULAR ACTIVATED CARBON
- LNG LIQUID NATURAL GAS
- NO. NUMBER
- PRM PHILLIPS REMEDIAL MEASURE
- PM PHILLIPS MARATHON
- VE VAPOR EXTRACTION



FIGURE D-8
PRM CORRECTIVE MEASURE
SITE MAP
KENAI TESORO REFINERY
NIKISKI, ALASKA

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Source Drawing From: Kent & Sullivan Inc., 4/1/2007

EXPLANATION

	GATE VALVE		LNAPL PUMP		HAND SWITCH
	CHECK VALVE		POSITIVE DISPLACEMENT PUMP		JUNCTION
	CONTROL VALVE		AIR FLOW METER		LNAPL
	3-WAY VALVE		FLOW RESTRICTOR		LOW SWITCH LEVEL
	FLOW CONTROL VALVE		PRESSURE GAUGE		PRESSURE GAUGE
	PRESSURE RELIEF VALVE		FLOW METER		PHILLIPS REMEDIAL MEASURE
	SUBMERSIBLE PUMP		GALLONS PER MINUTE		PHILLIPS MARATHON
	FLOW METER				

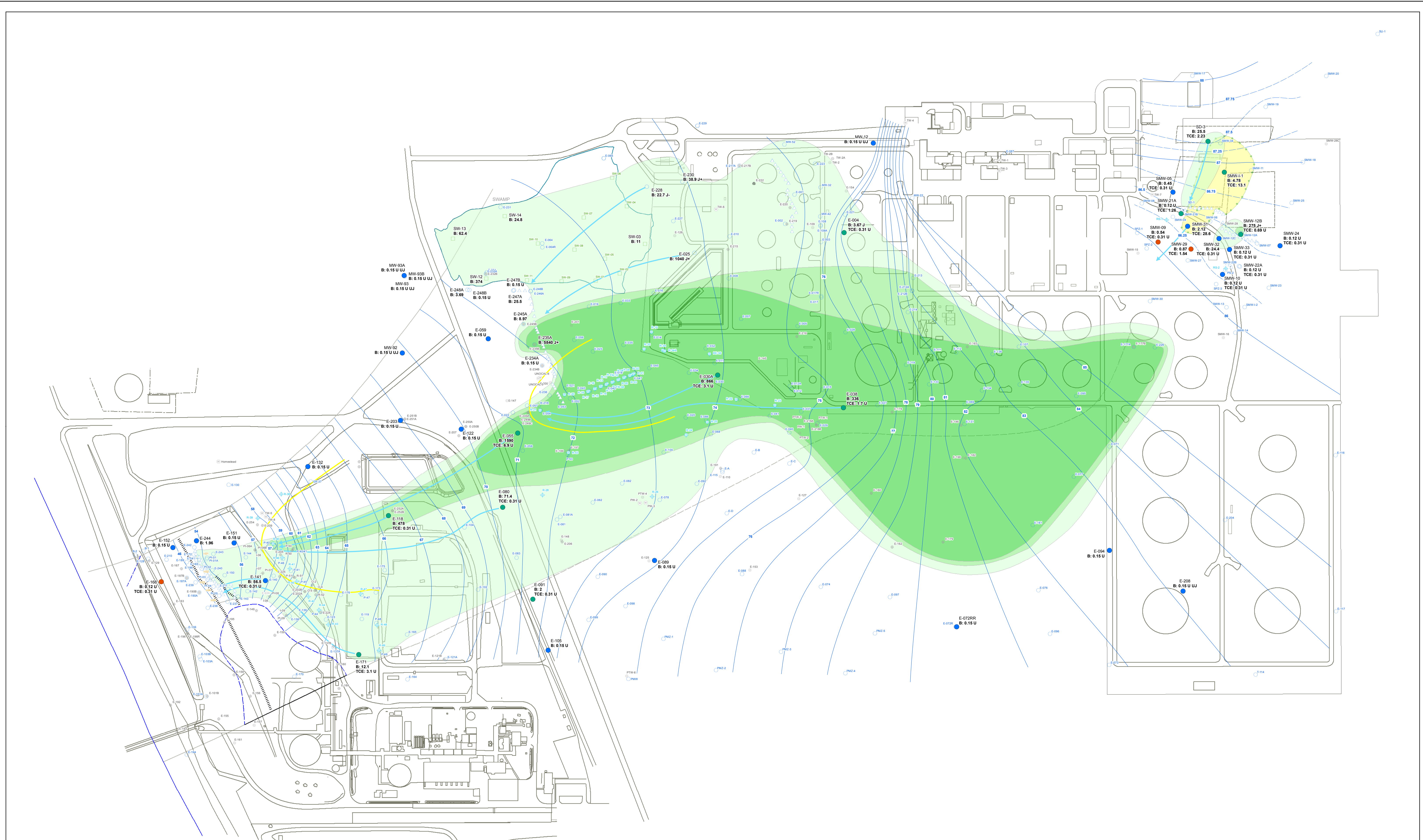


FIGURE D-9

**PRM CORRECTIVE MEASURE
PROCESS FLOW DIAGRAM**

**KENAI TESORO REFINERY
NIKISKI, ALASKA**

Drawn By: RJ Checked By: SP Scale: NONE Date: 9/15/2016 File: 36C-KENAI_INJECTIONBARRIER



EXPLANATION

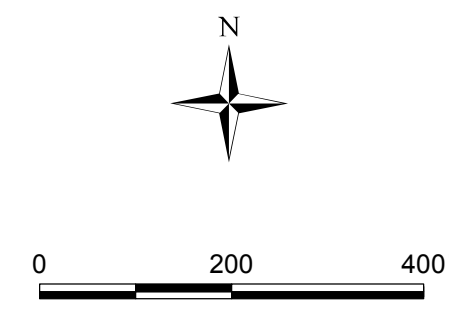
- | | |
|---|--|
| ● INDICATOR PARAMETER MONITORING WELL | — UNCONFINED AQUIFER CONTOUR |
| ● CONTAMINANT OF CONCERN MONITORING WELL | — IRREGULAR UNCONFINED AQUIFER CONTOUR |
| ● COMPLIANCE MONITORING WELL | — CAPTURE ZONE |
| ○ A-AQUIFER MONITORING WELL LOCATION | ▬ HYDRAULIC BARRIER |
| ⊕ RECOVERY WELL LOCATION | ■ BENZENE CONCENTRATION > 4.6 µg/L |
| ⊙ B-UNCONFINED AQUIFER MONITORING WELL LOCATION | ■ BENZENE CONCENTRATION > 100 µg/L |
| ⊙ UPPER CONFINED AQUIFER MONITORING WELL LOCATION | ■ BENZENE CONCENTRATION > 1,000 µg/L |
| ⊖ AIR SPARGE WELL | ■ ESTIMATED EXTENT OF TCE CONCENTRATIONS GREATER THAN 5 µg/L |

NOTES:

1. B = BENZENE
2. TCE = TRICHLOROETHENE
3. µg/L = MICROGRAMS PER LITER
4. U = EVALUATED TO BE UNDETECTED AT THE REPORTING LIMIT (x)

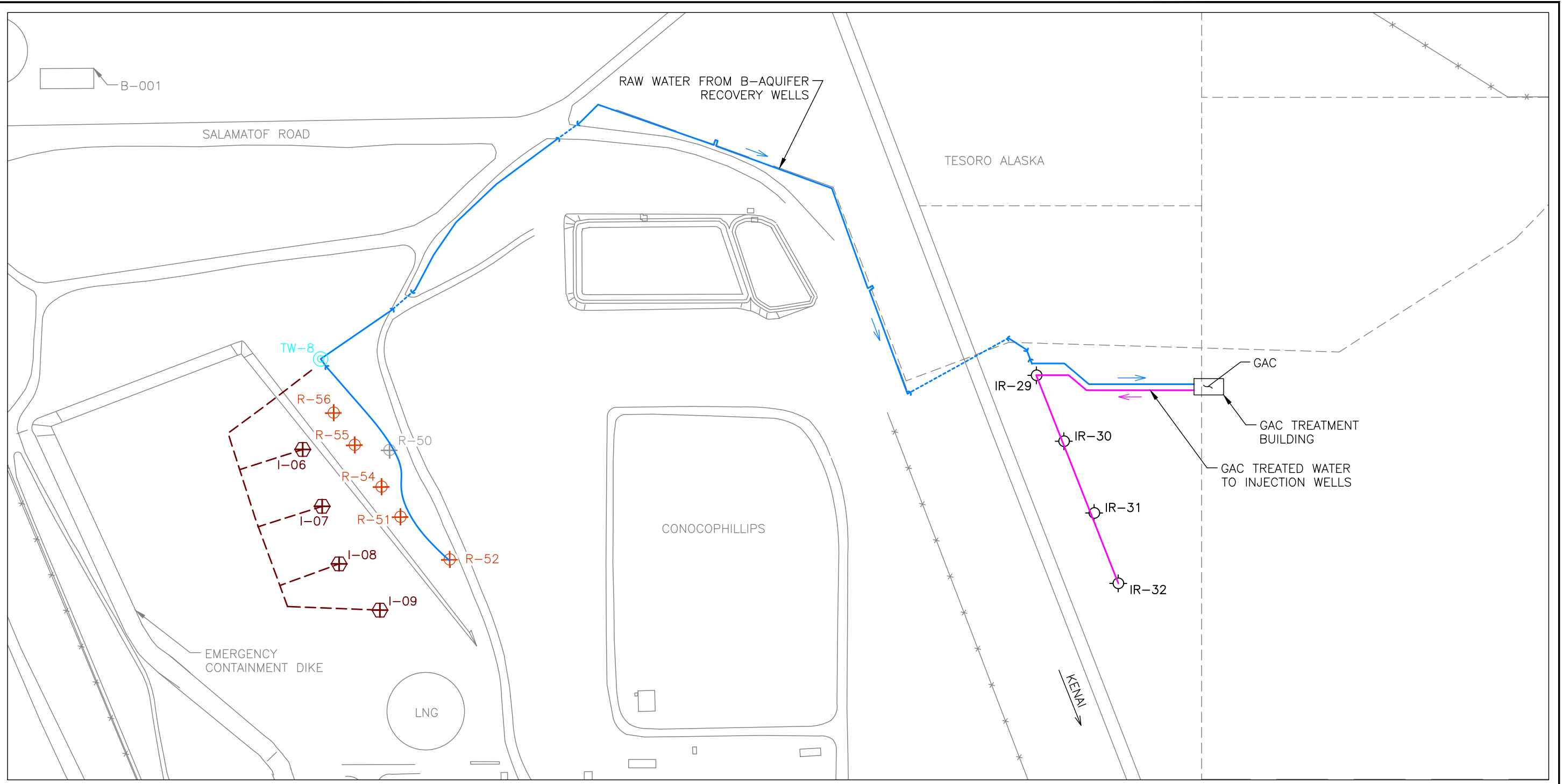
E-055
B: 1590
TCE: 6.9 U

WELL ID WITH BENZENE AND
TCE CONCENTRATION IN µg/L



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	A-AQUIFER INDICATOR PARAMETER CONCENTRATION MAP, MARCH 2017			
	TESORO KENAI REFINERY NIKISKI, ALASKA			
Drawn By: DH	Checked By: BLM	Scale: 1" = 200'	Date: 6/28/17	File: 2017Q2_RCRA_A-Aquifer.mxd

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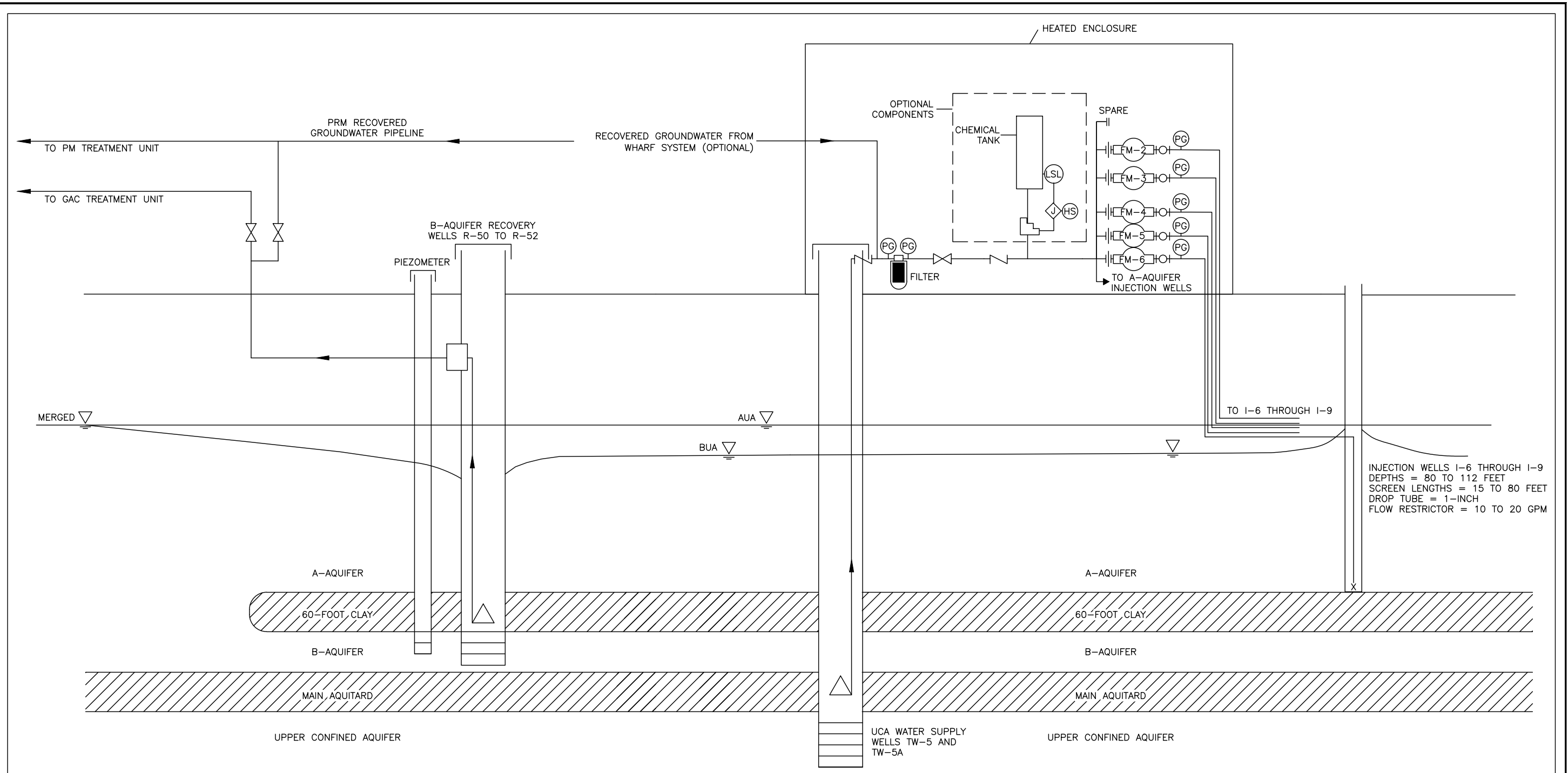
EXPLANATION

- | | | | |
|-------|--|--|--|
| TW-8 | PRODUCTION WELL AND DESIGNATION FOR PRM AND B-AQUIFER INJECTION SYSTEM | | B-AQUIFER RECOVERY WELL RAW WATER PIPELINE (DASHED WHERE SEGMENTS ARE UNDERGROUND) |
| R-52 | B-AQUIFER RECOVERY WELL AND DESIGNATION | | TREATED WATER PIPELINE |
| I-09 | B-AQUIFER INJECTION WELL AND DESIGNATION | | B-AQUIFER INJECTION WELL PIPELINE |
| R-50 | OFFLINE B-AQUIFER RECOVERY WELL AND DESIGNATION | | GRANULAR ACTIVATED CARBON |
| IR-32 | INJECTION WELL AND DESIGNATION | | LIQUID NATURAL GAS |
| | | | PHILLIPS REMEDIAL MEASURE |



 1252 Commerce Drive Laramie, Wyoming 82070 www.trihydro.com (P) 307/745.7474 (F) 307/745.7729	FIGURE D-11				
	B-AQUIFER CORRECTIVE MEASURE SYSTEM SITE MAP				
	KENAI TESORO REFINERY NIKISKI, ALASKA				
Drawn By: RJ	Checked By: SP	Scale: 1" = 200'	Date: 5/9/2017	File: 398-KR_B-AQUIFER_CORRECTIVEMEASURESYS_20170628	

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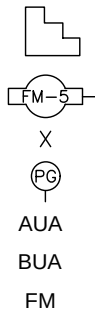


Source Drawing From: Kent & Sullivan Inc., 4/1/2007

EXPLANATION



GATE VALVE
CHECK VALVE
CONTROL VALVE
SUBMERSIBLE PUMP
LNAPL PUMP



POSITIVE DISPLACEMENT PUMP
FLOW METER
FLOW RESTRICTOR
PRESSURE GAUGE
A-AQUIFER
B-AQUIFER
FLOW METER
GRANULAR ACTIVATED CARBON

GPM GALLONS PER MINUTE
HS HAND SWITCH
J JUNCTION
LNAPL LIGHT NON-AQUEOUS PHASE LIQUID
LSL LOW SWITCH LEVEL
PG PRESSURE GAUGE
PRM PHILLIPS REMEDIAL MEASURE
PM PHILLIPS MARATHON
UCA UPPER CONFINED AQUIFER



FIGURE D-12

B-AQUIFER CORRECTIVE MEASURE
PROCESS FLOW DIAGRAM

KENAI TESORO REFINERY
NIKISKI, ALASKA

Drawn By: RJ Checked By: SP Scale: NONE Date: 9/7/2016 File: 36C-KENAI_B-AQUI-PANDID

EXPLANATION

- ⊙E-157 UPPER CONFINED AQUIFER MONITORING WELL LOCATION
- ⊙TW-5 PRODUCTION WELL LOCATION
- CORRECTIVE ACTION SAMPLING WELL
- CORRECTIVE ACTION AND COMPLIANCE MONITORING WELL
- GROUNDWATER CONTOUR BASED ON FEBRUARY 2005 DATA IN FEET MLLW
- APPROXIMATE EXTENT OF BENZENE CONCENTRATION GREATER THAN 5 μG/L BASED ON FEBRUARY 2005 DATA
- GAC GRANULAR ACTIVATED CARBON
- HEA HOMER ELECTRIC ASSOCIATION
- LNG LIQUID NATURAL GAS
- MLLW MEAN LOWER LOW WATER
- PM PHILLIPS MARATHON
- μG/L MICROGRAMS PER LITER
- UCA UPPER CONFINED AQUIFER

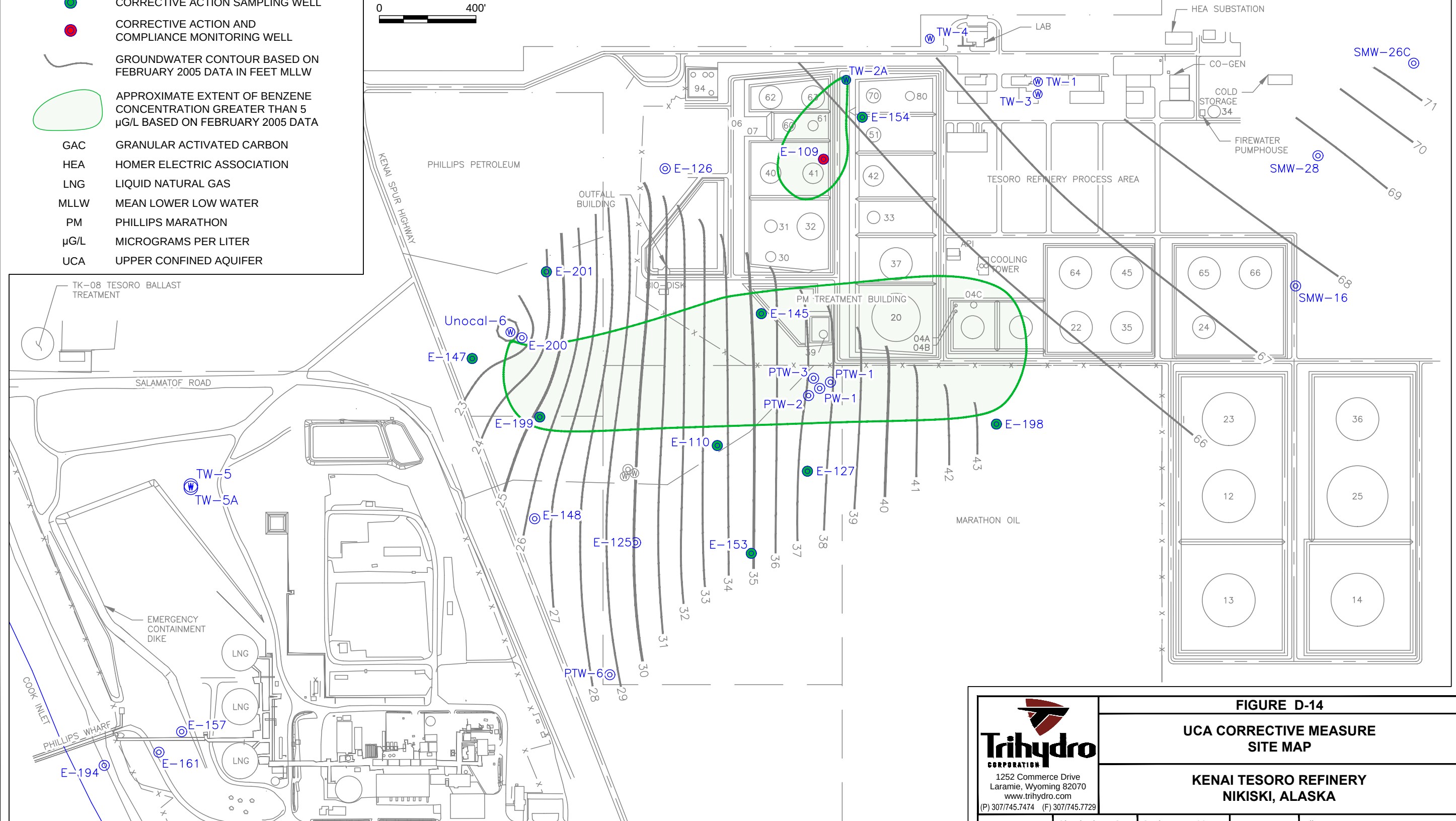
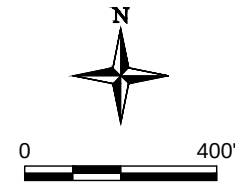


FIGURE D-14
UCA CORRECTIVE MEASURE
SITE MAP
KENAI TESORO REFINERY
NIKISKI, ALASKA

Drawn By: RJ | Checked By: SP | Scale: 1" = 400' | Date: 9/26/2016 | File: 36C-KENAI_CORRECTIVEMEASUREUCA

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Source Drawing From: Kent & Sullivan Inc., Circa 2007



EXPLANATION

- A-AQUIFER MONITORING WELL (UNCONFINED)

B-AQUIFER MONITORING WELL (UNCONFINED)

UCA MONITORING WELL (UPPER CONFINED)

SURFACE WATER SAMPLE

A-AQUIFER RECOVERY WELL

B-AQUIFER RECOVERY WELL

AIR SPARGE WELL
- A-AQUIFER INJECTION WELL

B-AQUIFER INJECTION WELL

UPPER CONFINED PRODUCTION WELL

INJECTION TRENCH

REMEDIATION SYSTEM BUILDING

SI CLOSED SURFACE IMPOUNDMENT

NOTES:
• IMAGE ATTRIBUTION: GOOGLE EARTH PRO, TERRAMETRICS, APRIL 17, 2011.

Trihydro

CORPORATION

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FIGURE D-15

WELL LOCATION SITE MAP

TESORO KENAI REFINERY
NIKISKI, ALASKA

Drawn By: DH

Checked By: SP

Scale: 1" = 180'

Date: 9/15/16

File: 201609_SiteMap_FigD-12.mxd