Western Refining Southwest LLC
A subsidiary of Marathon Petroleum Corporation
I-40 Exit 39
Jamestown, NM 87347

November 28, 2022

Mr. Rick Shean, Chief
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

RE: Heat Exchanger Bundle Pad Investigation Report
Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery
EPA ID #NMD000333211
HWB-WRG-21-013

Dear Mr. Shean:

Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery is submitting this Investigation Report for the Heat Exchanger Bundle Pad as requested in the New Mexico Environmental Department (NMED) Approval with Modifications Letter Dated April 19, 2022.

If you have any questions or comments regarding the information contained herein, please do not hesitate to contact Mr. John Moore at (505) 722-0205.

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction of supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,
Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery

Ruth A Cade

Ruth Cade
Vice President

Enclosure

cc: D. Cobrain, NMED HWB
L. Andress, NMED HWB
L. Barr, NMEC OCD
L. King, EPA Region 6
K. Luka, Marathon Petroleum Corporation
J. Moore, Marathon Gallup Refinery
H. Jones, Trihydro Corporation

Heat Exchanger Bundle Pad Investigation Report

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY

Gallup, New Mexico

EPA ID#
NMD000333211

November 28, 2022

Executive Summary

Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery (Refinery) is submitting this report detailing results from the May 2022 soil investigation in the vicinity of the Heat Exchanger Bundle Pad (Bundle Pad). The Bundle Pad is a concrete pad within Solid Waste Management Unit (SWMU) 3. While the Refinery was active, the Bundle Pad was used as an empty container storage area and to clean heat exchanger bundles. The Bundle Pad is now used to store transfer totes and vacuum truck supplies while the Refinery is idle. New Mexico Environment Department (NMED) provided an "Approval with Modifications, [Revised] Heat Exchanger Bundle Pad Investigation Work Plan" on April 19, 2022 (NMED 2022) which was used to conduct the investigation.

The NMED requested an investigation into the integrity of the sewer lines in the vicinity of the Bundle Pad in Comment 46 from the "Disapproval Annual Groundwater Monitoring Report Gallup Refinery – 2019" dated November 23, 2020 (NMED 2020), due to elevated benzene concentrations in groundwater monitoring well MKTF-16. The benzene concentrations in MKTF-16 suggested that the benzene source could be leaks from the process sewer line near the Bundle Pad. The process sewer runs south of the Bundle Pad and to the west with a sump in the central western area. NMED requested the investigation while the refinery is idled given the ability to access the area.

Prior to NMED's request and development of the work plan, the Refinery completed several preliminary tests in the process sewer near the Bundle Pad. This included the process sewer video/photo inspection in February 2020 and March 2021 dye tests near the Bundle Pad sewer. No sewer integrity issues were identified during the preliminary tests. The work plan was developed to further investigate the presence of elevated concentrations of benzene by installing and sampling soil borings in the area around the Bundle Pad. Fourteen soil borings were installed and 34 individual samples were collected at various depths using a geoprobe direct-push drill rig.

There were no Industrial or Construction Worker soil screening level (SSL) exceedances for volatile organic compounds. There were 4 samples with total petroleum hydrocarbons (TPH) – diesel range organics (DRO) and TPH – gasoline range organics (GRO) Construction worker SSL exceedances. However, the soil samples indicated higher TPH-DRO relative to TPH-GRO whereas the groundwater results for MKTF-16 show TPH-GRO concentrations higher (approximately an order of magnitude higher) than their TPH-DRO counterparts. The Refinery therefore concludes the benzene exceedances and TPH found in MKTF-16 are not a result of the Bundle Pad area sewer system.

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List of Acronyms

amsl	above mean sea level
bgs	below ground surface
DRO	diesel range organics
ft	feet
GRO	gasoline range organics
Bundle Pad	Heat Exchanger Bundle Pad
mg/kg	milligrams per kilograms
NMED	New Mexico Environment Department
ORO	motor oil range organics
PID	photoionization detector
Refinery	Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery
SPH	separate phase hydrocarbons
SSL	soil screening level
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

1.0 Introduction

The Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery (Refinery) is located approximately 17 miles east of Gallup, New Mexico along the north side of Interstate Highway I-40. The physical address is I-40, Exit #39 Jamestown, New Mexico 87347. The Refinery property covers approximately 810 acres.

The New Mexico Environment Department (NMED) requested an investigation into the integrity of the sewer lines in the vicinity of the Bundle Pad in Comment 46 from the "Disapproval Annual Groundwater Monitoring Report Gallup Refinery – 2019" dated November 23, 2020 (NMED 2020), due to elevated benzene concentrations in groundwater monitoring well MKTF-16. The benzene concentrations in MKTF-16 suggested that the benzene source could be leaks from the process sewer line near the Bundle Pad. The process sewer runs south of the Bundle Pad and to the west with a sump in the central western area. NMED requested the investigation while the refinery is idled given the ability to access the area.

Sampling was conducted in accordance with the revised work plan that was submitted to New Mexico Environment Department (NMED) on March 2, 2022. NMED provided an "Approval with Modifications, [Revised] Heat Exchanger Bundle Pad Investigation Work Plan" on April 19, 2022 (NMED 2022) which was used to conduct the investigation. This included the addition of several constituents to the analysis list for the laboratory. Western submitted the "Response to Approval with Modifications, [Revised] Heat Exchanger Bundle Pad Investigation Work Plan" on June 6, 2022 (Western 2022b) in agreement with NMED's modifications.

The Refinery is submitting this investigation report for the soil sampling completed in May 2022 around the Bundle Pad. The sampling was conducted to determine the extent of impact resulting from the Bundle Pad and surrounding process sewer lines. Results from the investigation are included herein.

1.1 Background

The Bundle Pad is located north of the truck loading rack, northwest of the process units, and southwest of the tank farm (Figure 1). The Bundle Pad is within the Solid Waste Management Unit (SWMU) 3 which was combined with the Empty Container Storage Area during the 2010-2013 Resource Conservation and Recovery Act (RCRA) Permit renewal (RPS 2014).

When the Refinery was active, the Bundle Pad was generally used to clean heat exchanger bundles. The drain along the west end of the Bundle Pad leads to a sump where collected wash water drains to the process sewer line (RPS 2014). There are no records of releases within the Bundle Pad footprint.

The general groundwater gradient in the area is to the west/northwest. As provided in the Investigation Work Plan, previous investigations to evaluate the integrity of the process sewer system were completed in the vicinity of the Bundle Pad, including:

- February 2020 - remote visual and cleaning inspection by Insta-Pipe
- March 2021 - dye test at the Bundle Pad sump

The March 2021 dye test was accomplished by plugging the inlets and outlet of the Bundle Pad sump and adding a mixture of green, fluorescent dye and water until the sump was full (photos included as Appendix A). The sump was inspected 24 hours later and no decrease in fluid level was noted, indicating that no leakage occurred. Additionally, no sewer integrity issues were identified during the 2020 remote visual and cleaning inspection (Appendix B).

2.0 Site Conditions

The Refinery has been indefinitely idled since August 2020. Historically, the Refinery generally processed crude oil transported to the facility by pipeline or tanker truck. While active, various process units were operated at the Refinery including crude distillation, reformer, fluidized catalytic cracker, alkylation, sulfur recovery, merox treater, and hydrotreater units. While the Refinery was active, the Bundle Pad was used for the cleaning of heat exchangers at the Refinery.

2.1 Surface Conditions

Local site topographic features include high ground in the southeast gradually decreasing to a lowland fluvial plain to the northwest. Elevations on the refinery property range from 6,860 ft above mean sea level (amsl) to 7,040 ft amsl. The Bundle Padis a concrete pad that sits at approximately 6,951 ft amsl. While the Refinery was active, the Bundle Pad was used as an empty container storage area and to clean heat exchanger bundles. The Bundle Pad is now used to store transfer totes and vacuum truck supplies while the Refinery is idle.

2.2 Subsurface Conditions

The shallow subsurface soil (alluvium) is comprised of clay and silt with some inter-bedded sand layers. Beneath the alluvium is the Petrified Forest Member of the Chinle Group, which primarily consists of interbedded mudstone, siltstone, and sandstone. The Alluvium/Chinle interface is as little as 15 ft below ground surface (bgs) to over 32 ft bgs. The depth to water in MKTF-16 has ranged between 8.22 ft bgs to 10.24 ft bgs during 2022. Wells within the vicinity of the Bundle Pad have had instances of separate phase hydrocarbons (SPH) during 2021 (Western 2022a). Wells that were sampled during 2021 within the vicinity of the Bundle Pad had detections of benzene greater than the NMED screening level for tap water (NMED 2021b).

3.0 Summary of Field Sampling Activities

Investigative activities were completed in May 2022. Soil borings were completed with a Geoprobe direct-push drill rig at 14 locations surrounding the Bundle Pad, and the total depth of each location ranged from 14 to 18 ft bgs (Figure 2). Soil cores were screened in the field for presence of volatiles using a photoionization detector (PID). The initial target depth for each boring was 15 ft bgs; however, boreholes were extended on an as-needed basis until the PID reading was less than 50 parts per million (Table 1). Visual and olfactory inspections were also used to assess if the boring total depth was adequate for vertical delineation. Boring logs are included as Appendix C.

Measurements taken from nearby access vaults (i.e., manholes) indicate that the Bundle Pad sump and process sewer lines in this area range between 10 and 14 ft bgs. At a minimum, soil samples were collected from the approximate bottom of the process sewer line and the bottom of each boring. Additional intervals were added based on PID readings and visual/olfactory inspections.

A total of 34 soil samples were collected from the 14 locations (HEB-01 through HEB-14). Historical groundwater results for monitoring well MKTF-16 were consulted to determine the appropriate analyte list, as requested by NMED in the "Approval with Modifications, [Revised] Heat Exchanger Bundle Pad Investigation Work Plan" (NMED 2022b). The list of volatile organic compounds (VOCs) is based on VOC groundwater exceedances at MKTF-16 between January 2017 and December 2021.

Soil samples were analyzed for VOCs by Method 8260 and for Total Petroleum Hydrocarbons (TPH) by 8015 as follows:

- VOCs by Method 8260
  - Benzene
  - 1,1-Dichloroethane
  - 1,4-Dioxane
  - Ethylbenzene
  - Methylene Chloride
  - Methyl tert-Butyl Ether
  - Naphthalene
  - Toluene
  - 1,2,4-Trimethylbenzene
  - 1,3,5-Trimethylbenzene
  - Vinyl Chloride
  - Xylenes, Total
- TPH by Method 8015
  - TPH - gasoline range organics (GRO)
  - TPH - diesel range organics (DRO)
  - TPH - motor oil range organics (ORO)

3.1 Work Plan Deviations

At location HEB-04, the sample collected at the 10 to 15 ft bgs interval was trapped inside the steel core and no sample was recovered. Due to the required clearance to ensure safety of the drilling and sampling team (i.e., ground penetrating radar and air knife exposure to 5 ft bgs) no additional boring was installed to replace HEB-04. However, an additional core was pushed within the HEB-04 boring, from approximately 15 to 18 ft bgs, and two samples were collected (15-16 ft bgs and 17.5-18 ft bgs).

4.0 Analytical Results

Analytical results were compared to NMED Residential, Industrial, and Construction Worker soil screening levels (SSLs). The following tables were prepared:

- Table 2 – TPH Results
- Table 3 – VOC Results
- Table 4 – Migration to Groundwater Results

Residential SSL exceedances are noted in the tables with bold text. All sample intervals are beneath 1 ft bgs; therefore the Industrial SSLs do not apply. Although Industrial SSL exceedances are not highlighted in the tables, it is important to note that the Industrial SSL and Construction Worker SSL are the same value, and Construction Worker SSL exceedances are noted in the tables with underlined text. Non-detect sample results in which the reporting limit exceeded applicable SSLs are noted with an asterisk (*) on Table 3. Given that the Refinery is an industrial site, Residential SSLs are not applicable screening levels based on the reasonably anticipated future land use remaining industrial .

Per NMED SSL guidance, soil leachate-based SSLs (SL-SSL) with a dilution attenuation factor (DAF) of 20 are compared to the maximum reported concentration as a first step screening assessment in Table 4. However, the Refinery has known impacts to groundwater, including the presence of separate phase hydrocarbons and an associated smear zone which can act as a long-term source to groundwater. For organic contaminants, vadose zone sources of hydrocarbons are expected to deplete before smear zone sources. The expectation for shorter longevity in the vadose zone can be attributed to several factors, including greater air saturation and less contaminant mass. Diffusive transport is faster in soils with higher air saturation (ITRC 2009), suggesting that mass removal of VOCs is faster in the vadose zone. The combination of less contaminant mass, faster transport rates, and high degradation potential suggest that shorter longevity in the vadose zone is a reasonable assumption. Therefore, it follows that soils overlying the smear zone may not require an interim response for the purpose of protecting groundwater. The Refinery proposes to conduct a holistic migration to groundwater analysis on a site-wide basis. As such, the results of the first step screening assessment reported on the tables are not further discussed in the text, and the ratios (maximum reported concentration divided by the SL-SSL) are not reported. However, as shown on Table 4, it is important to note that the intervals that exceed initial screening SL-SSLs are between 8 ft-bgs and 13 ft-bgs, indicative of a smear zone source given typical depth to groundwater in the area. Smear zone sources will also be addressed in a holistic site-wide manner as part of a future groundwater remedy evaluation.

4.1 Total Petroleum Hydrocarbons

A complete list of TPH results are provided in Table 2. There were 4 samples with TPH Construction Worker SSL exceedances and 8 samples with Residential SSL exceedances out of 34 individual samples. There were exceedances of both TPH-GRO and TPH-DRO which have applicable Construction Worker

SSLs of 500 milligrams per kilogram (mg/kg) and 3,000 mg/kg, respectively. The Construction Worker SSL exceedances are shown on Figure 3 and are as follows:

- TPH-GRO
  - HEB-01 (14-15 ft) = 651 mg/kg
  - HEB-02 (10-12 ft) = 1,750 mg/kg
  - HEB-04 (8-9 ft) = 1,190 mg/kg
  - HEB-02 (10-12 ft) = 3,140 mg/kg
  - HEB-12 (12-13 ft) = 6,700 mg/kg
- TPH-DRO

4.2 Volatile Organic Compounds

The VOC analyte list was determined by evaluating VOC exceedances in groundwater at nearby monitoring well MKTF-16 (Figure 2) between January 2017 and December 2021 (i.e., the most recent five-year period at the time of Work Plan creation) as requested by NMED in Comment #1 to the "Approval with Modifications, [Revised] Heat Exchanger Bundle Pad Investigation Work Plan" (NMED 2022b).

VOC results are provided in Table 3. Out of the 34 individual samples, there were no samples with Construction Worker SSL exceedances for any of the analyzed constituents.

5.0 Conclusions and Recommendations

Prior to NMED's request and development of the work plan, the Refinery completed several preliminary tests in the process sewer near the Bundle Pad. This included process sewer video/photo inspection in February 2020 and March 2021 dye tests near the Bundle Pad sewer. These tests concluded that no sewer integrity issues were identified.

While there are detections of hydrocarbon-related constituents in the soil, the soils do not pose a risk to industrial or construction workers. Given that the NMED screening level is based on human health considerations related to direct soil exposure (NMED 2022b), as well as assumptions about the composition of the hydrocarbon, the Refinery proposed to develop an alternate screening level for TPH-GRO. The alternate screening level for GRO would follow the TPH Criteria Work Group guidance for development, based on site specific exposure scenarios and chemical composition information for the heat exchanger bundle pad.

At this time, no additional soil samples are recommended in the vicinity of the Bundle Pad to further investigate the groundwater results at MKTF-16. Future investigations into the integrity of the process sewer system will be conducted in accordance with Comment #3 from the "Disapproval, Response to Disapproval, Revised Investigation Work Plan No. 2 Area of Concern 35" (NMED 2021a). The current exceedances of benzene in MKTF-16 will be addressed sitewide as discussed in Section 5.0. with a holistic analysis on a site-wide basis.

Analytical and inspection results do not indicate that the impacts observed at MKTF-16 originate from the process sewer system. Many of the VOC constituents with relatively high groundwater concentrations in MKTF-16 were either not detected or were detected at low levels in the soil samples. Benzene was detected at 4,800 mg/L in the groundwater at MKTF-16 during September 2021 and the highest concentration of benzene in the soil during this investigation was 1.34 mg/kg in HEB-02. Additionally, the soils samples indicated higher TPH-DRO relative to TPH-GRO (note that the majority of the TPH detections were below applicable limits) with the exception of HEB-01. However, in the groundwater results for MKTF-16, the TPH-GRO concentrations are higher (approximately an order of magnitude higher) than their TPH-DRO counterparts. The highest TPH-DRO detection was 6700 mg/kg at HEB-12, east of the Bundle Pad off the process sewer line. Therefore, the soil results collected during this investigation do not support a connection between the groundwater conditions at MKTF-16 and the process sewer system in the Bundle Pad area or the Bundle Pad sump.

6.0 References

ITRC. 2009. Evaluating Natural Source Zone Depletion at Sites with LNAPL. ITRC LNAPL Team. April.

New Mexico Environment Department (NMED). 2020. Disapproval, Annual Groundwater Monitoring Report Gallup Refinery – 2019, Western Refining Southwest LLC, Marathon Gallup Refinery, EPA ID# NMD000333211, HWB-WRG-20-013. November 23.

NMED. 2021a. Disapproval, Revised Investigation Work Plan No. 2 Area of Concern 35. Western Refining Southwest LLC, Gallup Refinery, McKinley County, Gallup, New Mexico, EPA ID# NMD000333211, HWB-WRG-20-009. October 20.

NMED. 2021b. Risk Assessment Guidance for Investigations and Remediation, Tables A-1 and 6-4. November.

NMED. 2022. Approval with Modifications, [Revised] Heat Exchanger Bundle Pad Investigation Work Plan, Western Refining Southwest LLC (dba Marathon Gallup Refinery), EPA ID# NMD000333211, HWB-WRG-21-012. April 19.

RPS. 2014. Investigation Work Plan, SWMU No. 3 Empty Container Storage Area/Heat Exchanger Bundle Cleaning Pad, Gallup Refinery, Western Refining Southwest, Inc., Gallup, New Mexico, EPA ID# NMD000333211, February.

Western Refining Southwest LLC (Western). 2022a. 2021 Annual Groundwater Monitoring Report, Western Refining Southwest LLC (dba Marathon Gallup Refinery), EPA ID# NMD000333211

Western. 2022b. Response to Approval with Modifications, [Revised] Heat Exchanger Bundle Pad Investigation Work Plan, Western Refining Southwest LLC (dba Marathon Gallup Refinery), EPA ID# NMD000333211, HWB-WRG-21-013. June 6.

Figures

Image Cite: USDA /fsa – Aerial Photography Field Office, NAIP MrSID – Publication: 2014

2 SOIL BORING LOCATIONS
SCALE: 1" = 30'

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0 30'

Image Cite: USDA /fsa – Aerial Photography Field Office, NAIP MrSID – Publication: 2014

1 KEY MAP
SCALE: 1" = 800'

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0 800'

EXPLANATION

- MKTF-16 — CHINLE/ALLUVIUM INTERFACE WELL AND DESIGNATION
- MANHOLE LOCATION
- SWMU 3 LOCATION
- S — PROCESS SEWER LINE
- BUNDLE PAD SUMP
- TANK

Trihydro CORPORATION
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FIGURE 1
HEAT EXCHANGER BUNDLE PAD LOCATION
HEAT EXCHANGER BUNDLE PAD
INVESTIGATION REPORT
WESTERN REFINING SOUTHWEST, LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: BB	Scale: AS SHOWN	Date: 10/5/22	File: 697-BUNDLEPADLOC-202209

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Image Cite: USDA /fsa – Aerial Photography Field Office, NAIP MrSID – Publication: 2014

EXPLANATION

- HEB–8 — BUNDLE PAD INVESTIGATION SOIL BORING LOCATION (MAY 2022)
- MKTF–16 — CHINLE/ALLUVIUM INTERFACE WELL AND DESIGNATION
- MANHOLE LOCATION
- SWMU 3 LOCATION
- S — PROCESS SEWER LINE
- BUNDLE PAD SUMP
- TANK

N

0 30'

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FIGURE 2
SAMPLE LOCATIONS
HEAT EXCHANGER BUNDLE PAD
INVESTIGATION REPORT
WESTERN REFINING SOUTHWEST, LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

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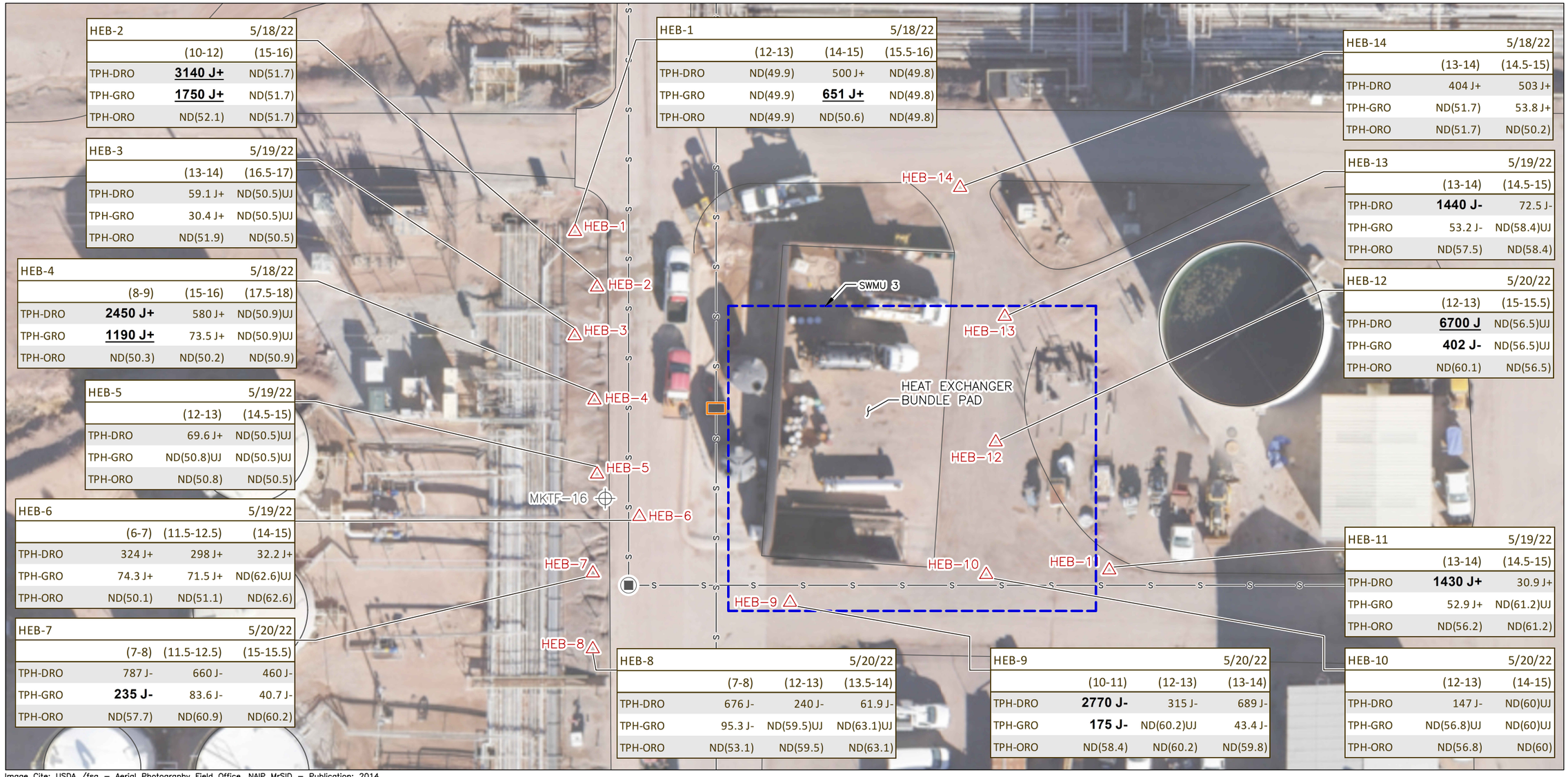

HEB-2		5/18/22
	(10-12)	(15-16)
TPH-DRO	**3140 J+**	ND(51.7)
TPH-GRO	**1750 J+**	ND(51.7)
TPH-ORO	ND(52.1)	ND(51.7)

HEB-3		5/19/22
	(13-14)	(16.5-17)
TPH-DRO	59.1 J+	ND(50.5)UJ
TPH-GRO	30.4 J+	ND(50.5)UJ
TPH-ORO	ND(51.9)	ND(50.5)

HEB-4			5/18/22
	(8-9)	(15-16)	(17.5-18)
TPH-DRO	**2450 J+**	580 J+	ND(50.9)UJ
TPH-GRO	**1190 J+**	73.5 J+	ND(50.9)UJ
TPH-ORO	ND(50.3)	ND(50.2)	ND(50.9)

HEB-5		5/19/22
	(12-13)	(14.5-15)
TPH-DRO	69.6 J+	ND(50.5)UJ
TPH-GRO	ND(50.8)UJ	ND(50.5)UJ
TPH-ORO	ND(50.8)	ND(50.5)

HEB-6			5/19/22
	(6-7)	(11.5-12.5)	(14-15)
TPH-DRO	324 J+	298 J+	32.2 J+
TPH-GRO	74.3 J+	71.5 J+	ND(62.6)UJ
TPH-ORO	ND(50.1)	ND(51.1)	ND(62.6)

HEB-7			5/20/22
	(7-8)	(11.5-12.5)	(15-15.5)
TPH-DRO	787 J-	660 J-	460 J-
TPH-GRO	**235 J-**	83.6 J-	40.7 J-
TPH-ORO	ND(57.7)	ND(60.9)	ND(60.2)

HEB-1			5/18/22
	(12-13)	(14-15)	(15.5-16)
TPH-DRO	ND(49.9)	500 J+	ND(49.8)
TPH-GRO	ND(49.9)	**651 J+**	ND(49.8)
TPH-ORO	ND(49.9)	ND(50.6)	ND(49.8)

HEB-14		5/18/22
	(13-14)	(14.5-15)
TPH-DRO	404 J+	503 J+
TPH-GRO	ND(51.7)	53.8 J+
TPH-ORO	ND(51.7)	ND(50.2)

HEB-13		5/19/22
	(13-14)	(14.5-15)
TPH-DRO	**1440 J-**	72.5 J-
TPH-GRO	53.2 J-	ND(58.4)UJ
TPH-ORO	ND(57.5)	ND(58.4)

HEB-12		5/20/22
	(12-13)	(15-15.5)
TPH-DRO	**6700 J**	ND(56.5)UJ
TPH-GRO	**402 J-**	ND(56.5)UJ
TPH-ORO	ND(60.1)	ND(56.5)

HEB-11		5/19/22
	(13-14)	(14.5-15)
TPH-DRO	**1430 J+**	30.9 J+
TPH-GRO	52.9 J+	ND(61.2)UJ
TPH-ORO	ND(56.2)	ND(61.2)

HEB-10		5/20/22
	(12-13)	(14-15)
TPH-DRO	147 J-	ND(60)UJ
TPH-GRO	ND(56.8)UJ	ND(60)UJ
TPH-ORO	ND(56.8)	ND(60)

HEB-8			5/20/22
	(7-8)	(12-13)	(13.5-14)
TPH-DRO	676 J-	240 J-	61.9 J-
TPH-GRO	95.3 J-	ND(59.5)UJ	ND(63.1)UJ
TPH-ORO	ND(53.1)	ND(59.5)	ND(63.1)

HEB-9			5/20/22
	(10-11)	(12-13)	(13-14)
TPH-DRO	**2770 J-**	315 J-	689 J-
TPH-GRO	**175 J-**	ND(60.2)UJ	43.4 J-
TPH-ORO	ND(58.4)	ND(60.2)	ND(59.8)

Image Cite: USDA /fsa – Aerial Photography Field Office, NAIP MrSID – Publication: 2014

ANALYTE TABLE EXPLANATION

HEB-1		5/18/22
		(1-4)
TPH-DRO	1000	3000
TPH-GRO	100	500
TPH-ORO	1000	3800

Soil Boring Designation; Sample Date; Sample Interval (FT BGS); TPH-Diesel Range Organics; TPH-Gasoline Range Organics; TPH-Oil Range Organics; NMED Residential SSL (mg/kg); NMED Construction Worker SSL (mg/kg)

EXPLANATION

- HEB-8 — BUNDLE PAD INVESTIGATION SOIL BORING LOCATION (MAY 2022)
- MKTF-16 — CHINLE/ALLUVIUM INTERFACE WELL AND DESIGNATION
- MANHOLE LOCATION
- SWMU 3 LOCATION
- S — PROCESS SEWER LINE
- BUNDLE PAD SUMP
- TANK
- FT BGS — FEET BELOW GROUND SURFACE
- TPH — TOTAL PETROLEUM HYDROCARBONS

NOTES:

1. NMED = NEW MEXICO ENVIRONMENT DEPARTMENT
2. ND(X) = NOT DETECTED AT THE REPORTING LIMIT, WHERE (X) DENOTES THE REPORTING LIMIT CONCENTRATION
3. VALUES SHOWN IN **BOLD AND BLACK COLOR** EXCEED NMED RESIDENTIAL SSL
4. VALUES SHOWN IN **BOLD, BLACK, AND UNDERLINED** EXCEED NMED CONSTRUCTION WORKER SSL
5. J = ESTIMATED CONCENTRATION
6. J- = ESTIMATED CONCENTRATION, VALUE BIAS LOW
7. J+ = ESTIMATED CONCENTRATION, VALUE BIAS HIGH
8. UJ = ESTIMATED REPORTING LIMIT
9. MG/KG = MILLIGRAMS PER KILOGRAM

N

0 30'

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FIGURE 3

TOTAL PETROLEUM HYDROCARBONS SOIL ANALYTICAL RESULTS, HEAT EXCHANGER BUNDLE PAD, INVESTIGATION REPORT

WESTERN REFINING SOUTHWEST, LLC D/B/A MARATHON GALLUP REFINERY GALLUP, NEW MEXICO

Drawn By: REP	Checked By: BB	Scale: 1" = 30'	Date: 10/5/22	File: 697-BUNDLEPADINVTPH-SOIL-202209

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Tables

TABLE 1. SAMPLING LOCATIONS, DEPTHS, AND PID READINGS
HEAT EXCHANGER BUNDLE PAD INVESTIGATION REPORT
WESTERN REFINING SOUTHWEST LLC, D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Sample ID	Sample depth (ft bgs)	PID reading (ppm)
HEB-01	6	91.4
	7	105.0
	8	47.3
	9	32.5
	10	170.6
	13	**6.8**
	14	**141.4**
	16	**1.2**
HEB-02	6	2.9
	7	20.7
	8	109.4
	9	217.1
	10	**292.7**
	12	262.3
	13	43.2
	14	134.9
	15	48.2
	16	**9.0**
HEB-03	6	121.2
	7	78.5
	8	379.0
	9	316.9
	10	377.9
	11	424.3
	12	442.5
	13	445.1
	14	**448.2**
	14.5	104.0
	15.5	60.6
	16.5	121.9
	17	**13.5**
HEB-04	6	40.8
	8	208.0
	9	**290.0**
	10	228.3
	16	**183.3**
	17	66.6
	18	**2.8**
HEB-05	6	80.5
	7	185.2
	8	119.3
	10	234.1
	11	85.3
	12	21.6
	13	**124.8**
	14	23.3
	15	**16.0**
HEB-06	**7**	**407.2**
	8	394.1
	10	104.8
	12.5	**378.4**
	14	315.7
	15	**13.1**
HEB-07	6	337.9
	7	304.1
	8	**362.7**
	9	188.9
	10	78.4
	11	8.2
	12	**40.6**
	13	63.2
	14	78.9
	15	59.9
	15.5	**48.2**

Sample ID	Sample depth (ft bgs)	PID reading (ppm)
HEB-08	6	261.7
	7	358.9
	8	**376.7**
	9	290.4
	10	125.3
	12	19.0
	13	**63.8**
	14	**22.8**
HEB-09	6	15.2
	8	127.4
	9	108.3
	10	89.0
	11	**128.4**
	12	46.4
	13	**44.6**
	14	**24.3**
HEB-10	8	0.5
	9	0.6
	10	84.3
	11	117.4
	12	**88.5**
	13	30.2
	14	4.2
	15	**1.4**
HEB-11	7	0.0
	9	0.0
	11	25.5
	12	21.9
	13	15.6
	14	**76.6**
	15	**14.8**
HEB-12	7	0.2
	8	67.5
	9	60.4
	10	135.7
	11	146.6
	12	68.4
	13	**160.2**
	14	56.3
	15	**5.5**
HEB-13	7	0.9
	9	64.2
	10	109.4
	12	121.4
	14	**147.2**
	15	**9.4**
HEB-14	6	0.0
	8	57.4
	10	135.3
	11	111.1
	14	**136.1**
	14.5	88.9
	15	**43.2**

Notes:
ft bgs - Foot/feet below ground surface
ppm - Parts per million
PID - Photoionization detector
Analytical samples noted in bold

TABLE 2. TPH RESULTS, HEAT EXCHANGER BUNDLE PAD INVESTIGATION REPORT
WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Location ID	Date Sampled	Start Depth (ft-bgs)	End Depth (ft-bgs)	Diesel Range Organics (mg/kg)	Gasoline Range Organics (mg/kg)	Oil Range Organics (mg/kg)
HEB-01 (12-13 ft)	05/18/22	12	13	ND(49.9)	ND(49.9)	ND(49.9)
HEB-01 (14-15 ft)	05/18/22	14	15	500 J+	**651 J+**	ND(50.6)
HEB-01 (15.5-16 ft)	05/18/22	15.5	16	ND(49.8)	ND(49.8)	ND(49.8)
HEB-02 (10-12 ft)	05/18/22	10	12	**3140 J+**	**1750 J+**	ND(52.1)
HEB-02 (15-16 ft)	05/18/22	15	16	ND(51.7)	ND(51.7)	ND(51.7)
HEB-03 (13-14 ft)	05/19/22	13	14	59.1 J+	30.4 J+	ND(51.9)
HEB-03 (16.5-17 ft)	05/19/22	16.5	17	ND(50.5) UJ	ND(50.5) UJ	ND(50.5)
HEB-04 (8-9 ft)	05/18/22	8	9	**2450 J+**	**1190 J+**	ND(50.3)
HEB-04 (15-16 ft)	05/19/22	15	16	580 J+	73.5 J+	ND(50.2)
HEB-04 (17.5-18 ft)	05/19/22	17.5	18	ND(50.9) UJ	ND(50.9) UJ	ND(50.9)
HEB-05 (12-13 ft)	05/19/22	12	13	69.6 J+	ND(50.8) UJ	ND(50.8)
HEB-05 (14.5-15 ft)	05/19/22	14.5	15	ND(50.5) UJ	ND(50.5) UJ	ND(50.5)
HEB-06 (6-7 ft)	05/19/22	6	7	324 J+	74.3 J+	ND(50.1)
HEB-06 (11.5-12.5 ft)	05/19/22	11.5	12.5	298 J+	71.5 J+	ND(51.1)
HEB-06 (14-15 ft)	05/19/22	14	15	32.2 J+	ND(62.6) UJ	ND(62.6)
HEB-07 (7-8 ft)	05/19/22	7	8	787 J-	**235 J-**	ND(57.7)
HEB-07 (11.5-12.5 ft)	05/20/22	11.5	12.5	660 J-	83.6 J-	ND(60.9)
HEB-07 (15-15.5 ft)	05/20/22	15	15.5	460 J-	40.7 J-	ND(60.2)
HEB-08 (7-8 ft)	05/20/22	7	8	676 J-	95.3 J-	ND(53.1)
HEB-08 (12-13 ft)	05/20/22	12	13	240 J-	ND(59.5) UJ	ND(59.5)
HEB-08 (13.5-14 ft)	05/20/22	13.5	14	61.9 J-	ND(63.1) UJ	ND(63.1)
HEB-09 (10-11 ft)	05/20/22	10	11	**2770 J-**	**175 J-**	ND(58.4)
HEB-09 (12-13 ft)	05/20/22	12	13	315 J-	ND(60.2) UJ	ND(60.2)
HEB-09 (13-14 ft)	05/20/22	13	14	689 J-	43.4 J-	ND(59.8)
HEB-10 (12-13 ft)	05/20/22	12	13	147 J-	ND(56.8) UJ	ND(56.8)
HEB-10 (14-15 ft)	05/20/22	14	15	ND(60) UJ	ND(60) UJ	ND(60)
HEB-11 (13-14 ft)	05/19/22	13	14	**1430 J+**	52.9 J+	ND(56.2)
HEB-11 (14.5-15 ft)	05/19/22	14.5	15	30.9 J+	ND(61.2) UJ	ND(61.2)
HEB-12 (12-13 ft)	05/20/22	12	13	**6700 J**	**402 J-**	ND(60.1)
HEB-12 (15-15.5 ft)	05/20/22	15	15.5	ND(56.5) UJ	ND(56.5) UJ	ND(56.5)
HEB-13 (13-14 ft)	05/19/22	13	14	**1440 J-**	53.2 J-	ND(57.5)
HEB-13 (14.5-15 ft)	05/19/22	14.5	15	72.5 J-	ND(58.4) UJ	ND(58.4)
HEB-14 (13-14 ft)	05/18/22	13	14	404 J+	ND(51.7)	ND(51.7)
HEB-14 (14.5-15 ft)	05/18/22	14.5	15	503 J+	53.8 J+	ND(50.2)
NMED Residential Soil Screening Level (all depths) (exceedances in bold text)				1000	100	1000
NMED Industrial Soil Screening Level (0-1 ft-bgs) (all samples are below 1 ft so Industrial SSLs do not apply)				3000	500	3800
NMED Construction Worker Soil Screening Level (1-10 ft-bgs) (exceedances underlined)				3000	500	3800

ft-bgs - feet below ground surface
J - estimated concentration
J- - estimated concentration, value biased low
J+ - estimated concentration, value biased high
mg/kg - milligrams per kilogram
ND(X) - not detected at the reporting limit, where (X) denotes the reporting limit concentration
NMED - New Mexico Environment Department
TPH - total petroleum hydrocarbons
UJ - estimated reporting limit

Notes:
1. Screening level source: NMED Risk Assessment Guidance for Site Investigations and Remediation (June 2022) - Table 6-2

TABLE 3. VOC RESULTS, HEAT EXCHANGER BUNDLE PAD INVESTIGATION REPORT
WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Location ID	Date Sampled	Start Depth (ft-bgs)	End Depth (ft-bgs)	Benzene (mg/kg)	1,1-Dichloroethane (mg/kg)	1,4-Dioxane (mg/kg)	Ethylbenzene (mg/kg)	Methylene Chloride (mg/kg)	Methyl tert-butyl ether (mg/kg)	Naphthalene (mg/kg)	Toluene (mg/kg)	1,2,4-Trimethylbenzene (mg/kg)	1,3,5-Trimethylbenzene (mg/kg)	Vinyl Chloride (mg/kg)	m,p-Xylene (mg/kg)	o-Xylene (mg/kg)	Xylenes, Total (mg/kg)
HEB-01 (12-13 ft)	05/18/22	12	13	ND(0.000994) UJ	ND(0.00497)	ND(0.0994)	0.00173	ND(0.0199)	ND(0.00497)	0.0202	ND(0.00497)	0.0293	ND(0.00497)	ND(0.00497)	0.00192 J	ND(0.000994)	0.00192 J
HEB-01 (14-15 ft)	05/18/22	14	15	0.763 J	ND(1.01)	ND(20.2)	10.9	ND(4.04)	ND(1.01)	1.37 J	ND(1.01)	4.9	5.22	**ND(1.01)**	15.6	0.201 J	15.8
HEB-01 (15.5-16 ft)	05/18/22	15.5	16	ND(0.00101) UJ	ND(0.00505)	ND(0.101)	ND(0.00101)	ND(0.0202)	ND(0.00505)	ND(0.0101)	ND(0.00505)	ND(0.00502)	ND(0.00505)	ND(0.00505)	ND(0.00202)	ND(0.00101)	ND(0.00202)
HEB-02 (10-12 ft)	05/18/22	10	12	1.34 J	ND(1.04)	ND(20.8)	26.6	ND(4.16)	ND(1.04)	10.2 J	0.316 J	128	21	**ND(1.04)**	133	23.3	156
HEB-02 (15-16 ft)	05/18/22	15	16	0.0032 J	ND(0.00515)	ND(0.103)	0.00064 J	ND(0.0206)	0.00289 J	ND(0.0103)	ND(0.00515)	ND(0.00515)	ND(0.00515)	ND(0.00515)	ND(0.00206)	ND(0.00103)	ND(0.00206)
HEB-03 (13-14 ft)	05/19/22	13	14	0.298 J	ND(1.04)	ND(20.9)	3.16 J	ND(4.17)	ND(1.04)	0.973 J	ND(1.04)	8.2 J	2.08 J	**ND(1.04)**	7.09 J	0.642 J	7.73 J
HEB-03 (16.5-17 ft)	05/19/22	16.5	17	0.00997	ND(0.0051)	ND(0.102)	0.0207	ND(0.0204)	0.000956 J	0.0106	ND(0.0051)	0.0751	0.0112	ND(0.0051)	0.0146	0.00217	0.0168
HEB-04 (8-9 ft)	05/18/22	8	9	0.652 J	ND(1.01)	ND(20.1)	17.8	ND(4.02)	ND(1.01)	8.3	2.38	80.3	17.2	**ND(1.01)**	92.6	30.5	123
HEB-04 (15-16 ft)	05/19/22	15	16	0.236	ND(1.02)	ND(20.4)	3.87	ND(4.08)	ND(1.02)	1.3 J	ND(1.02)	6.72	1.74	**ND(1.02)**	5.94	1.02	6.96
HEB-04 (17.5-18 ft)	05/19/22	17.5	18	0.0162	ND(0.00514)	ND(0.103)	0.0142	ND(0.0206)	0.00258 J	0.0102 J	0.00132 J	0.024	0.00593	ND(0.00514)	0.0189	0.00387	0.0228
HEB-05 (12-13 ft)	05/19/22	12	13	0.457	ND(0.127)	ND(2.54)	0.882	ND(0.509)	0.0247 J	0.3	0.111 J	2.16	0.703	ND(0.127)	1.55	0.165	1.72
HEB-05 (14.5-15 ft)	05/19/22	14.5	15	0.0812	ND(0.127)	ND(2.54)	0.313	ND(0.509)	ND(0.127)	0.138 J	0.0745 J	0.817	0.214	ND(0.127)	0.518	0.0757	0.594
HEB-06 (6-7 ft)	05/19/22	6	7	ND(0.202)	ND(1.01)	ND(20.2)	1.44	ND(4.05)	ND(1.01)	2.52	ND(1.01)	10.8	3.42	**ND(1.01)**	4.62	1.13	5.75
HEB-06 (11.5-12.5 ft)	05/19/22	11.5	12.5	0.542	ND(1.04)	ND(20.7)	9.71	1.18 J	ND(1.04)	3.63	0.234 J	19.8	5.27	**ND(1.04)**	10.8	0.702	11.5
HEB-06 (14-15 ft)	05/19/22	14	15	0.00142	ND(0.00632)	ND(0.126)	0.045	0.00593 J	0.00264 J	0.0494	0.00132 J	0.822	0.0769	ND(0.00632)	0.0955	0.00485	0.1
HEB-07 (7-8 ft)	05/19/22	7	8	ND(0.231)	ND(1.15)	ND(23.1)	4.82	ND(4.62)	ND(1.15)	3.9	ND(1.15)	30.1 J-	8.31	**ND(1.15)**	12.8 J-	ND(0.231)	12.8
HEB-07 (11.5-12.5 ft)	05/20/22	11.5	12.5	0.0141 J+	ND(0.00606)	ND(0.121)	0.94 J	0.00581 J+	ND(0.00606)	0.127 J+	0.0137 J+	2.95	0.549	ND(0.00606)	0.74 J	0.103	0.843 J
HEB-07 (15-15.5 ft)	05/20/22	15	15.5	0.00737 J	ND(0.149)	ND(2.99)	0.38 J	0.203 J	ND(0.149)	0.764	0.0781 J	2.63 J-	0.707	ND(0.149)	0.381 J-	0.0698	0.451 J
HEB-08 (7-8 ft)	05/20/22	7	8	ND(0.213)	ND(1.07)	ND(21.3)	0.759 J	ND(4.27)	ND(1.07)	2.66	ND(1.07)	11.8 J-	3.25 J	**ND(1.07)**	2.2 J-	ND(0.213)	2.2 J
HEB-08 (12-13 ft)	05/20/22	12	13	ND(0.00119)	ND(0.00594)	ND(0.119)	0.0243 J	0.00672 J	ND(0.00594)	0.0984	ND(0.00594)	0.817	0.0824	ND(0.00594)	0.0308 J-	0.00407	0.0349 J
HEB-08 (13.5-14 ft)	05/20/22	13.5	14	0.00142	ND(0.00632)	ND(0.126)	0.0463 J	0.00623 J	ND(0.00632)	0.114	ND(0.00632)	0.608	0.123	ND(0.00632)	0.0408 J-	0.00579	0.0466 J
HEB-09 (10-11 ft)	05/20/22	10	11	0.0129 J	ND(0.148)	ND(2.95)	0.622 J	ND(0.59)	ND(0.148)	1.64	0.0829 J	7.04	1.34	ND(0.148)	0.71 J	0.127	0.837 J
HEB-09 (12-13 ft)	05/20/22	12	13	ND(0.00122)	ND(0.00612)	ND(0.122)	0.0261 J	ND(0.0245)	ND(0.00612)	0.0732	ND(0.00612)	0.491	0.0503	ND(0.00612)	0.0298 J-	0.00626	0.0361 J
HEB-09 (13-14 ft)	05/20/22	13	14	0.00312 J+	ND(0.00599)	ND(0.12)	0.334 J	ND(0.024)	ND(0.00599)	1.12	0.00182 J+	2.45	0.621	ND(0.00599)	0.329 J	0.0703	0.399 J
HEB-10 (12-13 ft)	05/20/22	12	13	ND(0.00114)	ND(0.00569)	ND(0.114)	ND(0.00114) UJ	ND(0.0228)	ND(0.00569)	0.0248	0.00179 J	0.0107	ND(0.00569)	ND(0.00569)	ND(0.00228) UJ	ND(0.00114)	ND(0.00228) UJ
HEB-10 (14-15 ft)	05/20/22	14	15	ND(0.0012)	ND(0.00601)	ND(0.12)	ND(0.0012) UJ	ND(0.024)	ND(0.00601)	ND(0.012)	ND(0.00601)	ND(0.00601)	ND(0.00601)	ND(0.00601)	ND(0.0024) UJ	ND(0.0012)	ND(0.0024) UJ
HEB-11 (13-14 ft)	05/19/22	13	14	0.0117 J	ND(0.138)	ND(2.75)	0.453	ND(0.551)	ND(0.138)	1.97	0.0779 J	1.31	0.361	ND(0.138)	0.274	0.107	0.381
HEB-11 (14.5-15 ft)	05/19/22	14.5	15	ND(0.00123)	ND(0.00616)	ND(0.123)	ND(0.00122)	0.00691 J	ND(0.00616)	0.0113 J	ND(0.00616)	0.00373 J	0.00101 J	ND(0.00616)	ND(0.00246)	ND(0.00123)	ND(0.00246)
HEB-12 (12-13 ft)	05/20/22	12	13	ND(0.244)	ND(1.22)	ND(24.4)	2.01 J	ND(4.88)	ND(1.22)	7.69	ND(1.22)	18.4 J-	3.91	**ND(1.22)**	4.11 J-	1.1	5.21 J
HEB-12 (15-15.5 ft)	05/20/22	15	15.5	ND(0.00113)	ND(0.00567)	ND(0.113)	ND(0.00113) UJ	0.00583 J	ND(0.00567)	ND(0.0114)	ND(0.00567)	ND(0.00571)	ND(0.00567)	ND(0.00567)	ND(0.00227) UJ	ND(0.00113)	ND(0.00227) UJ
HEB-13 (13-14 ft)	05/19/22	13	14	ND(0.0287)	ND(0.143)	ND(2.87)	0.122	ND(0.574)	ND(0.143)	0.346	0.0841 J	0.124 J	0.0287 J	ND(0.143)	ND(0.0574)	ND(0.0287)	ND(0.0574)
HEB-13 (14.5-15 ft)	05/19/22	14.5	15	ND(0.00118)	ND(0.00589)	ND(0.118)	ND(0.00118)	ND(0.0236)	ND(0.00589)	ND(0.0118)	ND(0.00589)	ND(0.00589)	ND(0.00589)	ND(0.00589)	ND(0.00236)	ND(0.00118)	ND(0.00236)
HEB-14 (13-14 ft)	05/18/22	13	14	0.000411 J	ND(0.00516)	ND(0.103)	0.101	ND(0.0206)	ND(0.00516)	1.05	0.0022 J	2.13	0.611	ND(0.00516)	0.59	0.216	0.806
HEB-14 (14.5-15 ft)	05/18/22	14.5	15	0.00785 J	ND(0.126)	ND(2.51)	0.579	ND(0.503)	ND(0.126)	2.64	0.0665 J	0.142	ND(0.126)	ND(0.126)	ND(0.0503)	0.0378	0.0378 J
NMED Residential Soil Screening Level (all depths) (exceedances in bold text)				17.8	78.6	53.3	75.1	409.0	974.8	22.6	5228.4	NA	NA	0.7	764.0	805.0	870.8
NMED Industrial Soil Screening Level (0-1 ft-bgs) (all samples are below 1 ft so Industrial SSLs do not apply)				87.2	383.3	257.0	368.0	5130.0	4817.9	134.0	61340.2	NA	NA	28.4	3730.0	3940.0	4275.3
NMED Construction Worker Soil Screening Level (1-10 ft-bgs) (exceedances underlined):				142.0	1820.0	1880.0	1770.0	1210.0	24230.7	159.0	14041.3	NA	NA	161.0	696.0	736.0	798.3

ft-bgs - feet below ground surface
J - estimated concentration
J- - estimated concentration, value biased low
J+ - estimated concentration, value biased high
mg/kg - milligrams per kilogram
ND(X) - not detected at the reporting limit, where (X) denotes the reporting limit concentration
NMED - New Mexico Environment Department
UJ - estimated reporting limit
VOCs - volatile organic compounds

Notes:

1. Screening level source: NMED Risk Assessment Guidance for Site Investigations and Remediation (June 2022) - Table A-1

TABLE 4. MIGRATION TO GROUNDWATER, HEAT EXCHANGER BUNDLE PAD INVESTIGATION REPORT
WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

	Diesel Range Organics (mg/kg)	Gasoline Range Organics (mg/kg)	Oil Range Organics (mg/kg)	Benzene (mg/kg)	1,1-Dichloroethane (mg/kg)	1,4-Dioxane (mg/kg)	Ethylbenzene (mg/kg)
Result	**6700 J**	**1750 J+**	**ND(63.1)**	**1.34 J**	**ND(1.22)**	**ND(24.4)**	**26.6**
Location	HEB-12 (12-13 ft)	HEB-02 (10-12 ft)	HEB-08 (13.5-14 ft)	HEB-02 (10-12 ft)	HEB-12 (12-13 ft)	HEB-12 (12-13 ft)	HEB-02 (10-12 ft)
Date Sampled	5/20/2022	5/18/2022	5/20/2022	5/18/2022	5/20/2022	5/20/2022	5/18/2022
NMED Soil Leachate-Soil Screening Levels (exceedances in bold text)	13.2	4.94	13.2	0.0418	0.1360	0.0163	12.31

	Methylene Chloride (mg/kg)	Methyl tert-butyl ether (mg/kg)	Naphthalene (mg/kg)	Toluene (mg/kg)	1,2,4-Trimethylbenzene (mg/kg)	1,3,5-Trimethylbenzene (mg/kg)	Vinyl Chloride (mg/kg)
Result	**ND(4.88)**	**ND(1.22)**	**10.2 J**	2.38	128	21	**ND(1.22)**
Location	HEB-12 (12-13 ft)	HEB-12 (12-13 ft)	HEB-02 (10-12 ft)	HEB-04 (8-9 ft)	HEB-02 (10-12 ft)	HEB-02 (10-12 ft)	HEB-12 (12-13 ft)
Date Sampled	5/20/2022	5/20/2022	5/18/2022	5/18/2022	5/18/2022	5/18/2022	5/20/2022
NMED Soil Leachate-Soil Screening Levels (exceedances in bold text)	0.4706	0.5533	0.0583	12.14	NA	NA	0.0134

	m,p-Xylene (mg/kg)	o-Xylene (mg/kg)	Xylenes, Total (mg/kg)
Result	**133**	**30.5**	**156**
Location	HEB-02 (10-12 ft)	HEB-04 (8-9 ft)	HEB-02 (10-12 ft)
Date Sampled	5/18/2022	5/18/2022	5/18/2022
NMED Soil Leachate-Soil Screening Levels (exceedances in bold text)	2.97	2.98	154.35

J - estimated concentration

J+ - estimated concentration, value biased high

mg/kg - milligrams per kilogram

ND(X) - not detected at the reporting limit, where (X) denotes the reporting limit concentration

NMED - New Mexico Environment Department

Notes:

1. VOC Screening level source: NMED Risk Assessment Guidance for Site Investigations and Remediation (June 2022) - Table A-1, dilution attenuation factor = 20
2. TPH Screening level source: NMED Risk Assessment Guidance for Site Investigations and Remediation (June 2022) - Table 6-4, dilution attenuation factor = 20
3. Maximum results for each constituent shown and compared against the screening levels

Appendices A through C - Please See Attached CD

A. Dye Test Photo Log

B. Process Sewer Inspection Report

C. Boring Logs

Appendix A – Dye Test Photo Log

APPENDIX A. DYE TEST PHOTO LOG
HEAT EXCHANGER BUNDLE PAD INVESTIGATION REPORT
WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

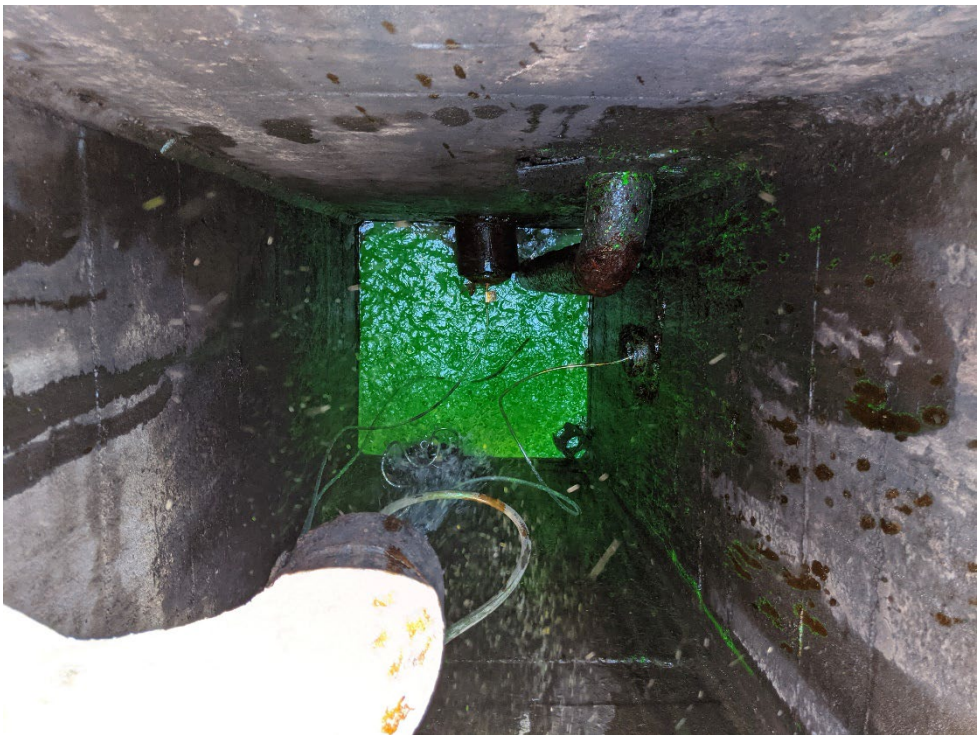


Photo 1. Dye Test #1.

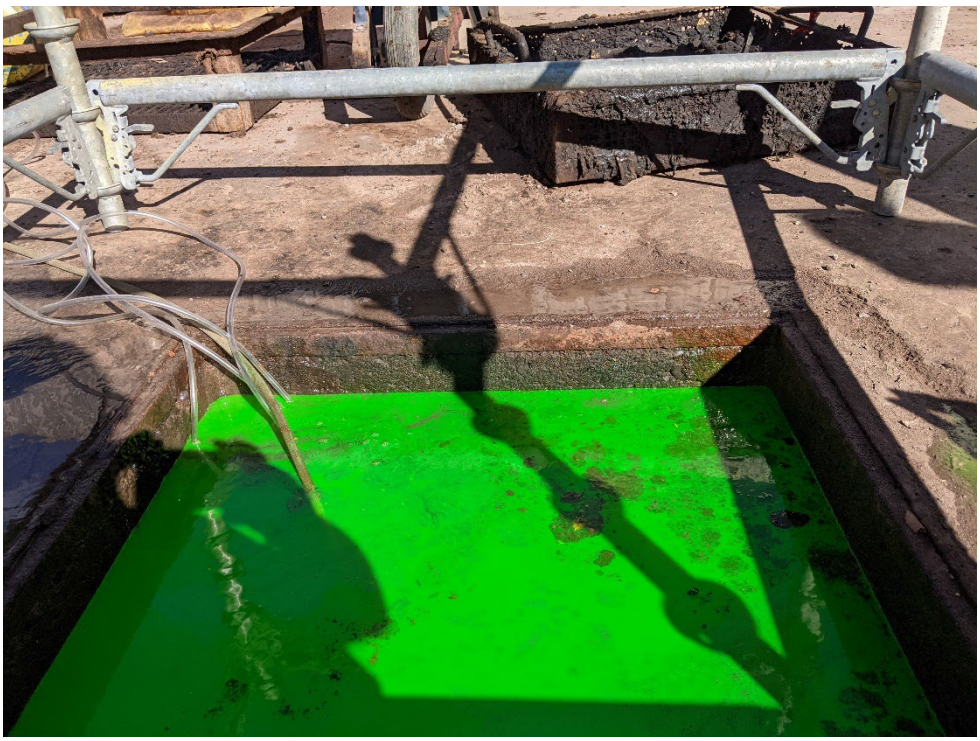


Photo 2. Dye Test #2.

Appendix B – Process Sewer Inspection Report

Insta-Pipe

**2520 50th Avenue SW,
Tumwater, WA 98512**

Remote Visual and Cleaning Inspection

FACILITY: Gallup, New Mexico

		Kelly Caillier Report Prepared By	Reliability Engineer Title	
B. James Inspector	Remote Visual Inspector Title			
		B. James Inspector Sign Off	2.10.2020 Date	
Brad Roberts Inspector	Remote Visual Inspector Title			
		Kelly Caillier Engineering	2.10.2020 Date	
		Client Sign Off	Date	

Inspection Type:	RVI INSPECTION	Inspection Date:	1.2020	Inspector:	B.James/Brad Roberts
Equipment Name:	Process & Storm Water Lines	Report Revision:	1		

RVI ANALYSIS NAVIGATION INSTRUCTIONS

Located inside of your RVI analysis is a navigation system installed for ease of quickly moving around the analysis without the need for scrolling. Beginning on the cover page, mouse clicking on the symbol will navigate to the first page of the Asset Maps. While on any of the summary pages (Pages 8 & 9 of analysis), mouse clicking on the will bring the user to the reflective asset detail page of the analysis. While on this page mouse clicking anywhere on the page will navigate to the drawing details report, where any PACP findings can be viewed in detail. To arrive in the same location from the summary, mouse clicking on the symbol will navigate directly to the assets detailed PACP finding drawing. A couple of the assets in this report have photographs only. By mouse clicking on the icon, this action will lead you directly to the photographs associated with the asset. Lastly, by clicking on the Insta-pipe logo anywhere in the analysis, this action will navigate back to the summary page.

CATEGORY STRUCTURE

The Analysis was also built with a five (5) level asset current condition category structure for ease of viewing and future planning. They are as follows:

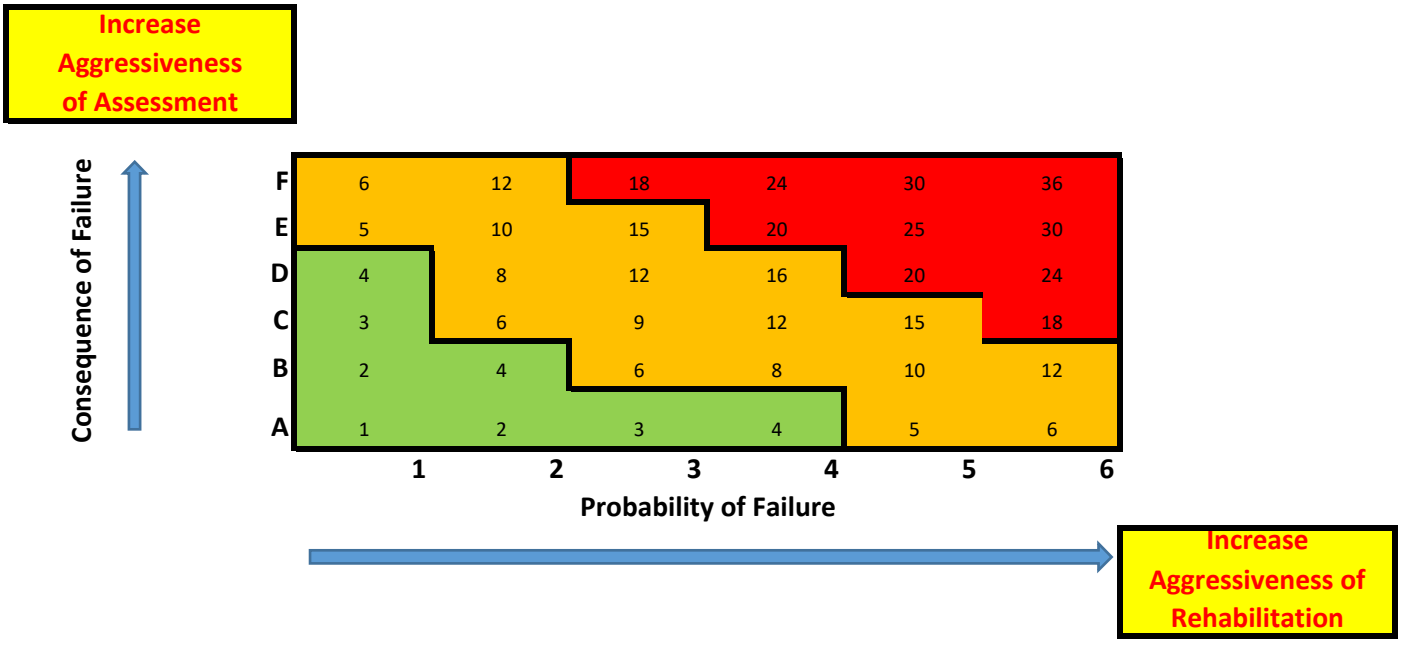
1. **Category 1 Assets:**
   a. Definition: PACP Code Defect Exist (Highest Probability of Failure Assets)
2. **Category 2 Assets:**
   a. Definition: RVI Inspector abandoned survey due to excess debris, material, or water.
3. **Category 3 Assets:**
   a. Definition: RVI Inspector abandoned survey due geometry challenges of the system.
4. **Category 4 Assets:**
   a. Definition: RVI Inspector was able to complete entire survey.
5. **Category 5 Assets:**
   a. Definition: Unknown Lines - No Survey, Only Map and Photographs.

Risk Based Inspection Methodology Introduction

The Analysis was built with an introduction to Risk Modeling and utilizing the tool for possible future scheduling and budget preparation. There are many facets and models incorporated into a reliable risk model implementation. Insta-Pipe's experience level with this implementation is unmatched. Below is an introduction and beginning model comparable to the values implemented in the report.

Note 1: Taking advantage of resinspection dates in place of risk values can be installed into this model for scheduling and budgeting purposes based on Risk Dynamics of the Asset condition is highly recommended after a deeper study into Marathon Asset focus.

NOTE 2: The goal of this implementation is sustainability of all assets in a balanced manner.



Matrix 1

If further discussion on the implementation of the Asset Risk Module or any of the values in this analysis is needed, please do not hesitate to request further information.

Sincerely,

Kelly P. Caillier, CRE

INSPECTION MAP OVERVIEW

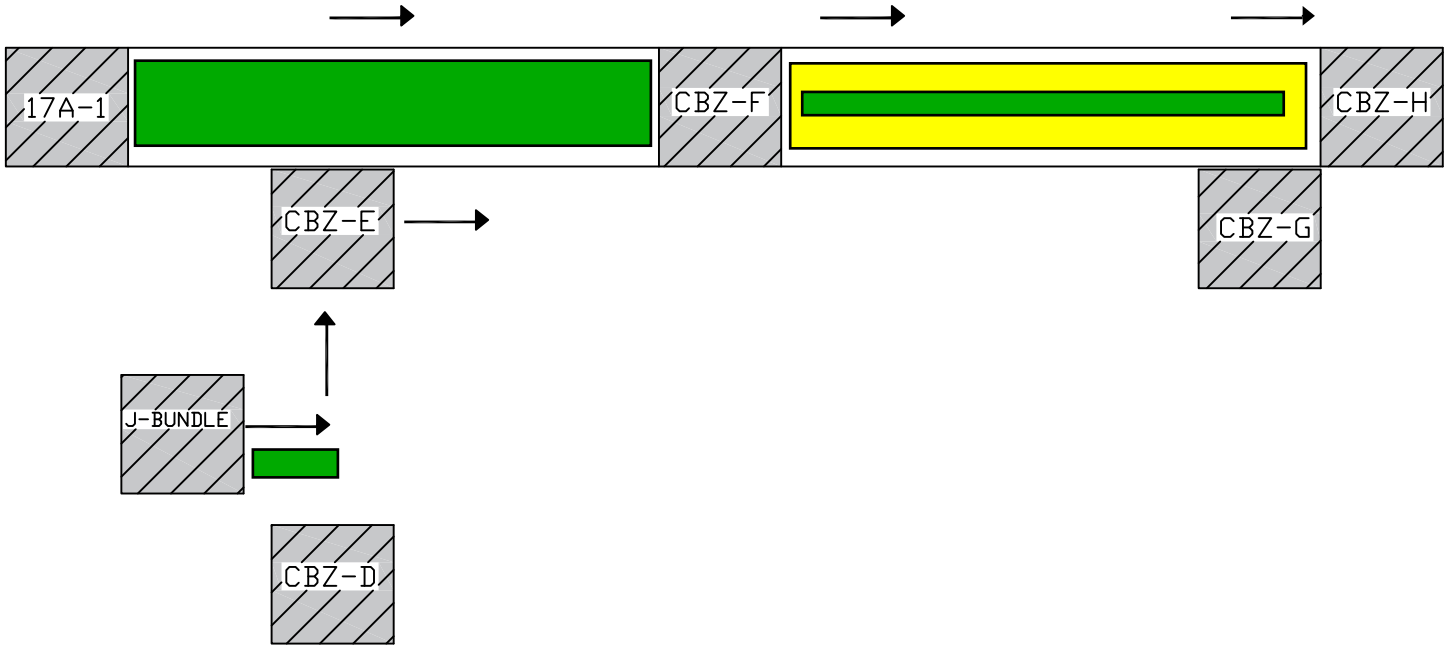
NORTH

UNKNOWN PROCESS 1

UNKNOWN STORM 1

JETTER UTILIZED

CRAWLER VIDEO



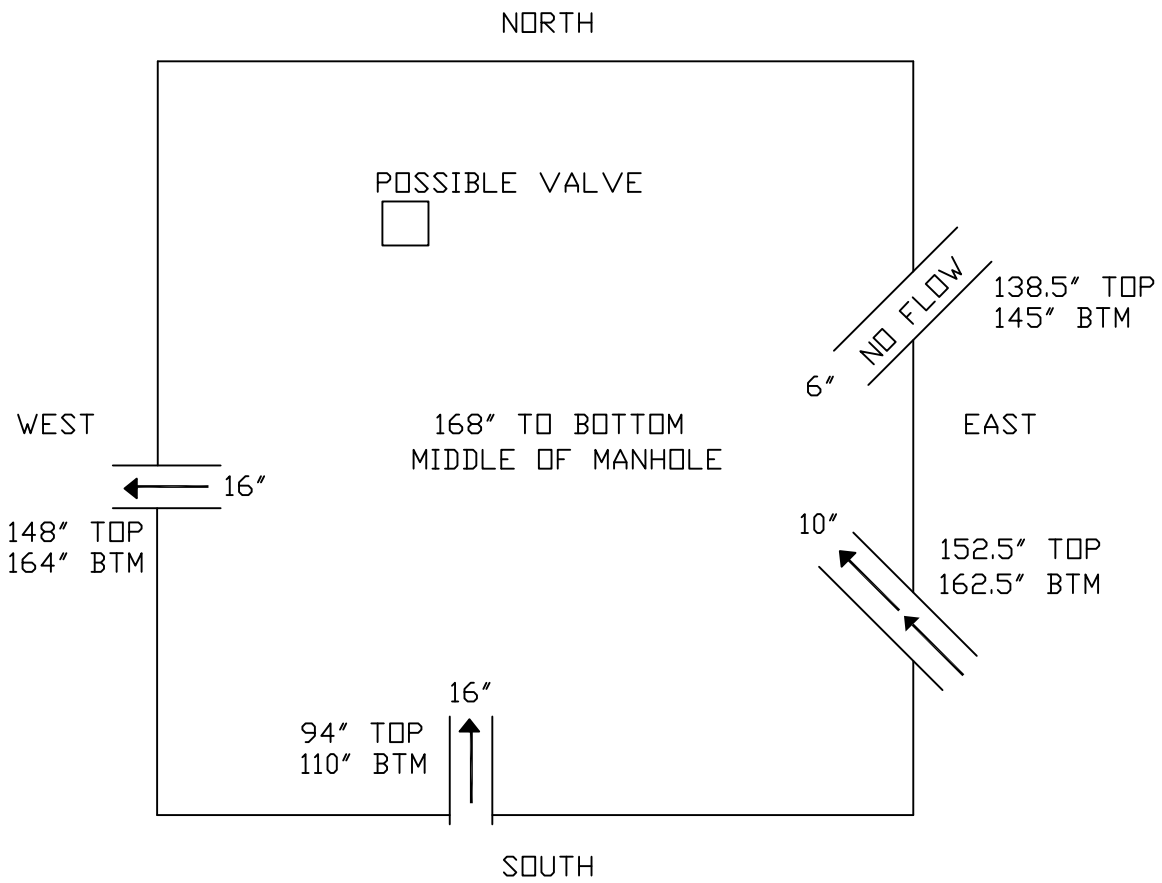
REVISIONS

Rev. No.	DATE	BY	DESCRIPTION
0	11/14/2019	TD	GENERATED TO CAD

insta-pipe TRENCHLESS PIPE REPAIR

CLIENT:	FACILITY:	DESCRIPTION:	DWG. NO.:	DWG. DATE:
MARATHON - GALLUP FACILITY	Gallup New Mexico	DESC: INSPECTION MAP OVERVIEW	DWG#: 1	2.5.2020

MANHOLE CBZ-G



REVISIONS			
Rev. No.	DATE	BY	DESCRIPTION
0	11/14/2019	TD	GENERATED TO CAD

CLIENT:	FACILITY:	DESCRIPTION:	DWG. NO.:	DWG. DATE:
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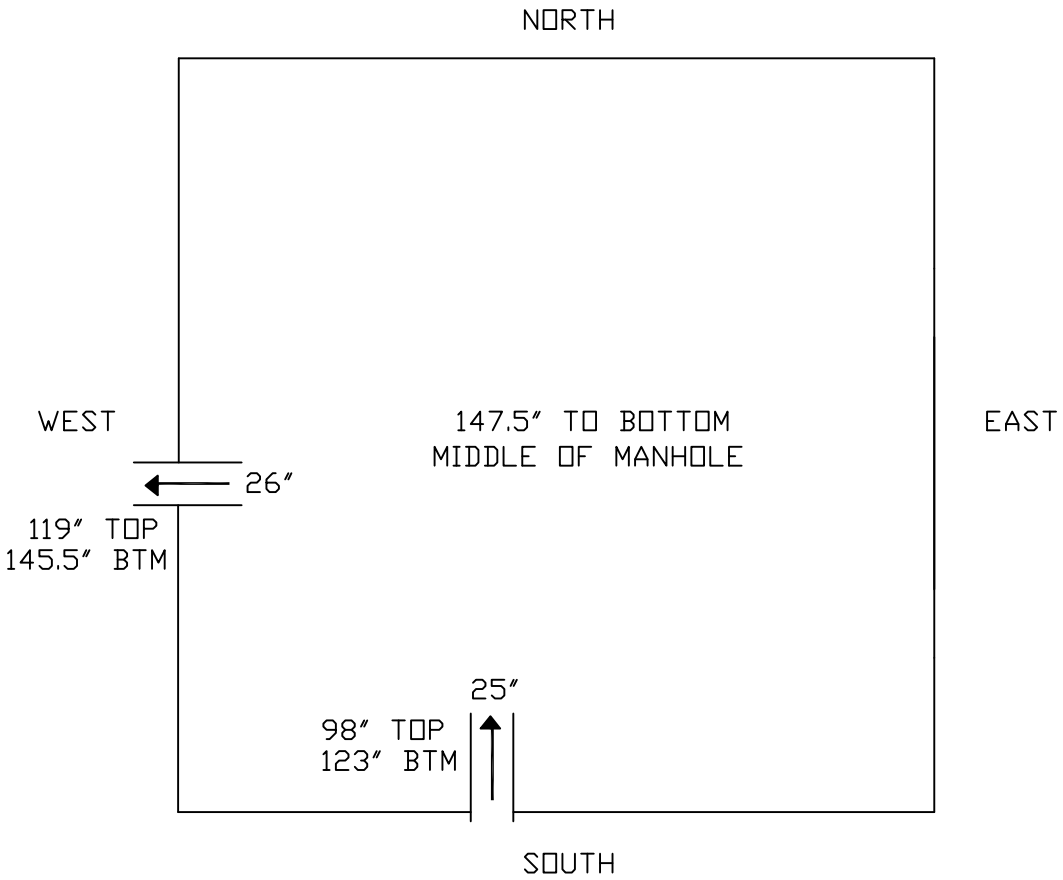
MANHOLE CBZ-H



REVISIONS

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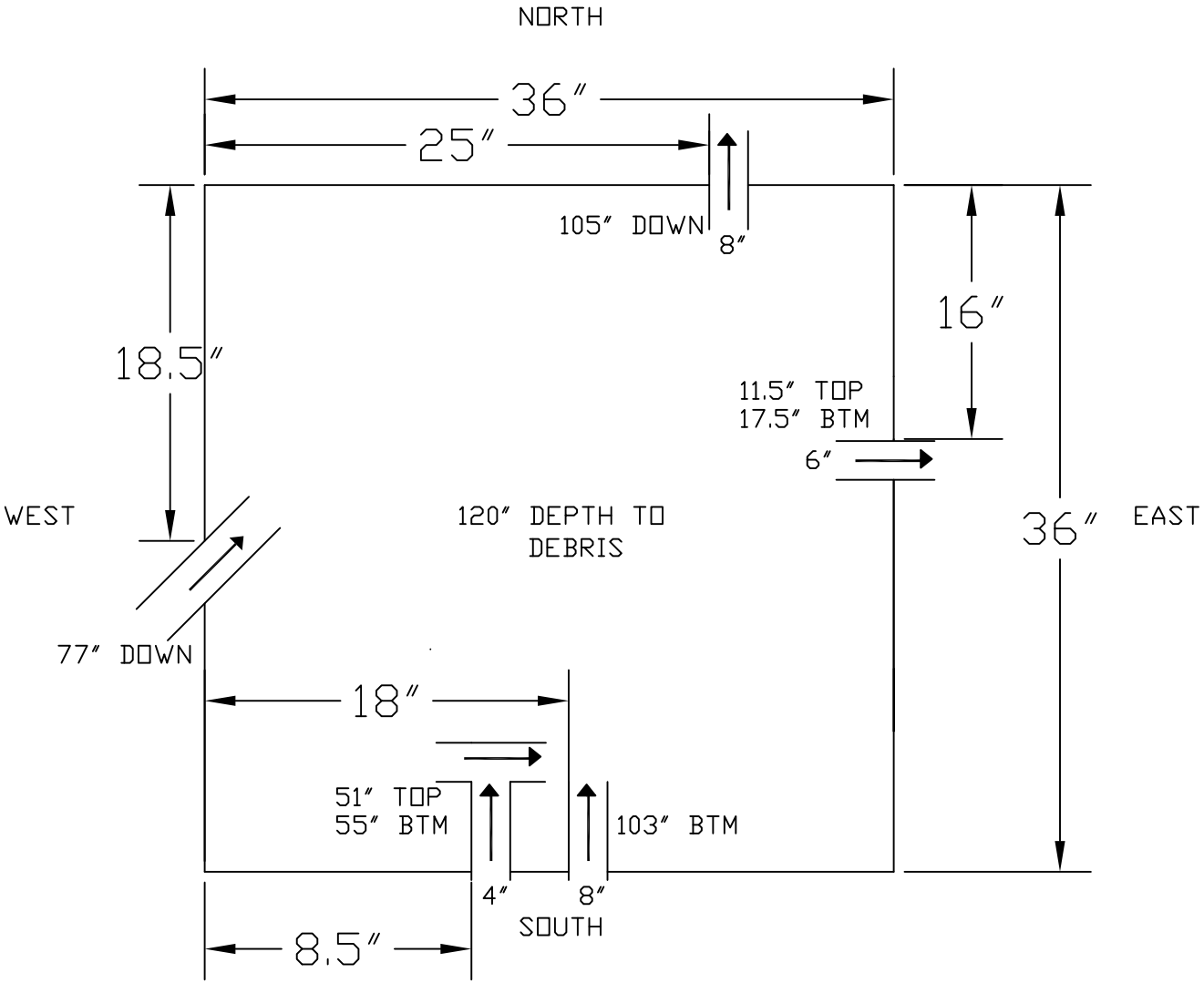
insta-pipe TRENCHLESS PIPE REPAIR

CLIENT:	FACILITY:	DESCRIPTION:	DWG. NO.:	DWG. DATE:
MARATHON - GALLUP FACILITY	Gallup New Mexico	DESC: MANHOLE CBZ-H OVERALL VIEW	DWG#: 1	2.5.2020

MANHOLE J-BUNDLE PAD



REVISIONS			
Rev. No.	DATE	BY	DESCRIPTION
0	11/14/2019	TD	GENERATED TO CAD

CLIENT:	FACILITY:	DESCRIPTION:	DWG. NO.:	DWG. DATE:
MARATHON - GALLUP FACILITY	Gallup New Mexico	J-BUNDLE PAD	DWG#: 1	2.5.2020

RVI INSPECTION CAMPAIGN
Gallup New Mexico Facility
Process and Stormwater Systems

Component Type	Component Identification	WGS84 Coordinates	Component Description	Campaign Date	Survey Length (FT)	Risk Ranking	PACP Findings
Category 1 Assets: PACP CODE DEFECT EXIST							
	During the Jan 2020 Survey No PACP defects exist						
Category 2 Assets: ABANDONED SURVEY DUE TO EXCESS DEBRIS, MATERIAL OR WATER							
PolyVinyl Chloride	CBZ-E towards CBZ-F		**UP:** CBZ-E **Down:** CBZ-F Street: Bundle Pad	1.28.2020	3.0*	*E	M
Category 3 Assets: ABANDON SURVEY DUE TO GEOMETRY OF SYSTEM							
Ductile Iron Pipe	J-Bundle Pad towards CBZ-E		**UP:** JBP **Down: CBZ-E** Street: Bundle Pad	1.29.2020	71.7	1E	M
Category 4 Assets: NO DEFECTS EXIST & SURVEY COMPLETE							
PolyVinyl Chloride	17A-1 towards CBZ-E		**UP:** 17A-1 **Down:** CBZ-E Street: Bundle Pad	1.29.2020	12.0	1E	
Ductile Iron Pipe	Bundle Pad towards CBZ-E		**UP:** Bundle Pad **Down:** CBZ-E Street: Bundle Pad	1.28.2020	66.0	1E	
PolyVinyl Chloride	CBZ-F towards CBZ-G		**UP:** CBZ-F **Down:** CBZ-G Street: Bundle Pad	1.28.2020	421.6	1E	
Ductile Iron Pipe	CBZ-G towards CBZ-H		**UP:** CBZ-G **Down:** CBZ-H Street: Bundle Pad	1.30.2020	12.0	1E	

PACP FINDINGS INDEX

S	Structural	H	Hydraulics	C	Constructional
M	Miscellaneous	O	O & M	*	Incomplete

RVI INSPECTION CAMPAIGN
Gallup New Mexico Facility
Process and Stormwater Systems

Component Type	Component Identification	WGS84 Coordinates	Component Description	Campaign Date	Survey Length (FT)	Asset Size	PACP Findings
Category 5 Assets: Unknown Lines - No Survey							
Unknown Component	Process Line 		**Unknown**	1.30.2020	N/A	N/A	
Unknown Component	Storm Water Line 		**Unknown**	1.30.2020	N/A	N/A	

PACP FINDINGS INDEX

S	Structural	H	Hydraulics	C	Constructional
M	Miscellaneous	O	O & M	*	Incomplete

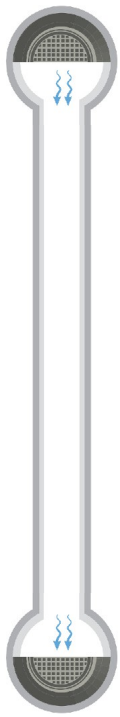
ITpipes
4921 Alexander Blvd
Albuquerque, NM
505-341-0109

Defect Listing Plot with Images

Pipe Segment Refere...	City	Street	Material	Location C...	Pipe Use
	GALLUP	BUNDLE PAD	PolyVinyl Chloride		Stormwater
Upstream MH	**Total Length**	**Year Constructed**	**Shape**	**Location Details**	
17A-1			Circular		
Downsstream MH	**Length surveyed**	**Year Renewed**	**Height / Width**	**Pipe Joint...**	
CBZ-E	12		16 / 16		

SPR	0	MPR	0	PO Number	Customer
SPRI	0	MPRI	0		
QSR	0000	QMR	0000	Work Order Number	Purpose

OPR	Surveyed By	Direction	Date	Media label	
0	BJAMES	Downstream	20200129		
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**	
0	U-0317-07007227	Light Cleaning	11:40		
Date Cleaned			**End Time**	**Additional Info**	
			11:47		



17A-1

0.0 ft. Access Point Manhole

START AT MANHOLE 17A-1

0.0 ft. Miscellaneous Water Level

12.0 ft. Access Point Manhole

CBZ-E

CBZ-E

LEGEND

COLLAPSE

CRACK

HOLE

TAP FACTORY

ROOTS

DEPOSITS

GRADE

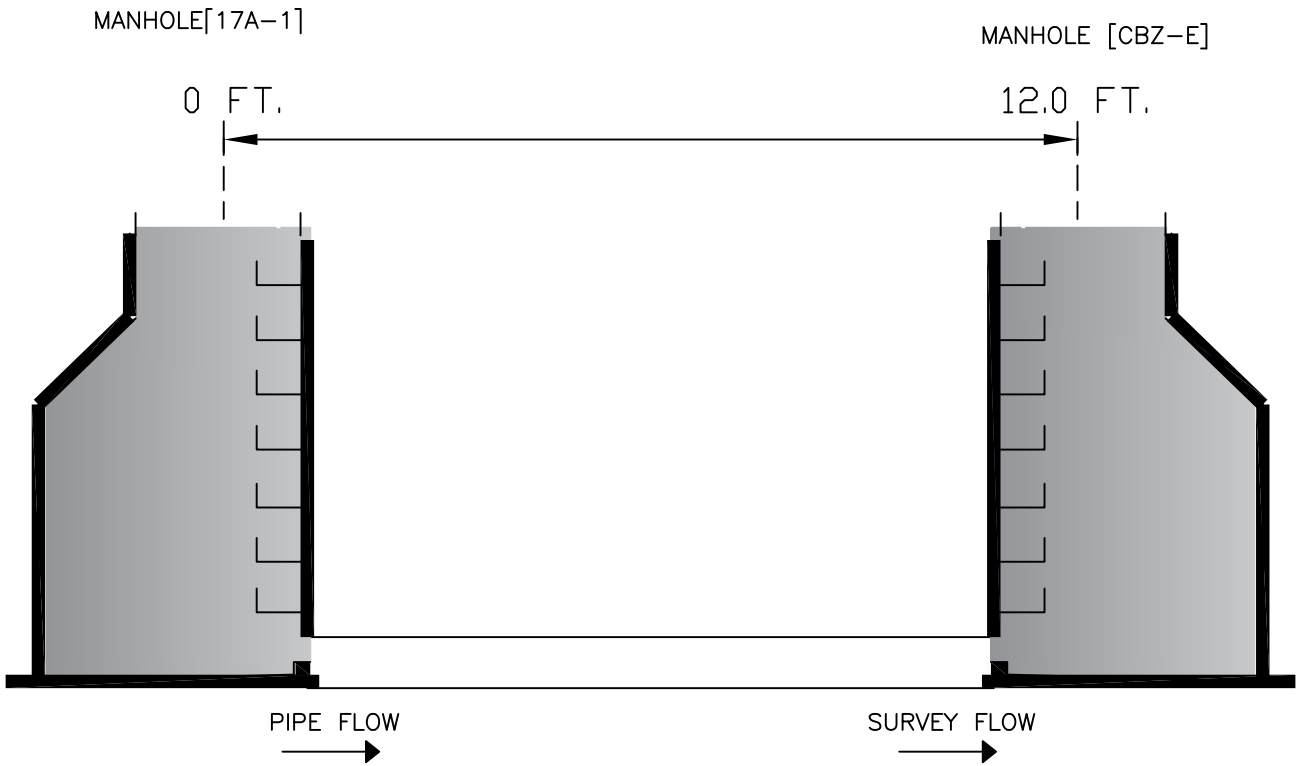
JOINT

FLOW

STRUCTURAL DEFECT CODING
*ABBREVIATION + STRUCT. DEFECT TYPE + SIZE OF DEFECT

C	CRACK
F	FRACTURE
B	BROKEN
H	HOLE
J	JOINT
D	DEFORMED
X	COLLAPSE
LF	LINING FEATURES
WF	WELD FAILURE
RP	POINT REPAIR
A	ACCESS POINT
V	VISIBLE
S	SURFACE DAMAGE

	ROOTS
F	FINE
M	MEDIUM
T	TAP
B	BALL
	JOINTS
JOS	OFFSET SMALL
JOM	OFFSET MEDIUM
JOL	OFFSET LARGE
	CRACKS
CL	LONGITUDINAL
CC	CIRCUMFERENTIAL
CM	MULTIPLE
CS	SPIRAL
CH	HINGE



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CLIENT:	FACILITY:	DESCRIPTION:	DWG. NO.:	DWG. DATE:
MARATHON - GALLUP FACILITY	Gallup New Mexico	DESC: 17A-1 to CBZ-E	DWG#: 1	2.5.2020

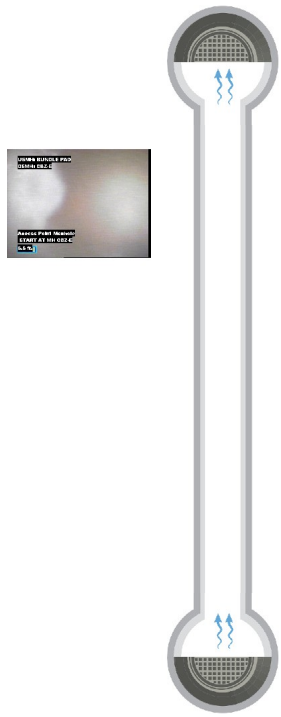
ITpipes
4921 Alexander Blvd
Albuquerque, NM
505-341-0109

Defect Listing Plot with Images

Pipe Segment Refere...	City	Street	Material		Location C...	Pipe Use
	GALLUP	BUNDLE PAD	Ductile Iron Pipe			Stormwater
Upstream MH	Total Length	Year Constructed	Shape		Location Details	
BUNDLE PAD			Circular			
Downsstream MH	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
CBZ-E	66		8	8		

SPR	0	MPR	0	PO Number	Customer
SPRI	0	MPRI	0		
QSR	0000	QMR	0000	Work Order Number	Purpose

OPR	Surveyed By	Direction	Date	Media label	
0	BJAMES	Upstream	20200128		
OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
0	U-0317-07007227	No Pre-Cleaning	11:04		
Date Cleaned			End Time	Additional Info	
			11:15		



CBZ-E

0.0 ft. Access Point Manhole

START AT MH CBZ-E

0.0 ft. Miscellaneous Water Level

66.0 ft. Access Point Manhole

BUNDLE PAD

BUNDLE PAD

LEGEND

COLLAPSE

CRACK

HOLE

TAP FACTORY

ROOTS

DEPOSITS

GRADE

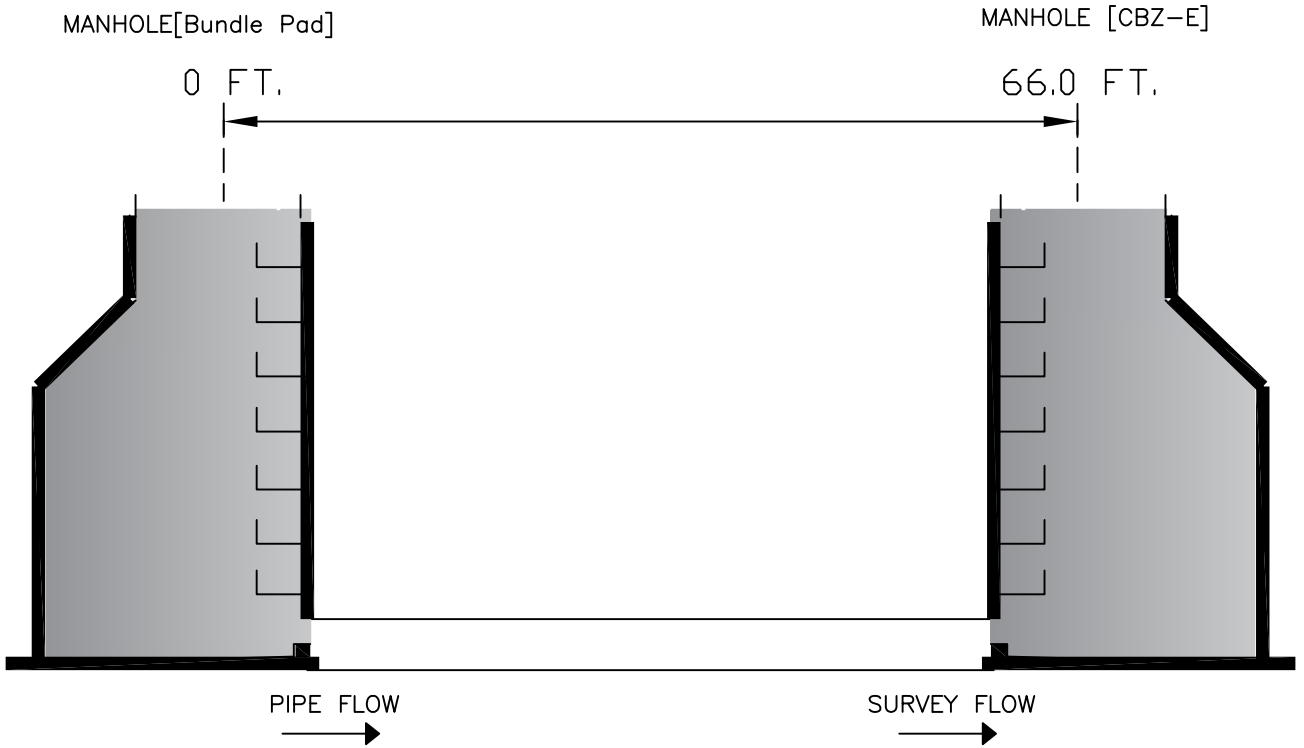
JOINT

FLOW

STRUCTURAL DEFECT CODING
*ABBREVIATION + STRUCT. DEFECT TYPE + SIZE OF DEFECT

C	CRACK
F	FRACTURE
B	BROKEN
H	HOLE
J	JOINT
D	DEFORMED
X	COLLAPSE
LF	LINING FEATURES
WF	WELD FAILURE
RP	POINT REPAIR
A	ACCESS POINT
V	VISIBLE
S	SURFACE DAMAGE

	ROOTS
F	FINE
M	MEDIUM
T	TAP
B	BALL
	JOINTS
JOS	OFFSET SMALL
JOM	OFFSET MEDIUM
JOL	OFFSET LARGE
	CRACKS
CL	LONGITUDINAL
CC	CIRCUMFERENTIAL
CM	MULTIPLE
CS	SPIRAL
CH	HINGE



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CLIENT:	FACILITY:	DESCRIPTION:	DWG. NO.:	DWG. DATE:
MARATHON - GALLUP FACILITY	Gallup New Mexico	DESC: Bundle Pad - CBZ-E	DWG#: 1	2.5.2020

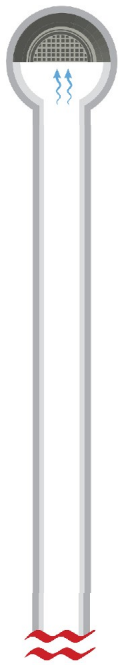
ITpipes
4921 Alexander Blvd
Albuquerque, NM
505-341-0109

Defect Listing Plot with Images

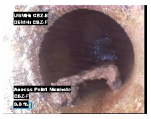
Pipe Segment Refere...	City	Street	Material		Location C...	Pipe Use
	GALLUP	BUNDLE PAD	PolyVinyl Chloride			Stormwater
Upstream MH	Total Length	Year Constructed	Shape		Location Details	
CBZ-E			Circular			
Downsstream MH	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
CBZ-F	3		16	16		

SPR	0	MPR	0	PO Number	Customer
SPRI	0	MPRI	0		
QSR	0000	QMR	0000	Work Order Number	Purpose

OPR	Surveyed By	Direction	Date	Media label	
0	BJAMES	Upstream	20200128		
OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
0	U-0317-07007227	No Pre-Cleaning	12:45		
Date Cleaned			End Time	Additional Info	
			12:51		



0.0 ft. Access Point Manhole



CBZ-F

0.0 ft. Miscellaneous Water Level

3.0 ft. Miscellaneous Survey Abandoned

CAN NOT MOVE PAST DEBRI

LEGEND

COLLAPSE

CRACK

HOLE

TAP FACTORY

ROOTS

DEPOSITS

GRADE

JOINT

FLOW

STRUCTURAL DEFECT CODING
*ABBREVIATION + STRUCT. DEFECT TYPE + SIZE OF DEFECT

C	CRACK
F	FRACTURE
B	BROKEN
H	HOLE
J	JOINT
D	DEFORMED
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LF	LINING FEATURES
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A	ACCESS POINT
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	JOINTS
JOS	OFFSET SMALL
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	CRACKS
CL	LONGITUDINAL
CC	CIRCUMFERENTIAL
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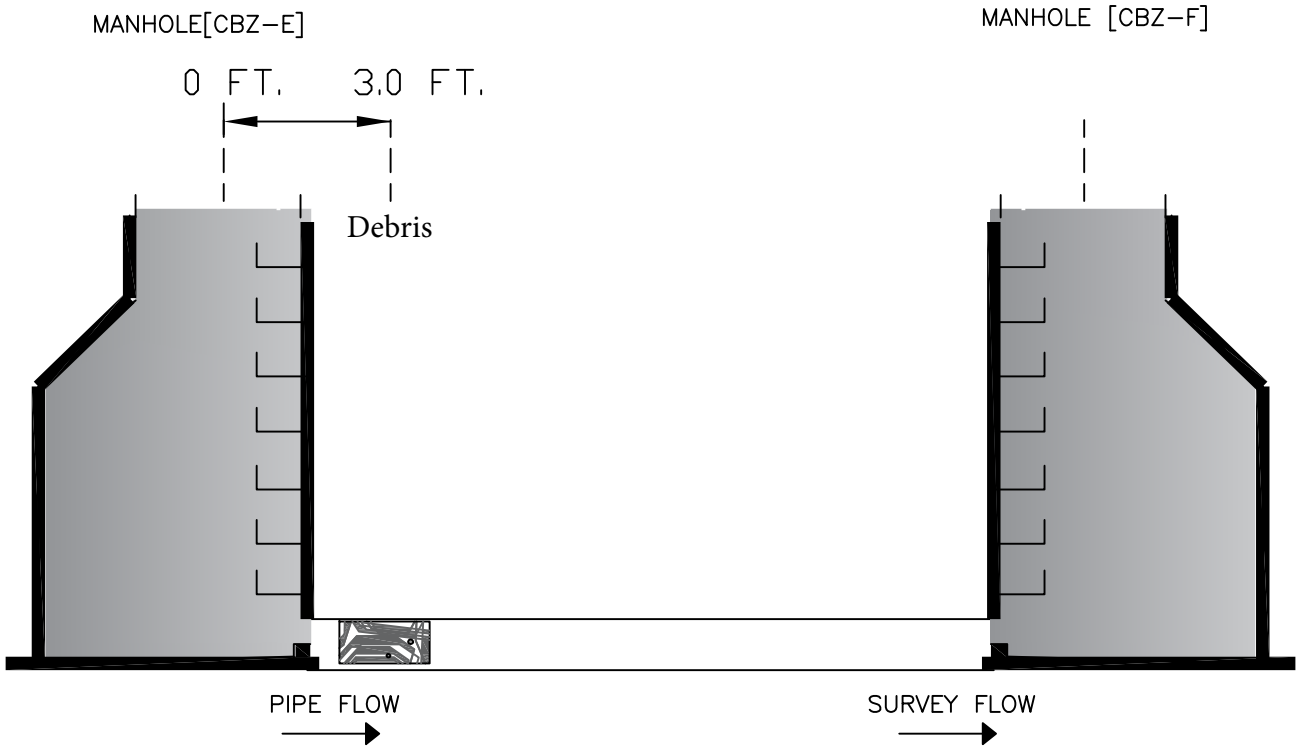
CS	SPIRAL
CH	HINGE



REVISIONS

Rev. No.	DATE	BY	DESCRIPTION
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insta-pipe TRENCHLESS PIPE REPAIR

CLIENT:	FACILITY:	DESCRIPTION:	DWG. NO.:	DWG. DATE:
MARATHON - GALLUP FACILITY	Gallup New Mexico	DESC: CBZ-E - CBZ-F	DWG#: 1	2.5.2020

ITpipes
4921 Alexander Blvd
Albuquerque, NM
505-341-0109

Defect Listing Plot with Images

Pipe Segment Refere...	City	Street	Material	Location C...	Pipe Use
	GALLUP	BUNDLE PAD	PolyVinyl Chloride		Stormwater

Upstream MH	Total Length	Year Constructed	Shape	Location Details
CBZ-F			Circular	

Downsstream MH	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
CBZ-G	421.6		16	16		

SPR	0	MPR	0	PO Number	Customer
SPRI	0	MPRI	0		
QSR	0000	QMR	0000	Work Order Number	Purpose

OPR	Surveyed By	Direction	Date	Media label	
0	BJAMES	Downstream	20200128		
OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
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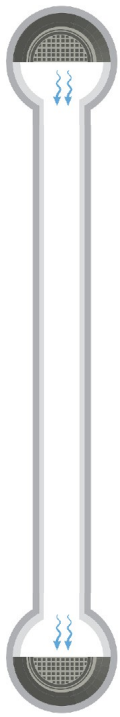
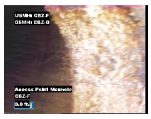
Date Cleaned			End Time	Additional Info	
			13:41		



CBZ-F

0.0 ft. Access Point Manhole



CBZ-F

0.0 ft. Miscellaneous Water Level

421.6 ft. Access Point Manhole

END AT MH CBZ-G

CBZ-G

LEGEND

COLLAPSE

CRACK

HOLE

TAP FACTORY

ROOTS

DEPOSITS

GRADE

JOINT

FLOW

STRUCTURAL DEFECT CODING
*ABBREVIATION + STRUCT. DEFECT TYPE + SIZE OF DEFECT

C	CRACK
F	FRACTURE
B	BROKEN
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J	JOINT
D	DEFORMED
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LF	LINING FEATURES
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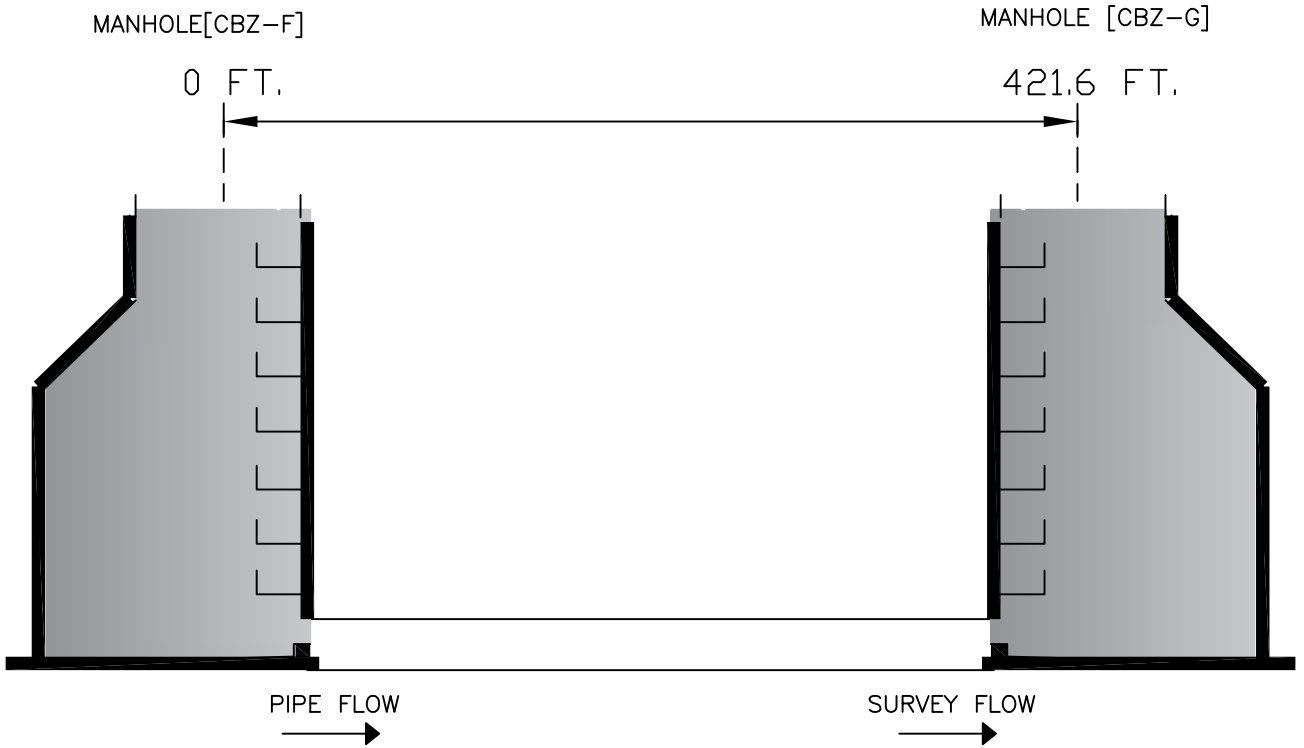
A	ACCESS POINT
V	VISIBLE
S	SURFACE DAMAGE

	ROOTS
F	FINE
M	MEDIUM
T	TAP
B	BALL
	JOINTS
JOS	OFFSET SMALL
JOM	OFFSET MEDIUM
JOL	OFFSET LARGE
	CRACKS
CL	LONGITUDINAL
CC	CIRCUMFERENTIAL
CM	MULTIPLE
CS	SPIRAL
CH	HINGE



REVISIONS

Rev. No.	DATE	BY	DESCRIPTION
0	11/14/2019	TD	GENERATED TO CAD

CLIENT:	FACILITY:	DESCRIPTION:	DWG. NO.:	DWG. DATE:
MARATHON - GALLUP FACILITY	Gallup New Mexico	DESC: CBZ-F - CBZ-G	DWG#: 1	2.5.2020

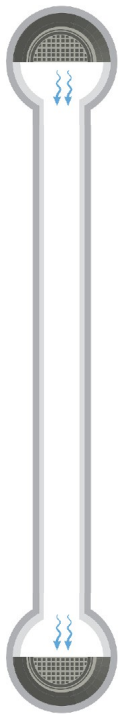
ITpipes
4921 Alexander Blvd
Albuquerque, NM
505-341-0109

Defect Listing Plot with Images

Pipe Segment Refere...	City	Street	Material		Location C...	Pipe Use
	GALLUP	BUNDLE PAD	Ductile Iron Pipe			Stormwater
Upstream MH	Total Length	Year Constructed	Shape		Location Details	
CBZ-G			Circular			
Downsstream MH	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
CBZ-H	13		12	12		

				PO Number	Customer
SPR	0	MPR	0		
SPRI	0	MPRI	0	Work Order Number	Purpose
QSR	0000	QMR	0000		

OPR	Surveyed By	Direction	Date	Media label	
0	BJAMES	Downstream	20200130		
OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
0	U-0317-07007227	No Pre-Cleaning	09:12		
Date Cleaned			End Time	Additional Info	
			09:16		



CBZ-G

0.0 ft. Access Point Manhole

CBZ-G

0.0 ft. Miscellaneous Water Level

13.0 ft. Access Point Manhole

CBZ-H

CBZ-H

LEGEND

COLLAPSE

CRACK

HOLE

TAP FACTORY

ROOTS

DEPOSITS

GRADE

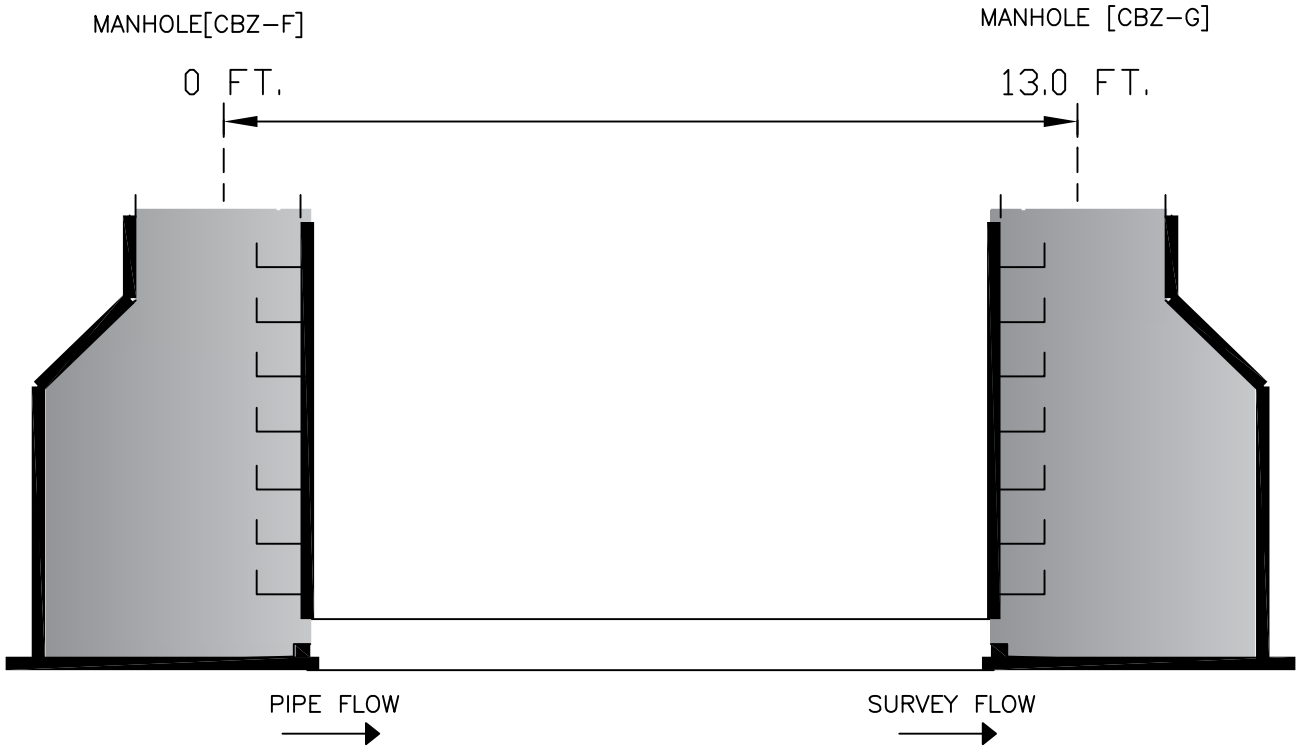
JOINT

FLOW

STRUCTURAL DEFECT CODING
*ABBREVIATION + STRUCT. DEFECT TYPE + SIZE OF DEFECT

C	CRACK
F	FRACTURE
B	BROKEN
H	HOLE
J	JOINT
D	DEFORMED
X	COLLAPSE
LF	LINING FEATURES
WF	WELD FAILURE
RP	POINT REPAIR
A	ACCESS POINT
V	VISIBLE
S	SURFACE DAMAGE

	ROOTS
F	FINE
M	MEDIUM
T	TAP
B	BALL
	JOINTS
JOS	OFFSET SMALL
JOM	OFFSET MEDIUM
JOL	OFFSET LARGE
	CRACKS
CL	LONGITUDINAL
CC	CIRCUMFERENTIAL
CM	MULTIPLE
CS	SPIRAL
CH	HINGE



REVISIONS

Rev. No.	DATE	BY	DESCRIPTION
0	11/14/2019	TD	GENERATED TO CAD

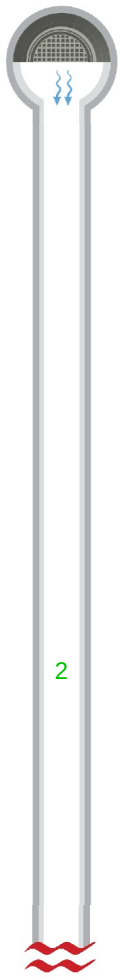
CLIENT:	FACILITY:	DESCRIPTION:	DWG. NO.:	DWG. DATE:
MARATHON - GALLUP FACILITY	Gallup New Mexico	DESC: CBZ-G - CBZ-H	DWG#: 1	2.5.2020

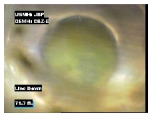
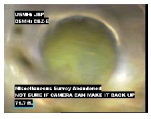
ITpipes
4921 Alexander Blvd
Albuquerque, NM
505-341-0109

Defect Listing Plot with Images

Pipe Segment Refere...	City	Street	Material	Location C...	Pipe Use
	GALLUP	BUNDLE PAD	Ductile Iron Pipe		Stormwater
Upstream MH	**Total Length**	**Year Constructed**	**Shape**	**Location Details**	
JBP			Circular		
Downsstream MH	**Length surveyed**	**Year Renewed**	**Height / Width**	**Pipe Joint...**	
CBZ-E	71.7		8 / 8		

SPR	0	MPR	2	PO Number	Customer
SPRI	0	MPRI	2	Work Order Number	Purpose
QSR	0000	QMR	2100		
OPR	Surveyed By	Direction	Date	Media label	
2	BJAMES	Downstream	20200129		
OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
2	U-0317-07007227	No Pre-Cleaning	10:26		
Date Cleaned			End Time	Additional Info	
			10:36		



0.0 ft.	Access Point Manhole			START AT MANHOLE JBP
0.0 ft.	Miscellaneous Water Level			
31.4 ft.	Miscellaneous Water Level			
71.7 ft.	Line Down			
71.7 ft.	Miscellaneous Survey Abandoned			NOT SURE IF CAMERA CAN MAKE IT BACK UP

LEGEND

COLLAPSE

CRACK

HOLE

TAP FACTORY

ROOTS

DEPOSITS

GRADE

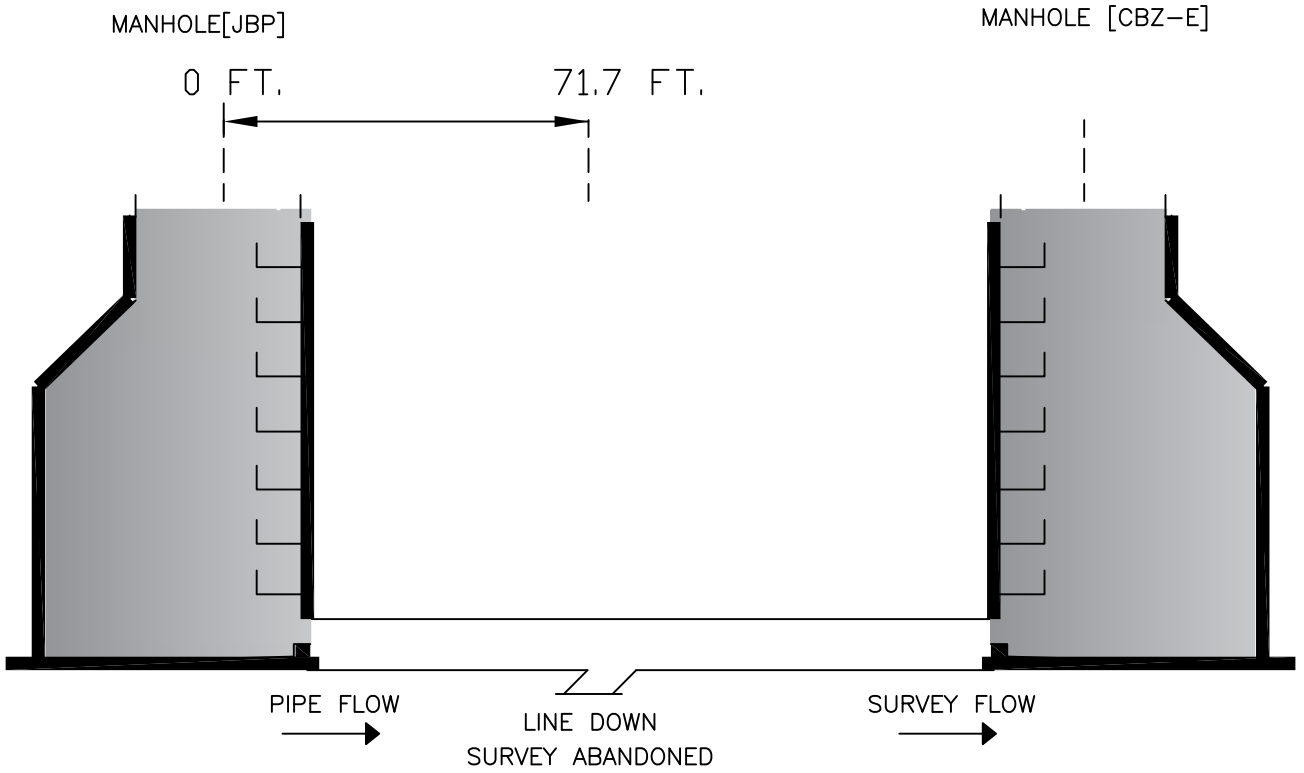
JOINT

FLOW

STRUCTURAL DEFECT CODING
*ABBREVIATION + STRUCT. DEFECT TYPE + SIZE OF DEFECT

C	CRACK
F	FRACTURE
B	BROKEN
H	HOLE
J	JOINT
D	DEFORMED
X	COLLAPSE
LF	LINING FEATURES
WF	WELD FAILURE
RP	POINT REPAIR
A	ACCESS POINT
V	VISIBLE
S	SURFACE DAMAGE

	ROOTS
F	FINE
M	MEDIUM
T	TAP
B	BALL
	JOINTS
JOS	OFFSET SMALL
JOM	OFFSET MEDIUM
JOL	OFFSET LARGE
	CRACKS
CL	LONGITUDINAL
CC	CIRCUMFERENTIAL
CM	MULTIPLE
CS	SPIRAL
CH	HINGE



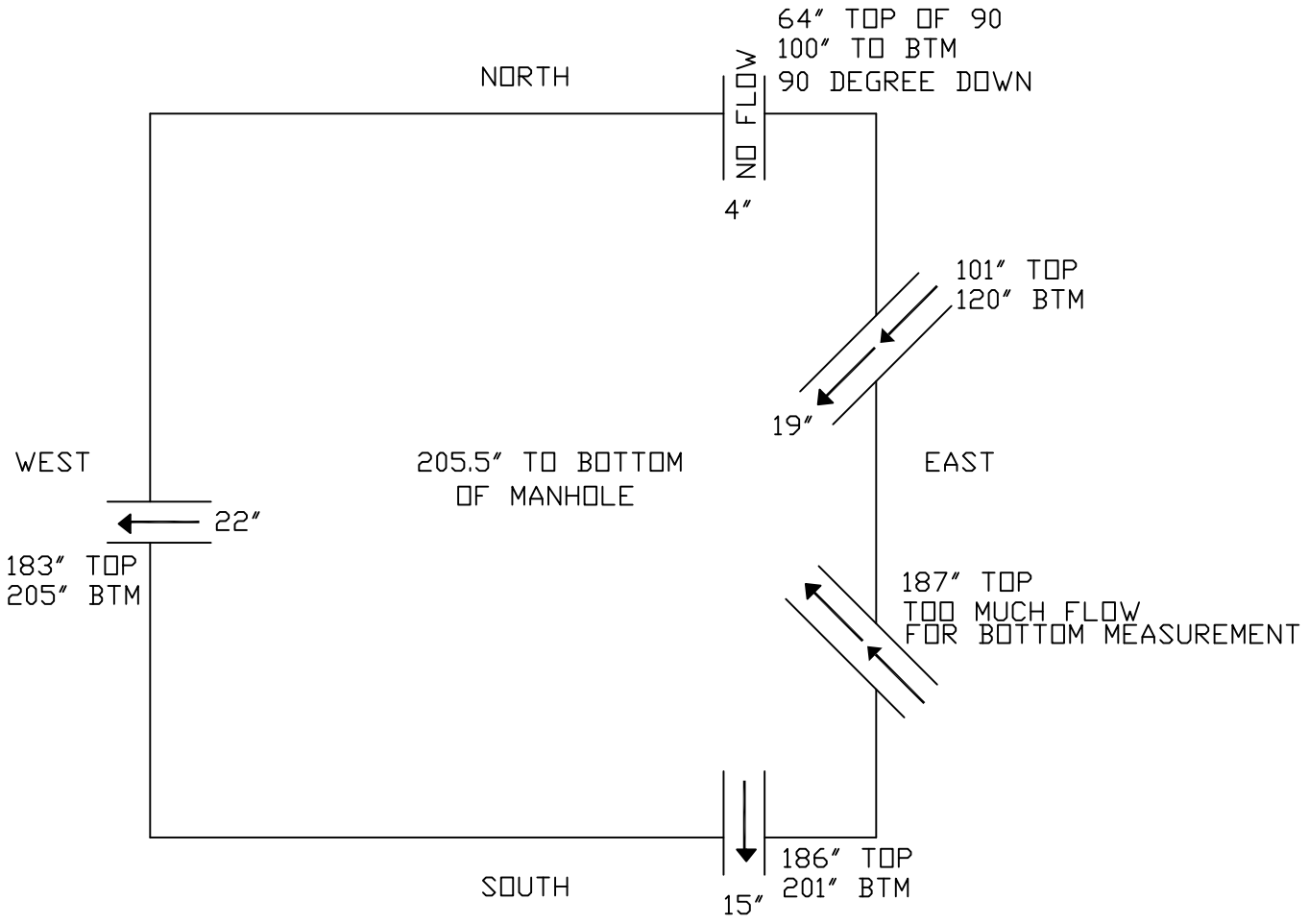
REVISIONS

Rev. No.	DATE	BY	DESCRIPTION
0	11/14/2019	TD	GENERATED TO CAD

insta-pipe TRENCHLESS PIPE REPAIR

CLIENT:	FACILITY:	DESCRIPTION:	DWG. NO.:	DWG. DATE:
MARATHON - GALLUP FACILITY	Gallup New Mexico	DESC: JBP - CBZ-E	DWG#: 1	2.5.2020

UNKNOWN PROCESS 1



REVISIONS			
Rev. No.	DATE	BY	DESCRIPTION
0	02/05/2020	KC	GENERATED TO CAD

CLIENT:	FACILITY:	DESCRIPTION:	DWG. NO.:	DWG. DATE:
MARATHON - GALLUP FACILITY	Gallup New Mexico	DESC: UNKNOWN PROCESS LINE	DWG#: 1	2.5.2020

	REMOTE VISUAL INSPECTION – SEWER AND PROCESS LINES	
CLIENT: MARATHON	FACILITY: GALLUP NM	DATE: 2020.1.29
ID# UNKNOWN PROCESS 1	PHOTOLOG	SURVEYED BY: B. JAMES

UNIDENTIFIED PROCESS LINE 1 PHOTO 1

UNIDENTIFIED PROCESS LINE 1 PHOTO 2

UNIDENTIFIED PROCESS LINE 1 PHOTO 3

UNIDENTIFIED PROCESS LINE 1 PHOTO 4

	REMOTE VISUAL INSPECTION – STORMWATER AND PROCESS LINES	
CLIENT: MARATHON	FACILITY: GALLUP NM	DATE: 2020.1.29
ID# UNKNOWN PROCESS 1	PHOTOLOG	SURVEYED BY: B. JAMES

UNIDENTIFIED PROCESS LINE 1 PHOTO 5

UNIDENTIFIED PROCESS LINE 1 PHOTO 6

UNIDENTIFIED PROCESS LINE 1 PHOTO 7

UNIDENTIFIED PROCESS LINE 1 PHOTO 8

	REMOTE VISUAL INSPECTION – STORMWATER AND PROCESS LINES	
CLIENT: MARATHON	FACILITY: GALLUP NM	DATE: 2020.1.29
ID# UNKNOWN PROCESS 1	PHOTOLOG	SURVEYED BY: B. JAMES

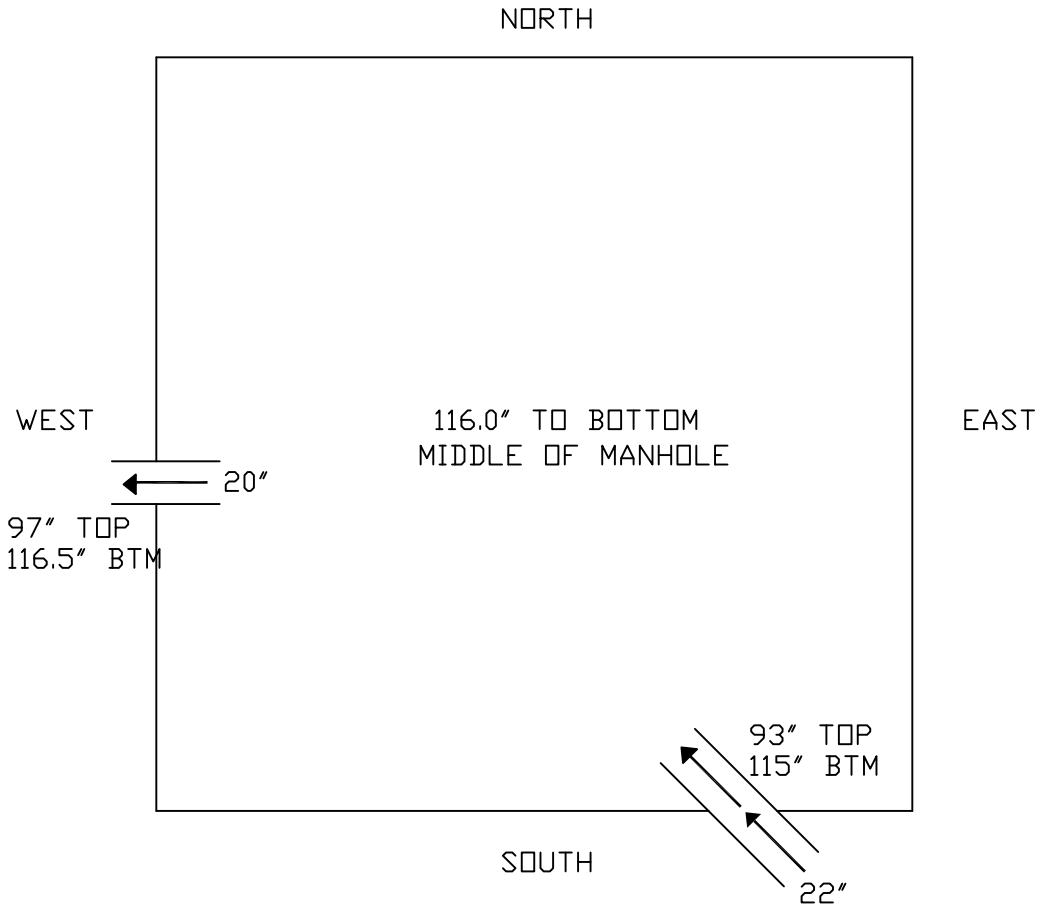
UNIDENTIFIED PROCESS LINE 1 PHOTO 9

UNIDENTIFIED PROCESS LINE 1 PHOTO 10

UNIDENTIFIED PROCESS LINE 1 PHOTO 11

UNIDENTIFIED PROCESS LINE 1 PHOTO 12

UNKNOWN STORMWATER 1



REVISIONS			
Rev. No.	DATE	BY	DESCRIPTION
0	02/05/2020	KC	GENERATED TO CAD

CLIENT:	FACILITY:	DESCRIPTION:	DWG. NO.:	DWG. DATE:
MARATHON - GALLUP FACILITY	Gallup New Mexico	DESC: UNKNOWN STORM LINE	DWG#: 1	2.5.2020

	REMOTE VISUAL INSPECTION – STORMWATER AND PROCESS LINES	
CLIENT: MARATHON	FACILITY: GALLUP NM	DATE: 2020.1.29
ID# UNKNOWN STORM	PHOTOLOG	SURVEYED BY: B. JAMES

UNIDENTIFIED STORM LINE PHOTO 1

UNIDENTIFIED STORM LINE PHOTO 2

UNIDENTIFIED STORM LINE PHOTO 3

Appendix C – Boring Logs

Trihydro CORPORATION

Lithology Log Sheet 1 of 2

LOCID: HEB-01

Project Name: Heat Exchanger Bundle Pad Investigation	Project Number: 697-101-001	Site ID: Marathon Gallup Refinery
Drilling Company: Cascade	Driller:	Ground Elevation:	Total Drilled Depth:
Drilling Equipment: Geoprobe 6620DT	Drilling Method: Direct Pust	Borehole Diameter: 2 inch	Date/Time Drilling Started: 5/18/2022 @ 12:09	Date/Time Total Depth Reached:
Type of Sampling Device: Continuous Core		Water Level (bgs): First / Final
Sample Hammer: GH62 Type / Driving Wt. / Drop		Geologist/Engineer: Brian McLoughlin / Jim Hageman	Checked by/Date:
Weather: Clear, sunny, light wind		Other Personnel Present:
Site Conditions:		
Location Description (include sketch in field logbook): GPS used for location		

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	PID	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types, times, and depth, odor, organic vapor measurements, etc.)
2				Top 5' cleared for utilites, no recovery							
4											
6				Sandy gravel, brownish gray (5'-6')	91.4						
				Reddish sand (6'-7')	105						Slight HC-like odor, no moisture
8				Red sand with intermixed gravel, some black stains (7'-8')	47.25						
				Red/brown clay, dense clay (8'-10')	32.53						
10					170.6						Slight HC-like odor, some moisture
				Red/brown dense clay with intermixed gravel (0.5%) (10'-14')							
12											Slight HC-like odor, dry
					6.76						
14					141.4						
				Red/brown sandy clay, moist throughout. Some black staining							Strong HC-like odor @ 14' -15'
16				Very dry, red/brown silty soil (clay? WS?), T.D. @ 16', refusal	1.15 @ 16'						No odor @ 15'-16'+A15:U94

Trihydro CORPORATION

Lithology Log Sheet 1 of 2

LOCID: HEB-02

Project Name: Heat Exchanger Bundle Pad Investigation	Project Number: 697-101-001	Site ID: Marathon Gallup Refinery
Drilling Company: Cascade	Driller:	Ground Elevation:	Total Drilled Depth:
Drilling Equipment: Geoprobe 6620DT	Drilling Method: Direct Pust	Borehole Diameter: 2 inch	Date/Time Drilling Started: 5/18/2022 @ 15:00	Date/Time Total Depth Reached: 5/18/2022
Type of Sampling Device: Continuous Core		Water Level (bgs): First / Final
Sample Hammer GH62 — Type / Driving Wt. / Drop		Geologist/Engineer: Brian McLoughlin / Jim Hageman	Checked by/Date:
Weather		Other Personnel Present
Site Conditions		
Location Description (include sketch in field logbook): GPS used for location		

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	PID	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types, times, and depth, odor, organic vapor measurements, etc.)
2–4				Top 5' cleared for utilites, no recovery							
6				Sandy gravel (0.5") (5'-7.5')	2.85						HC-like odor, some moisture
				Black stains, moist, sandy, gravel (6.5'-7.5')	20.7						HC-like odor, some moisture
8					109.4						HC-like odor, some moisture
				Reddish brown clay, mostly dry, some black streaking	217.1						HC-like odor, some moisture
10					292.7						HC-like odor, some moisture
				Reddish brown clay (10'-10.25')	262.3						HC-like odor
12				Black sand layer, strong HC-like odor (10.25'-12')							
				Sandy clay, reddish brown w/ black streaks, fading @ depth 13'	43.2						No odor
14				Red/brown clay, dense	134.9						Faint HC-like odor 13'-13.5'
				Grayish red clay, friable, dry, no odor	48.15						No odor to bottom
16				S.A.A. Total depth at 16'	9						

Trihydro Corporation

Lithology Log Sheet 1 of 2

LOCID: HEB-03

Project Name: Heat Exchanger Bundle Pad Investigation	Project Number: 697-101-001		Site ID: Marathon Gallup Refinery
Drilling Company: Cascade	Driller:	Ground Elevation:	Total Drilled Depth:
Drilling Equipment: Geoprobe 6620DT	Drilling Method: Direct Pust	Borehole Diameter: 2 inch	Date/Time Drilling Started: 5/19/2022	Date/Time Total Depth Reached:
Type of Sampling Device: Continuous Core		Water Level (bgs): First	Final
Sample Hammer GH62 Type	Driving Wt.	Drop	Geologist/Engineer: Brian McLoughlin / Jim Hageman	Checked by/Date:
Weather			Other Personnel Present:
Site Conditions			

Location Description (include sketch in field logbook)
GPS used for location

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	PID	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types, times, and depth, odor, organic vapor measurements, etc.)
2				Top 5', no recovery, utility clearance activities							
4											
6				Red brown clayey sand, mixed gravel (<0.5")	121.2						No odor, dry,
				S.A.A with gravel	78.5						
8				S.A.A with sand @ 7.5'	379.0						
				Dense clay with intermixed sand	316.9						Faint HC-like odor, mostly dry
10				S.A.A.	377.9						
				Red/brown clay, light brown intermixed sand	424.3						Light moisture, faint HC-like odor
12				Sandy material, stained black, 11.5'-12'	442.5						HC-like odor, moist
				Clay with intermixed sand stained black	445.1						HC-like odor, moist
14				Sandy clay red/brown with some black streaks	448.2						HC-like odor, moist
				Dense clay, red/brown with black streaks	104.0						HC-like odor (faint), some moisture
				Dense red clay, some faint black stains	160.63						No HC-odor, no moisture
16					121.9						
					13.5						
18											

Trihydro Corporation

Lithology Log Sheet 1 of 2

LOCID: HEB-04

Project Name: Heat Exchanger Bundle Pad Investigation	Project Number: 697-101-001		Site ID: Marathon Gallup Refinery
Drilling Company: Cascade	Driller:	Ground Elevation:	Total Drilled Depth:
Drilling Equipment: Geoprobe 6620DT	Drilling Method: Direct Pust	Borehole Diameter: 2 inch	Date/Time Drilling Started: 5/18/2022 @ 17:30
			Date/Time Total Depth Reached:
Type of Sampling Device: Continuous Core		Water Level (bgs): First	Final
Sample Hammer GH62 Type	Driving Wt.	Drop	Geologist/Engineer: Brian McLoughlin / Jim Hageman
			Checked by/Date:
Weather:		Other Personnel Present:	
Site Conditions:			

Location Description (include sketch in field logbook)
GPS used for location

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	PID	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types, times, and depth, odor, organic vapor measurements, etc.)
2				No recovery, utility clearance to 5'							
4											
6				Reddish/brown sandy soil (5'-6'), no odor, no moisture	40.75						No odor
				Red/brown sandy gravel (<0.5") with increased black staining. Little moisture, HC-like odor (6'-8')	208.0						HC-like odor
8				S.A.A. Dark black sand layer (8.5'-9'), HC-odor, moist	290						HC- like odor
10				Red brown dense clay, little black staining	228.3						Faint HC-like odor
12				10'-15' liner stuck in machine. Dense clay on either end, removal not possible, no sample recovered End of Day 5/18/2022							
14											
16				15'-17' Red/brown dense clay, some sand intermixed. Sand has slight HC-like odor	183.3 66.6						Slight HC-like odor
18				Red/brown/gray clayey soil, no odor, no moisture	2.75						No odor

Trihydro Corporation

Lithology Log Sheet 1 of 2

LOCID: HEB-05

Project Name: Heat Exchanger Bundle Pad Investigation	Project Number: 697-101-001		Site ID: Marathon Gallup Refinery
Drilling Company: Cascade	Driller: Richard/Biancos	Ground Elevation	Total Drilled Depth
Drilling Equipment: Geoprobe 6620DT	Drilling Method: Direct Pust	Borehole Diameter: 2 inch	Date/Time Drilling Started: 5/19/2022 @ 10:00	Date/Time Total Depth Reached: 5/19/2022
Type of Sampling Device: Continuous Core		Water Level (bgs): First	Final
Sample Hammer GH62 Type	Driving Wt.	Drop	Geologist/Engineer: Brian McLoughlin / Jim Hageman	Checked by/Date
Weather: Clear, sunny, light breeze, 70's		Other Personnel Present	
Site Conditions			

Location Description (include sketch in field logbook)
GPS used for location

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	PID	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types, times, and depth, odor, organic vapor measurements, etc.)
2				No recovery, top 5 feet due to clearance activities							
4											
6				Red/brown sandy gravel (0.5"), moist	80.48						Slight HC-like odor
					185.2						
8				Dense clay, some sandy	119.3						S.A.A
				Sandy soil with some clay, moist							S.A.A
10				Dense clay, red/brown	234.1						S.A.A
12				Dense clay red/brown	85.3						HC-like odor, light moisture
					21.6						
					124.8						
14				S.A.A.	23.34						No HC-odor, very moist
				Red/brown sandy soil, very moist (13.75'-14.5')							No HC-odor, mostly dry
				Red/brown dense clay	15.95						No HC-odor, mostly dry
16				T.D.@15' BGS							
18											

Trihydro Corporation

Lithology Log Sheet 1 of 2

LOCID: HEB-06

Project Name: Heat Exchanger Bundle Pad Investigation	Project Number: 697-101-001		Site ID: Marathon Gallup Refinery
Drilling Company: Cascade	Driller:	Ground Elevation:	Total Drilled Depth:
Drilling Equipment: Geoprobe 6620DT	Drilling Method: Direct Pust	Borehole Diameter: 2 inch	Date/Time Drilling Started: 5/19/2022 @ 13:10
			Date/Time Total Depth Reached: 5/19/2022
Type of Sampling Device: Continuous Core		Water Level (bgs): First	Final
Sample Hammer GH62 Type	Driving Wt.	Drop	Geologist/Engineer: Brian McLoughlin / Jim Hageman
			Checked by/Date:
Weather			Other Personnel Present
Site Conditions			

Location Description (include sketch in field logbook)
GPS used for location

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	PID	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types, times, and depth, odor, organic vapor measurements, etc.)
2				No recovery 0'-5' due to utility clearance activities							
4											
6				Red/brown clayey sand, no odor, mostly dry							No odor
				Sandy gravel, no odor, no staining 6'-7.5'	407.2						Faint HC-like odor
8				Moist sandy gravel (<0.25")	394.1						No odor
				Red/brown dense clay, little/no moisture	104.8						No odor
10				Red/brown dense clay							
12				Sandy interval with some black staining	378.4						HC-like odor
				Dense clay sand with some back stains and streaks							Faint HC-like odor
14					315.7						
				Dense red/brown clay	13.12						No odor
16											
18											

Trihydro Corporation

Lithology Log Sheet 1 of 2

LOCID: HEB-07

Project Name: Heat Exchanger Bundle Pad Investigation	Project Number: 697-101-001	Site ID: Marathon Gallup Refinery	
Drilling Company: Cascade	Driller:	Ground Elevation:	Total Drilled Depth:
Drilling Equipment: Geoprobe 6620DT	Drilling Method: Direct Pust	Borehole Diameter: 2 inch	Date/Time Drilling Started: 5/19/2022 @ 16:40
Date/Time Total Depth Reached: 5/19/2022			
Type of Sampling Device: Continuous Core		Water Level (bgs): First / Final	
Sample Hammer GH62 — Type / Driving Wt. / Drop		Geologist/Engineer: Brian McLoughlin / Jim Hageman	Checked by/Date:
Weather: Clear, light breeze		Other Personnel Present:	
Site Conditions:			

Location Description (include sketch in field logbook)
GPS used for location

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	PID	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types, times, and depth, odor, organic vapor measurements, etc.)
2–4				No recovery 0-5' due to utility clearance activities							
6				Dry red/brown sandy soil, no odor, some gravel (0.5")	337.9						No odor
				Clay, dense, dark red/brown	304.1						No odor
8				Red/brown sandy soil with black staining, HC-like odor, moist	362.7						HC-like odor
10				Red/brown dense clay with black streaks/staining, mostly dry, little moisture	188.9 78.4						HC-like odor
12				Red/brown dense clay	8.2						No odor
				Red/brown clay, moist, some sand present	40.5 63.21						Faint HC-like odor
14				Red/brown dense clay	78.9						S.A.A.
				Red/brown dense clay	59.85 48.2						S.A.A.
16				Total Depth 15.5'							
18											

Trihydro Corporation

Lithology Log Sheet 1 of 2

LOCID: HEB-08

Project Name: Heat Exchanger Bundle Pad Investigation	Project Number: 697-101-001		Site ID: Marathon Gallup Refinery
Drilling Company: Cascade	Driller:	Ground Elevation:	Total Drilled Depth:
Drilling Equipment: Geoprobe 6620DT	Drilling Method: Direct Pust	Borehole Diameter: 2 inch	Date/Time Drilling Started: 5/20/2022 @ 09:30
			Date/Time Total Depth Reached:
Type of Sampling Device: Continuous Core		Water Level (bgs): First	Final
Sample Hammer GH62 Type	Driving Wt.	Drop	Geologist/Engineer: Brian McLoughlin / Jim Hageman
			Checked by/Date:
Weather: Clear, wind < 20 MPH, 60's		Other Personnel Present:	
Site Conditions:			

Location Description (include sketch in field logbook)
GPS used for location

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	PID	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types, times, and depth, odor, organic vapor measurements, etc.)
2				No recovery due to utility clearance 0'-5'							
4											
6				Sandy gravel (0.25"), no odor, no staining (light brown)	261.7						No odor
				Some moisture, mostly clay, slight HC-odor (6'-7')	358.0						Slight HC-like odor
8				Sandy soil with black staining throughout	376.7						HC-like odor
				Clay with some sand	290.4						Slight HC-like odor
10				Sandy gravel area with black staining clay at bottom	125.3						HC-like odor
12				Red/brown dense clay	18.95						No odor
				Clayey sand, red/brown, dense, increased moisture	63.8						Slight HC-like odor
14				Red/brown dense clay	22.8						No odor
				14' Total depth							
16											
18											

Trihydro Corporation

Lithology Log Sheet 1 of 2

LOCID: HEB-09

Project Name: Heat Exchanger Bundle Pad Investigation	Project Number: 697-101-001		Site ID: Marathon Gallup Refinery
Drilling Company: Cascade	Driller:	Ground Elevation:	Total Drilled Depth:
Drilling Equipment: Geoprobe 6620DT	Drilling Method: Direct Pust	Borehole Diameter: 2 inch	Date/Time Drilling Started: 5/20/2022 @ 11:35
Date/Time Total Depth Reached:			
Type of Sampling Device: Continuous Core		Water Level (bgs): First / Final	
Sample Hammer GH62 — Type / Driving Wt. / Drop		Geologist/Engineer: Brian McLoughlin / Jim Hageman	Checked by/Date:
Weather: Clear, sunny, wind ~20 MPH		Other Personnel Present:	
Site Conditions:			

Location Description (include sketch in field logbook)
GPS used for location

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	PID	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types, times, and depth, odor, organic vapor measurements, etc.)
2–4				No recovery due to utility clearance activities							
6				Red/Brown clay dry	15.15						No odor, dry
				Soapy gravel/clay layer, no odor, no staining							
8				Red/brown clay, dense, dry, intermixed gravel (<0.10")	127.4						Slight HC-like Odor
					108.3						
10					88.95						
12				Clayey sand, moist red/brown, some black staining	128.4						Light HC-like odor
				Dense clay, red/brown, mostly dry	46.4						
				S.A.A.	44.6						
14				S.A.A. with moist sand lense (13.25'-13.5')	24.25						No odor
				Total depth 14'							
16–18											

Trihydro Corporation

Lithology Log Sheet 1 of 2

LOCID: HEB-10

Project Name: Heat Exchanger Bundle Pad Investigation	Project Number: 697-101-001		Site ID: Marathon Gallup Refinery
Drilling Company: Cascade	Driller:	Ground Elevation:	Total Drilled Depth:
Drilling Equipment: Geoprobe 6620DT	Drilling Method: Direct Pust	Borehole Diameter: 2 inch	Date/Time Drilling Started: 5/20/2022 @ 10:55
Date/Time Total Depth Reached:			
Type of Sampling Device: Continuous Core		Water Level (bgs): First	Final
Sample Hammer GH62 Type	Driving Wt.	Drop	Geologist/Engineer: Brian McLoughlin / Jim Hageman
Checked by/Date:			
Weather:		Other Personnel Present:	
Site Conditions:			

Location Description (include sketch in field logbook)
GPS used for location

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	PID	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types, times, and depth, odor, organic vapor measurements, etc.)
2				No recovery due to utility clearance activities 0'-5'							
4											
6				Dry, sandy gravel (.75")	0.5						No odor
8				Red dense clay with some intermixed gravel (3/4")	0.55						No odor
10					84.3						No odor
				Sandy gravel (0.75"), dark black staining, moist	117.4						HC-like odor
12				Increasing moisture, clayey gravel/sand, red/brown	88.5						HC-like odor
					30.15						HC-like odor
14				Red dense clay, very dense, mostly dry	4.2						Little/No odor
				Dry	1.35						
16				15' Total depth							
18											

Trihydro Corporation

Lithology Log Sheet 1 of 2

LOCID: HEB-11

Project Name: Heat Exchanger Bundle Pad Investigation	Project Number: 697-101-001	Site ID: Marathon Gallup Refinery	
Drilling Company: Cascade	Driller:	Ground Elevation:	Total Drilled Depth:
Drilling Equipment: Geoprobe 6620DT	Drilling Method: Direct Pust	Borehole Diameter: 2 inch	Date/Time Drilling Started: / Date/Time Total Depth Reached:
Type of Sampling Device: Continuous Core		Water Level (bgs): First / Final	
Sample Hammer GH62 Type / Driving Wt. / Drop		Geologist/Engineer: Brian McLoughlin / Jim Hageman	Checked by/Date:
Weather:		Other Personnel Present:	
Site Conditions:			

Location Description (include sketch in field logbook)
GPS used for location

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	PID	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types, times, and depth, odor, organic vapor measurements, etc.)
2				No recovery due to utility clearance 0'-5'							
4											
6				Sandy gravel (<0.5") light brown/red, no moisture (5'-9')							No odor
					0.0						
8											
					0.0						
10				Red/brown sandy clay, dry							No odor
				Red/brown sandy clay	25.5						Faint HC-like odor
					21.85						
12					15.6						
				Red/brown sandy clay with gray spots	76.6						Faint HC-like odor
14					14.75						No odor
				T.D. @ 15'							
16											
18											

Trihydro Corporation

Lithology Log Sheet 1 of 2

LOCID: HEB-12

Project Name: Heat Exchanger Bundle Pad Investigation	Project Number: 697-101-001		Site ID: Marathon Gallup Refinery
Drilling Company: Cascade	Driller:	Ground Elevation:	Total Drilled Depth:
Drilling Equipment: Geoprobe 6620DT	Drilling Method: Direct Pust	Borehole Diameter: 2 inch	Date/Time Drilling Started: 5/20/2022 @ 10:15
Date/Time Total Depth Reached: 5/20/2022 @ 10:45			
Type of Sampling Device: Continuous Core		Water Level (bgs): First / Final	
Sample Hammer GH62 Type / Driving Wt. / Drop		Geologist/Engineer: Brian McLoughlin / Jim Hageman	Checked by/Date:
Weather: Clear, sunny, wind ~20 mph		Other Personnel Present	
Site Conditions			

Location Description (include sketch in field logbook)
GPS used for location

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	PID	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types, times, and depth, odor, organic vapor measurements, etc.)
2				No recovery due to utility clearance 0'-5'							
4											
6				Sandy gravel (0.5"), no odor	0.1						No odor
8				Dense clay, red/brown	67.5						
				Sand ~4 inches	60.4						Slight Hc-like odor
10				Clayey sand, red/brown	135.7						S.A.A.
				Clay, red/brown, dense (10'-10.5')	146.6						No odor
				Sandy gravel (0.25"), moist							HC-like odor
				Clay red/brown, dense	68.4						HC-like odor
12				Gravel/sand (< 0.75"), very moist, some black staining throughout	160.2						HC-like odor
					50.3						
14				S.A.A. Dry clay, mottled gray	5.5						No odor
16											
18											

Trihydro Corporation

Lithology Log Sheet 1 of 2

LOCID: HEB-13

Project Name: Heat Exchanger Bundle Pad Investigation	Project Number: 697-101-001		Site ID: Marathon Gallup Refinery
Drilling Company: Cascade	Driller:	Ground Elevation:	Total Drilled Depth:
Drilling Equipment: Geoprobe 6620DT	Drilling Method: Direct Pust	Borehole Diameter: 2 inch	Date/Time Drilling Started: 5/19/2022 @	Date/Time Total Depth Reached: 5/19/2022 @
Type of Sampling Device: Continuous Core		Water Level (bgs): First	Final
Sample Hammer GH62 Type	Driving Wt.	Drop	Geologist/Engineer: Brian McLoughlin / Jim Hageman	Checked by/Date:
Weather: Cloudy, 70's, wind (< 20 mph)		Other Personnel Present:	
Site Conditions:			

Location Description (include sketch in field logbook)
GPS used for location

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	PID	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types, times, and depth, odor, organic vapor measurements, etc.)
2				No recovery due to utility clearance 0'-5'							
4											
6				Red/brown sandy gravel (< 0.25"), mostly dry	0.85						No odor
8				Sandy clay with black staining (8'-8.75')	64.17						
10				Red/brown dense clay	109.4						
12				Red/brown clay, dense, little moisture	121.4						Faint HC-like odor
14				Red/brown sandy soil with black staining (12.75'-14'), moist	147.24						HC-like odor
				Dense clay, red/brown, dry (14'-14.75')	9.4						No odor
				Gray, friable, clay 14.75'-15'							T.D. Drilled
16											
18											

Trihydro Corporation

Lithology Log Sheet 1 of 2

LOCID: HEB-14

Project Name: Heat Exchanger Bundle Pad Investigation	Project Number: 697-101-001		Site ID: Marathon Gallup Refinery
Drilling Company: Cascade	Driller:	Ground Elevation:	Total Drilled Depth:
Drilling Equipment: Geoprobe 6620DT	Drilling Method: Direct Pust	Borehole Diameter: 2 inch	Date/Time Drilling Started: 5/18/2022 @ 11:00	Date/Time Total Depth Reached: 5/18/2022 @ 11:10
Type of Sampling Device: Continuous Core		Water Level (bgs): First / Final	
Sample Hammer GH62 Type / Driving Wt. / Drop		Geologist/Engineer: Brian McLoughlin / Jim Hageman	Checked by/Date:
Weather: Clear, sunny, 80's, wind < 10 MPH		Other Personnel Present	
Site Conditions			

Location Description (include sketch in field logbook)
GPS used for location

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	PID	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types, times, and depth, odor, organic vapor measurements, etc.)
2				Utility clearance to 5' bgs, no sample							
4											
6				Sand (~0.75") @ 5', no staining, no odor Sandy gravel (< 0.5") from 5' to 6.5'	0.0						
					0.5						No odor, no staining, dry
8				Reddish/brown dense clay from 6.5'-10'	57.4						
10					135.3						HC-like odor @ 9' bgs - 10' bgs
					111.1						Faint HC-like odor, little moisture
12				Reddish brown dense clay with intermxed gravel lenses (< 3/4") @ at 11', 12', 12.5'							
											No odor, no staining, little moisture
					136.1						S.A.A.
14					88.9						
				Total depth 15'	43.24						
16				Bottom of process sewer roughly 12' bgs. Sample @ 13' bgs per WP Some fluid w/ HC-like odor was in sample core around 12.5' bgs							
18											

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 161699

CONDITIONS

Operator: Western Refining Southwest LLC 539 South Main Street Findlay, OH 45840	OGRID: 267595
	Action Number: 161699
	Action Type: [UF-DP] Discharge Permit (DISCHARGE PERMIT)

CONDITIONS

Created By	Condition	Condition Date
jburdine	Accepted for Record Retention Purposes-Only	11/28/2022