Installation of Groundwater Recirculation System Work Plan

Coleman Oil Company Facility
3 East Chehalis Street
Wenatchee, Washington

Prepared for:

Coleman Oil Company, LLC
335 Mill Road
Lewiston, Idaho 83501

May 22, 2020

Prepared by:

HydroCon, LLC
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Coleman Oil Company Facility
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Prepared for:

Coleman Oil Company LLC
335 Mill Road
Lewiston, Idaho 83501

HydroCon Project No: 2017-074

Prepared by:

Craig Hultgren, LHG
Principal Geologist

Reviewed by:

Mark Selman, PE
Principal Engineer

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Acronyms

BTEX	benzene, toluene, ethylbenzene, and total xylenes
Clarke	Clarke Construction
Coleman Oil	Coleman Oil Company
DRPH	diesel range petroleum hydrocarbons
Ecology	Washington Department of Ecology
EPA	Environmental Protection Agency
GRPH	gasoline range petroleum hydrocarbons
HydroCon	HydroCon Environmental LLC
µg/L	micrograms per liter
mg/Kg	milligrams per Kilogram
LNAPL	light nonaqueous-phase liquid
MTCA	Model Toxics Control Act
ORPH	oil range petroleum hydrocarbons
PID	photoionization detector
QAPP	Quality Assurance Project Plan
SAP	Sampling and Analysis Plan
SRI	Supplemental Remedial Investigation
VOCs	volatile organic compounds
WAC	Washington Administrative Code

1.0 INTRODUCTION

HydroCon Environmental, LLC (HydroCon), has prepared this Work Plan on behalf of Coleman Oil Company (Coleman Oil) to install a groundwater recirculation system in the upland area of the Coleman Oil facility. The system will recirculate treated groundwater instead of discharging it into the City of Wenatchee's sanitary sewer system. This water will be enriched with oxygen using hydrogen peroxide to promote increased biological degradation of the residual contaminants at the site.

This work plan has been prepared to supplement the RI/FS and requirements of Exhibit B – Scope of Work and Schedule of Agreed Order No. DE 15389 entered into by Coleman Oil Company, LLC; Coleman, Services IV, LLC; and the Washington State Department of Ecology (Ecology) with an effective date of September 18, 2017 (Agreed Order). The Agreed Order is a continuation of previous and ongoing significant oil spill response activities and removal actions conducted under the Administrative Order on Consent for Removal Activities issued by the U. S. Environmental Protection Agency (EPA) on May 5, 2017 (EPA Docket No. CWA-10-2017-0114).

The site, as defined under the Washington State Model Toxics Control Act Cleanup Regulation (MTCA), Chapter 173-340 of the Washington Administrative Code (WAC §173-340-200), comprises the portion of the Coleman Oil Property and adjacent properties where hazardous substances have come to be located in soil, groundwater, and surface water at concentrations exceeding applicable cleanup levels (herein referred to as the Site) as a result of releases at the Coleman Oil Property.

Supporting documentation is found in the attachments to the Supplemental Remedial Investigation (SRI) Work Plan (HydroCon 2018a) and Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) that include Standard Operating Procedures (SOPs) and field forms that will be used during the investigation.

1.1 *Purpose and Scope*

The purpose of this system is to recirculate treated groundwater that will be enriched with dissolved oxygen to promote enhanced biologic degradation of the residual contamination remaining at the site. The treatment of groundwater collected from the remediation system at the Site will remain unchanged. This system includes passing the contaminated water through granular activated carbon (GAC) to remove contaminants. The new system will enrich the dissolved oxygen content of the treated water using hydrogen peroxide (H_20_2) and then discharge it back into one or more of sumps placed in the uplands area of the Site during previous remedial excavations (Figure 2). This will convert the current remediation system into a closed loop system eliminating the need to discharge the treated water into the City of Wenatchee's sanitary sewer system.

This recirculation system will include a series of trenches to place 2-inch diameter piping to 11 sumps that were installed during the 2017 and 2019 remedial excavations (Figure 3). These include the following:

- 6 sumps installed in the 2017 Remedial Excavation (Sump 1 through Sump 6)
- 3 sumps installed in the West Trench (WT-N, WT-M, and WT-S)
- 2 sumps installed in the 2019 Remedial Excavation (RE-West and RE-East)

Individual pipe runs will be installed at each sump. The piping will be attached to a manifold shown on Sheet M-101 in the attached design plan (Appendix A). Treated and oxygen enriched water will be routed to the manifold which will have a series of 11 valves that control which sump/conveyance standpipe will receive the water. The purpose of the manifold is to direct the application of treated water to selected areas of the uplands area. This will allow focused application of treated/oxygen enriched water to areas that have elevated GRPH and DRPH concentrations.

1.2 *Responsible Agency*

Ecology is the lead regulatory agency for the cleanup action at the Site as promulgated in the MTCA. The SRI has been performed to meet the requirements of Exhibit B – Scope of Work and Schedule of Agreed Order.

1.3 *Project Organization*

The names and responsibilities of key project representatives and personnel involved in the cleanup action at the Site are listed in below:

- Frank P. Winslow, Ecology's assigned Project Manager
- Jim Cach, Coleman Oil Company's Project Manager
- Craig Hultgren, LHG, HydroCon, Project Manager
- Nick Varnum, LHG, HydroCon, Senior Geologist
- Rob Honsberger, HydroCon, Field Lead
- Kurt Johnson, APEX Laboratory, Forensic Chemist and Quality Assurance Officer

2.0 PROJECT BACKGROUND

The following section provides a summary of the Site location and description, geologic setting, and pertinent background of environmental issues at the site. Supplemental information about the Site can be found in the SRI Report (HydroCon 2018b).

2.1 *Site Description*

The Site is located at 3 Chehalis Street in Wenatchee, Washington. The Site is located nearly adjacent to the west side of the Columbia River. Land use near the Site is primarily industrial (Figure 1).

2.2 *Site History*

The Site has been in operation as a bulk fuel facility since 1921. Coleman Services IV, LLC purchased the property in January 2007 and Coleman Oil has operated the Site since that time.

A petroleum sheen was discovered on the west side of the Columbia River approximately 300 feet north of the Site on March 17, 2017. Subsequent line tightness testing revealed that two lines could not hold pressure and review of Coleman Oil inventory records indicated that the release was most likely from the underground R99 renewable diesel fuel line.

Subsequent testing included the installation of groundwater monitoring wells, soil borings, and test pits in different phases between March and September 2017 by Farallon (2017) and March, April, and August 2018 by HydroCon (2018b and 2018c) (Figure 2). This testing indicated soil and groundwater had been impacted at concentrations above MTCA Method A cleanup levels, including impacts to soil and groundwater near the location of the sheen.

2.3 *Remedial Measures*

Several remedial measures have taken place at the Site since the discovery of the release.

- Pads and booms have been placed in the Columbia River in the observed sheen discharge area to recover product since discovery of the release. This practice has continued along with daily reporting regarding Columbia River conditions.
- In 2017, a remedial excavation was performed on the Coleman Oil facility near the point of release. Approximately 741 tons of petroleum contaminated soil was removed for offsite disposal.
- Sumps were placed in the 2017 remedial excavation backfill. Pumps were placed in the sumps to recover product and maintain a cone of depression to minimize product migration. Effluent from the sumps was routed to an oil/water separator and settling tanks prior to treatment using granular activated carbon (GAC). The treated water was disposed under permit into the City of Wenatchee's sanitary sewer system.
- Farallon Consulting and Ecology's consultant (Environmental Partners, Inc. [EPI] installed fifteen wells at the Site (MW-1 through MW-11, BH-1 through BH-3, and RW-1). Product recovery via skimming using a peristaltic pump and tubing and/or passive recovery using hydrophobic socks has occurred in some of the wells.
- In April 2018, HydroCon performed a supplemental remedial investigation (SRI) that included the addition of fourteen new 4-inch diameter monitoring wells (MW12 through MW23, MW01S, MW03S). Three wells with persistent LNAPL measurements (MW-9, MW-10, and BH-1) were fitted with pumps and connected with underground piping for pressurized air to operate the pumps, and conduit for electrical control and effluent piping to collect the recovered groundwater and product. The recovered groundwater and product from these wells are routed through three oil/water separators, into storage tanks

and then through filtration and GAC and into storage tanks. The treated water is analyzed prior to discharge in batches under an agreement between Coleman Oil and the City of Wenatchee into the City's sanitary sewer system. Pumping of the three wells began on May 5, 2018.

- In August 2018 nine new 4-inch diameter monitoring wells (MW24 through MW32) were installed at the Site. Two of the wells used to recover product and contaminated groundwater (MW-9 and MW-10) were deepened, completed as 4-inch diameter wells, and renamed MW09R and MW10R, respectively.
- A surface release of diesel and gasoline that was stored in a 55-gallon drum at the Site occurred near the northeastern corner of Tank Farm A in early September 2018. A total of 16.83 tons of petroleum contaminated soil was removed by remedial excavation. Confirmation soil sampling results indicated that the lateral extent of contamination had been removed. However, the concentration of gasoline range petroleum hydrocarbons (GRPH) and diesel range petroleum hydrocarbons (DRPH) in the floor sample collected near the groundwater interface exceeded their respective MTCA Method A cleanup levels. No further excavation was attempted due to the presence of the Tank Farm A containment and a massive boulder that was too large to remove using the excavation equipment. Further remedial action in this area will be considered in the feasibility study that will be prepared for the Site.
- The remediation system was expanded in November 2018 to include six more recovery points (MW17, MW24, MW28, MW29, MW30, and MW32). The modified remediation system now consists of three separate zones that pump LNAPL and contaminated groundwater into an associated OWS. These zones include the MW09R zone (MW09R, MW17, and MW32) with only MW09R currently active; the MW10R zone (W10R, MW24, and MW28) with all 3 wells active; and the BH-1 zone (BH-1, MW29, and MW30) with all 3 wells active. The expanded remediation system began pumping on November 2, 2018.
- As of December 31, 2019, a total of 454.47 gallons of R99 have been recovered (HydroCon 2020b).

2.4 *Geologic & Hydrogeologic Setting*

The Site is in the Wenatchee Valley approximately 150 feet west south-west of the Columbia River at an elevation of approximately 660 feet above mean sea level (Figure 1). The topography of the Site slopes very gently to the north north-west parallel to the Columbia River.

The soils beneath the Site are consistent with ice-age alluvial deposits underlain by the Chumstick Formation bedrock. The alluvium consists primarily of silt and silty sand, with layers of clay, sand, gravel, and cobbles. The thickness of the alluvial deposits ranges from 6 to 31.5 feet. Boring logs and drilling observations indicate that a more massive, well cemented sandstone layer is beneath thin layers of mudstone, shale and sandstone and the sandstone appears to be acting as an aquitard in this

area. The groundwater level is within a few feet of the top of the Chumstick Formation and always above the sandstone layer. An exception is at MW22 where the groundwater is approximately 15 feet above the top of the Chumstick formation. This area has been disturbed by previous excavation and has been backfilled with construction and other debris.

Groundwater flow is generally parallel with the Chumstick formation. The groundwater flow direction and the dip of the sandstone surface are both to the north, northeast except in the area between the Site and the Columbia River where both are more to the east.

Contaminant transport and groundwater flow appears to follow the surface of the Chumstick formation and field observations paired with analytical data suggest that the petroleum contamination penetrates a few feet into the formation and travels laterally within the shaley sandstone and shale/siltstone/mudstone of the Chumstick formation. Beginning at the point of release, product migrated downward via gravity until it reached groundwater. Downgradient migration appears to be controlled by geology (bedrock) along preferential pathways within the subsurface that are likely fractured and/or channelized areas within the Chumstick Formation and areas of different porosity in the overlying alluvium. These pathways appear to be complex and localized based on the intermittent presence of LNAPL in monitoring wells installed near the Columbia River near the observed sheen discharge area and where the four seeps are located. Limited aquifer testing performed in February and August 2018 demonstrated that none of the wells tested are hydraulically connected, except MW10R and MW24. Over 200 gallons of R99 (based on product recovery totals) have been recovered from the Columbia River with the apparent discharge points being east of monitoring wells BH-2 (south) to MW-10 (north).

2.5 *Contaminant Distribution*

The results of the Supplemental Remedial Investigation [(SRI), HydroCon 2018b] provided significant clarification to the understanding of contaminant distribution at the Site. Diesel and gasoline range hydrocarbons exceeding MTCA Method A cleanup levels are present in subsurface soil, groundwater, shoreline soils, and shoreline sediments. R99 Renewable diesel in groundwater extends from the release area to the north-northeast to the area between MW21 and MW22; a distance of 550 feet. Soil is impacted by DRPH transported by groundwater. The majority of the DRPH is attributed to the release of R99. However, diesel and other petroleum products stored at the site from almost 100 years of operations is also present in the subsurface. Shoreline soil and shoreline sediments are impacted by groundwater discharging to the Columbia River approximately 400 feet north of the release area. GRPH extends to the area of impact south of the release area (MW13 and MW1S) and is likely due to historic releases not associated with the R99 Renewable diesel release. The current understanding of the extent of subsurface soil, groundwater, and shoreline soils impacted for diesel and gasoline range hydrocarbons is shown on Figure 3.

Gasoline and diesel impact to soil and groundwater at MW22, the northernmost monitoring well, are interpreted to be due to a source not associated with the operations at Coleman Oil Company.

3.0 INSTALLATION OF RECIRCULATION SYSTEM

This section describes the objectives and methods of the proposed work. Applicable sections of the SRI Work Plan Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) are adopted here for this work plan.

3.1 *Update Health and Safety Plan*

HydroCon will update the site-specific Health and Safety Plan to guide field safety protocols, in accordance with rules established by the Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act (WISHA).

3.2 *Utility Locates*

HydroCon will contact the Washington 1-call utility locates hotline to request a public utility locates. White paint marks will be placed on the ground to delineate the area that needs to be surveyed, as is required by law, prior to calling in the locate request. In addition, a private utility locate contractor will be hired to clear boring locations prior to drilling.

3.3 *Permits*

The following permits will be obtained from regulatory agencies that govern the work.

- An underground injection control (UIC) permit from Ecology will be required to apply treated water into the subsurface. HydroCon will complete the application and well registration form and provide it to Ecology's UIC program for approval.
- Electrical permits will be acquired from Washington Labor and Industries. The electrical contractor will be responsible for obtaining the permits.
- Coleman Oil will obtain a disposal permit from the Greater Wenatchee Regional Landfill.

3.4 *Field Screening*

HydroCon's geologist will utilize field screening techniques to observe the excavation spoils for the presence of petroleum contamination. Field screening will consist of volatile organic vapor measurements using a photoionization detector (PID), sheen testing, visual observations (staining, etc.), and olfactory observations. A portion of each soil sample will be placed in a sealable plastic baggie. The tip of the PID will be inserted into the plastic bag in the airspace above the soil sample and the PID measurement will be recorded. The PID will be calibrated before use at the Site to a test gas standard consisting of 100 parts per million (ppmv) isobutylene. Because several factors can affect PID

readings (e.g. moisture, temperature, and background conditions), HydroCon will determine that a value of 2 ppm or greater may indicate the presence of organic vapors originating from contaminants at the Site. Soil with elevated PID readings and/or the presence of hydrocarbon staining, odor, and sheen will be placed in labeled 55-gallon drums and temporarily stored on site pending disposal to the Greater Wenatchee Regional Landfill.

3.5 *Trenching*

Clarke Construction (Clarke) will excavate trenches to a depth of approximately 2.5 feet bgs from the remediation system to the sumps shown on Sheet R102 of the attached design plan (Appendix A). Soil excavated during trenching will be placed on the ground next to the trench for use as backfill. The field geologist will monitor the excavation using field screening techniques described in Section 3.4 for the presence of petroleum contaminated soil (PCS). If PCS is encountered, the field geologist will direct the excavation contractor to place the soil on top of and cover it with thick plastic sheeting (visqueen).

Two-inch diameter IPS 100 psi polyethylene piping will be placed in the trenches. Each set of pipes will be labeled by the field geologist for identification purposes. The pipes will be labeled with corresponding sump identification numbers (shown on Figure 3). Trace wire will also be placed in each trench so that the lines can be located in the future using electromagnetic tooling, if necessary.

A 2-inch diameter hole will be drilled in each sump at a depth of approximately 2.5 feet bgs to accommodate the respective discharge pipe. The end of each pipe will be fitted with an elbow so that it routes water down into the respective conveyance pipe as shown on Sheet C100 of the attached design plan (Appendix A).

Approximately 4 inches of imported sand or pea gravel will be placed over the pipes. The remaining area of the trenches will be backfilled with the soil removed during excavation if field screening indicates that there is no PCS. If necessary, clean granular fill consisting of 5/8-inch minus rock (or similar) obtained from a local quarry will be used as backfill.

3.6 *Recirculation System Equipment Enclosure*

A manufactured enclosure will be delivered to the Site. All components within the enclosure needed to operate the system including electrical panels, hydrogen peroxide tank, fans, blowers, etc. will be installed and ready for service connection. Apple City Electric will connect the electrical service and test the system for operational status. The PVC piping will be plumbed to the manifold and to groundwater treatment system as shown on Sheet M101 in the attached design plan (Appendix A). A list of equipment and instrumentation for the system is shown on Sheet M102 in the attached design plan (Appendix A).

3.7 *Management of Investigation Derived Waste*

If PCS is encountered during excavation, the field geologist will direct Clarke to segregate the contaminated soil into stockpiles lined and covered with visqueen. The drums will be staged at the Site pending waste profiling. A soil sample will be collected from each drum and analyzed for the following:

- DRPH and ORPH using Northwest Method NWTPH-Dx
- GRPH using Northwest Method NWTPH-Gx
- BTEX using EPA Method 8260C
- 5035 kits will be used for the VOC analysis

The samples will be shipped to APEX Laboratory in Tigard, Oregon for analysis. HydroCon will provide the analytical results to the Wenatchee Regional Landfill. The drums will be transported to the landfill for disposal under Coleman Oil's permit.

If any exceedances of MTCA cleanup levels are found during soil trenching, then such locations and results will be presented to Ecology. An assessment of the extent of the contamination will be performed and removed from the site. Confirmation samples will be collected after remedial action to demonstrate that such contamination is no longer present prior to closing the site.

Any water generated by the excavation contractor (from pressure washing/decontamination) will be temporarily contained in their utility trailer and will be emptied daily into the Site's water treatment system. The water will be treated using GAC and then recirculated after oxygen enrichment using H_20_2.

All solid waste will be placed in an onsite receptacle which will be hauled to the Wenatchee Regional Landfill for disposal.

3.8 *Field Forms*

Field reports will be used to document field activity, sampling, observations, decision making, communication and other relevant topics during each day of the field work. HydroCon will document field activity with the following forms included in Appendix B.

- Field Report Form
- Chain-of-Custody Form

4.0 REPORTING

Data collected from the field work will be downloaded into spreadsheets and summarized and reported in a report following completion of fieldwork. The report will present a summary of field activities and analytical results. In addition, the report will include the following:

- A narrative discussion documenting the details of field work performed.
- A narrative discussion of sampling and analytical results will also be provided if PCS is encountered during excavation.
- Tabulated soil analytical results, if warranted.
- Figures showing the remediation system as-built construction.
- Figures showing sample locations, if warranted.
- A narrative on the system start up.

5.0 SCHEDULE OF IMPLEMENTATION

The field work is tentatively scheduled to begin during the end of June or early July 2020. The Draft report will be submitted within 90 days of receipt of the final laboratory data and/or completion of the construction of the recirculation system.

6.0 REFERENCES

Ecology, 2017. *Sediment Cleanup User's Manual*. *Guidance for Implementing the Cleanup Provisions of the Sediment Management Standards, Chapter 173-204 WAC*. Publication No. 12-09-057. December

_____, 2018. *Status Update on Supplemental Remedial Investigation*. September 27.

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———. 2019b. *Draft Focused Feasibility Study. Coleman Oil R99 Renewable Diesel Spill, Wenatchee, Washington*. Prepared for Coleman Oil Company, LLC. October 28.

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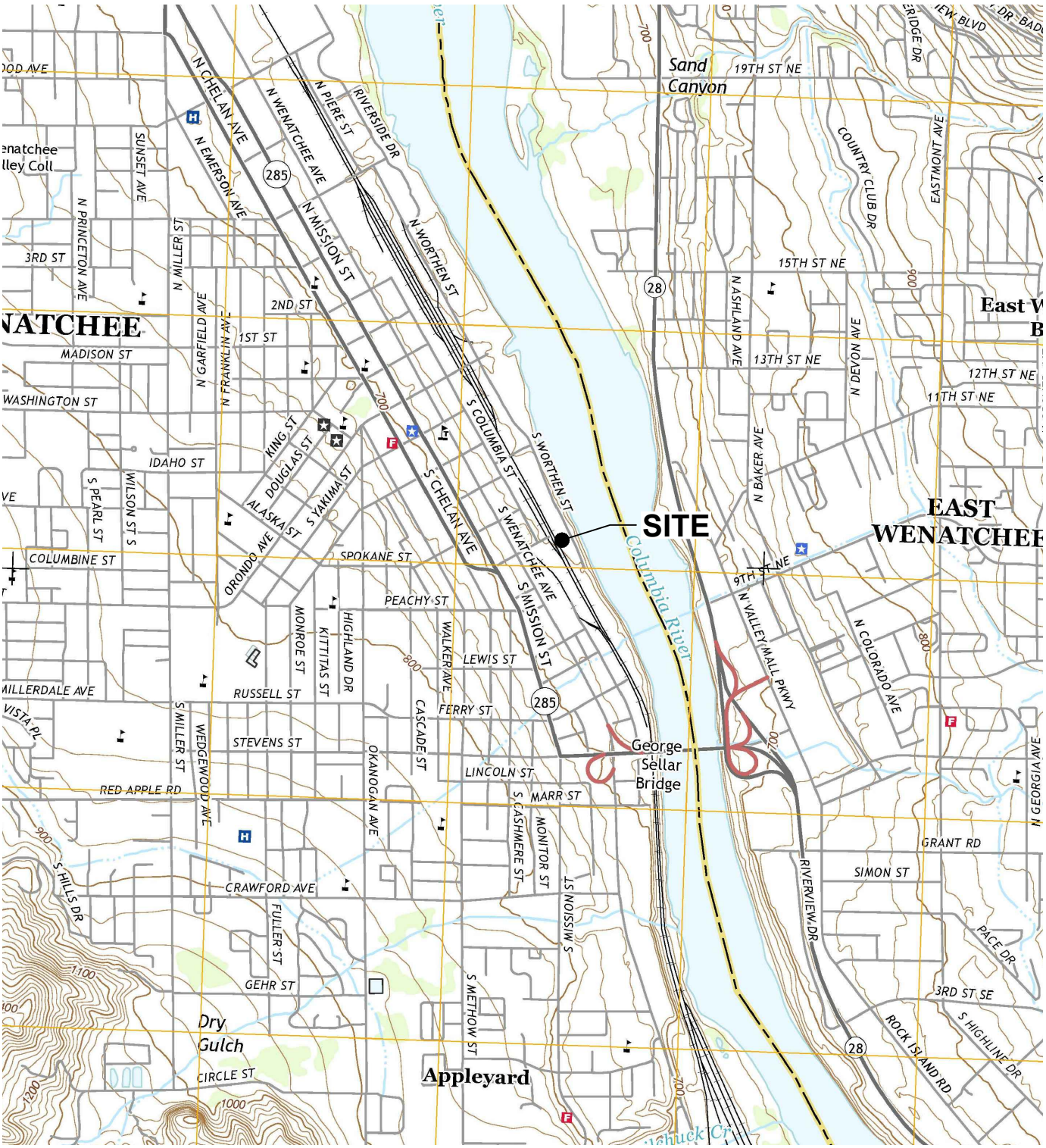
FIGURES



NOTE(S):

USGS, WENATCHEE QUADRANGLE
WASHINGTON
7.5 MINUTE SERIES (TOPOGRAPHIC)

0 2000 4000

SCALE IN FEET
1" = 2000'

N
W E
S

Hydro Con
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 10-18-18
DWN: JJT
CHK: RH
APPROVED: RH
PRJ. MGR: CH
PROJECT NO: 2017-074

FIGURE 1
SITE LOCATION MAP

COLEMAN OIL COMPANY
3 CHEHALIS ST.
WENATCHEE, WA.

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LEGEND

- Road
- Railroad
- Former Dry Well
- MW-1 — Monitoring Well (FARALLON)
- MW12 — Monitoring Well (HydroCon)
- BH-1 — Monitoring Well (EPI, 2017)
- RW-1 — Recovery Well (FARALLON)
- FB-3 — Boring Locations
- SUMP#6 — Sump
- Containment Booms
- TP01 — Test Pit Locations
- Sediment Sample Locations
- Attempted Sediment Sample Location

MW22
MW21
MW24
MW10R
MW25
MW26
BH-3
MW27
RW-1
FB-9
MW20
MW28
BH01R
MW29
MW19
MW30
BH-2
SL05
FB-8
MW31
MW09R
FB-7
FB-3
MW17
MW32
MW16
CHEHALIS ST.
MW18
MW-8
2017 Remdial Excavation
SUMP#5
HC02
FB-11
FB-4
MW-11
SUMP#6
FB-10
Former Storage Building
FB-5
SUMP#3
East-West Trench
North-South Trench
MW15
Former Main Office and Warehouse Building
HC12
MW14
SUMP#2
MW-6
MW-7
MW23
Former Truck Loading Rack
East-West Trench 2
HC01
FB-6
MW-5
TP08
MW-4
West Trench
SUMP#1
HC10
TP07
HC08
SUMP#4
HC11
MW-2 /FB-2
Former Underground Product Lines
Former Tank Farm B Fuel and Oil ASTs
HC09
2018 Drum Spill Excavation
2019 Remedial Excavation
HC07
MW13R
HC06
UST Access
TP03
TP02
TP06
Former Pipe Load/Unload
TP05
2013 Remedial Excavation
TP01
HC05
TP04
HC04
MW01S
Former Control Valve Building
HC03
MW-1/FB-1
Former Above Ground Pumps
MW03S
Tank Farm A Fuel ASTs
MW-3
Cardlock Dispenser Island
Former Dispenser Island
MW12
Truck Parking
Upriver Primary Containment Boom
Downriver Primary Containment Boom
River Level Gage
SL04
SL03
SL02
SL01
SS06
SS04
SS01
SS07
SS08
SS05
SS02
SS03
COLUMBIA RIVER
River Bank
S WORTHEN ST.

FIGURE 2
SITE FEATURES

COLEMAN OIL COMPANY
3 CHEHALIS ST.
WENATCHEE, WA.

DATE: 1-10-20
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2017-074

HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

0 50 100
SCALE IN FEET
1" = 50'

N W E S

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LEGEND

SUMP1 ◎ SUMP

PROPOSED TRENCH LOCATIONS

PROPOSED NEW VAULT LOCATIONS

C / C-10X CROSS SECTION LOCATIONS

PROPOSED PIPE TRENCH LOCATIONS

S WORTHEN ST.

CHEHALIS ST.

TRANSITION SUMP

SUMP5

F C101

SUMP6

SUMP3

WT-N

EXISTING BURIED EXTRACTION PIPING

SUMP2

WT-M

WEST TRENCH

SUMP1

B C100

WT-S

SUMP4

E C101

NEW RECIRCULATION EQUIPMENT ENCLOSURE

COMPRESSOR/CONTROL ROOM

2019 REMEDIAL EXCAVATION

A C100

D C101

RE-EAST

RE-WEST

C C101

TANK FARM A FUEL ASTs

N W E S

0 30 60

SCALE IN FEET
1" = 30'

HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 5-15-20
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2017-074

FIGURE 3
RECIRCULATION SYSTEM LAYOUT

COLEMAN OIL COMPANY
3 CHEHALIS ST.
WINATCHEE, WA.

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APPENDIX A

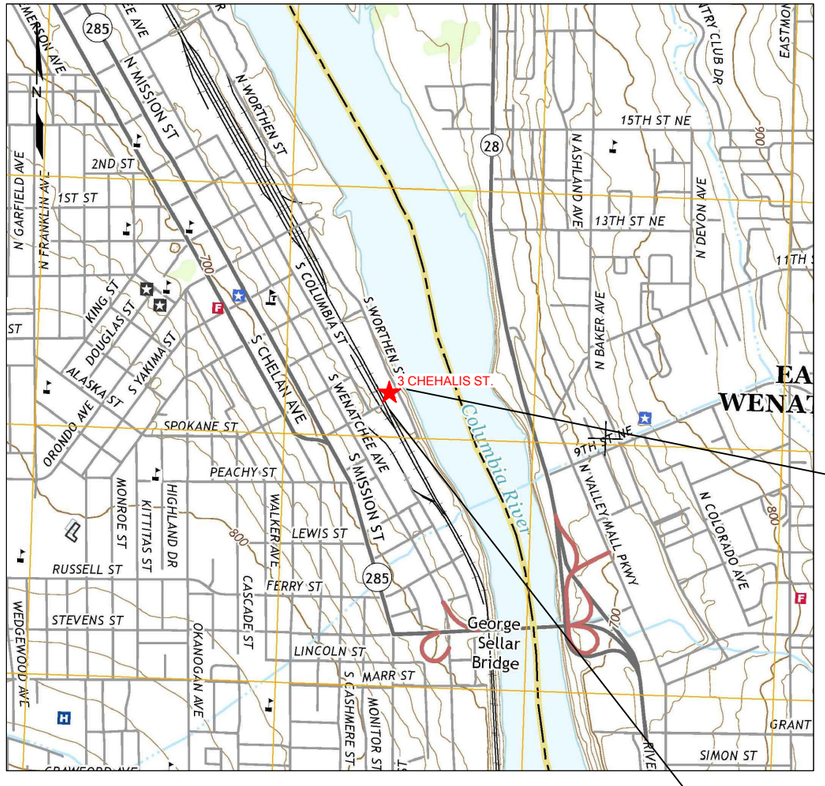
RECIRCULATION SYSTEM DESIGN DOCUMENTS

GROUNDWATER RECIRCULATION SYSTEM

COLEMAN OIL

3 CHEHALIS ST.

WENATCHEE, WASHINGTON



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C-101	TENCH DETAILS FOR OTHER AREAS
M-100	PROCESS FLOW & INSTRUMENTATION
M-101	EQUIPMENT ENCLOSURE PLAN
M-102	EQUIPMENT SCHEDULE

MARK ERNEST SELMAN
STATE OF WASHINGTON
47301
REGISTERED PROFESSIONAL ENGINEER

PROJECT NAME: COLEMAN OIL
PROJECT NUMBER: 2017-074
STREET ADDRESS: 3 CHEHALIS ST.
CITY, STATE: WENATCHEE, WA.

DATE: MARCH 2020
DRAWN BY: JJT
CHECKED BY: MES

NO.	DATE	REVISION

SHEET G-100
COVER SHEET

NOT TO SCALE

SELMAN ENGINEERING LLC
HydroCon

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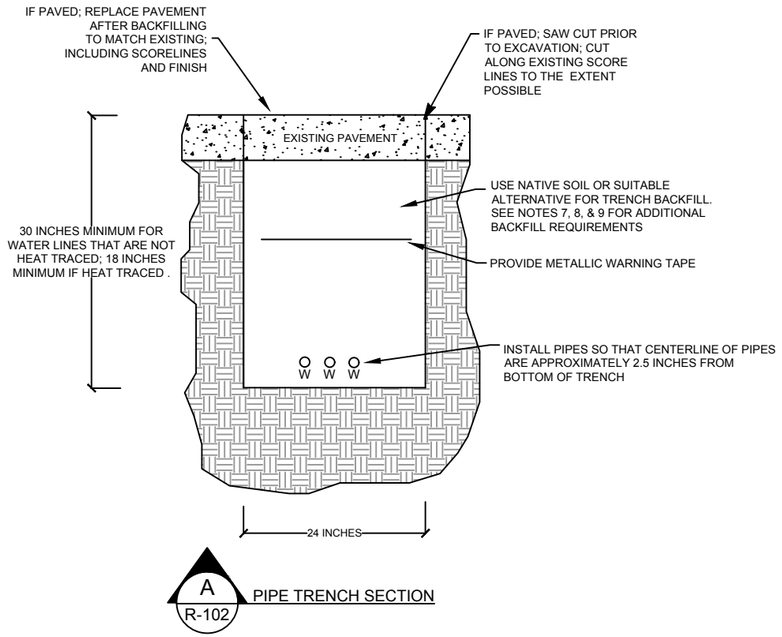
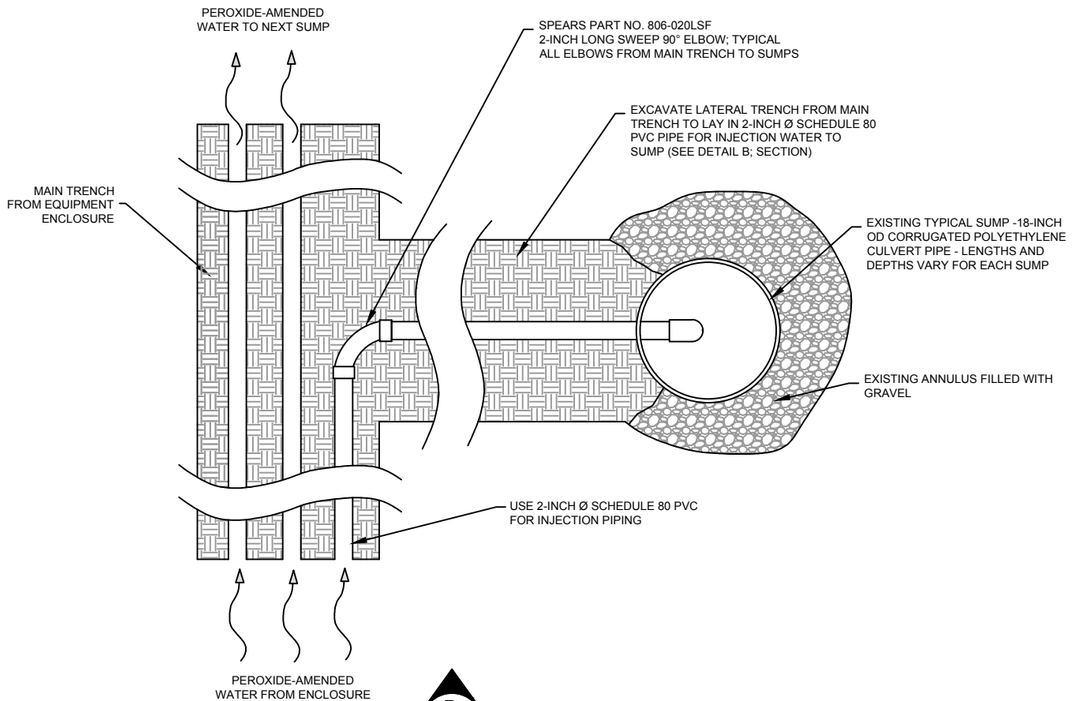


A R-102 PIPE TRENCH SECTION



B R-102 TYPICAL SUMP CONNECTION DETAIL - PLAN

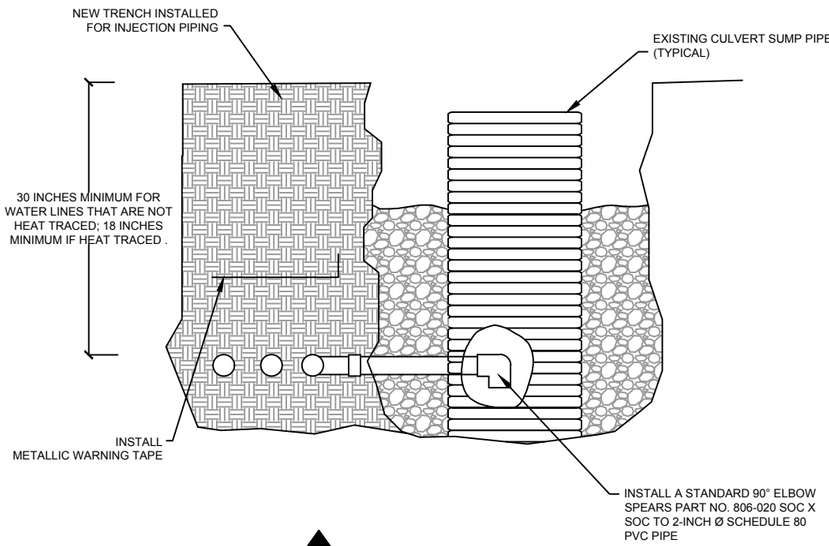
NOT TO SCALE

GENERAL NOTES:

1. INSPECT ALL PIPES FOR CUTS, SCRATCHES, GOUGES, OR SPLIT END UPON DELIVERY TO SITE AND PRIOR TO INSTALLATION. DO NOT USE DAMAGED SECTIONS OF PIPE.
2. STORE AND HANDLE PIPING IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. TRENCH BOTTOM SHALL BE CONTINUOUS, FREE OF ROCKS, AND RELATIVELY SMOOTH.
4. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR PIPE SOLVENT CONNECTIONS AND CURE TIMES.
5. TEST PIPES FOR LEAKS PRIOR TO BACKFILLING.
6. FOLLOW PVC PIPING MANUFACTURER'S RECOMMENDATIONS FOR SNAKING BURIED PIPE TO COMPENSATE FOR THERMAL EXPANSION/CONTRACTION.
7. PLACE AND SURROUND PIPE(S) WITH A 6-INCH THICKNESS OF BACKFILL FREE OF ROCKS WITH A PARTICLE SIZE OF $\frac{1}{2}$ INCH OR LESS. CLEAN SAND IS PREFERRED.
8. PLACE BACKFILL IN 6- TO 8-INCH LOOSE LIFTS AND COMPACT BY HAND OR WITH A MECHANICAL TAMPER. PLACE A 12-INCH LOOSE LIFT ABOVE PIPE PRIOR TO BEGINNING COMPACTION. REMOVE LARGE OR SHARP ROCKS, FROZEN CLODS, AND OTHER DEBRIS GREATER THAN 2" IN DIAMETER.
9. PROVIDE AN UNYIELDING SURFACE ON THE FINAL LIFT OF THE BACKFILL PRIOR TO PAVING.

PIPING LEGEND

(W) 2"-DIA. SCH. 80 PVC WATER LINE



B R-102 TYPICAL SUMP CONNECTION DETAIL - SECTION OR ELEVATION

MARK SELMAN — STATE OF WASHINGTON — 147301 — REGISTERED PROFESSIONAL ENGINEER

PROJECT NAME: COLEMAN OIL
PROJECT NUMBER: 2017-074
STREET ADDRESS: 3 CHEHALIS ST.
CITY, STATE: WENATCHEE, WA.

DATE: MARCH 2020
DRAWN BY: JJT
CHECKED BY: MES

NO.	DATE	REVISION
1		

SHEET C-100

DETAILS FOR WEST TRENCH AND TYPICAL SUMP

SELMAN ENGINEERING LLC

HydroCon

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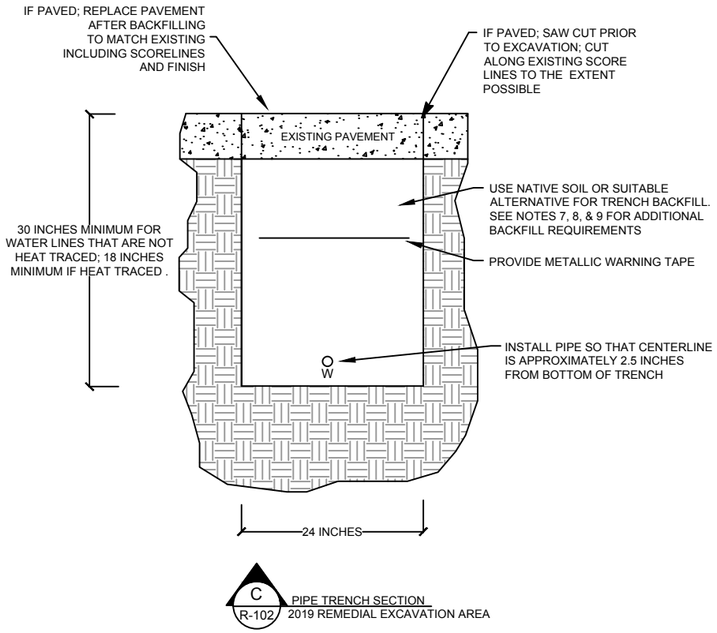
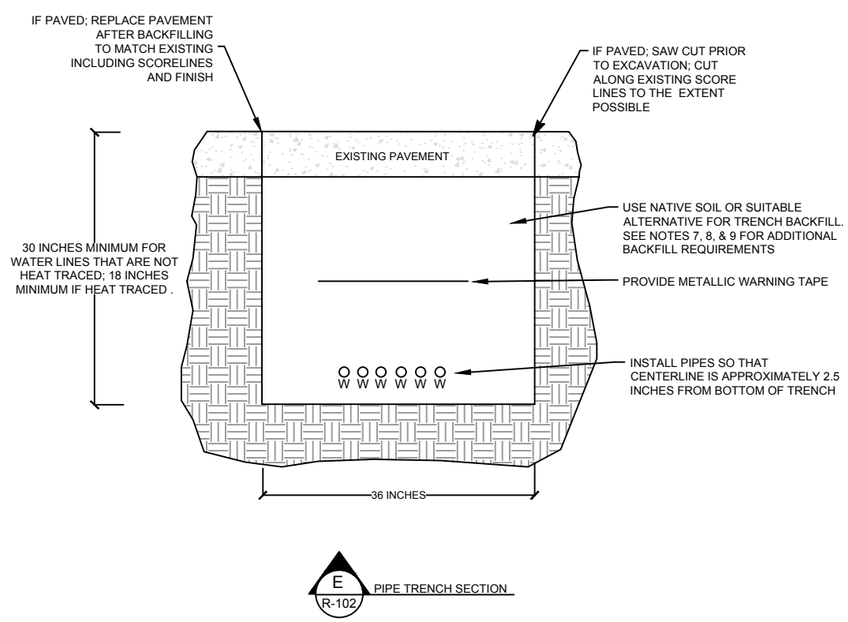


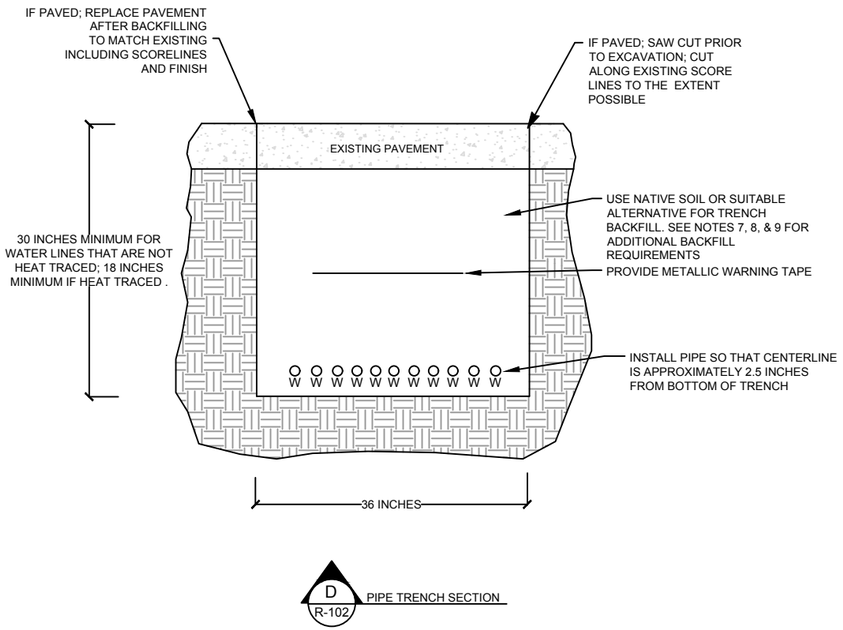


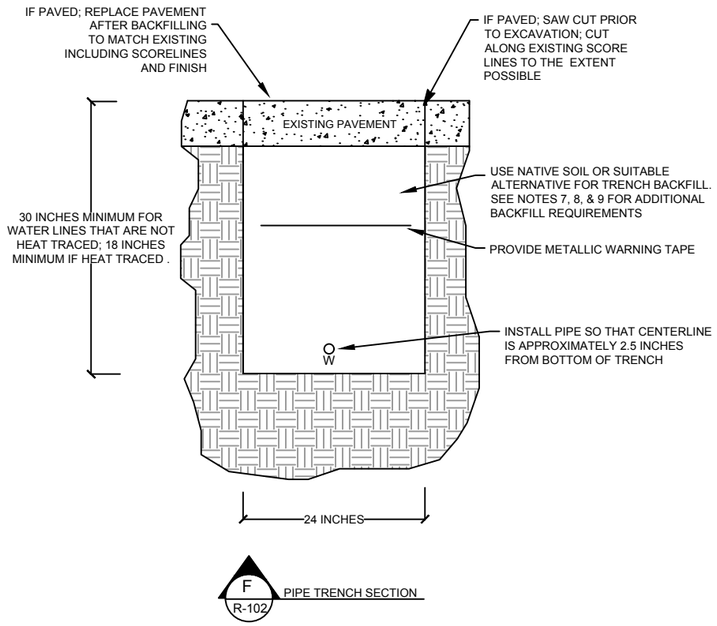
GENERAL NOTES:

1. INSPECT ALL PIPES FOR CUTS, SCRATCHES, GOUGES, OR SPLIT END UPON DELIVERY TO SITE AND PRIOR TO INSTALLATION. DO NOT USE DAMAGED SECTIONS OF PIPE.
2. STORE AND HANDLE PIPING IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. TRENCH BOTTOM SHALL BE CONTINUOUS, FREE OF ROCKS, AND RELATIVELY SMOOTH.
4. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR PIPE SOLVENT CONNECTIONS AND CURE TIMES.
5. TEST PIPES FOR LEAKS PRIOR TO BACKFILLING.
6. FOLLOW PVC PIPING MANUFACTURER'S RECOMMENDATIONS FOR SNAKING BURIED PIPE TO COMPENSATE FOR THERMAL EXPANSION/CONTRACTION.
7. PLACE AND SURROUND PIPE(S) WITH A 6-INCH THICKNESS OF BACKFILL FREE OF ROCKS WITH A PARTICLE SIZE OF $\frac{1}{2}$ INCH OR LESS. CLEAN SAND IS PREFERRED.
8. PLACE BACKFILL IN 6- TO 8-INCH LOOSE LIFTS AND COMPACT BY HAND OR WITH A MECHANICAL TAMPER. PLACE A 12-INCH LOOSE LIFT ABOVE PIPE PRIOR TO BEGINNING COMPACTION. REMOVE LARGE OR SHARP ROCKS, FROZEN CLODS, AND OTHER DEBRIS GREATER THAN 2" IN DIAMETER.
9. PROVIDE AN UNYIELDING SURFACE ON THE FINAL LIFT OF THE BACKFILL PRIOR TO PAVING.

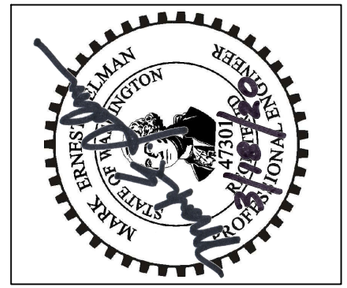
PIPING LEGEND

W — 2"-DIA. SCH. 80 PVC WATER LINE





NOT TO SCALE



PROJECT NAME: COLEMAN OIL
PROJECT NUMBER: 2017-074
STREET ADDRESS: 3 CHEHALIS ST.
CITY, STATE: WENATCHEE, WA.

DATE: MARCH 2020
DRAWN BY: JJT
CHECKED BY: MES

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SHEET C-101

TRENCH DETAILS FOR OTHER AREAS

SELMAN ENGINEERING LLC

HydroCon

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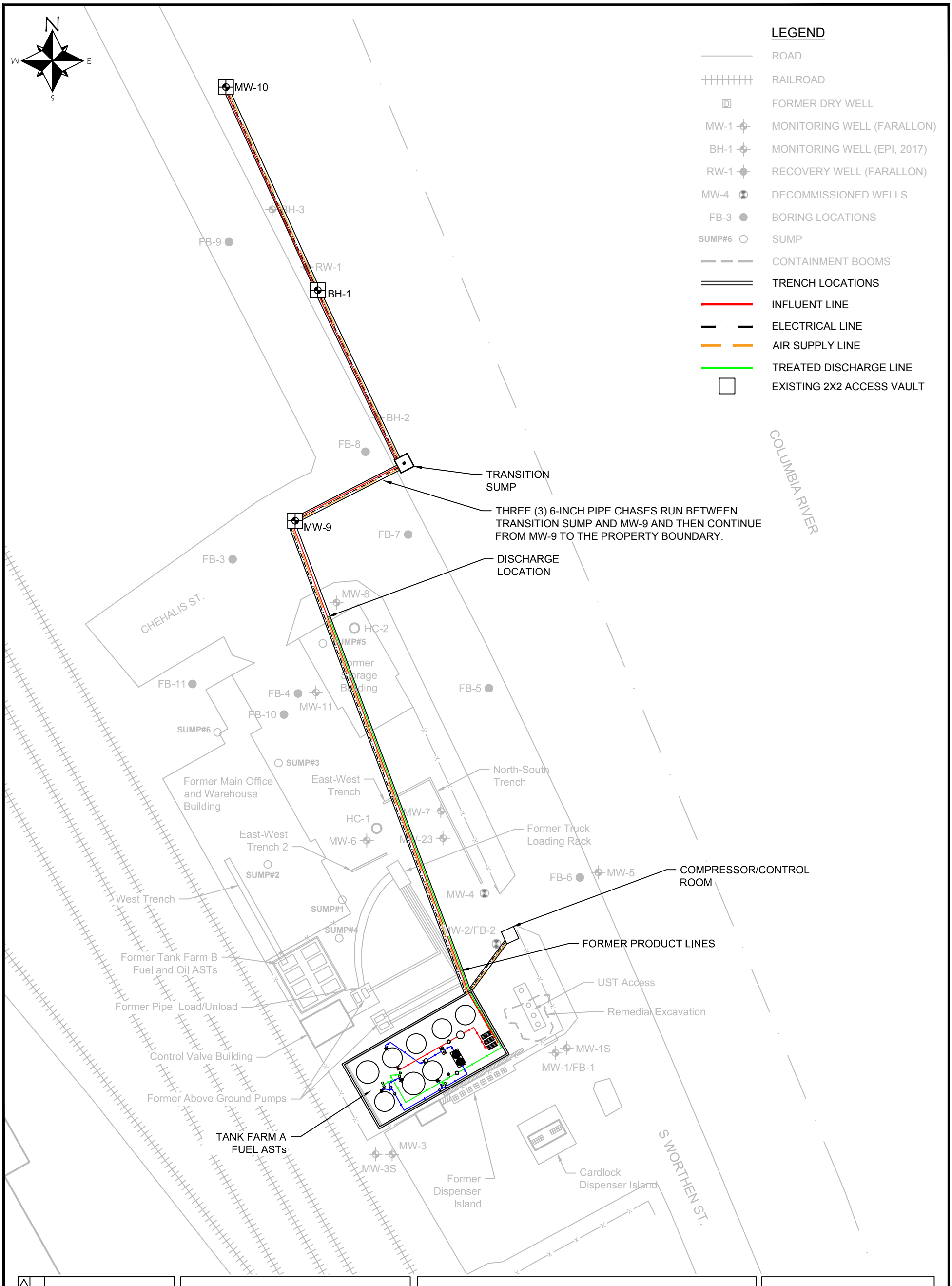

#	DATE	REVISION
		SHEET NO.

DATE: MARCH 2020
DRAWN BY: JJT
CHECKED BY: MES
SCALE: 1" = 50'

PROJECT NAME: COLEMAN OIL
PROJECT NUMBER: 2017-074
STREET ADDRESS: 3 CHEHALIS ST.
CITY, STATE: WENATCHEE, WA.

MARK ERNEST SELMAN
STATE OF WASHINGTON
47301
REGISTERED PROFESSIONAL ENGINEER
3/18/20

HydroCon
SELMAN ENGINEERING LLC

EXISTING SITE LAYOUT

SHEET R-100

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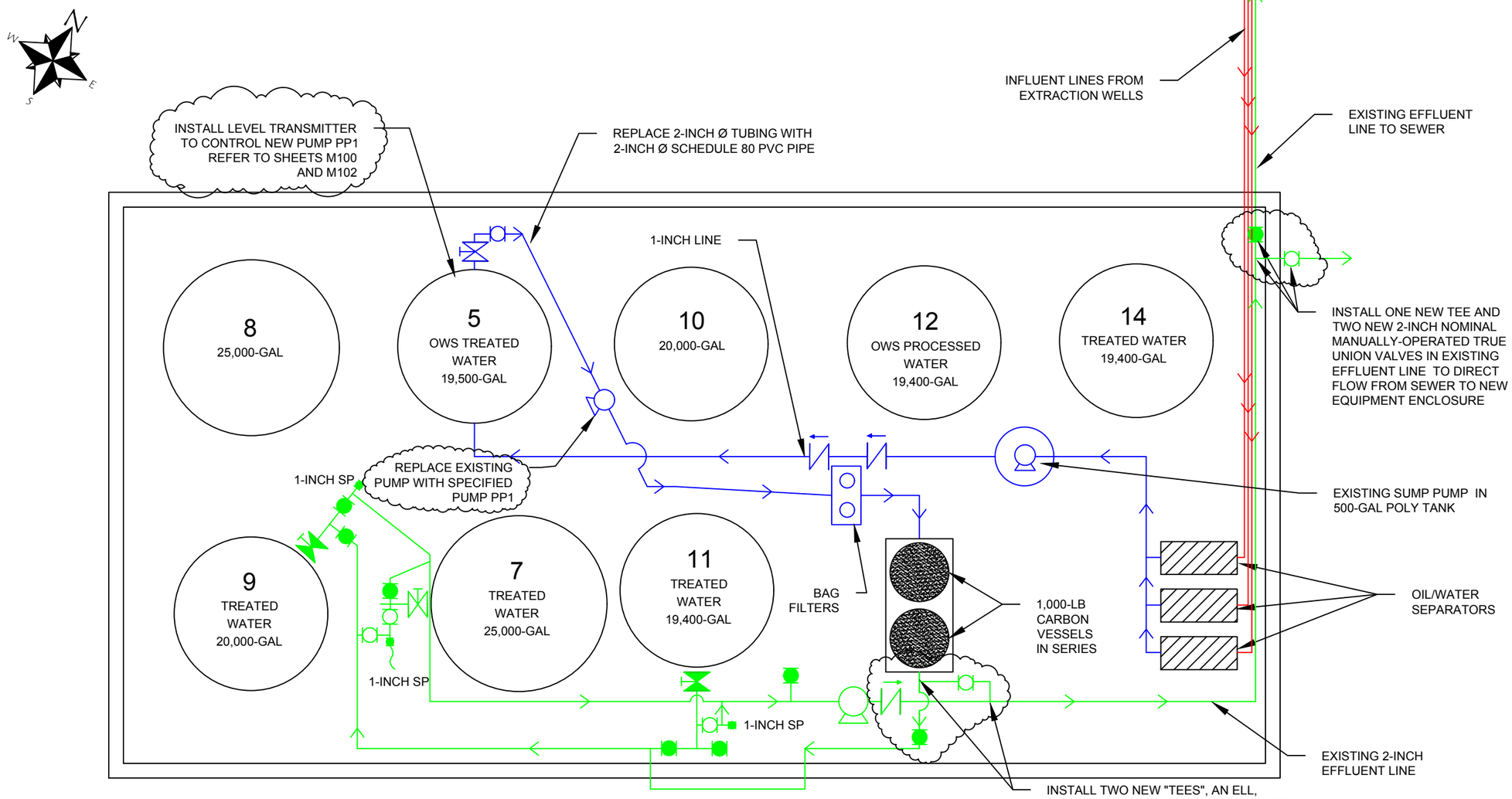

LEGEND

- TANK CONTAINMENT AREA
- INFLUENT LINE (IMPACTED WATER)
- OWS-TREATED WATER
- SYSTEM-TREATED WATER
- CHECK VALVE
- TANK DRAIN VALVE
- VALVE NORMALLY OPEN
- VALVE NORMALLY CLOSED
- > FLOW DIRECTION ARROW
- SP SAMPLE PORT

NOTES

1. PROVIDE HEAT TRACE TAPE OR LINE (I.E. 5 WATTS PER FOOT) AND FOAM INSULATION FOR ALL EXPOSED PIPES, VALVES, AND FITTINGS IN THE TANK CONTAINMENT AREA.
2. REFER TO SHEET M-100 FOR A DESCRIPTION OF REVISED PROCESS FLOW AND NEW CONTROL LOGIC.

MARK ERNEST SELMAN — STATE OF WASHINGTON — 47301 — REGISTERED PROFESSIONAL ENGINEER

PROJECT NAME: COLEMAN OIL
PROJECT NUMBER: 2017-074
STREET ADDRESS: 3 CHEHALIS ST.
CITY, STATE: WENATCHEE, WA.

DATE: MARCH 2020
DRAWN BY: JJT
CHECKED BY: MES
SCALE: 1" = 8'

#	DATE	REVISION	SHEET NO.

SHEET R-101

TANK FARM A LAYOUT

SELMAN ENGINEERING LLC

HydroCon

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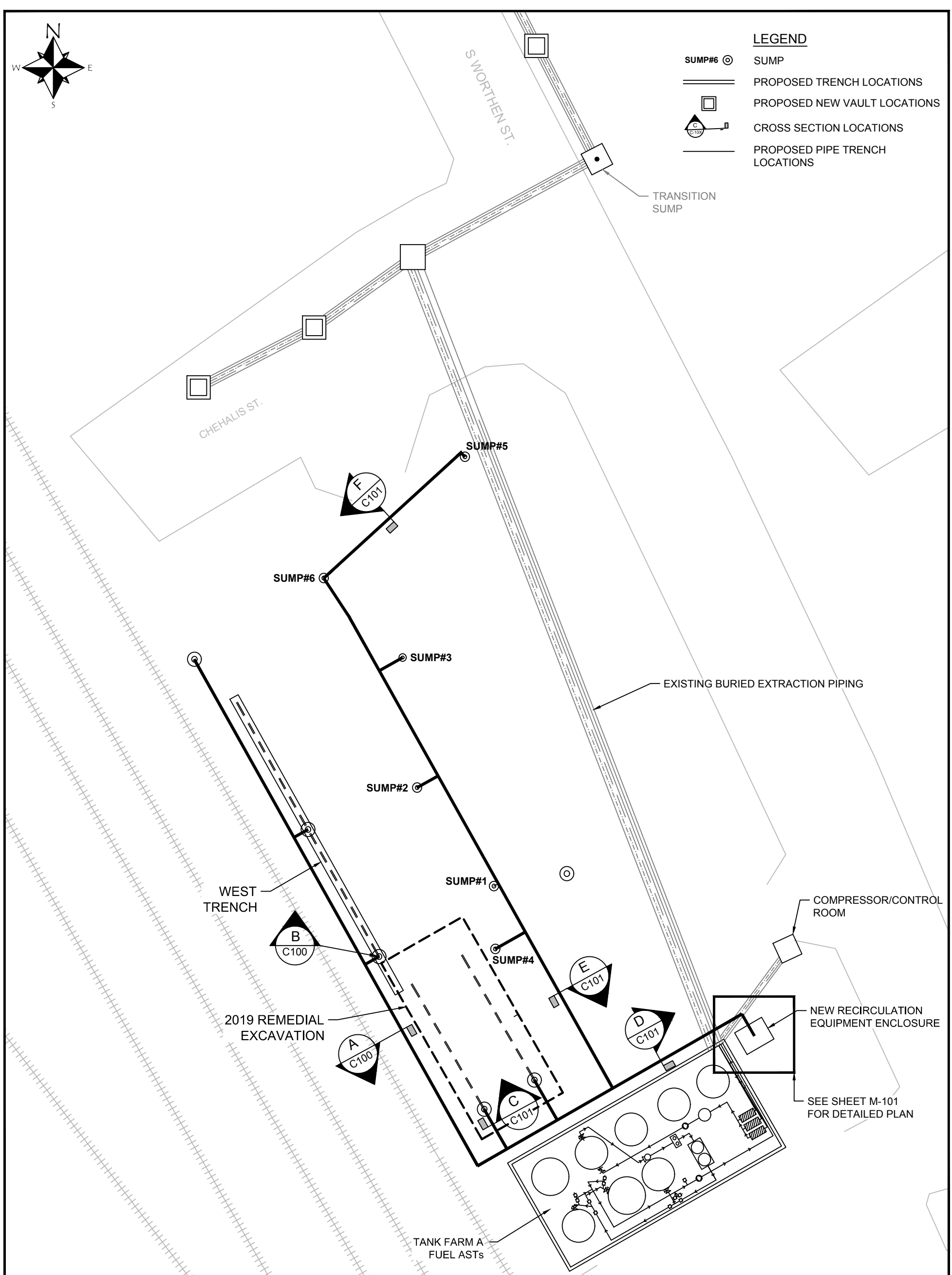

#	DATE	REVISION
		SHEET NO.

DATE: MARCH 2020
DRAWN BY: JJT
CHECKED BY: MES
SCALE: 1" = 30'

PROJECT NAME: COLEMAN OIL
PROJECT NUMBER: 2017-074
STREET ADDRESS: 3 CHEHALIS ST.
CITY, STATE: WENATCHEE, WA.

MARK ERNEST SELMAN
STATE OF WASHINGTON
47301
REGISTERED PROFESSIONAL ENGINEER
3/18/20

HydroCon
SELMAN ENGINEERING LLC

PROPOSED RECIRCULATION SYSTEM LAYOUT

SHEET R-102

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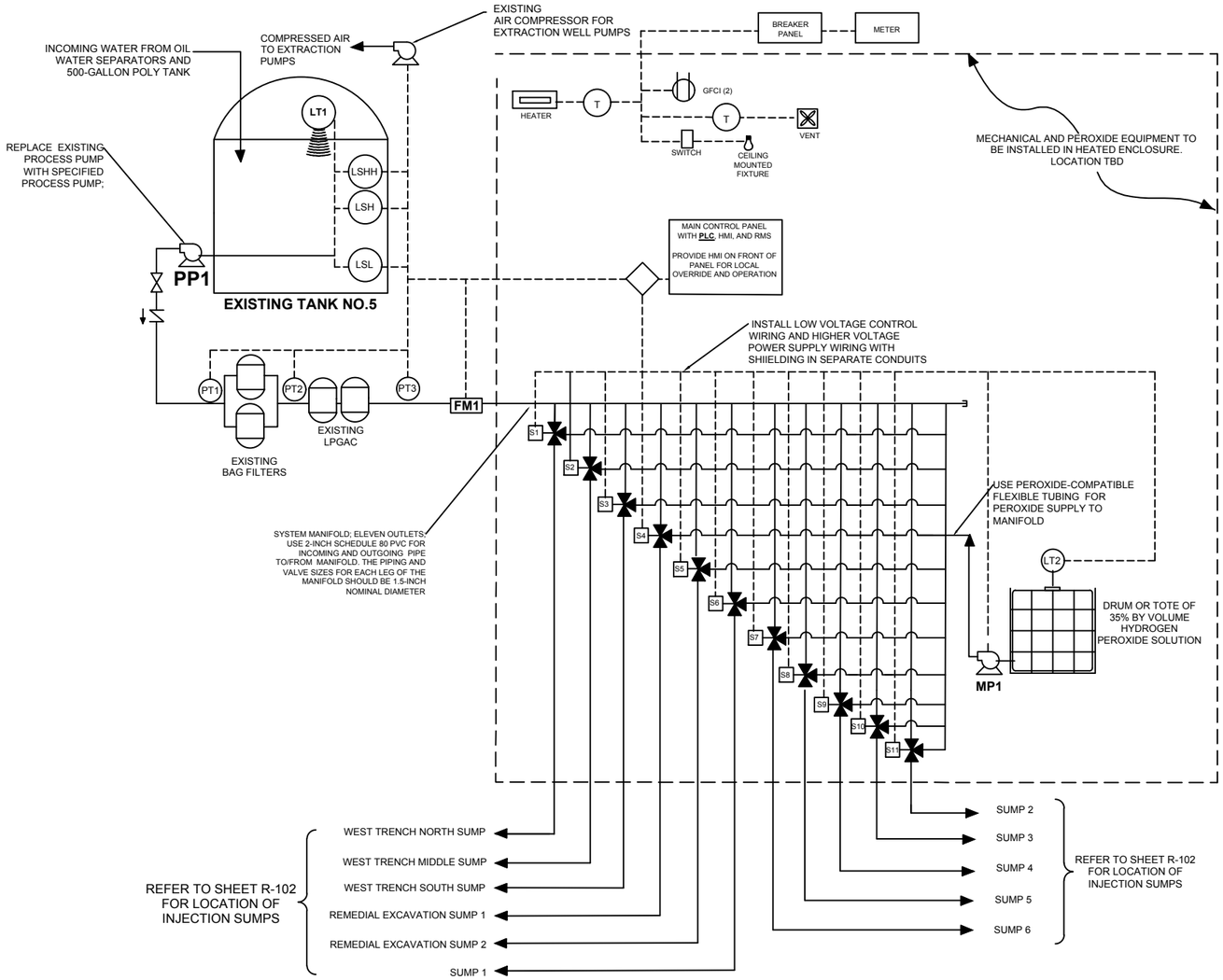

GENERAL NOTES

1. POLY EQUALIZATION WATER TANK, PIPING, VALVES, FITTINGS, AND FLOWMETER EXPOSED TO THE WEATHER MUST BE HEATED OR HEAT TRACED. ALSO PROVIDE INSULATION FOR PIPING, VALVES AND FITTINGS.
2. THE ELECTRICAL LOAD FOR THE HEAT TRACE WIRING SHALL BE BASED ON AN ESTIMATE OF 5 WATTS PER FOOT FOR A DISTANCE OF 150 FEET, OR A TOTAL OF 750 WATTS. THE LOAD FOR THE POLY TANK HEATER, IF ANY WILL BE DETERMINED AS PART OF FINAL ELECTRICAL DESIGN.

OPERATIONAL CONTROL LOGIC FOR PLC

1. THE NORMAL OPERATING MODE WILL BE AUTOMATIC, PRE-PROGRAMMED AND CONTROLLED VIA LOCALLY-MOUNTED CONTROL PANEL WITH HMI. LEVEL TRANSMITTER LT1 MOUNTED IN EXISTING TANK NO. 5 WILL CONTROL THE OPERATION OF MAIN PROCESS PUMP PP1. PUMP PP1 WILL BE A ELECTRICAL CENTRIFUGAL PUMP OF TYPE EQUIVALENT TO THAT SPECIFIED. PUMP PP1 WILL ENERGIZE WHEN THE FLUID LEVEL IN TANK NO. 5 REACHES THE HIGH-LEVEL (LSH) ELEVATION. IF THE HIGH-HIGH LEVEL FLUID ELEVATION (LSHH) IS REACHED, THE PLC IN THE NEW CONTROL PANEL WILL DEENERGIZE THE EXISTING AIR COMPRESSOR THAT OPERATES THE EXTRACTION WELL NETWORK, AND SIMULTANEOUSLY ISSUE A REMOTE ALARM NOTIFICATION VIA THE DESIRED ALARM NOTIFICATION METHOD (PHONE, TEXT, EMAIL). THE SYSTEM WILL BE PROGRAMMED TO REQUIRE A MANUAL SYSTEM RESTART AFTER THE HIGH-HIGH FLOAT CONDITION IS CORRECTED.
2. WHEN THE PLC ENERGIZES PP1, IT WILL SIMULTANEOUSLY ENERGIZE METERING PUMP MP1. MP1 WILL PROVIDE A PRESET FEED RATE INTO THE MANIFOLD LEG SOLENOID VALVE THAT IS PROGRAMMED TO BE OPENED. THIS AUTOCYCLE WILL REPEAT BY CYCLING TO THE NEXT PROGRAMMED MANIFOLD VALVE IN SEQUENCE WHEN THE CYCLE IS REPEATED.
3. FLOWMETER FM1 WILL ACQUIRE AND RECORD THE INSTANTANEOUS FLOWRATE IN GALLONS PER MINUTE FOR PUMP PP1, AND MAINTAIN A RUNNING TOTAL OF ALL WATER PUMPED BY PP1. THIS DATA MUST BE LOGGED AND AVAILABLE FOR BOTH LOCAL VIEWING ON THE HMI AND BY REMOTE ACCESS BY PERSONAL COMPUTER VIA INTERNET. MANUAL PUMP CONTROL FOR PP1 (ON/OFF) INTERLOCKED TO MP1, MUST ALSO BE PROGRAMMED INTO THE PLC FOR BOTH LOCAL FUNCTION VIA THE HMI, AND REMOTELY VIA CELLULAR OR HARDWIRE COMMUNICATIONS.
4. IT IS DESIRABLE FOR THE CONTROL SOFTWARE TO ENABLE BOTH LOCAL AND REMOTE CONTROL OF THE FLOW RATE FROM METERING PUMP MP1 AND TO CONTROL MANIFOLD SOLENOID VALVES TO ENABLE OPERATION OF THESE VALVES BASED ON FLOW OR PUMP ON TIME.
5. SYSTEM PRESSURES WILL BE MONITORED CONTINUOUSLY UPSTREAM AND DOWNSTREAM OF THE BAG FILTERS AND LIQUID PHASE GAC UNITS VIA PRESSURE TRANSMITTERS. WHEN PRESSURE READINGS REACH PRESET LEVELS, THE PLC WILL DEENERGIZE THE AIR COMPRESSOR FOR THE EXTRACTION SYSTEM, DEENERGIZE PUMPS PP1 AND MP1, AND SEND AN ALARM NOTIFICATION TO OPERATOR(S). AS WITH THE HIGH-HIGH LEVEL ALARM CONDITION IN TANK NO. 5, A MANUAL SYSTEM RESET AND RESTART WILL BE REQUIRED FOLLOWING THE ELEVATED PRESSURE ALARM CONDITION.
6. A FLUID LEVEL TRANSMITTER WILL BE SPECIFIED AND PROVIDED BY THE EQUIPMENT VENDOR AND PROGRAMMED TO NOTIFY OPERATORS WHEN THE FLUID LEVEL IN THE PEROXIDE CONTAINER (EITHER TOTE OR DRUM) REACHES A PRESET LOW LEVEL.

LT1, LT2
LEVEL TRANSMITTERS TO BE SPECIFIED BY THE SYSTEM FABRICATION VENDOR

PP1
AMT MODEL 369E; CURVE H OR EQUIVALENT

PT1, 2, AND 3
PRESSURE TRANSMITTERS - DWYER MODEL 628-08-GH-P1-E6-S1

FM1
SEAMETRICS MJNR-1.5 -INCH; 1 GALLON PER PULSE

MP1
LMI; MODEL PD75
1 GPH; 115 OR 230V

MAJOR EQUIPMENT

HMI	HUMAN-MACHINE INTERFACE
PLC	PROGRAMMABLE LOGIC CONTROLLER
LT1	LEVEL TRANSMITTER
MP1	PEROXIDE METERING PUMP
PP1	PROCESS PUMP
RMS	REMOTE MONITORING SYSTEM

EQUIPMENT ENCLOSURE

STRUCTURE HOUSING EQUIPMENT AND MANIFOLD TO INCLUDE:

- PLC, HMI, RMS; AND ALL CONTROL WIRING
- 115V AND 230V ELECTRICAL CIRCUITS, WIRING AND BREAKER PANEL ASSUMING A MINIMUM 100A SERVICE
- ELECTRIC HEATER THERMOSTATICALLY CONTROLLED
- INSULATION
- LIGHT FIXTURE(S)
- WINDOWS, DOORS (PERSONNEL AND OVERHEAD)
- ELECTRICAL OUTLETS
- ROOFING AND GUTTERS
- VENTILATION FAN; THERMOSTATICALLY CONTROLLED

LEGEND

PI	PRESSURE INDICATOR		TRUE UNION VALVE - NORMALLY OPEN
SP	SAMPLE PORT		TRUE UNION VALVE NORMALLY CLOSED
T	THERMOSTAT CONTROL	PT1	PRESSURE TRANSMITTER
LSHH	HIGH-HIGH LEVEL FLOAT SWITCH (EXISTING)	S	3-WAY SOLENOID VALVE; MOTOR-OPERATED; ALL PORTS NORMALLY CLOSED
LSH	HIGH LEVEL FLOAT SWITCH (EXISTING)		CHECK VALVE
LSL	LOW LEVEL FLOAT SWITCH (EXISTING)		

NOT TO SCALE

MARK ERNEST SELMAN — STATE OF WASHINGTON — 4730 — REGISTERED PROFESSIONAL ENGINEER

PROJECT NAME: COLEMAN OIL
PROJECT NUMBER: 2017-074
STREET ADDRESS: 3 CHEHALIS ST.
CITY, STATE:- WENATCHEE, WA.

DATE: MARCH 2020
DRAWN BY: JJT
CHECKED BY: MES

#	DATE	REVISION SHEET NO.

SHEET M-100

PROCESS FLOW & INSTRUMENTATION

SELMAN ENGINEERING LLC

HydroCon

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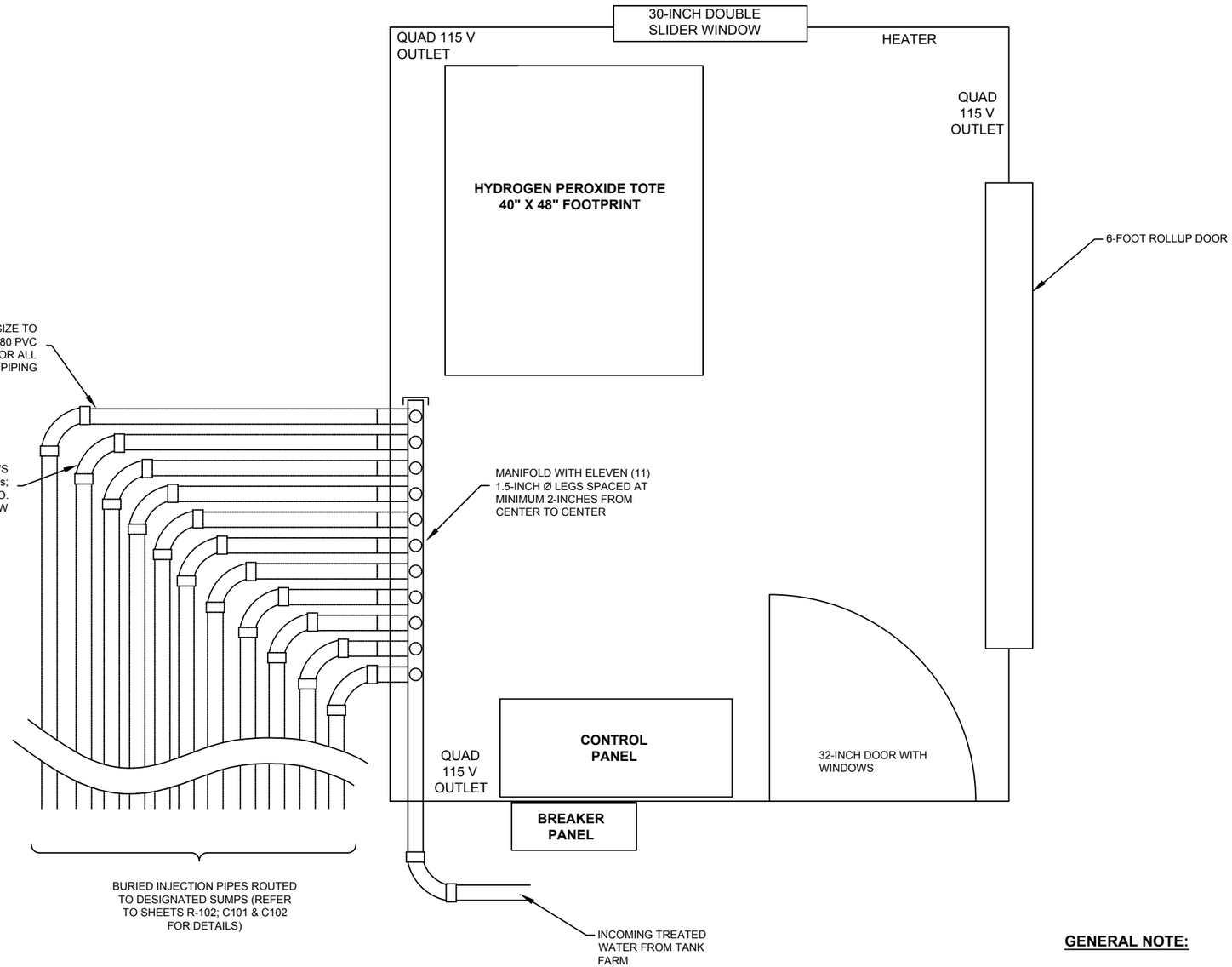

NOT TO SCALE

GENERAL NOTE:

1. THIS EQUIPMENT ENCLOSURE PLAN IS A RENDERING OF A POSSIBLE EQUIPMENT LAYOUT. THE FINAL LAYOUT WILL BE DETERMINED AFTER REVIEW AND APPROVAL OF THE VENDOR'S SHOP DRAWINGS BY THE OWNER PRIOR TO ORDER AND SHIPPING.
2. IF FEASIBLE, THE ENCLOSURE FLOOR AND FOUNDATION SHOULD BE ABLE TO SUPPORT A PALLET JACK WITH A FULL 330-GALLON TOTE. THIS EQUATES TO A DEAD LOAD OF APPROXIMATELY 4,000 POUNDS. IF NOT FEASIBLE; PEROXIDE CAN BE DELIVERED IN 55-GALLON DRUM QUANTITIES.
3. ALL ITEMS ON THE PLAN WERE DRAWN TO A 1:1 SCALE.

MARK ERNEST SELMAN — STATE OF WASHINGTON — 47301 — REGISTERED PROFESSIONAL ENGINEER

PROJECT NAME: COLEMAN OIL
PROJECT NUMBER: 2017-074
STREET ADDRESS: 3 CHEHALIS ST.
CITY, STATE: WENATCHEE, WA.

DATE: MARCH 2020
DRAWN BY: JJT
CHECKED BY: MES

#	DATE	REVISION

SHEET M-101

EQUIPMENT ENCLOSURE PLAN

SELMAN ENGINEERING LLC

HydroCon

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EQUIPMENT SCHEDULE

COLEMAN OIL RECIRCULATION SYSTEM

(REFER TO SHEET M-100 FOR MAJOR EQUIPMENT ABBREVIATIONS)

EQUIPMENT SCHEDULE

- **LT1 & LT2 - LEVEL TRANSMITTERS**
  TBD BY EQUIPMENT VENDOR

- **PP1 - PROCESS PUMP**
  AMT MODEL 369E ELECTRIC CENTRIFUGAL PUMP; CURVE H; NON AUTO; 230V; 3ϕ; 60Hz; 2 HP; PRODUCES 20 GPM @ 60 FEET OF TDH; FULL LOAD 6A @ 230V

- **MP1 - METERING PUMP**
  MANUFACTURER: LMI; MODEL #PD75 - ADJUSTABLE TO MAX OF 1.1 GPH; 150 PSI; ENHANCED CONTROL WITH PULSE INPUT; REMOTE STOP/START, AND TANK LEVEL INPUT. LIQUID END: MOLDED FASTPRIME NO. 848 - HEAD (PVC); FITTINGS (PVC); BALLS (CERAMIC); SEAT/O-RINGS (POLYPREL®); POWER CODE 1 - 115V/230V; 50 TO 60 Hz.

- **PT1, 2, 3 - PRESSURE TRANSMITTERS**
  DWYER MODEL 628-08-GH-P1-E6-S1

- **FM1 - FLOW METER**
  SEAMETRICS MJNR-1.5 -INCH; 1 GALLON PER PULSE;

- **SOLENOID VALVES S1 THROUGH S12**
  TBD BY EQUIPMENT VENDOR

- **PLC - PROGRAMMABLE LOGIC CONTROLLER**
  TBD BY EQUIPMENT VENDOR

- **RMS- REMOTE MONITORING SYSTEM**
  TBD BY EQUIPMENT VENDOR

EQUIPMENT SCHEDULE (continued)

VENDOR FABRICATED; ASSEMBLED AND SHIPPED:
8' X 10' EQUIPMENT STRUCTURE/ENCLOSURE EQUIPMENT AND MANIFOLD TO INCLUDE:

- PLC, HMI, RMS; AND ALL CONTROL WIRING
- 115V AND 230V ELECTRICAL CIRCUITS, WIRING AND BREAKER PANEL ASSUMING A MINIMUM 100A SERVICE
- ELECTRIC HEATER; THERMOSTATICALLY CONTROLLED
- BUILDING FIBERGLASS INSULATION
- LIGHT FIXTURE(S)
- WINDOWS, DOORS (PERSONNEL AND OVERHEAD)
- ELECTRICAL OUTLETS
- ROOFING AND GUTTERS
- VENTILATION FAN; THERMOSTATICALLY CONTROLLED

SHOP DRAWINGS TO BE PROVIDED TO OWNER FOR APPROVAL PRIOR TO CONSTRUCTION

ABBREVIATIONS

DC = DIRECT CURRENT
GPH = GALLONS PER HOUR
GPM = GALLONS PER MINUTE
HP = HORSEPOWER
Hz = HERTZ
PVC= POLYVINYL CHLORIDE

ϕ = ELECTRICAL PHASE
TBD = TO BE DETERMINED
TDH = TOTAL DYNAMIC HEAD
TEFC = TOTAL ENCLOSED FAN COOLED
V = ALTERNATING CURRENT VOLTAGE

MARK ERNEST SELMAN — STATE OF WASHINGTON — 47301 — REGISTERED PROFESSIONAL ENGINEER — 3/10/20

PROJECT NAME: ——— COLEMAN OIL
PROJECT NUMBER: ——— 2017-074
STREET ADDRESS: ——— 3 CHEHALIS ST.
CITY, STATE: ——— WENATCHEE, WA.

DATE: ——— MARCH 2020
DRAWN BY: ——— JJT
CHECKED BY: ——— MES

△						*	DATE	REVISION SHEET NO.
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SHEET M-102

EQUIPMENT & INSTRUMENTATION

SELMAN ENGINEERING LLC

HydroCon

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APPENDIX B

FIELD FORMS

HydroCon	**DAILY FIELD REPORT**	HydroCon Job Number:
	Project Name:	Date:
Phone: 360.703.6079 Fax: 360.703.6086 314 W 15th Street, Suite 300; Vancouver, WA	Client:	Page: Of
Prepared By:	Location:	Arrival: Departure:
Purpose:	Weather:	Permit:

APEX LABS

6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # _____ COC ____of____

Company:	Project Mgr:	Project Name:	Project #:
Address:	Phone:	Email:	PO #
Sampled by:			

ANALYSIS REQUEST

Site Location: OR WA CA AK ID ____ SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	**NWTPH-HCID**	**NWTPH-Dx**	**NWTPH-Gx**	**8260 BTEX**	**8260 RBDM VOCs**	**8260 Halo VOCs**	**8260 VOCs Full List**	**8270 SIM PAHs**	**8270 Semi-Vols Full List**	**8082 PCBs**	**8081 Pest**	**RCRA Metals (8)**	**Priority Metals (13)**	**Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn** TOTAL DISS. TCLP	**TCLP Metals (8)**							**Archive**

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle)

1 Day 2 Day 3 Day

4 DAY 5 DAY Other: _____

SPECIAL INSTRUCTIONS:

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	**RECEIVED BY:**	**RELINQUISHED BY:**	**RECEIVED BY:**
Signature: Date:	Signature: Date:	Signature: Date:	Signature: Date:
Printed Name: Time:	Printed Name: Time:	Printed Name: Time:	Printed Name: Time:
Company:	Company:	Company:	Company: