FINAL

SUPPLEMENTAL REMEDIAL INVESTIGATION WORK PLAN – PHASE 4
CHEVRON SERVICE STATION NO. 9-6590
232 East Woodin Avenue
Chelan, Washington

October 22, 2018

Prepared for:
Washington State Department of Ecology
1250 West Alder Street
Union Gap, Washington 98903

Prepared by:
Leidos, Inc.
18939 120th Avenue NE, Suite 112
Bothell, Washington 98011

On Behalf of:
Chevron Environmental Management Company
6001 Bollinger Canyon Road
San Ramon, California 94583

leidos

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San Ramon, California 94583

Russell S. Shropshire, PE
Principal Engineer

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SUPPLEMENTAL REMEDIAL INVESTIGATION WORK PLAN – PHASE 4
CHEVRON SERVICE STATION NO. 9-6590

1. INTRODUCTION AND OBJECTIVES

Leidos, Inc. (Leidos), on behalf of Chevron Environmental Management Company (Chevron), prepared this work plan to perform additional Supplemental Remedial Investigation (SRI) activities at Chevron Service Station No. 9-6590 (the Site), located at 232 East Woodin Avenue in Chelan, Washington (Figure 1). SRI activities for the Site are being performed pursuant to the terms of Agreed Order No. DE 10629, which was entered into by Chevron and the Washington State Department of Ecology (Ecology) in June 2014.

The objective of the SRI Phase 4 activities is to expand upon previous work performed to address data gaps regarding the presence of petroleum hydrocarbon contamination and light non-aqueous phase liquid (LNAPL) at the Site. Specifically, this phase of the SRI will include the following investigation elements:

1. Investigation of subsurface anomalies identified by a ground-penetrating radar (GPR) survey near monitoring well MW-21, which are suspected of being undocumented underground storage tanks (USTs);
2. Performance of a geophysical survey and soil sampling to evaluate the potential for additional petroleum contamination sources in the vicinity of monitoring well MW-17;
3. Installation of four new monitoring wells, one in the southwest portion of the Site in the vicinity of Chelan River Walk Park and three to the east of the Chevron service station property to delineate the extent of petroleum impacted soil and groundwater to the east of the Site;
4. Soil sampling in the vicinity of the Wells Fargo Bank property in order to further delineate the vertical extent of petroleum impacts and LNAPL to the west of the Chevron service station property; and
5. Maintenance and repair of the existing monitoring well network associated with the Site.

Additional details regarding the background and methodology for each of these proposed investigation elements are included in the following sections.

2. INVESTIGATION OF SUSPECTED UNDOCUMENTED USTS IN THE VICINITY OF MONITORING WELL MW-21

This phase of the SRI Phase 4 field activities will be performed to confirm whether undocumented USTs are present beneath the sidewalk in the vicinity of monitoring well MW-21, and, if so, to evaluate whether these USTs are an on-going source to petroleum hydrocarbon impacts to soil and groundwater in this area.

2.1 BACKGROUND

As previously discussed in the work plan for SRI Phase 3 field activities (Leidos, 2017), the area in the vicinity of monitoring well MW-21 has long been suspected as an additional source of petroleum hydrocarbon contamination at the Site, based on the occurrence of shallow soil impacts in this area and the history of former fueling service operations on the property at 141 East Woodin Avenue (Figure 1).

Based on this information, Leidos previously subcontracted Geophysical Survey, LLC of Kennewick, Washington to conduct a non-intrusive geophysical survey of this area to look for evidence of undocumented USTs or other subsurface fueling infrastructure that might still be present in this area. This work was completed on April 27, 2018. During the survey, three anomalies characteristic of USTs were delineated with GPR. Two of the anomalies were estimated to be at a depth of approximately 4.3 feet below ground surface (bgs) and were estimated to be approximately 3 feet by 5 feet laterally. The third anomaly was estimated to be approximately 4.9 feet bgs and approximately 5 feet by 15 feet laterally. Based on the locations of these anomalies (which are shown on Figures 1 and 2 of the Geophysical Investigation Report included as Appendix A), it is believed that they may be undocumented USTs associated with the former fueling service operations that are known to have taken place on the property at 141 East Woodin Avenue from approximately the 1920s through 1940s.

2.2 INVESTIGATION METHODOLOGY

To confirm whether or not the anomalies delineated by GPR are undocumented USTs, Leidos will complete "pothole" excavations above the central portion of each GPR anomaly using air/vacuum excavation equipment.

Prior to initiating the air/vacuum excavation work, a utility locate will be performed in the area to identify any shallow utilities that could be encountered during the work. The utility locate will include use of a GPR unit that will focus on the upper 1 – 2 feet of the ground surface, in order to identify any shallow utilities that could be damaged during concrete coring activities.

Following completion of the utility locate, a concrete coring subcontractor will be utilized to cut an approximately 12-inch diameter core through the reinforced concrete sidewalk near the central portion of the two eastern-most GPR anomalies. Concrete coring may not be necessary for the western GPR anomaly due to its location near the northern end of the landscape planter in that area. Air/vacuum excavation equipment will then be used to remove soil within the "pothole" area until the presence of a UST or other subsurface infrastructure is confirmed, or to depth of at least 8 feet bgs, whichever comes first. If a subsurface utility or other obstacle is encountered during pothole excavation activities, the excavation will be backfilled and a replacement will be located nearby.

If the presence of undocumented USTs is confirmed at one or more of the anomaly locations, additional pothole excavations will be advanced at locations approximately adjacent to each side of the UST encountered. Each of these borings will be advanced to the approximate bottom depth of the adjacent tank, which will be estimated based on the depth of the top of the tank and the tank diameter. Soil samples will be collected from each of these borings at an interval of approximately every 2 feet using a hand auger. Soil samples will be logged in the field in accordance with the Unified Soil Classification System (USCS) by a Leidos geologist and field screened for indications of petroleum contamination by headspace vapor measurements, using a photo-ionization detector (PID), and sheen testing.

At a minimum, one soil sample from each boring will be submitted for laboratory analysis, based on field screening results. For example, the samples producing the highest PID readings, strongest sheen, or otherwise having the greatest visual or olfactory indications of petroleum impact will be selected for laboratory analysis. Soil samples selected for laboratory analysis will

be submitted to Eurofins Lancaster Laboratories Environmental (Eurofins) for the following analyses:

- Gasoline-range organics (GRO) by ECY 97-602 NWTPH-Gx;
- Diesel-rang organics (DRO) and heavy-oil-range (HRO) by ECY 97-602 NWTPH-Dx:
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX), methyl tertiary butyl ether (MTBE), ethylene dibromide (EDB), and ethylene dichloride (EDC) by USEPA 8260B; and
- Total lead by USEPA 6010B.

Following completion of the pothole excavations, each hole will be backfilled and the ground surface will be restored per specifications to be provided by the City of Chelan Public Works Department.

3. PETROLEUM SOURCE INVESTIGATION NEAR MONITORING WELL MW-17

This phase of the SRI Phase 4 field activities will be performed to further evaluate the potential for petroleum contamination contributions from past gasoline fueling station operations at the properties located at 221 and 229 East Woodin Avenue, which are located immediately north of the Site, near existing monitoring well MW-17. This investigation will consist of:

- A geophysical survey on the properties located at 221 and 229 East Woodin Avenue[1], and along the sidewalk and parking areas that are immediately south of these properties; and
- A series of seven soil borings to be advanced along the northern and southern boundaries of the East Woodin Avenue right-of-way, in the vicinity of monitoring well MW-17 (see Figure 1).

3.1 BACKGROUND

Recent groundwater monitoring data for MW-17 (Leidos, 2018) indicate an increase in dissolved-phase petroleum constituent concentrations that appears to be associated with the recent trend of rising groundwater elevation at the Site. Since December 2015, the concentrations of GRO, toluene, ethylbenzene, and xylenes in groundwater from this monitoring well have increased by approximately an order of magnitude, while groundwater elevation at this location has risen approximately 5 feet. These results suggest that petroleum contamination is present near MW-17 in shallower soils that were previously unsaturated since MW-17's installation in June 2002.

As discussed in Section 1.2.2 of the 2006 Remedial Investigation/Feasibility Study Report for the Site (SAIC, 2006), historical records indicate that gasoline fueling stations were formerly operated on both of the properties immediately north of monitoring well MW-17 (221 and 229 East Woodin Avenue).

[1] Performance of investigation activities on the properties located at 221 and 229 East Woodin Avenue will be contingent upon obtaining access from the property owners to perform this scope of work.

At 221 East Woodin Avenue, fueling service operations were reportedly conducted from approximately 1910 through the 1970s. Property records indicate that Union Oil Company of California leased the property in 1928 for the storage and sale of gasoline and other petroleum products. A historic photo of the property from 1959, which is presented in Appendix A of the 2006 RI/FS Report, shows a pump island in front of the currently existing building, which was reportedly built in 1946 (Chelan County Assessor). Therefore, it is presumed that the UST basin for any fueling service operations conducted after 1946 would be located in front of the current building footprint. Ecology's UST Site/Tank Data Summary database does not contain any records for the property; therefore, the current status of any USTs that were formerly used on the property is unknown.

At 229 East Woodin Avenue, fueling service operations were reportedly conducted from at least 1939 through the late 1970s. Property records indicate that Richfield Oil Corporation leased the property from February 1939 through at least June of 1971. Ecology's UST Site/Tank Data Summary database contains records for three USTs for this property, which were reportedly installed in December 1964 and closed-in-place in August 1996. Each of these tanks were reported to have been used for storage of leaded gasoline. Leidos is not aware of any closure records for the earlier generation(s) of USTs that would have been used at this property. However, based on our professional experience we believe that it is likely that the earlier generation(s) of USTs were not removed and are still present on the property.

Based on this information, Leidos believes that additional investigation is warranted in this area to evaluate whether the Site is being impacted by these potential petroleum source areas.

3.2 MW-17 GEOPHYSICAL INVESTIGATION

The goal of the geophysical investigation will be to evaluate the properties at 221 and 229 East Woodin Avenue, and the adjacent sidewalk and parking areas, for evidence of possible undocumented USTs that have potentially contributed to petroleum impacts to soil and groundwater in the general vicinity of monitoring well MW-17. The area of interest for the geophysical survey is shown on Figure 1. Leidos will subcontract Geophysical Survey, LLC to perform this work, which will consist of electromagnetic and GPR locating methods, similar to the survey that was previously performed in the vicinity of monitoring well MW-21.

3.3 MW-17 SOIL BORING INVESTIGATION

In order to further assess the area around monitoring well MW-17 for the potential for alternate sources of petroleum impacts, Leidos proposes to conduct a shallow soil sampling investigation in this area. This work will be conducted to collect additional data on shallow soil conditions (< 25 feet bgs) to the south of the properties at 221 and 229 East Woodin Avenue, and to the north of the Chevron service station property, along the north and south margins of this street.

Proposed shallow soil boring locations are shown on Figure 1. However, actual boring locations will be determined in the field based on the results of public and private utility locates that will be performed prior to any intrusive subsurface activities.

Each boring will initially be cleared to a depth of at least 8 feet bgs using air/vacuum excavation equipment or a similar "soft-dig" method to avoid damage to buried utilities or other subsurface infrastructure. Within this interval, the diameter of the boring will be at least 3 inches larger than the largest diameter of tooling to be advanced into the boring. From the ground surface to 8 feet

bgs, soil samples will be collected approximately every 2 feet using a stainless steel hand-auger. When samples are to be collected, use of air-vacuum excavation equipment will be stopped at least 6 inches above the top of the desired sampling interval and a hand-auger will be used to clear the boring to the desired sampling depth and to collect the soil sample. If a subsurface utility or other obstacle is encountered during the bore-hole clearance procedure, the boring will be properly abandoned and backfilled, and a replacement boring will be located nearby, if possible.

Following completion of boring clearance to at least 8 feet bgs, each boring will be advanced to a depth of at least 30 feet bgs using a sonic drilling rig. If field screening results above 30 feet bgs suggest that petroleum contamination has not been encountered or that the bottom-most extent of petroleum contamination has been reached, borings will be terminated at 30 feet bgs. Otherwise, borings will be advanced until field screening results suggest that the bottom-most extent of petroleum contamination has been reached, or to 50 feet bgs, whichever is less.

Within each boring, soil samples will be collected on a continuous basis within lined sample tubes or split-spoon sample collection tooling in order to minimize disturbance and maximize recovery of the soil cores. Use of this soil sample collection tooling will eliminate the standard sonic drilling process of vibrating collected soil cores from the core barrel sampler into core bags, in order to minimize disturbance to the collected soil cores.

Soil samples will be logged in the field in accordance with the Unified Soil Classification System (USCS) by a Leidos geologist and field screened for indications of petroleum impact by headspace vapor measurements, using a photo-ionization detector (PID), and sheen testing.

At a minimum, two soil samples from each boring will be submitted for laboratory analysis, based on field screening results. For example, the samples producing the highest PID readings, strongest sheen, or otherwise having the greatest visual or olfactory indications of petroleum impact will be selected for laboratory analysis. Soil samples selected for laboratory analysis will be submitted to Eurofins Lancaster Laboratories Environmental (Eurofins) for the following analyses:

- Gasoline-range organics (GRO) by ECY 97-602 NWTPH-Gx;
- Diesel-rang organics (DRO) and heavy-oil-range (HRO) by ECY 97-602 NWTPH-Dx:
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX), methyl tertiary butyl ether (MTBE), ethylene dibromide (EDB), and ethylene dichloride (EDC) by USEPA 8260B; and
- Total lead by USEPA 6010B.

QA/QC sampling associated with the SRI Phase 4 field activities will include collection of duplicate samples at a frequency of one per twenty soil samples, and collection of equipment rinse samples to confirm the effectiveness of sampling equipment decontamination procedures. Duplicate soil samples will be submitted for the analyses listed above. Equipment rinse sampling will be performed by collecting laboratory-supplied distilled water that has been used as the final rinse during equipment decontamination procedures. At a minimum, the following equipment rinse samples will be collected:

1) At least one equipment rinse sample will be collected from a hand auger used for soil sample collection; and

2) At least one equipment rinse sample will be collected from sample collection tooling used by a drill rig used for the project.

Equipment rinse samples will be analyzed for GRO by ECY 97-602 NWTPH-Gx and BTEX, MTBE, EDB, and EDC by USEPA Method 8260B.

Following completion of each boring, the hole will be abandoned by backfilling with bentonite chips to a depth of approximately 18 inches bgs, followed by a concrete seal to the ground surface.

4. NEW MONITORING WELL INSTALLATION

Four new monitoring wells are proposed to be installed as part of the SRI Phase 4 field activities. Descriptions of the proposed locations and a justification for each of the new monitoring wells are provided below. Proposed new well locations are also shown on Figure 1.

- **MW-40** Monitoring well MW-40 was previously proposed as part of the SRI Phase 2 activities conducted in November 2016. However, the well could not be completed at that time due to a lack of legal access to the property where the well was proposed for installation. Chevron has been working with the Chelan County Public Utility District (PUD) to negotiate terms of access for the property and the PUD recently issued Chevron a permit to install this well in the parking area immediately east of the Chelan Riverwalk Park. This well will be installed to collect additional hydrogeologic data regarding the relationship between the shallow perched aquifer and Lake Chelan in the southwestern portion of the Site.
- **MW-41** Monitoring well MW-41 will be installed within the City of Chelan sidewalk near the northeast corner of the intersection of East Woodin Avenue and Sanders Street. This monitoring well will be installed in the perched aquifer to address Ecology requests for additional delineation of potential petroleum impacts to soil and groundwater to the east of the Chevron service station property.
- **MW-42 and MW-43** Monitoring wells MW-42 and MW-43 will be installed within the City of Chelan sidewalk east of Sanders Street and south of East Woodin Avenue. These monitoring wells will also be installed in the perched aquifer to address Ecology requests for additional delineation of potential petroleum impacts to soil and groundwater to the east of the Chevron service station property.

4.1 MONITORING WELL INSTALLATION AND CONSTRUCTION

Borehole clearance and soil field screening/sampling procedures will be the same as those previously described in Section 3.3. A minimum of two soil samples from each monitoring well boring will be submitted for laboratory analysis: one from the capillary fringe (if encountered); and the second from the bottom-most sample interval attained in the boring. The bottom-most sample will be used to demonstrate that the sampling effort has advanced to sufficient depth to define the vertical extent of petroleum-hydrocarbon impacts, if present. Additional soil samples may also be submitted based on field-screening observations.

Construction of monitoring well MW-40 will be similar to monitoring wells MW-38 and MW-39, which were designed to evaluate the extent of shallow perched groundwater to the southwest of the Site and its potential for communication with Lake Chelan. The well will be constructed

as a 2-inch diameter monitoring well with a 25-foot screened interval set at an elevation of approximately 1,075 to 1,100 feet above sea level, which has been selected to allow for groundwater monitoring within the licensed surface level range for Lake Chelan, which is 1,079 to 1,100 feet. Based on the approximate surface elevation at the proposed location for this well, and the elevation requirements for the well screen interval, it is expected that the boring for monitoring well MW-40 will be advanced to approximately 45 feet bgs. This well will be installed whether or not groundwater is encountered at the time of boring.

Monitoring wells MW-41 through MW-43 are expected to be constructed similar to existing monitoring wells MW-5 and MW-8. Historical groundwater data for these wells indicate that groundwater has typically been encountered at depths of approximately 19 to 35 feet bgs in this area. Therefore, this well will be advanced to a depth of at least 40 feet bgs.

The new monitoring wells will be constructed using 2-inch diameter schedule 40 poly-vinyl chloride casing and 0.010-inch factory slotted screen with a 10/20 Colorado sand (or equivalent) filter-pack. Each monitoring well will be completed at the ground surface with a flush-mounted, traffic rated, well box.

If sufficient groundwater is present within the screened interval of the new monitoring wells, the wells will be developed for future groundwater sampling. Monitoring well development will be performed after a period of at least 24 hours following completion of a well, in order to allow the well seal to setup and solidify. Well development will consist of alternating periods of surging the well with a stainless steel bailer for several minutes, followed by removal of groundwater and suspended sediments using a disposable bailer or submersible pump. Surging will be performed throughout the entire length of the submerged screen interval. Surging and bailing of the well will be repeated until groundwater removed from the well appears to be relatively free of suspended sediments and total well depth measurements indicate that sediment deposits are not present in the well casing, or until a volume of water equal to ten times the original water column volume has been removed, whichever is first.

Following their installation, Leidos will complete a preliminary survey of the location and elevation of the new monitoring wells. Monitoring well location coordinates will be determined using a handheld Global Positioning System (GPS) receiver. Monitoring well elevation measurements will be made to the nearest 0.01 foot at the ground surface (i.e. top of well-box lid) and at the top of the well casing (relative to at least two existing monitoring wells at the Site) using a rotary laser level and grade rod. A comprehensive professional survey of all new and existing monitoring wells at the Site will also be completed as part of the SRI Phase activities, which is further discussed in Section 6.

5. SOIL BORING INVESTIGATION FOR LNAPL DELINEATION AND PILOT TEST WELL INSTALLATION NEAR MONITORING WELL MW-10

This phase of the SRI Phase 4 activities will be performed in order to further delineate the vertical extent of LNAPL in soil in the area immediately west of the Chevron service station property. Leidos proposes to advance up to five soil borings in this area. Based on the results of soil logging and field screening, Leidos may install one or more 4-inch diameter wells for future pilot testing of LNAPL recovery or other cleanup strategies.

5.1 BACKGROUND

Long-term LNAPL gauging results for monitoring wells MW-9, MW-10, and MW-12 indicate that measurable LNAPL has generally been present in each of these monitoring wells since their installation in 2001, through present day. These results suggest that LNAPL saturation in soils to the immediate west of the Chevron service station property (in the vicinity of the Wells Fargo Bank property at 222 East Woodin Avenue) have remained sufficiently high to provide a source of mobile LNAPL for a period now exceeding 17 years. However, despite the apparent extent of high LNAPL saturation values in this area, soil sampling data collected to date has not been sufficient to delineate the vertical interval in which this mobile LNAPL is present. Therefore, the objective of this phase of the SRI Phase 4 activities is to collect additional soil characterization data in this area in order to further evaluate the extent of LNAPL present. If indications of extensive LNAPL impacts to soil are observed during field screening of these soil samples, Leidos may elect to install one or more 4-inch diameter monitoring wells to be used for future pilot testing of LNAPL recovery or remediation technologies.

5.2 LOCATIONS

The following soil boring locations are proposed for this phase of the investigation:

- Two soil boring locations are proposed along the western boundary of the Chevron service station property, immediately east of the Wells Fargo Bank building. These borings are intended to provide data regarding the current extent of petroleum impacts in this area, and to supplement earlier, less comprehensive, soil sampling data collected during installation of monitoring wells MW-3, MW-4, MW-6, MW-7, and other soil borings that were previously completed in this area of the Site.
- Two soil borings are proposed along the western boundary of the Wells Fargo Bank property. These borings are intended to provide additional data regarding the lateral and vertical extent of the LNAPL body that has contributed to the consistent presence of mobile LNAPL in monitoring well MW-10 since 2001. These borings will be located within the western-most lane of the drive-thru for the Wells Fargo Bank.
- One soil boring is proposed in the City of Chelan parking lot, to the west of monitoring well MW-9. This boring is intended to provide additional data regarding the lateral and vertical extent of the LNAPL body that has contributed to the nearly continuous presence of mobile LNAPL in monitoring well MW-9 since 2002.

5.3 INVESTIGATION METHODOLOGY

Borehole clearance and soil field screening/sampling procedures will be the same as those previously described in Section 3.3. Borings for this phase of the investigation will be advanced until field screening results suggest that the bottom-most extent of petroleum impacts has been defined or to 50 feet bgs, whichever is less.

A minimum of two soil samples from each boring will be submitted for laboratory analysis: one from the capillary fringe (if encountered); and the second from the bottom-most sample interval attained in the boring. The bottom-most sample will be used to demonstrate that the sampling effort has advanced to sufficient depth to define the vertical extent of petroleum-hydrocarbon impacts, if present. Additional soil samples may also be submitted based on field-screening results.

5.4 PILOT TEST WELL INSTALLATION

If field screening results indicate that an interval containing LNAPL has been encountered, Leidos will evaluate the soil log and field screening results to determine whether the location should be considered for construction of a well for future pilot testing or LNAPL recovery efforts. If installed, pilot test wells will be constructed in the perched aquifer using 4-inch diameter schedule 40 poly-vinyl chloride casing and 0.010-inch factory slotted screen with a 10/20 Colorado sand (or equivalent) filter-pack. The well-screen interval will be determined in the field, based on field screening results, and will be selected to target the depth interval of soil that is expected to contain LNAPL at or above residual saturation values. Screened intervals for these wells will not exceed 20 feet in length. Each well will be completed at the ground surface with a flush-mounted, traffic rated, well box.

6. MAINTENANCE, REPAIR AND SURVEYING OF EXISTING MONITORING WELL NETWORK

Existing monitoring wells at the Site are currently inspected and maintained by Gettler-Ryan on a quarterly basis as part of on-going groundwater monitoring. However, Leidos has recently observed that many of the older monitoring wells at the Site have been subject to more extensive damage, such that complete replacement of their well boxes should be considered. Examples of this damage include broken concrete surface seals, and missing or damaged lid-bolt tabs that prevent the well lid from being properly secured.

As part of the SRI Phase 4 activities, Leidos will complete a comprehensive inspection of the existing monitoring well network at the Site to identify maintenance and repairs that should be performed. Relatively simple repairs such as replacement of gaskets, well locks, well plugs or lid-bolts will be performed by Leidos. However, for monitoring wells requiring more extensive repairs, Leidos will subcontract a licensed drilling contractor to remove and replace the existing damaged well box. Leidos will work with the City of Chelan and other impacted property owners to coordinate the completion of this work.

Following completion of all necessary monitoring well maintenance and repairs, Leidos will subcontract a Washington State licensed land-surveying firm to complete a comprehensive location and elevation survey of all new and existing monitoring wells at the Site. Monitoring well elevation measurements will be made to the nearest 0.01 foot at the ground surface (i.e., top of well-box lid) and at the top of the well casing, relative to the North American Vertical Datum (NAVD) of 1988. Monitoring well locations will be mapped relative to the North American Datum of 1983 High Accuracy Reference Network (NAD83 HARN).

7. INVESTIGATION-DERIVED WASTE MANAGEMENT

Regulated investigation-derived waste (IDW) associated with the SRI Phase 4 activities is anticipated to include soil cuttings and water, which will be generated during drilling activities, equipment decontamination, and well development. Mixed liquid waste consisting of LNAPL and groundwater may also be generated. All regulated IDW will be containerized in 55-gallon United States Department of Transportation-approved drums. Drums containing LNAPL will be staged in a lockable secondary-containment storage unit on the Chevron service station property. All other IDW drums will be stored on the Chevron service station property at a location approved by the station manager until a waste disposal profile can be generated and off-site

transportation and disposal can be arranged (typically 6 to 8 weeks). Waste disposal coordination for regulated IDW will be handled by Chevron, with support by Leidos.

Non-regulated IDW, such as nitrile gloves, plastic sheeting, and bailers will be bagged and disposed as standard municipal waste.

8. SCHEDULE

Leidos will begin planning for this project upon receipt of Ecology approval of this work plan. Project planning is expected to require approximately four to six weeks to complete, prior to the initiation of investigation field activities. However, the schedule to begin field work at the Site may also be contingent on Chevron approval, property access, street-use or other permits, contractor availability, staffing resources, and weather concerns.

Leidos will provide Ecology with at least one week's notice prior to the start of any SRI field activities.

9. REFERENCES

Leidos (2015). "Supplemental Remedial Investigation Report – Phase 1, Chevron Service Station No. 9-6590." December 14.

Leidos (2017). "Supplemental Remedial Investigation Work Plan – Phase 3, Chevron Service Station No. 9-6590." October 18.

Leidos (2018). "Groundwater Monitoring Summary Report, December 2015 – December 2017, Chelan Chevron." June 22.

SAIC (2006). "Final Remedial Investigation / Feasibility Study Report, Chevron Service Station No. 9-6590." December 2006.

LIMITATIONS

This technical document was prepared on behalf of Chevron and is intended for its sole use and for use by the local, state, or federal regulatory agency that the technical document was sent to by Leidos. Any other person or entity obtaining, using, or relying on this technical document hereby acknowledges that they do so at their own risk, and Leidos shall have no responsibility or liability for the consequences thereof.

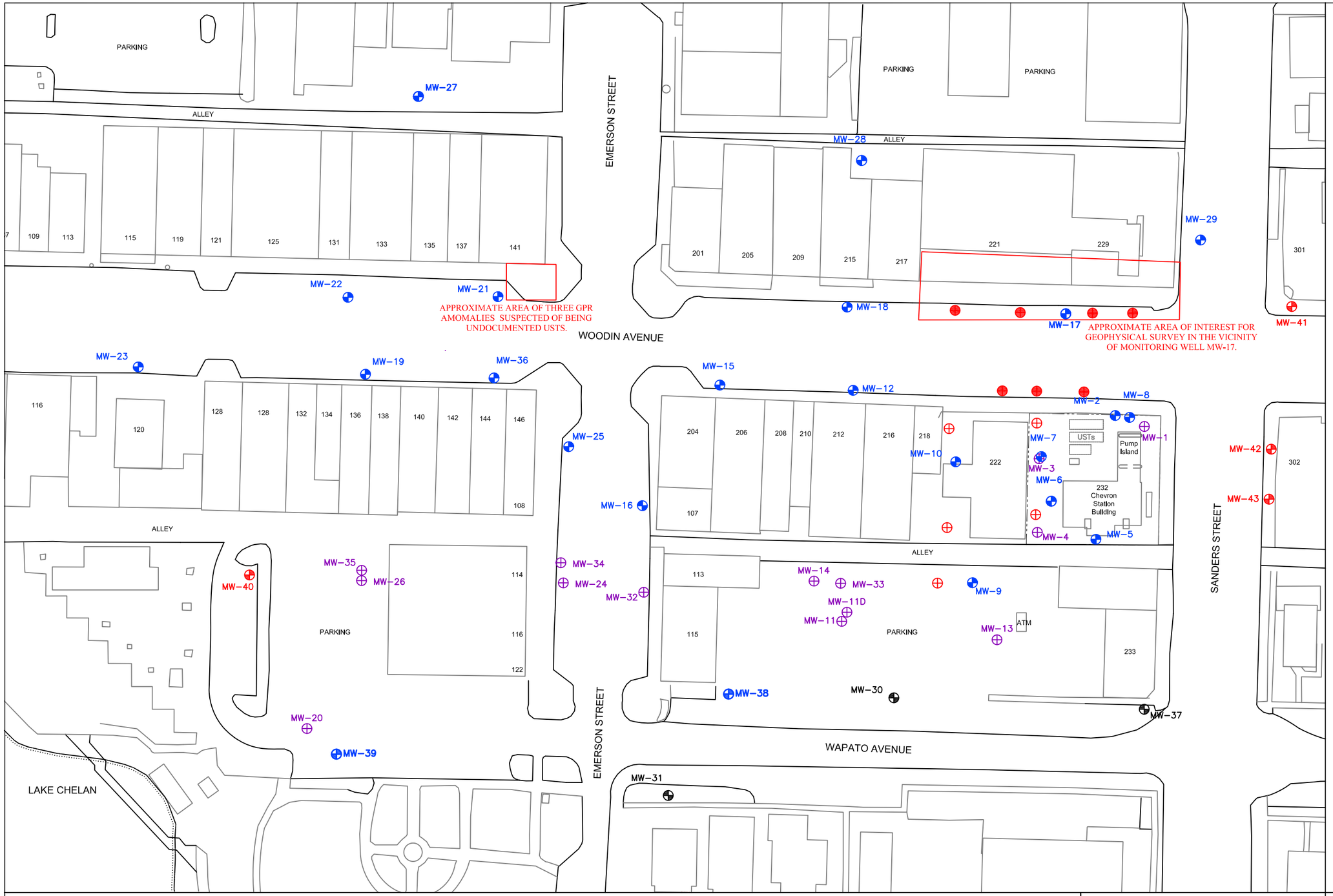
Site history and background information provided in this technical document are based on sources that may include interviews with environmental regulatory agencies and property management personnel and a review of acquired environmental regulatory agency documents and property information obtained from Chevron and others. Leidos has not made, nor has it been asked to make, any independent investigation concerning the accuracy, reliability, or completeness of such information beyond that described in this technical document.

Recognizing reasonable limits of time and cost, this technical document cannot wholly eliminate uncertainty regarding the vertical and lateral extent of impacted environmental media.

Opinions and recommendations presented in this technical document apply only to site conditions and features as they existed at the time of Leidos site visits or site work and cannot be applied to conditions and features of which Leidos is unaware and has not had the opportunity to evaluate.

All sources of information on which Leidos has relied in making its conclusions (including direct field observations) are identified by reference in this technical document or in appendices attached to this technical document. Any information not listed by reference or in appendices has not been evaluated or relied on by Leidos in the context of this technical document. The conclusions, therefore, represent our professional opinion based on the identified sources of information.

Figures



LEGEND

- MW-2 — PERCHED GROUNDWATER MONITORING WELL
- MW-30 — DEEP GROUNDWATER MONITORING WELL
- MW-1 — ABANDONED DRY MONITORING WELL
- PROPOSED SOIL BORING LOCATION FOR MW-17 SOURCE AREA INVESTIGATION
- MW-40 — PROPOSED SOIL BORING/ GROUNDWATER MONITORING WELL LOCATION
- PROPOSED SOIL BORING/4" RECOVERY WELL LOCATION

N

NOTES

Base Map from City of Chelan, 1994

Additional Reference Material:
Aerial Photograph from September 1991
(Washington State Department of Natural Resources)

0 80' 160'

leidos

Chevron Service Station No. 96590
232 East Woodin Avenue
Chelan, Washington

FIGURE 1
Site Map with Proposed SRI Phase 4 Investigation Locations

FILE NAME:	DATE:
96590_Site Map_2018.dwg	9/17/2018

Appendix A:
Geophysical Investigation Summary Report

Geophysical Survey LLC
711 S Tacoma Street
Kennewick, Washington 99336

May 2, 2018

Russell Shropshire
Leidos
18912 North Creek Parkway, Suite 101
Bothell, WA 98011

Re: ***Geophysical Investigation***
Project #323781.00.17.W.161D.0706.0101
Chelan, WA

Mr. Shropshire:

Geophysical Survey LLC conducted a geophysical investigation at the northwest corner of the intersection of E Woodin Avenue and N Emerson Street in Chelan, Washington on April 27, 2018. The objective of the survey was to detect and delineate underground storage tanks (USTs).

Methodology

Time Domain Electromagnetic Method (EM61)

Time domain electromagnetic methods involve generating a signal of known frequency and voltage from a transmitter. In the presence of metallic objects an EM signal is induced when the transmitted signal is applied. When the transmitter is turned off the induced signal decays at a rate proportional to the metal mass in which it was induced.

The Geonics EM61MK2 consists of a transmitter (Tx) and receiver (Rx) coil and a coincident receiver coil located 12 inches above the bottom coil. The transmitter coil is energized by a pulse of current and the receiver coils measure the response decay at fixed time intervals. Three time gates of data from the bottom coil and the top coil are recorded, differential data is the top coil minus channel 3 bottom coil data. Differential data is useful in negating effects of surface metal.

Ground-Penetrating Radar

Ground-penetrating radar (GPR) uses a transducer to transmit FM frequency electromagnetic energy into the ground. Interfaces in the subsurface, defined by contrasts in dielectric constants, magnetic susceptibility, and to some extent, electrical conductivity, reflect the transmitted energy. The GPR system then measures the travel time between transmitted pulses and arrival of reflected energy. Buried objects such as pipes, barrels, foundations, and buried wires can cause all or a portion of the transmitted energy to be reflected back towards a receiving antenna. Geologic features such as cross-

bedding, lateral and vertical changes in soil properties, and rock interfaces can also cause reflections of a portion of the EM energy.

The dielectric constant and magnetic susceptibility of the medium primarily control the velocity of the EM energy. Values of EM velocities, for depth calculations, are determined by measurement, experience in an area, by ties to known buried reflectors, and from knowledge of the subsurface medium.

The depth of investigation is a function of the transmit power, receiver sensitivity, frequency of the antenna, and attenuation of the transmitted energy due to the geologic medium. The maximum depth of investigation may vary significantly as a result of the changing soil conditions. High attenuation, and consequent smaller penetration depths, of the EM energy typically occurs where the soil conductivity is greater than 25 milli-siemens per meter and/or in areas with numerous reflective interfaces. Depth of investigation is also affected by highly conductive material, such as metal drums and pipes that essentially reflect all the energy. The method cannot "see" directly below areas of highly reflective material because all of the energy is reflected.

Electromagnetic Line Locating

Utility line locating equipment operates through the principles of electromagnetics (EM), designed to detect underground utilities constructed of electrically conductive materials. An active signal is applied to the underground utility by means of a radio frequency (RF) transmitter and then traced with a receiver. With direct coupling, an RF signal is applied to a cable or pipe where there is access to a contact point. With no access to the utility, the indirect mode is used. A transmitter is placed on the ground surface above the conductor and the signal is induced through earth onto the pipe or cable.

The active signal is created from current flowing from the transmitter, along the conductor (utility line), and back to the transmitter thru the ground. The signal can also return thru other utility lines. This type of return can distort the electromagnetic field and cause erroneous locations.

Passive signals include power transmission (60Hz) and radio transmission (15kHz-27kHz). 60Hz signals are present in conductors carrying electric current and from utilities carrying return current (indirect induction). Radio signals are created by high power, low frequency communication transmitters. Conductive utilities re-radiate the signal. A receiver is used to trace power and radio transmissions.

FIELD SURVEY

Mapping Control

A Trimble Pro6H GPS with sub-foot level accuracy was used for location control of EM data and mapping of surface features.

EM61 Data Acquisition

Electromagnetic data were collected using a Geonics EM61MK II metal detector. Data were collected at 0.6 foot intervals on transects spaced 3 feet apart. EM data were collected using NAV61 software from Geomar on an Allegro CX datalogger.

GPR Data Acquisition

GPR data were acquired with a Geophysical Survey Systems, Inc. (GSSI) SIR3000 control unit, a 400 MHz antenna. GPR data were collected at 15 scans/foot with a 50 nanoSecond window (approximately 7 feet with a dielectric constant of 8). Data transects were spaced 3 feet apart in two orthogonal directions.

DATA PROCESSING

EM Data Processing

Electromagnetic data were processed using Trackmaker61MK2 software from Geomar. EM 61 Channels 1-3 and top channel data were output to .xyz format and transformed to geo-referenced format using Didger from Golden Software. Data was gridded and contoured using a Kriging algorithm in Surfer 13 from Golden software.

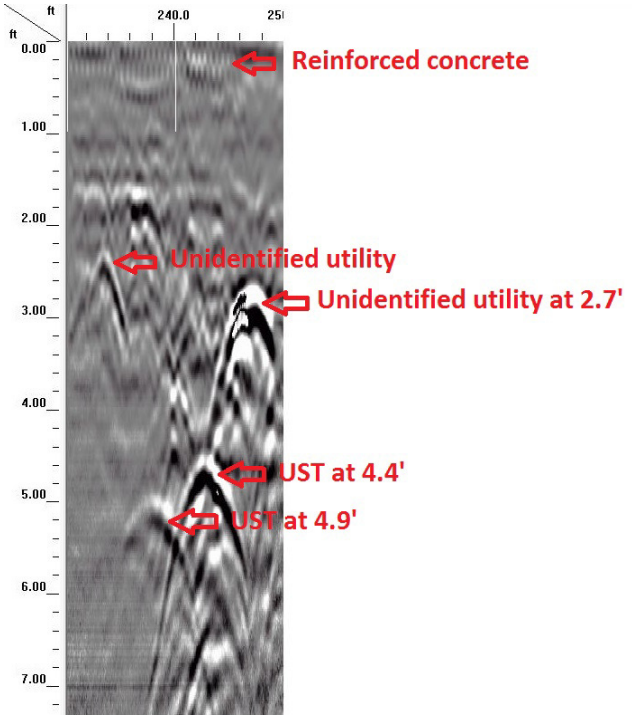
GPR Data Processing

GPR data was processed using Radan 7.0 from GSSI. A finite response filter was used as a background filter.

RESULTS AND INTERPRETATION

EM data was inconclusive due to a 6 x 6 inch reinforcing mesh.

Three anomalies characteristic of USTs were delineated with GPR in the investigation. Two five foot by three foot USTs at a depth of approximately 4.3 feet and one UST fifteen by five feet at a depth of 4.9 feet were detected.



Three unidentified utility lines were detected around the interpreted USTs. The hyperbolic anomaly interpreted as a utility line at 2.7 feet may represent a fourth UST. Full investigation of this anomaly was not attempted with GPR due to landscaping.

CLOSURE

Geophysical surveys performed as part of this survey may or may not successfully detect or delineate any or all subsurface objects or features present. Locations, depths and scale of buried objects or subsurface features mapped as a result of this survey are a result of geophysical interpretation, and should be considered as confirmed, actual, or accurate only where recovered by excavation or drilling.

Geophysical Survey LLC performed this work in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. No warranty, express or implied, beyond exercise of reasonable care and professional diligence, is made. This report is intended for use only in accordance with the purposes of the study described within.

Respectfully,

Geophysical Survey LLC

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LIST OF FIGURES

Legend

- 2.0 — Depth to top in feet
- Unknown utility
- E — Electric line
- W — Water line
- SD — Irrigation line
- UST

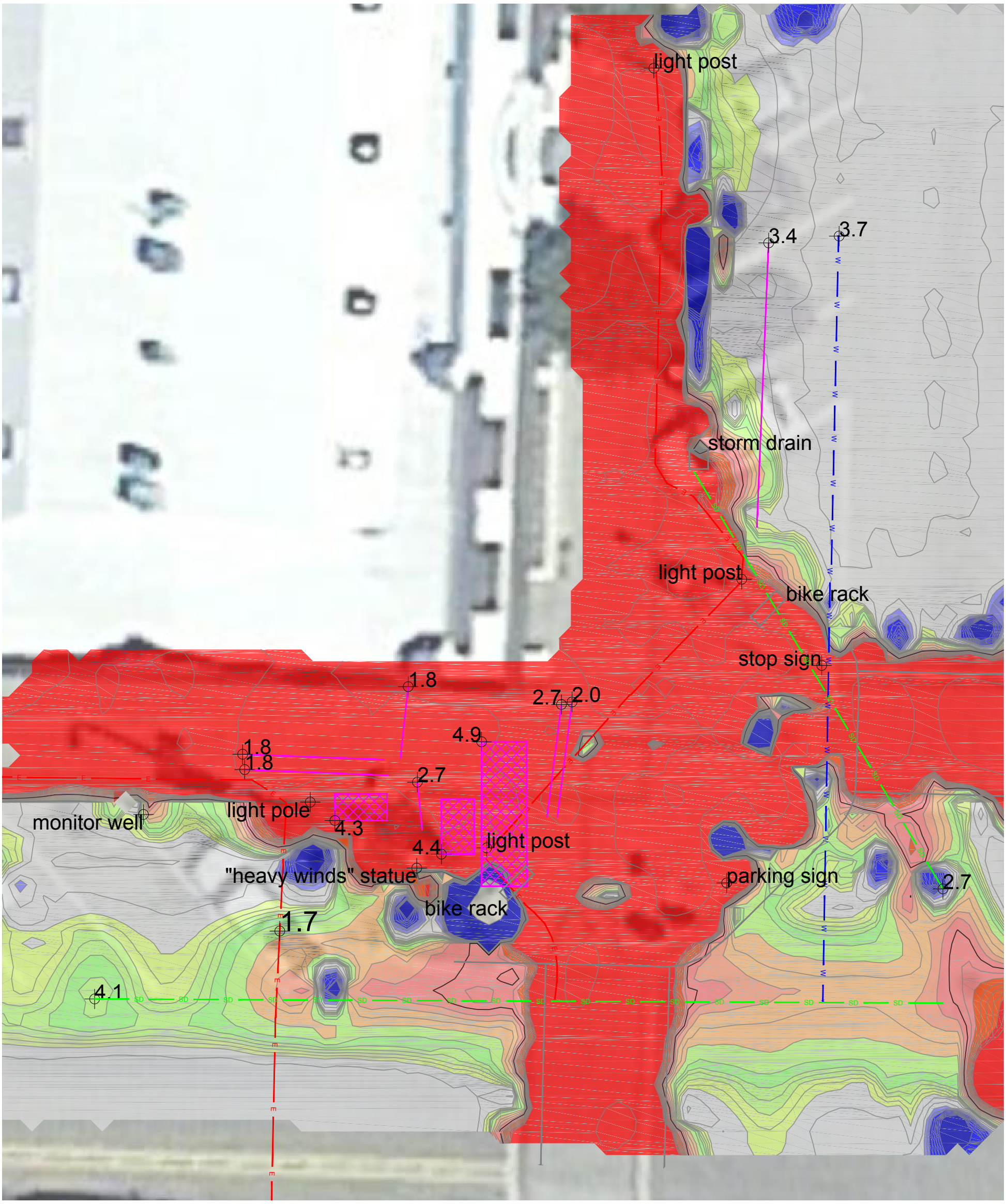
N

1 Inch = 10 Feet

0 10

GEOPHYSICAL SURVEY LLC

FIGURE 1
Geophysical Interpretation
Chelan, WA



Legend

- 2.0 — Depth to top in feet
- Unknown utility
- Electric line
- Water line
- Irrigation line
- UST

1 Inch = 10 Feet

0 10

Differential Response (mV)

-1000 -90 -70 -50 -30 -10 -2.5 2.5 10 30 50 70 90 110 130 1000

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FIGURE 2
EM Data Contours
Chelan, WA