



Central Oregon Irrigation District
Pilot Butte Canal EIS
Draft Geology, Soils, and Hazardous Materials
Technical Report
Deschutes County, Oregon

Prepared for

Central Oregon Irrigation District



May 2024

Prepared by

Parametrix

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Central Oregon Irrigation District Pilot Butte Canal EIS Draft Geology, Soils, and Hazardous Materials Technical Report

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Parametrix, 2024. Central Oregon Irrigation District Pilot Butte Canal EIS Draft Geology, Soils, and Hazardous Materials Technical Report. Prepared by Parametrix, Bend, Oregon. May 2024.

CERTIFICATION

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, as a professional environmental scientist.

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Central Oregon Irrigation District

Pilot Butte Canal EIS

Draft Geology, Soils, and Hazardous Materials Technical Report

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ACRONYMS, INITIALISMS, AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
BMP	best management practice
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COID	Central Oregon Irrigation District
DEQ	Oregon Department of Environmental Quality
District	Central Oregon Irrigation District
DSL	Oregon Department of State Lands
EDR	Environmental Data Resources
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FR	Federal Register
FTA	Federal Transit Administration
GSI	geological strength index
gpm	gallons per minute
NFA	no further action
NRHP	National Register of Historic Places
NRCS	Natural Resources Conservation Service
OAR	Oregon Administrative Rules
ODOT	Oregon Department of Transportation
ORS	Oregon Revised Statute
RCRA	Resource Conservation and Recovery Act
UIC	underground injection control
USC	United States Code
UST	underground storage tanks

EXECUTIVE SUMMARY

No high-risk hazardous materials sites were identified in the project's Study Area. Four medium-risk hazardous materials sites were identified within the Study Area; however, none of these sites would require ongoing cleanup or remediation. Therefore, construction-related impacts are discussed but are likely to be minor and related to incidental soil contamination that could be disturbed during construction.

Geologic impacts for the project Study Area were identified related to blasting near-surface basalt along the Project Area. Trenching for the new pipeline would likely require removal of bedrock through a combination of excavation by backhoe or equivalent and blasting. The pipe and associated trench would be designed to allow for long-term stability of the pipe and minimize potential loss of irrigation water to leakage. Mitigation measures include placement of a geomembrane to minimize potential for shifting over time, compacting fill material adequately to support the weight of planned vehicle and railroad traffic, and providing additional reinforcement as recommended by project engineers.

1. INTRODUCTION

As a part of the preparation of the Environmental Impact Statement (EIS) for the Pilot Butte Canal Piping Project (Project), this technical report has been prepared to identify and evaluate geology, soils, and hazardous materials impacts and effects within the Project's Study Area.

This report describes the methods used to support the environmental evaluation and outlines the approach to evaluating the potential beneficial and adverse effects of the Project. The report includes a description of the analysis area, relevant laws and regulations, methods for collecting data and assessing impacts, and possible mitigation measures. The analysis is designed to comply with the National Environmental Policy Act and relevant federal, state, and local laws.

1.1 Project Location

The Central Oregon Irrigation District (COID or District) is analyzing piping approximately 18 to 21 miles of the PBC from NE 17th Street in Redmond, Oregon, to the diversion point from the Deschutes River in Bend, Oregon (Figure 1). The piping would extend from the piped section of the PBC approved under the 2020 *Smith Rock-King Way Infrastructure Modernization Project Final Watershed Plan-Environmental Assessment* (NRCS, USDA 2020). Additional portions along the existing alignment that have been piped or converted to box culverts during previous construction projects include:

- Major freeway or roadway crossings of US 97, OR 20, and OR 126, in Bend and Redmond (0.2 miles)
- Within the city of Bend and Deschutes County for the Juniper Ridge hydroelectric facility (3.3 miles)
- Within Deschutes County north of the Juniper Ridge hydroelectric plant (0.1 miles)
- Within urbanized Redmond (1.5 miles)

The portions to be piped for the applicable alternatives for this Project are shown in Figure 1.

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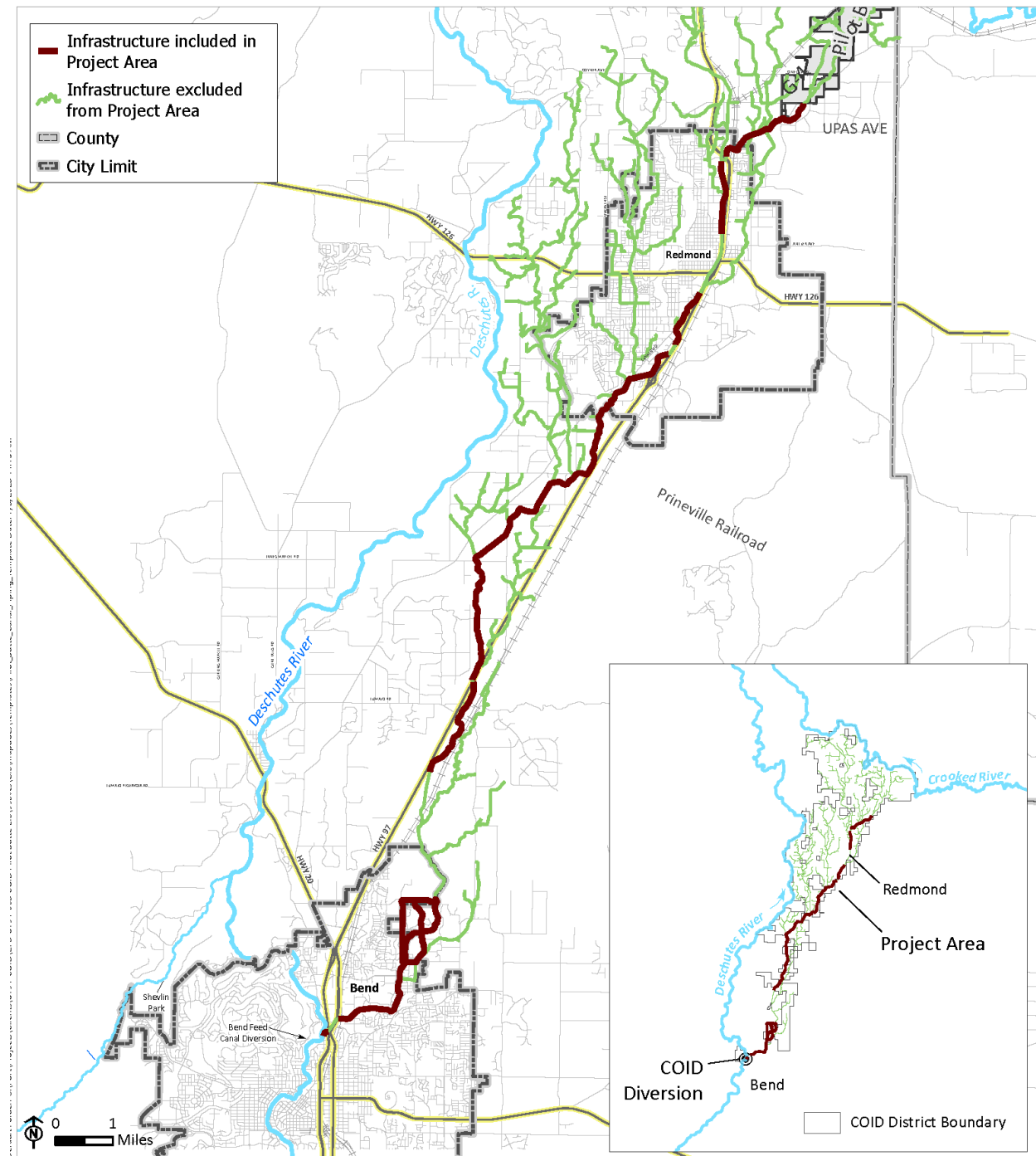


Figure 1. Project Area

1.2 Project Purpose and Need

The purpose of this Project is agricultural water management through irrigation water conservation in District-owned infrastructure, improvement of water delivery reliability to District patrons, and reduction of long-term operation and maintenance costs on approximately 21 miles of the District-owned Pilot Butte Canal. The Project is needed to address the following watershed problems and resource concerns: water loss in District conveyance systems and water delivery and operation and maintenance inefficiencies. Implementation of the proposed action would address the sponsors' objectives and goals to reduce seepage loss and provide better-managed water diversions for farm use; support agricultural land use; improve streamflow for fish, aquatic, and riparian habitat; and increase public safety.

2. PROJECT ALTERNATIVES

2.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the District would continue to operate and maintain the existing delivery system within the Project Area in its current condition. This alternative assumes that modernization of the District's infrastructure would not be reasonably certain to occur, as funding at the scale necessary to modernize District infrastructure is not anticipated from other sources. The No Action Alternative would be a continuation of the District's current operations and maintenance.

The No Action Alternative would not meet the project purpose and need. Water would continue to be lost to seepage and evaporation in District infrastructure. Inefficiencies in water delivery reliability for farmers; streamflow and habitat conditions for fish and aquatic species; public safety; and sediment levels in irrigation water would not improve. The No Action Alternative would fail to achieve the goal of maximizing sustainable economic development, as identified in the Federal Objective to protect the environment. It would not resolve current water supply problems stemming from the loss of water from District infrastructure. Further, it would not foster the economic well-being of present and future generations through sustainable use and management of water resources to provide water supply and water quality for irrigated agriculture in the Deschutes basin.

2.2 Modernization Alternative (Future with Federal Investment)

The Modernization Alternative would focus on a single priority infrastructure modernization project: the District would replace the existing open PBC within the Project Area with a pressurized, closed conduit pipeline system (see Figure 2). When completed, the pipe would extend over approximately 18 to 21 miles of the COID system from the diversion point from the Deschutes River in Bend, Oregon, to NE 17th Street in Redmond, Oregon. Pipeline construction would begin in the northern portion of the Project Area at the piped section of the PBC that was approved under the 2020 Smith Rock-King Way Infrastructure Modernization Project Final Watershed Plan-Environmental Assessment (USDA, NRCS 2020), and progress south to the North Canal Dam. Construction of the Modernization Alternative would occur over the course of 3 years; two project groups would be constructed each construction season. The six project groups are described in Table 1

Table 1. Project Group and Construction Sequence

Project Groups	Project Group Length (feet)	Construction Year	Construction Start	Construction End
1 – King Way	11,000	0	October 2026	April 2027
2 – Redmond				
Pilot Butte Canal Alignment Option	13,500	1	October 2027	April 2028
Watermaster Road Alignment Option	13,500	1	October 2027	April 2028
NW Canal Boulevard Alignment Option	13,500	1	October 2027	April 2028
3 – Veterans Way	16,700	2	October 2028	April 2029
4 – Canal	13,900	2	October 2028	April 2029
5 – Deschutes Market	22,000	1	October 2027	April 2028
6 – Rivers Edge				
Pilot Butte Canal Alignment Option	18,100	0	October 2026	April 2027
18th Street Alignment Option	19,300	0	October 2026	April 2027
Old Deschutes Road Alignment Option	19,800	0	October 2026	April 2027

Construction would occur during the non-irrigation season (October to April), with Project Group 1 (King Way) and Project Group 6 (Rivers Edge) construction beginning as early as the 2026–2027 non-irrigation season. The construction sequencing may be changed to provide flexibility for the construction contractor. Construction of each project group is anticipated to require one non-irrigation season to complete, and all six project groups would be completed over the course of three construction seasons. Two project groups—Redmond and Rivers Edge—each contain a segment with multiple alignment options. The alignment options are discussed below. Under the Modernization Alternative, federal funding through Public Law 83-566 would be available and would be expected to cover approximately 75% of total costs. The District would cover the remaining 25% of total costs.

A section of the PBC in Deschutes County just south of the Juniper Ridge hydroelectric facility, in the Rivers Edge project group, and another section in the downtown area of Redmond, in the Redmond project group, include historic features listed in the National Register of Historic Places (NRHP). In 2019, a Section 106 programmatic agreement was signed by COID, the Oregon State Historic Preservation Office, and the Bureau of Reclamation. The Natural Resources Conservation Service (NRCS) was added as a signatory in 2023. The programmatic agreement identified that COID will maintain the downtown Redmond reach “such that the historic integrity of and identification of the historic property as representative of an irrigation conveyance system will not be adversely affected.” The alignment options for the Deschutes County/North Bend (in the Rivers Edge project group) and the City of Redmond (in the Redmond project group) NRHP-listed historic sections of the Project Area are described in Section 2.2.1 and Section 2.2.2, respectively.



2.2.1 Deschutes County/North Bend Alignment Options

The Modernization Alternative has four options for piping between Yeoman Road and Cooley Road in Deschutes County and north Bend (see Figure 3).

- No Modernization within this Segment (no piping)
- Pilot Butte Canal Alignment (existing canal alignment)
- NE 18th Street Alignment
- Old Deschutes Road Alignment

2.2.1.1 No Modernization within this Segment (No Piping)

This alignment option would keep the 7,800-foot NRHP-listed stretch of the PBC between Yeoman and Cooley Roads in its current configuration and functionality as an open canal. This option would require a pressure reducing station south of Yeoman Road to slow the flow velocity as it exits the pressurized pipe so that the existing open canal can function as currently designed.

2.2.1.2 Pilot Butte Canal Alignment (Existing Canal Route)

This alignment option would replace the open channel with pipe directly within the existing open channel alignment. This alignment option would be built wholly within the section of canal that is listed in the NRHP. This option would not pipe the open channel section immediately south of the Juniper Ridge hydroelectric facility (approximately 170 feet), and it would require installing a pressure reducing station prior to where flow enters the hydroelectric facility.

2.2.1.3 NE 18th Street Alignment

This option would pipe the PBC within a new alignment beginning at the intersection of the existing alignment and Yeoman Road. It would travel west and then north to follow NE 18th Street to its intersection with Cooley Road. At Cooley Road, the alignment option would make an approximately 90-degree turn to follow an alignment extending from near the eastern terminus of Cooley Road to the existing PBC. This option would avoid impacts to a portion of the PBC that is listed in the NRHP. The historic section of canal would be left in place, but it would no longer receive irrigation water from the COID system.

2.2.1.4 Old Deschutes Road Alignment

The Old Deschutes Road Alignment option would place pipe in a new alignment beginning at Yeoman Road. It would travel east along Yeoman Road and then northeast to follow Old Deschutes Road. The alignment would travel generally north, cross the existing PBC, then continue north to Cooley Road. The alignment would make an approximately 90-degree turn to follow Cooley Road to the existing the PBC. This option would avoid impacts to the NRHP-listed portion of PBC. The historic section of canal would be left in place, but it would no longer receive irrigation water from the COID system.

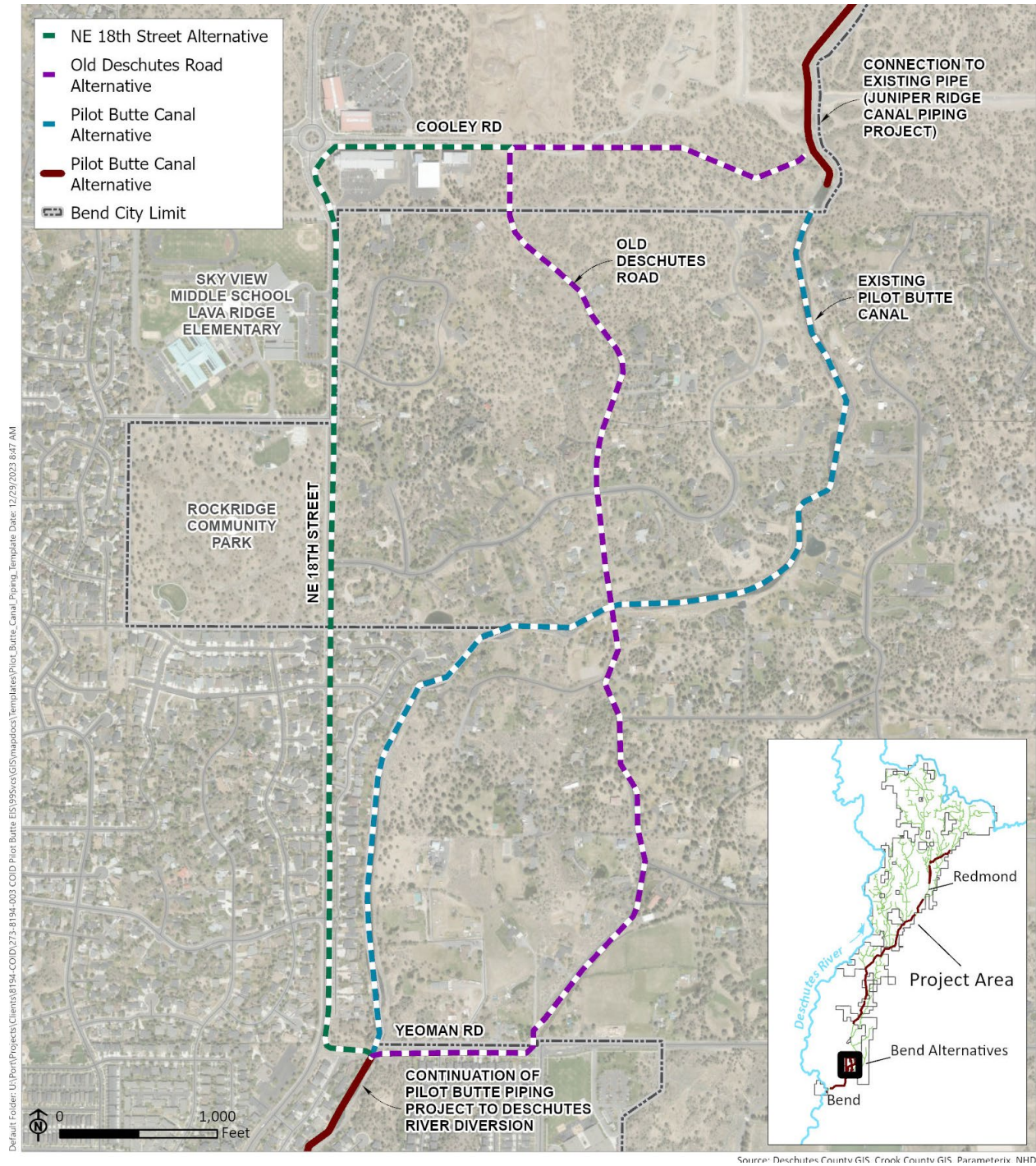


Figure 3. Deschutes County/North Bend Alignment Options

2.2.2 City of Redmond Alignment Options

The Modernization Alternative has four options for piping within the NRHP-listed historic Downtown Redmond section between NW Dogwood Avenue and NW Quince Avenue (see Figure 4).

- No Modernization within this Segment (no piping)
- Pilot Butte Canal Alignment (existing canal alignment)
- Piping to the east in the Watermaster's Access Road
- Piping to the west within Northwest Canal Boulevard

2.2.2.1 No Modernization within this Segment (No Piping)

This alignment option would keep the 6,800-foot NRHP-listed stretch of the PBC in Redmond in its current configuration and functionality as an open canal. This option would require installing a pressure reducing station near the intersection of SW Veteran's Way and US 97 to slow the flow velocity as it exits the pressurized pipe so that the existing open canal can function as currently designed.

2.2.2.2 Pilot Butte Canal Alignment (Existing Canal Route)

This alignment option would replace the open channel with pipe directly within the existing open channel alignment. This alignment option would be built wholly within the section of canal that is listed in the NRHP.

2.2.2.3 Piping to the east in the Watermaster's Access Road

This alignment option would install pipe to the east of the existing PBC and avoid impacts to the section of canal that is listed in the NRHP. The historic section of canal would be left in place, but it would no longer receive irrigation water from the COID system.

2.2.2.4 Piping to the west within Northwest Canal Boulevard

This alignment option would pipe to the west of the existing PBC, primarily within NW Canal Boulevard, and avoid impacts to the section of canal that is listed in the NRHP. The historic section of canal would be left in place, but it would no longer receive irrigation water from the COID system.

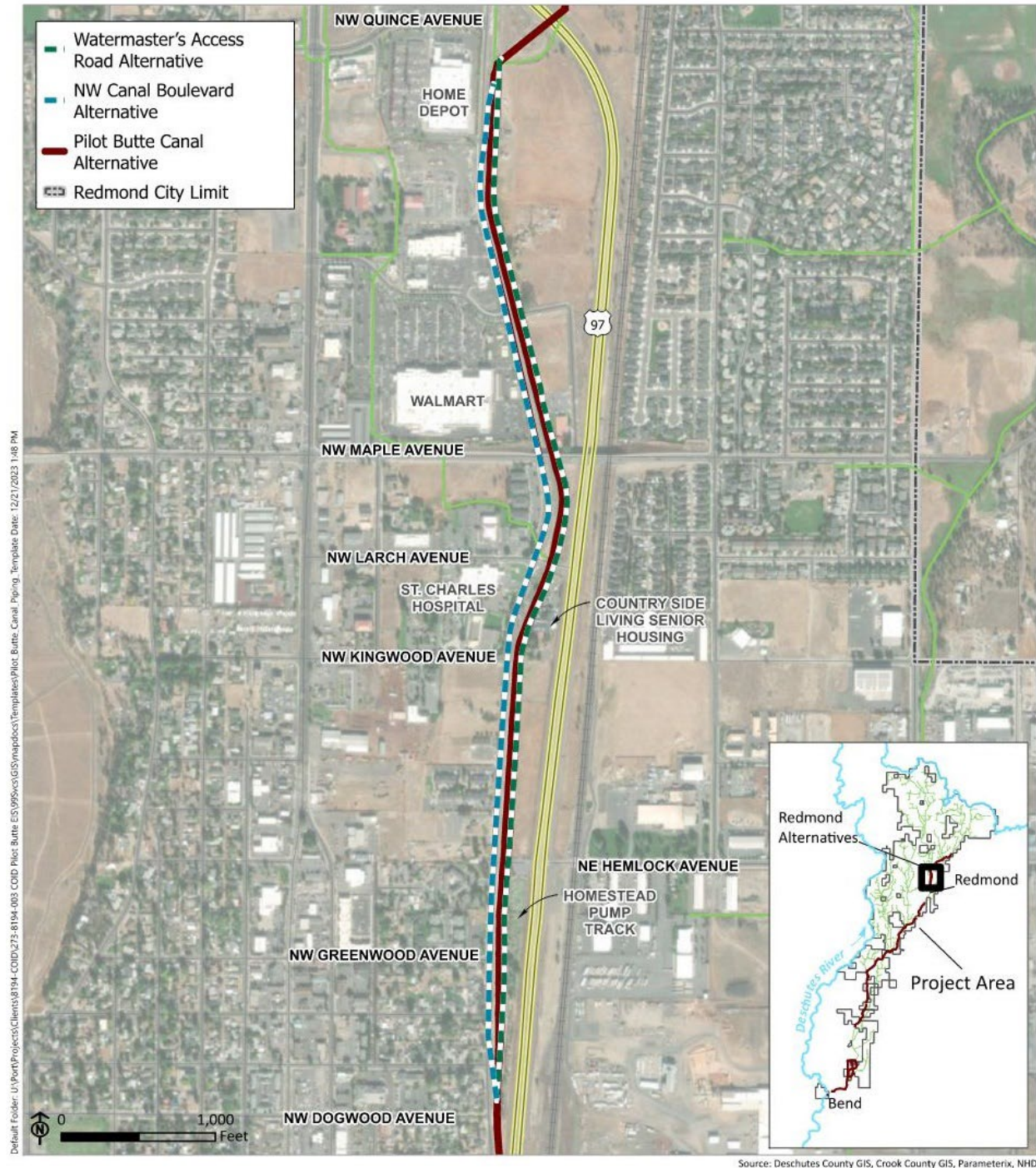


Figure 4. Redmond Alignment Options

3. DEFINITIONS

The following terminology is used when discussing geographic areas in this technical report.

Project Area. The area within which improvements associated with the project alignment options would occur and the area needed to construct these improvements. The Project Area includes the area needed to construct all permanent infrastructure, including adjacent parcels where modifications would be required for associated work such as utility realignments or upgrades.

Study Area. This is the general geographic area within which physical impacts to the environment could occur with the project alternatives. The Study Area is resource-specific and differs depending on the environmental topic being addressed. For all topics, the Study Area encompasses the Project Area, and for some topics (such as for utilities), the geographic extent of the Study Area is the same as that for the Project Area. For other topics (such as transportation) the Study Area is substantially larger to account for impacts that could occur outside of the Project Area. The Study Area for analyses of geology and soils and hazardous materials is defined in Section 5.1.

Project vicinity. The environs surrounding the Project Area. The project vicinity does not have a distinct geographic boundary but is used in general discussion to denote the larger area.

Hazardous material. Any item or agent (biological, chemical, radiological, and/or physical) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors.

Underground storage tank. Any tank, including underground piping connected to the tank, that is or has been used to contain hazardous substances or petroleum products and the volume of which is 10% or more beneath the surface of the ground. Releases from underground storage tanks (USTs) caused by leaks, spills, and overfills present major risks to human health and the environment. The U.S. Environmental Protection Agency (EPA) has developed regulations, primarily implemented at the state level, to register all USTs and ensure that leak detection, spill, overfill, and corrosion protection requirements are met.

4. LEGAL REGULATIONS AND STANDARDS

4.1 Laws, Plans, Policies, and Regulations

4.1.1 Federal Environmental Protection Agency Laws

The following federal rules and regulations were used to guide data collection for hazardous material sites in the Project Area. These rules and regulations are implemented and enforced by the EPA.

- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) 1980 (42 United States Code [USC] 9601 et seq.). CERCLA is a federal law designed to clean up sites contaminated with hazardous substances as well as broadly defined "pollutants or contaminants." CERCLA's broad authority to clean up releases or threatened releases of hazardous substances that may endanger public health or welfare or the (natural) environment was given primarily to the EPA.

- Resource Conservation and Recovery Act (RCRA) of 1976 (42 USC 6901 et seq.). Regulations promulgated under RCRA set standards for the treatment, storage, and disposal of hazardous waste in the United States.
- Clean Water Act of 1972, amended in 1977 and 1987 (33 USC 1251–1387). This is the primary federal law governing water pollution, and its objective is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment and maintaining the integrity of wetlands.
- The Superfund Amendments and Reauthorization Act of 1986 (42 USC 9601 et seq.) amended CERCLA and requires Superfund actions to consider requirements found in other state and federal environmental laws and regulations and increased the focus on human health problems posed by hazardous waste sites.
- Federal Insecticide, Fungicide and Rodenticide Act of 1972 (7 USC 136 et seq.). This act provides federal regulation of the distribution, sale, and use of pesticides.
- Toxic Substances Control Act of 1976, updated in 2016 (15 USC [C. 53] 2601–2692). This act regulates the production, importation, use, and disposal of chemical substances including PCBs (polychlorinated biphenyls), asbestos, radon, and lead-based paint.

4.1.2 State of Oregon and Local Government Regulations

The following state and local rules and regulations were used to guide data collection for hazardous materials sites in the Project Area. These rules and regulations are implemented and enforced by the Oregon Department of Environmental Quality (DEQ):

- Hazardous Waste and Hazardous Materials I and Hazardous Waste and Hazardous Materials II (2003 Oregon Revised Statutes 465 and 466, as amended). Provides guidance for the protection of public health and safety from hazardous waste, regulation on the reduction of the use of toxic substances and hazardous waste generation, and rules and regulations for the storage, treatment, and disposal of hazardous waste and PCBs.
- Underground Storage Tank Rules, 1990 (Oregon Administrative Rules [OAR] 340150). Provides rules and regulations for the operation and management of USTs, including leak protection standards, compliance, training, construction specifications, and decommissioning requirements.
- Residential Heating Oil Underground Storage Tanks, 1998 (OAR 340-177). Specifies requirements for the cleanup of releases of petroleum from residential heating oil USTs, decommissioning requirements, and service provider reporting requirements.
- Groundwater Quality Protection, 1998 (OAR 340-040). Establishes rules for the mandatory minimum groundwater protection requirements for federal and state agencies, cities, counties, industries, and citizens.
- Environmental Hazards Notice, 1998 (OAR 340-130). Requires notice of locations of and alterations to potentially hazardous sites to protect public health, safety, and the environment.

- Standards Applicable for Dry Cleaning Stores Facilities and Dry Stores, 2002 (OAR 340-124). Provides the waste minimization requirements specifically for dry cleaning facilities and dry stores.
- Illegal Drug Lab Cleanup Assistance, 1999 (OAR 340-140). Establishes the policies of DEQ when responding to a request made by law enforcement for assistance with the cleanup of hazardous materials and chemicals related to the production of illegal drugs.
- Hazardous Waste Management System, 2003 (OAR 340-100 to 110, 120, 124 and 142). Controls hazardous waste from the time of generation through transportation, storage, treatment, and disposal.
- Hazardous Substance Remedial Action Rules, 1997 (OAR 340-122). Establishes standards and procedures for the determination of removal and remedial actions necessary to protect public health, safety, and welfare, and the environment in the event of a release or threat of a release of a hazardous substance.

4.2 Design Standards

There are no applicable design standards required by federal, state, and local law, or by agency policy—besides any listed in the above plans and policies—that are related to hazardous materials, soils, and geology impacts.

5. AFFECTED ENVIRONMENT

5.1 Study Area

For the analysis of hazardous materials, the Study Area included the Project Area and adjacent properties within 0.25 miles because potential impacts would likely be restricted to the immediate vicinity of the Project Area. The Environmental Data Resources (EDR) search distance was set to the American Society for Testing and Materials (ASTM) standard for hazardous materials analyses of either side of the Project Area. A complete list of the databases reviewed and associated search distances is included in the EDR report, Appendix A.

For the geology and soils discussion, the Study Area includes the Project Area and the regional geologic and hydrogeologic conditions that would impact the Project Area.

5.2 Resource Identification and Evaluation Methods

The purpose of this analysis was to evaluate the potential for encountering hazardous materials or petroleum hydrocarbons as a result of project activities in compliance with the National Environmental Policy Act. This report also identifies those soil and geologic features that could result in construction impacts from noise and vibration impacts.

5.2.1 Published Sources and Databases

5.2.1.1 Regulatory Database Review

Pertinent state and federal regulatory database information was procured from EDR. The complete EDR database report is included in Appendix A. All sites identified within 0.25 miles of the Project Area were assessed for the potential to impact the Project; however, due to the anticipated limited ground disturbance involved in the Project, only sites with releases within 0.25 miles (state databases) of the Project Area were evaluated in depth. A comprehensive list of regulatory databases reviewed is contained in the EDR report (Appendix A).

Sites identified on priority databases (databases indicating a release of hazardous materials or petroleum to soil or groundwater) were evaluated based on the proximity of the site to the Project Area and the potential for contamination from or associated with the site to exist within or close to the Project Area (Appendix B). Historical uses of the sites and site vicinities were considered in the evaluation of the potential for the site to affect the Project Area or adjacent properties.

5.2.1.2 Regulatory File Review

Some sites identified in the regulatory database review as having confirmed releases of hazardous materials were further evaluated for pertinent details via the online DEQ Environmental Cleanup Site Information database (DEQ 2022). This tool provides additional details of site conditions and regulatory status as well as electronic site documents where available.

5.2.1.3 Geological File Review

Geological information was collected from the Oregon Department of Geology and Mineral Industries. Soil information was collected from NRCS, U.S. Department of Agriculture, Web Soil Survey, this includes soil with farmland classification.

5.2.2 Field Visits and Surveys

A field survey to confirm the locations of identified sites that may pose an environmental risk to the Project Area would be conducted once project details are further defined. The survey would also be completed to further evaluate environmental conditions that may indicate where hazardous materials may be present in the vicinity of the Project Area.

5.3 Existing Conditions

5.3.1 Hazardous Materials

5.3.1.1 Regulatory Database Review

The affected environment within the Study Area was assessed by reviewing the state and federal regulatory database records as described above. The identified sites were assigned to one of three risk categories based on the proximity to the Project Area, the type and number of databases in which the site was found, known releases of hazardous materials or petroleum products, and the status of

remediation or cleanup efforts at sites with known releases. One of three risk categories was assigned to sites within the Study Area: high, medium, and low.

- **High risk.** Sites that would involve substantial contamination of large areas, including soil, groundwater, and multiple contaminants, and that might represent a higher risk of further releases of hazardous materials that would be detrimental to human health or the environment; that would be likely to involve high levels of regulatory approvals or extensive or lengthy remediation activities that may create other impacts to the environment; or that could pose major delays to the development of the Project.
- **Medium risk.** Sites where the nature of potential contamination is known based on existing investigation data, the potential contaminants are not extremely toxic or difficult to treat, and the probable remediation approaches are straightforward.
- **Low risk.** Sites where the nature of potential contamination is known based on existing investigation data and the sites are not expected to have notable impacts to the Project due to their location, or sites where hazardous materials were used but had no or only very small, reported releases.

State databases indicate a confirmed release of a hazardous material or petroleum hydrocarbons on approximately 50 sites located within 0.25 miles of the Project Area. One site is listed in federal databases (SEMS-ARCHIVE, the Bend Millwork Systems/Jeld-Wen, Inc. site) and is described in detail below.

Based on location, regulatory or cleanup status, and/or the minor nature and extent of the release, the majority of the sites are a low risk to impact the Project Area. The low risk sites analyzed during this assessment are summarized in Appendix B. The four remaining sites were determined to be in the medium risk category and are discussed below.

Bend Millwork Systems / Jeld-Wen, Inc. – 62845 Boyd Acres Road, Bend, OR

The Bend Millwork Manufacturing / JELD-WEN Inc. site is located at the 62845 Boyd Acres Road in Bend, Oregon, and is a building materials manufacturing facility. The facility historically has treated wood products to control sap stain and mildew using a wood treatment solution applied in a dip tank. The facility is listed in eight federal and state databases (SEMS-ARCHIVE, ECSI, CLR, AST, VCP, SPILLS, ENG CONTROLS, INST CONTROLS). Remedial actions have been taken at the site including work conducted for soils and groundwater operable units and the excavation of contaminated soils, drywell abandonment, asphalt capping, and extensive groundwater monitoring. Following the remedial actions taken at the site, engineering controls and institutional controls in the form of a deed restriction and monitoring were selected for the final remedy for the soils, and institutional controls in the form of deed restrictions were selected for the final remedy for the groundwater. In 2011, the site received a conditional no further action (NFA) determination from DEQ. The site is ranked as medium risk for the Project based on the contamination on-site; however, the site is approximately 900 feet to the north of the Pilot Butte Canal. It is unlikely contamination from this site could have migrated to the soils near the Project Area. Figure 5 shows the location of this site.

Figure 6 shows the location of a database-listed site with low potential for impact. The figure is included to provide complete mapping of all sites identified during the database review.

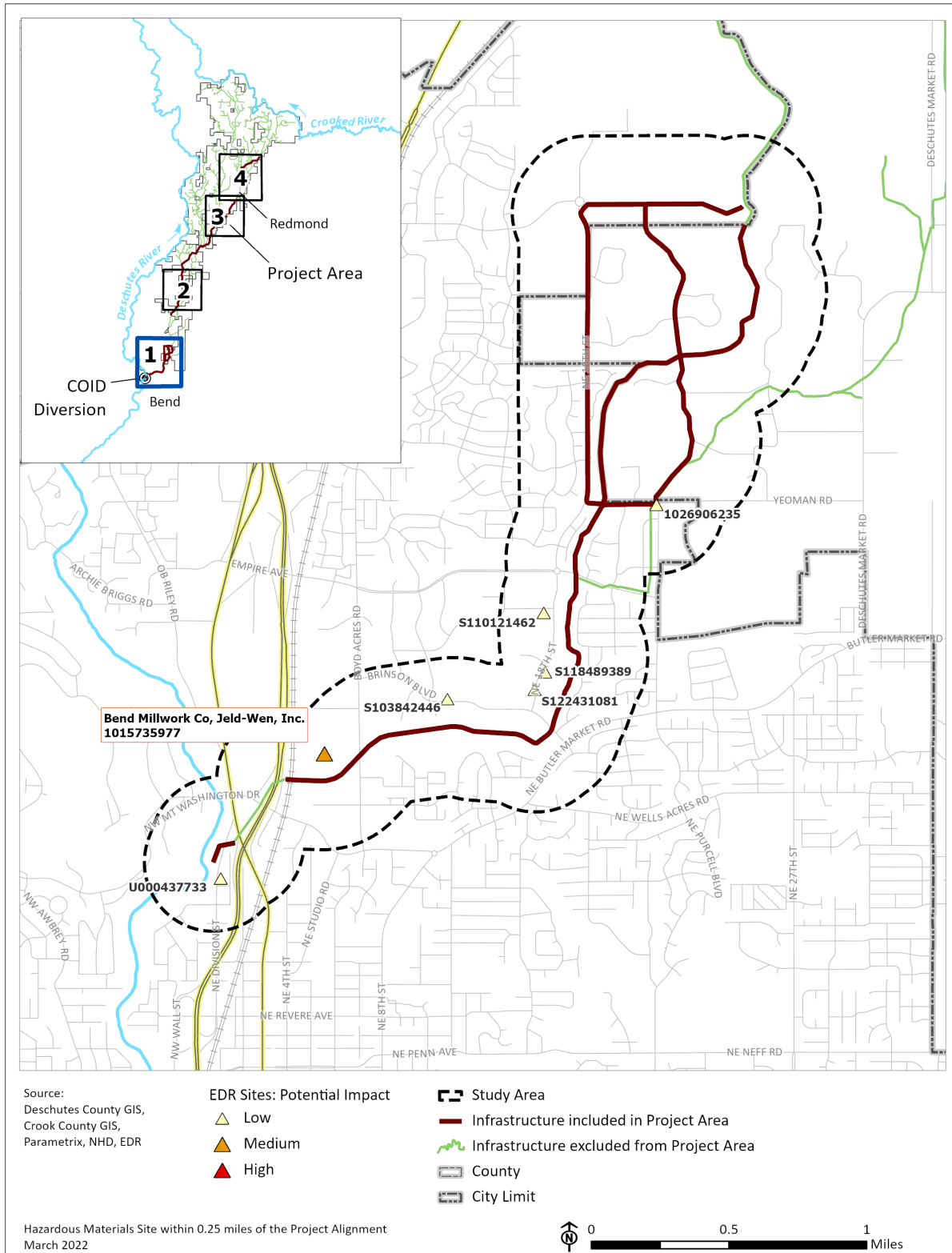


Figure 5. Hazardous Materials Site within 0.25 miles of the Project Area – Tile 1

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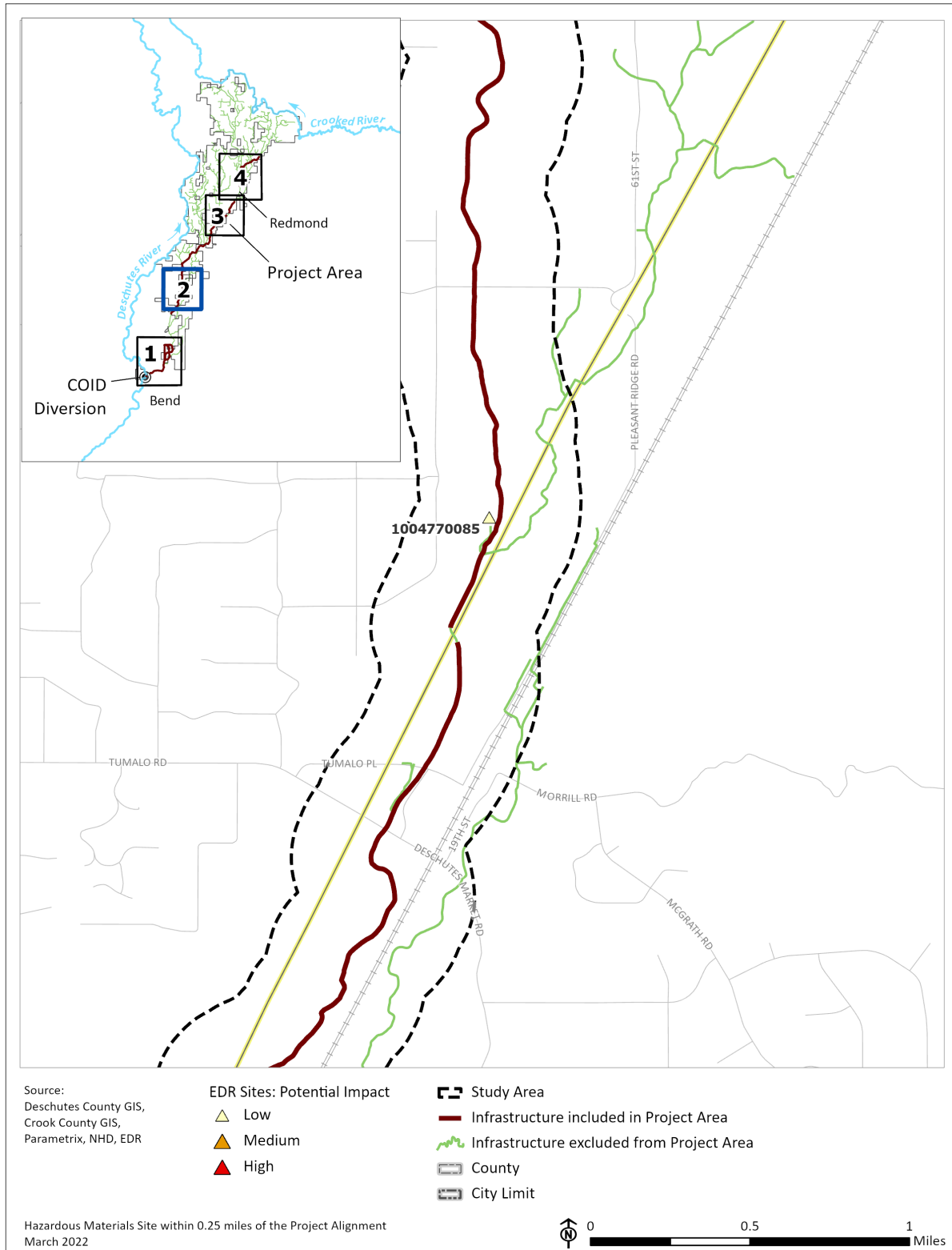


Figure 6. Hazardous Materials Site within 0.25 miles of the Project Area – Tile 2

Redmond Chevron – 2005 S Highway 97, Redmond, OR

The site is listed for a UST petroleum release in 2014 and is also listed in the EDR database facilities under the names Colving Oil, LLC, and American Energy Inc. The site is located to the east of the canal, and the rear portion of the property abuts the east bank of the canal. Pictures in the DEQ LUST database show the release on gravel at the site, and the spill does not appear to migrate off-site. However, no closure or cleanup date is listed, and no NFA determination has been made according to the LUST database. Groundwater was not impacted according to the petroleum release form found in the LUST database. Because the incident remains open and based on the close proximity of the site to the Pilot Butte Canal, the site is ranked as medium risk for the Project. See Figure 7 for the location of this site.

Cavel West – 1607 SE Railroad Avenue, Redmond, OR

The Cavel West site was located at 1607 SE Railroad Avenue, prior to the construction of US 97. An NFA determination was issued by DEQ (June 30, 2003) after soil sampling and underground injection control (UIC) well decommissioning in 2003. The UIC well was decommissioned with a small volume of mercury-contaminated sediments in the bottom of the UST at a depth of 20 feet below ground surface. Elevated nitrogen levels were also present but likely related to blood disposal correlated with historical uses of the site (slaughterhouse). The site is ranked as medium risk for the Project because of the exact location of the site was not able to be ascertained. If remnants of UIC wells are found during project construction in this general vicinity, the contents of the UIC well should be properly characterized for proper disposal. See Figure 7 for the location of this site.

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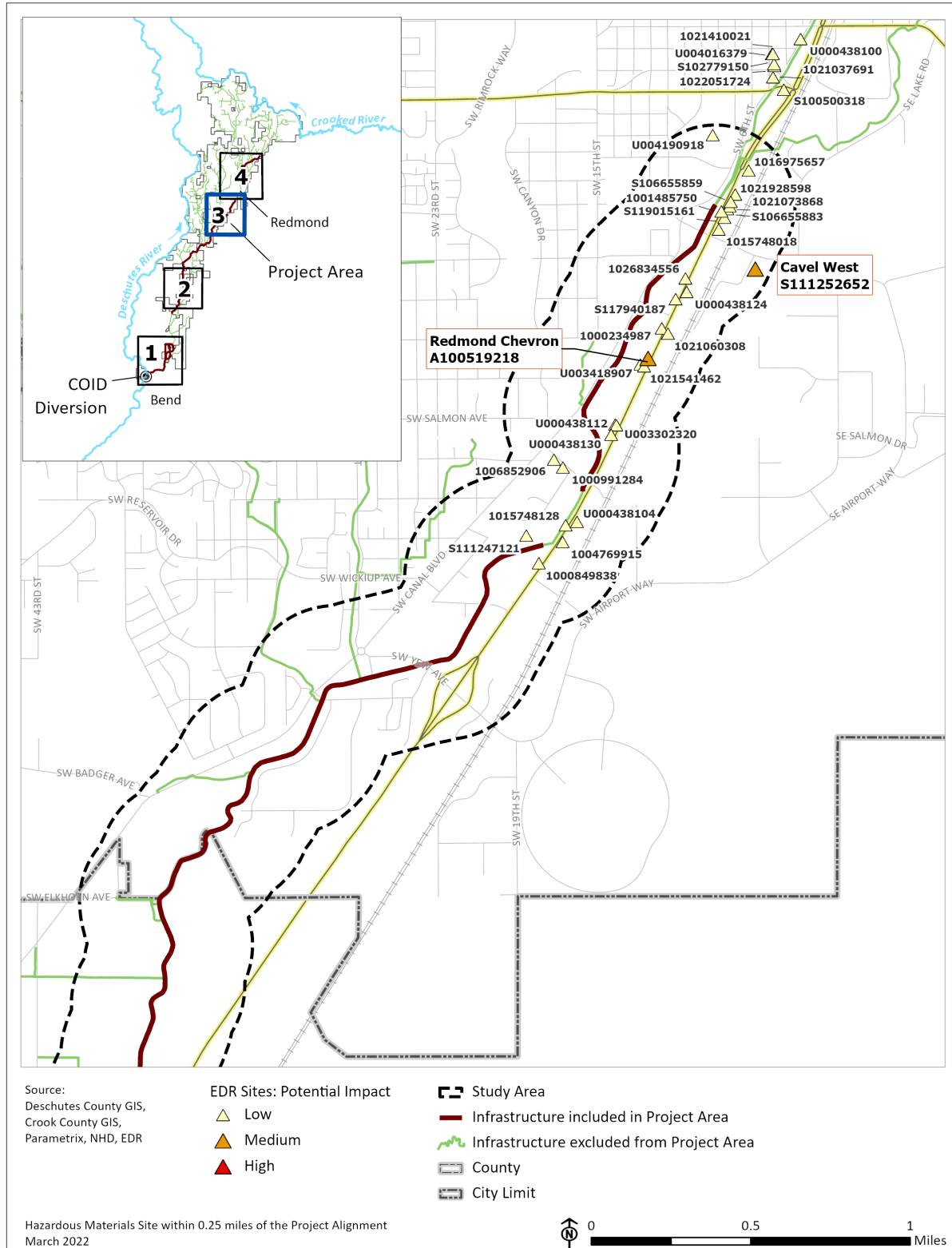


Figure 7. Hazardous Materials Site within 0.25 miles of the Project Area – Tile 3

Unocal Bulk Plant (Former) – 260 NE Canal Boulevard, Redmond, OR

The former Unocal Bulk Plant was located at 260 Canal Boulevard and was acquired by the Oregon Department of Transportation in the early 2000s for the construction of US 97. Soil contamination was found on-site during subsurface investigations in the 1980s and early 2000s, and it was partially excavated and removed from the site. Given the relatively immobile nature of the contaminant present and the significant depth to groundwater (250 to 300 feet below ground surface), it was deemed unlikely that the documented impacts would reach the first significant water-bearing zone. The remaining contamination left in place was determined to be protective of human and environmental health considering the current and future land and water uses of the site. An NFA determination was made by DEQ in 2005. Portions of the site were redeveloped during the construction of US 97 in the Redmond area in 2008. The site is ranked as medium risk for the Project because the exact location of the contamination was not able to be ascertained. See Figure 8 for the location of this site.

5.3.2 Geology and Soils

5.3.2.1 Project Area Soils

The predominant soil unit in the southern half of the Project Area is the Gosney soil group, characterized by shallow, somewhat excessively drained soils on lava plains and formed in ash. Secondary to the Gosney group is the Deskamp series, consisting of moderately deep, somewhat excessively drained soils on lava plains. The predominant soil unit in the northern half of the Project Area is the Deschutes-Stukel series which consists of shallow, well-drained soils that formed in residual material weathered from tuff, diatomite, and other volcanic rocks. Stukel soils are on hills, lava plains, and rock benches and have slopes of 0% to 40% (NRCS, USDA 2023a).

Bend Area (Southern Portion of Project Area)

- Wanoga-Fremkle-Rock outcrop complex, 0% to 15% slopes
- Gosney-Rock outcrop-Deskamp complex, 0% to 15% slopes
- Deskamp-Gosney complex, 0% to 8% slopes

North of Bend and South of Redmond (Central Portion of Project Area)

- Gosney-Rock outcrop-Deskamp complex, 0% to 15% slopes
- Deskamp-Gosney complex, 0% to 8% slopes
- Deschutes sandy loam, 0% to 3% slopes
- Stukel-Deschutes-Rock outcrop complex, 0% to 15% slopes
- Stukel sandy loam, 0% to 3% slopes
- Statz sandy loam, 0% to 3% slopes
- Stukel-Rock outcrop-Deschutes complex, dry, 0% to 8% slopes

Redmond Area (Northern Portion of Project Area)

- Deschutes-Stukel complex, dry, 0% to 8% slopes
- Houstake sandy loam, 0% to 3% slopes
- Deschutes-Stukel complex, dry, 0% to 8% slopes
- Deschutes sandy loam, dry, 0% to 3% slopes
- Stukel-Rock outcrop-Deschutes complex, dry, 0% to 8% slopes

Farmland Classification

NRCS has developed technical soil groups that are associated with a particular soil type and a soil's rating for agricultural commodity production (NRCS, USDA 2023b). NRCS soil groupings within the Project area are 64% farmland of statewide importance, 14% prime farmland if irrigated, and 22% not prime farmland.

5.3.2.2 Project Area Topography

Elevation in the Project Area ranges from approximately 3,500 feet above sea level in the Bend area to approximately 2,900 feet above sea level in the Redmond area and northeast of Redmond. The existing canal is generally flat with a gradual slope downward to the north, following the general topography and hydraulic gradient as the Deschutes River.

The Deschutes River and its tributaries are the dominant surface water features in the area, draining areas on the east side of the Cascade Mountains. The Deschutes River flows north through Bend and Redmond, into Lake Billy Chinook, and eventually into the Columbia River, far north of the Project Area.

5.3.2.3 Project Area Geologic Mapping

The Project Area lies within the Deschutes Basin, which is situated between the Ochoco mountains to the east and the Cascade Mountains to the west. The geology of the Deschutes Basin is influenced by the episodic volcanic activity of the past several million years. The region is characterized by the Newberry Volcano Formation and Deschutes Formation. These formations are characterized by basalt rock and basaltic andesite lava flows and vent deposits (DOGAMI n.d.). In addition to volcanic lava flows of basalt, the regional geology also consists of tuff and pumice deposits and interbedded sedimentary layers of clay, silt, sand, and gravel.

The surface geologic map unit within the Project Area is Newberry Basalt (Qbn), which is described as Pleistocene-era, open-textured vesicular lava flows (Sherrod et al. 2004). These flows erupted from vents on the north flank of the Newberry Volcano and flowed north across a broad plain extending to Redmond. Beyond Redmond, the basalt flowed into the Deschutes and Crooked River Canyons and reached Lake Billy Chinook via the Deschutes Canyon.

The Newberry basalt rock fabric is predominantly gray and slightly weathered to fresh with a hardness of R3 to R4 and a Geological Strength Index (GSI) range of 20 to 90 (ODOT 2021). The basalt varies from some vesicles (5% to 25%) to highly vesicular (15% to 50%) to locally scoriaceous (greater than or equal to 50%). Basaltic rock with lower GSI is typified by a disintegrated or brecciated texture associated with very close discontinuity spacing and smooth and/or infilled joints and fractures. Rock with greater GSI is characteristically dense and competent, with a massive texture, moderately close to wide discontinuity spacing, rough to slightly smooth joint and fracture surfaces, and trace to no infill.

The Sisters fault zone is located in the vicinity of Bend. The majority of faulting occurred in the late Quaternary (DOGAMI n.d.). Additional faulting activity is not anticipated in the Project Area.

5.3.2.4 Project Area Groundwater

Depth to groundwater along the Project Area ranges from approximately 350 feet below ground surface in the vicinity of Redmond to approximately 700 feet below ground surface in the vicinity of Bend (OWRD n.d.).

Groundwater generally flows east and then north through the Deschutes Basin. Approximately half of this groundwater discharges into streams through springs along the edge of the Cascade Mountains [statement citation not provided]. The remainder of this groundwater discharges into streams and rivers near the confluence of the Metolius, Deschutes, and Crooked Rivers (Gannett et al. 2001).

For additional information regarding groundwater recharge rates and flow, refer to the Water Resources Technical Report.

6. IMPACT ASSESSMENT METHODOLOGY AND DATA SOURCES

The hazardous materials assessment considered known sites on, adjacent to, or near the Project Area the potential for human or environmental impacts should the sites be affected by construction. The EDR search distance was set to the ASTM standard for hazardous materials analyses of either side of the Project Area. A complete list of the databases reviewed and associated search distances is included in the EDR report, Appendix A. The evaluation reflects the type of contamination and the media contaminated, then applies professional judgment to assess the level of concern that contamination may pose to the Project Area.

6.1 Long-Term Impact Assessment Methods

6.1.1 Hazardous Materials

Long-term impacts were determined by evaluating the need to conduct or maintain remedial actions to address contaminated materials that may remain on an existing contaminated site after construction of the Project is completed. Long-term beneficial effects could result if contaminated sites are remediated or contaminated material is managed.

6.1.2 Geology and Soils

Long-term impacts were determined by evaluating existing data and the results of previously conducted research and investigations in the region and considering the impacts of the constructed pipeline on the soils and geology in the Project Area.

6.2 Short-Term Impact Assessment Methods

6.2.1 Hazardous Materials

Short-term impacts from hazardous materials were determined by evaluating the risks of encountering contaminated media (soil or groundwater) during construction. Additionally, short-term construction impacts were defined to include leakage or spills associated with construction activities, equipment, and materials (fuel or lubricants) or exposure to or migration of contaminants encountered in soil or groundwater during construction.

6.2.2 Geology and Soils

Similar to long-term impacts, short-term construction impacts were determined by evaluating existing data and the results of previously conducted research and investigations in the region and considering the impacts of soil disturbance and excavation into basalt and basaltic andesite lava flows and vent deposits during the construction of the pipeline. Excavation techniques would likely require blasting in the southern portions of the Project Area.

6.3 Indirect Impact Assessment Methods

Indirect impacts related to hazardous materials, soils, and geology are not anticipated based on the nature of the Project.

6.4 Cumulative Impact Assessment Methods

The cumulative impacts analysis considers the Project's impacts combined with other past, present, and reasonably foreseeable future actions that would have environmental impacts in the Project vicinity. The analysis of potential cumulative hazardous materials impacts examines both near-term construction effects, as well as long-term operational impacts.

7. ENVIRONMENTAL CONSEQUENCES

7.1 Introduction

There is potential for existing hazardous materials to exist in sediments, soils, or structures in the Project Area, based on database research and identified known sites of concern. The analysis focused on the potential for hazardous materials to be released into air, water, or soils during construction and documented measures that would be required to avoid releases that could endanger human or environmental health.

7.1.1 No Action Alternative

7.1.1.1 Hazardous Materials

Under the No Action Alternative, no disturbance or remediation of known contaminated sites would occur as part of this Project. Additionally, in an open canal, a potential hazardous materials release adjacent to or near the canal could contaminate the soil of the canal, as well as the water in the canal and migrate downstream.

7.1.1.2 Geology and Soils

Under the No Action Alternative, no disturbance of underlying geologic materials would occur. Long-term effects on soils would be minor. Erosion would continue to occur within open ditches, and sedimentation would continue. Continued operation of the District's system would not be expected to measurably affect soils associated with prime farmlands.

7.1.2 Modernization Alternative (Full Piping)

7.1.2.1 Hazardous Materials

For the Modernization Alternative, there is potential for disturbance of four known contaminated sites (see Table 2). These sites are described in Section 5.3.1. All four sites are in areas where there is no difference between alignment options. No medium-risk sites were identified within the segments of the

Project Area containing different alignment options. The impacts would be the same regardless of alignment option.

No sites were identified that would require ongoing cleanup or remediation. Therefore, identified impacts would be construction-related and are discussed further in Section 7.2.

Table 2. Medium-Ranked Hazardous Materials Site by Alternative

Alternative	Number of Medium-Risk Sites
No Action Alternative	4
Modernization Alternative (Full Piping)	4
Deschutes County/North Bend Options	
No Modernization Within the Segment (No Piping)	4
Pilot Butte Canal Option	
NE 18th Street Option	
Old Deschutes Road Option	
City of Redmond Options	
No Modernization Within this Segment	4
Pilot Butte Canal Alignment	
Piping to the east in the Watermaster's Access Road	
Piping to the west within Northwest Canal Boulevard	

7.1.2.2 Deschutes County/North Bend Alignment Options

No medium-risk sites are located within the portion of the Deschutes County/North Bend segment containing alignment options. The impacts would be the same regardless of the selected alignment option.

7.1.2.3 City of Redmond Alignment Options

No medium-risk sites are located within the portion of the City of Redmond segment containing the alignment options. The impacts would be the same regardless of the selected alignment option.

Table 3. Summary of Medium-Risk Sites

Map ID (EDR Report)	Facility Name	Street Address	City	Databases ¹	EDR ID	Risk	Ranking Rationale	Affected Alignment Option
K63, K64, 251	Redmond Chevron (AKA Colving Oil, American Energy, Inc)	2005 S HIGHWAY 97 HWY	REDMOND	AST, EDR Hist Auto, LUST, UST	A100519218	M	The site is adjacent to the east side of the canal, and the rear portion of the property abuts the east bank of the canal. Because the incident remains open and based on the close proximity of the site to the Pilot Butte Canal, the site is ranked as medium risk for the Project.	All
73	UNOCAL Bulk Plant (Former) – Redmond	260 NE CANAL BLVD.	REDMOND	VCP, ECSI	S106778135	M	Prior to the development of US 97, this site was directly east of the canal. Some contamination was left in place, and an NFA determination was received (2005). Portions of the site were redeveloped during the construction of US 97 in the Redmond area in 2008. The site is ranked as medium risk for the Project because the exact location of the contamination was not able to be ascertained.	All
T83, T84, T85, T86	Bend Millwork Co, Jeld-Wen, Inc.	62845 BOYD ACRES ROAD	BEND	SEMS- ARCHIVE, RCRA-VSQG, ECSI, CLR, AST, ENG CONTROLS, OR HAZMAT, UST, ICIS, US AIRS, MANIFEST, FINDS	1015735977	M	The site is a large cleanup site 900 feet north of the canal. A conditional NFA is in place. It is unlikely contamination from this site could have migrated to the soils near the Project Area; therefore the site is ranked as medium risk for the Project.	All

Map ID (EDR Report)	Facility Name	Street Address	City	Databases ¹	EDR ID	Risk	Ranking Rationale	Affected Alignment Option
146	Cavel West	1607 SE RAILROAD AVE.	REDMOND	ECSI	S111252652	M	An AST was removed, and contaminated soil was excavated and disposed of properly. The tank area was capped, and institutional controls are in place. The site is separated from the canal by two properties, US 97, and the railroad. An NFA was received in 2001. The ECSI listing is under Deschutes Ready Mix – Redmond. The site is ranked as medium risk based on the contamination left in place and the distance from the Project Area.	All

Please see the EDR Report for an explanation of the environmental databases.

AKA = also known as; AST = aboveground storage tank; Ave = Avenue; Blvd = Boulevard; NFA = no further action

7.1.2.4 Geology and Soils

For the Modernization Alternative, the current canal would be removed and replaced with an underground pipe for the alignment option that uses the existing canal. For alignment options that use a new alignment, the current canal would be left in place in its current condition but with no water flowing. The pipe would be placed underground, within native bedrock material, and would be covered with engineered fill and completed with soil. The impacts would be the same regardless of the selected alignment option and are construction-related; see Section 7.2 for more discussion.

Actions proposed under the Modernization Alternative would result in disturbance to soils, including soils classified as farmland of statewide importance and prime farmland if irrigated. Overall, the Modernization Alternative would have minor, short-term effects on soil resources because most effects would occur within limited portions of the Project Area and only during the construction period. Long-term effects on soils would include reduced erosion and sedimentation where buried pipelines would replace open ditches. Additionally, water saved through reduced evaporation and seepage would support irrigated agriculture on soils classified as prime farmland if irrigated and farmland of statewide importance.

The soils and geology impacts would be the same regardless of selected alignment option.

7.2 Short-Term (Construction) Impacts

7.2.1 Modernization Alternative (Full Piping)

7.2.1.1 Hazardous Materials

During construction in the Redmond Chevron site area (2005 S Hwy 97) and the Unocal Bulk Plant (Former) site area (260 NE Canal Boulevard), there is moderate potential for contaminant exposure or the mobilization of contaminants based on this assessment. If an NFA is received by the Redmond Chevron site from DEQ prior to construction, this site would be reevaluated and most likely considered a low-risk site upon review of the NFA and associated documents.

For the Unocal Bulk Plant (Former) site area, the exact location of the contamination was not able to be ascertained. However, the site received an NFA determination from DEQ. In the event that contaminated soil or groundwater is encountered during construction, a contaminated media management plan should be prepared.

Because of the distance of the known contamination at the Bend Millwork Co/Jeld-Wen, Inc. site and the Cavel West site from the Project Area, project construction is not likely to encounter contaminated soil or groundwater from these sites. For the Cavel West site, the exact location of the site was not able to be ascertained; therefore, if remnants of UIC wells, used for the disposal of stormwater and other surface waters, are found during the project construction in this general vicinity, the contents of the UIC well should be properly characterized for proper disposal. Because of the institutional and engineering controls in place in the area of the Bend Millwork Co/Jeld-Wen, Inc. site, the construction contractor should be aware of any project disturbances to these controls that could violate restrictions in place.

Environmental media—soils, sediments, surface water, and groundwater—can be adversely affected by the exacerbation of existing contamination or the release of hazardous substances during construction

activities. Additionally, construction could lead to the potential disturbance of unknown contamination (undocumented storage tanks, asbestos-containing materials, lead-based paint) from excavation, earthwork, grading, and utility work. Effects from hazardous materials may cause a risk to human health or the environment, raise liability issues, increase project costs, and/or cause schedule delays.

Alternatively, hazardous substances or petroleum products have the potential to be released into the environment during construction activities. Construction equipment can release petroleum products into the environment from the improper transfer of fuel or from spills.

Potential Effects on Construction Activities

Adverse effects to worker safety and public health from hazardous materials during construction can occur if not correctly mitigated. Potential exposure routes include dermal contact and ingestion of contaminated soil and water and inhalation of contaminated vapors or particulates. Exposure is typically greatest during excavation work, demolition, or application of materials that contain hazardous substances. Potential receptors include construction workers, excavation workers, and the traveling public. Health effects depend on the type of contaminants, duration, dosage, exposure route, and age of those exposed.

Waste can be generated during construction activities when contaminated materials are encountered or generated by construction and demolition. Waste can consist of contaminated soils, sediments, water, and/or building materials. Non-hazardous wastes are those wastes that are exempt from or do not apply to RCRA Subtitle C regulations. They are typically called solid waste. Non-hazardous wastes likely to be encountered are fill, debris, soil, and piping equipment. Non-hazardous wastes require management in accordance with applicable federal and state regulations. Characterizing, managing, storing, and disposing of non-hazardous waste would likely be a common component of project construction.

A solid waste that is dangerous and/or potentially harmful to human health is considered a hazardous waste. Hazardous waste can have characteristics of toxicity, corrosivity, reactivity, and/or ignitability that are governed by RCRA Subtitle C regulations. Universal wastes include batteries, pesticides, and mercury-containing light bulbs. In addition, wastes that contain PCBs are managed under the Toxic Substance Control Act and under 40 CFR Part 761. Characterizing, managing, storing, and disposing of hazardous waste would not likely be a component of project construction. Based on the information presented above, no high-risk hazardous materials sites were identified in the Study Area, and thus the construction is not likely to encounter large amounts of hazardous materials in soil or groundwater. Construction contractors would adhere to applicable regulations regarding hazardous material handling and spill response during construction (further detailed in Section 8). However, if not mitigated correctly, hazardous wastes can increase project costs and cause schedule delays and are a source of liability to the Project.

7.2.1.2 Geology and Soils

Under the Modernization Alternative, soils would be disturbed, vegetation would be cleared, and backfilling and grading would occur in the Project Area. Clearing, compaction, and construction would increase soil erosion and sedimentation potential. During project construction, soils adjacent to canals and soils within the surrounding area of the access roads would be impacted due to construction equipment access and staging. Existing maintenance roads and access routes commonly used for operations and maintenance would be used when possible. Best management practices (BMPs) would

be implemented to minimize erosion and contain runoff on-site; they could include silt fencing, straw wattles, geotextile filters, and applying water to disturbed soils to prevent wind erosion.

After construction, the new pipelines would be underground, and all disturbed areas would be recontoured and planted with a seed mix of native grasses and forbs in consultation with NRCS.

Along most of the Project Area, effects on soil resources would be short-term and minor because BMPs would be implemented. The effects on soil resources would be moderate where excavation for the new pipe alignment would occur and only during the construction period.

Current surface material consists of a thin layer of accumulated sediment within the canal, overlying basaltic bedrock. Trenching to install the underground piping would remove surface sediment and bedrock.

The hardness of bedrock within the Project Area ranges from relatively soft and highly vesicular to dense and competent. Trenching would likely require removing bedrock through a combination of excavation (e.g., backhoe, rock hammers, or equivalent) and blasting. For the Modernization Alternative and all alignment options, blasting would be required and could potentially occur at any point along the pipe alignment. Preliminary geotechnical investigations in the northern portion of the alignment (King Way Project Group) have been evaluated during design. In order to reach approximately 15 feet of depth below existing grade for the pipe trench, the bottom two to ten feet of the pipe trench would require blasting. The variation is due to different geologic conditions as the alignment progresses from south to north in the King Way Project Group. Although detailed geological investigations have not been completed along the entire alignment, it is anticipated that similar ground conditions would be encountered through the entirety of the alignment.

Once trenching is complete, a liner would be installed and gravel fill would be placed within the trench. Trucking would be required to remove excavated bedrock and to import gravel fill.

The soils and geology construction impacts would not be significantly different among the alignment options.

7.2.2 Potential Off-Site Staging Areas

The construction contractor may use one or more off-site staging areas outside the Study Area to store or assemble materials that would then be transported by truck to the construction site. Off-site staging could occur with any of the alternatives. Whether, where, and how to use such sites would be the choice of the contractor; therefore, the actual site or sites cannot be known at this time. Given this uncertainty, detailed analysis of impacts is not possible at this time. It is assumed that because of regulatory and time constraints on the contractor, any site they choose would need to be already developed with road access. It is also assumed that the contractor would be responsible for relevant permitting or mitigation that could be required for use of a chosen site. The EIS identifies the types of impacts that could occur from off-site staging, based on the above assumptions. This analysis is not intended to “clear” any specific site, but rather to ensure disclosure of the general types of impacts.

7.3 Cumulative Effects

7.3.1 No Action Alternative

Hazardous material contamination in the soil and groundwater throughout the Project Area would not be disturbed, remediated, or mitigated under the No Action Alternative. Therefore, hazardous material contamination would not be different from existing conditions and would not contribute to or be impacted by past, present, and reasonably foreseeable actions. Similarly, adverse and/or beneficial effects of project construction and operation would not be realized; thus, impacts to cumulative effects from reasonably foreseeable actions would not occur as a result of the No Action Alternative.

7.3.2 Build Alternatives

Operation of the Project, as well as concurrent projects identified in the area, would likely involve some use and handling of hazardous materials and would be required to comply with hazardous material laws and regulations. Therefore, these projects would likely implement programs to manage hazardous material handling, use, and disposal, such as spill response plans to address accidental releases. This makes it unlikely that construction of the projects would have a cumulative adverse impact to hazardous material conditions.

Additionally, the Project and other projects in the area are likely to improve conditions over the long term due to the removal and disposal of some contaminated soils, groundwater, and/or sediment. As a result, no adverse cumulative impacts to hazardous materials are expected from the Project and the other reasonably foreseeable future projects.

7.4 Compliance with Laws, Regulations, and Standards

7.4.1 Federal

Federal acts that may pertain to the approval process include:

- The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. 42 USC 9601 et seq.
- The Superfund Amendments and Reauthorization Act of 1986. 42 USC 9601 et seq.
- The Resource Conservation and Recovery Act (RCRA) of 1976. 42 USC 6901 et seq.
- The Toxic Substance Control Act of 1976. 15 USC 2601 et seq.

In addition, the EPA requires a National Pollutant Discharge Elimination System permit for stormwater discharge. It is expected that the Project would be in compliance with all regulations and would obtain all appropriate permits as necessary.

7.4.2 State of Oregon

ORS and Oregon Administrative Rules (OARs) that may apply to the approval process include:

- Hazardous Waste and Hazardous Materials I and Hazardous Waste and Hazardous Materials II. 2003 ORS 465 and 466, as amended.

- Asbestos Requirements. 2002. OAR 340-248.
- Groundwater Quality Protection. 1998. OAR 340-040.
- Environmental Hazards Notice. 1998. OAR 340-130.
- Hazardous Waste Management System. 2003. OAR 340-100 to 110, 120, 124 and 142.
- Hazardous Substance Remedial Action Rules. 1997. OAR 340-122.
- Water Resource Department. OAR 690-220.

It is expected that the Project would be in compliance with all regulations and would obtain all appropriate permits as necessary.

7.5 Conclusion

Long-term and short-term (construction) impacts were identified and evaluated. No sites were identified within the Project Area that would require long-term remediation, monitoring, or cleanup activities. Four medium-risk sites were identified that have the potential to be disturbed during construction and that should be taken into consideration by the construction contractor to ensure that hazardous materials encountered are managed and disposed of properly. Adverse effects on worker safety and public health from hazardous materials during construction is not anticipated based on this assessment. In general, hazardous material impacts and geology/soils impacts were the same for each of the alignment options.

8. MITIGATION MEASURES

8.1 Common to Piping

8.1.1 Health and Safety Plan

A project-wide construction health and safety plan would minimize the potential for exposure of construction workers to hazardous materials and the risk to human health and the environment. Health and safety plans are required by federal Occupational Safety and Health Act regulations and state regulations.

8.1.2 Contaminated Media Management Plan

A site-specific contaminated media management plan would ensure proper characterization, management, storage, disposal, and reporting of contaminated materials encountered during construction activities. The plan could outline the roles and responsibilities of personnel; health and safety requirements; methods and procedures for characterizing, managing, storing, and disposing of waste; and reporting requirements.

8.1.3 Spill Prevention, Control, and Countermeasure

Spill kits would be located at fuel storage areas, and the construction crew would have adequate absorbent materials and containment booms on hand to enable the rapid cleanup of any spill. Immediately upon learning of any fuel, oil, hazardous material including uncured concrete, or other regulated substance spill, or upon learning of conditions that would lead to an imminent spill, the person discovering the situation shall initiate actions to contain the fluid or eliminate the source of the spill and notify the spill coordinator or crew foreman immediately. If it is determined that a spill is beyond the scope of on-site equipment and personnel, an environmental emergency response contractor would be contacted immediately to contain or clean up the spill. Any spill into a waterbody or along the adjacent streambed would be reported immediately to Oregon Emergency Response Service at 1-800-452-0311 and the National Response Center at 1-800-424-8802. The spill coordinator would complete a spill report form for each release of a regulated substance, regardless of volume.

8.1.4 Piping Resiliency

The pipe and associated trench would be designed to allow for long-term stability of the pipe and minimize potential loss of irrigation water to leakage. Mitigation measures include:

- Place geomembrane securely to minimize potential for shifting over time (a geotextile liner would be installed in the trench, followed by pipe bedding and the pipe).
- Compact fill material adequately to support the weight of planned vehicle and railroad traffic.
- Provide additional reinforcement as recommended by project engineers.

8.1.5 Soil Restoration

Surface area that is currently within the canal, along access roads, and within staging areas adjacent to the canal would be completed as new surface soil (except for vehicle and rail crossings). New topsoil would be placed in these areas following installation of the piping. Where new soil is placed, the soil mix would need to be weed-free and conducive to meeting NRCS planting standards.

9. CONTACTS AND COORDINATION

No contacts or organizations were contacted in regard to this Geology, Soils, and Hazardous Materials Technical Report.

10. PREPARERS

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Appendix A

EDR Report

This information is available upon request.



Appendix B

Sites Identified in Environmental Databases



MAP ID	FACILITY NAME	STREET ADDRESS	CITY	ZIP	LAT	LONG	DATABASES	EDR ID	RANKING	RANKING RATIONALE	AFFECTED ALTERNATIVE
A7	SOLIS AT PETROSA	INTERSECTION OF YEOMAN RD. AND DESCHUTES	BEND	97701	44.09459114	-121.2737996	ECHO, NPDES	1026906235	L	CWA, no violations, no release associated with this listing	Old Deschutes Market Road Alignment (North Bend)
B9	CENTAL OREGON DISTRICT HOSPITAL	1253 N CANAL BLVD	REDMOND	97756	44.28809523	-121.1689517	LUST	U003302355	L	Close to alignment, soil excavation and NFA determination, LUST closure 2000, no GW impact	All
B10	ST CHARLES MEDICAL CENTER REDM	1253 N CANAL BLVD	REDMOND	97756	44.28809523	-121.1689517	AST, HSIS	S105005169	L	Close to alignment, no release associated with this listing	All
B11	LOWE'S OF REDMOND #2865	1313 N CANAL BLVD	REDMOND	97756	44.28851337	-121.1687394	MANIFEST, RCRA-SQG	S125302391	L	Close to alignment but not adjacent. SPILLS incidents are all cleaned up, no waterways or catch basins affected. No violations from actual Lowes facility.	All
13	ODOT - HIGH COUNTRY DISPOSAL	124 NE HEMLOCK AVE.	REDMOND	97756	44.28371927	-121.1683559	ECSI, VCP	S109346116	L	In 2008, DEQ assisted ODOT in reviewing several sites that was subsequently developed for the re-route of Highway 97 around downtown Redmond. Two sites were evaluated in detail: Mid-Oregon Oil (ECSI #4896) and High Country Disposal (ECSI #5060). DEQ issued No Further Action determinations for both.	All
C14	PACIFIC DETROIT DIESEL ALLISON	1368 S HWY 97 S END BLDG BAY 2	REDMOND	97756	44.26420673	-121.1762386	FINDS, RCRA NonGen/NLR, ECHO	1001485750	L	Separated from alignment by Hwy 97, RCRA NonGen, no release documented	All
B15	ST CHARLES MEDICAL CTR - REDMOND	1253 NW CANAL BLVD	REDMOND	97756-15	44.28828462	-121.169051	RCRA NonGen / NLR, LUST, UST, HAZMAT, NPDES	1015748478	L	Close to alignment, LUST cleanup completed in 2006, tanks decommissioned. Currently two active permitted tanks.	All
17	FAIRS DIESEL EQUIPMENT REPAIR	65301 N HWY 97	BEND	97701	44.17121925	-121.252802	FINDS, RCRA-VSQG, ECHO	1004770085	L	Close to alignment, no release, RCRA VSQG	All
D19	REDMOND CARDLOCK	2310 NW HWY 97	REDMOND	97756	44.25453292	-121.1829604	LUST, UST	U000438112	L	Property is adjacent to alignment the building is not right next to canal though, USTs are decommissioned, contaminated soil was excavated, some was left in place below RBCs	All
E20	E. A. MOORE TRUCKING & CONTRACTING	402 N. CANAL BLVD	REDMOND	97756	44.27925934	-121.1692839	RCRA NonGen / NLR	1015748313	L	This was one of several sites that ODOT and DEQ evaluated during remedial investigation as part of the Redmond Reroute of Highway 97. It was determined that further action was not warranted for this site.	All
E21	ODOT E A MOORE TRUCKING ESTATE OF	402 NW CANAL BLVD	REDMOND	97756	44.27925934	-121.1692839	RCRA NonGen / NLR	1008374899			
E22	ODOT - EA MOORE SITE	402 NW CANAL BLVD.	REDMOND	97756	44.27925934	-121.1692839	ECSI, VCP	S106497258			
D23	PRIME EQUIPMENT #572	2333 S HWY 97	REDMOND	97756	44.25450338	-121.1828885	UST	U003302320	L	No release associated with these listings but seems like the same facility as the Redmond Cardlock LUST listing	All
D24	CTS TIRES	2333 S. HWY 97	REDMOND	97756	44.25450338	-121.1828885	FINDS, RCRA NonGen/NLR, ECHO	1016144672	L		
C25	ARCO BULK PLANT (FORMER) - REDMOND	1414 S HWY. 97	REDMOND	97756	44.264315	-121.1758653	ECSI, UIC	S106655883	L	Redeveloped with development of Hwy 97	All
C27	REDMOND TRUCK SERVICE	1362 S HIGHWAY 97	REDMOND	97756	44.26392375	-121.1760502	LUST	S119015161	L	Separated from canal by HWY 97, cleanup completed and NFA received. No GW impacts, contaminated soil disposed of and all tanks decommissioned.	All
C28	MAX MILLS	1392 S HIGHWAY 97	REDMOND	97756	44.26392375	-121.1760502	UST	U000438125	L	Seven decommissioned tanks, not adjacent to alignment	All
29	ABH CO HEATING & COOLING	1438 S HIGHWAY 97	REDMOND	97756	44.26338485	-121.1764064	RCRA NonGen / NLR	1015748018	L	Not adjacent to alignment, no releases, RCRA NonGen	All
F31	RON'S OIL EXXON #11	2337 HWY 97	REDMOND	97756	44.25406777	-121.1832172	UST	U000438130	L	Not adjacent to alignment, no release, 3 active tanks	All
C32	CENTRAL OREGON SPORTS SERVICE	1302 S HWY 97	REDMOND	97756	44.26443803	-121.1757147	EDR Hist Auto	1021073868	L	Separated from alignment by Hwy 97, no release documented	All
33	BIG COUNTRY RV INC	2872 SW 17TH PL	REDMOND	97756	44.24949728	-121.1885865	AST, HSIS	S111247121	L	Adjacent to alignment, no release reported, listed for propane and lead acid batteries and a diesel AST.	All
G34	PIONEER TRANSM SVC REDMOND	1242 S HIGHWAY 97	REDMOND	97756	44.26497446	-121.175362	EDR Hist Auto	1021928598	L	Separated from alignment by Hwy 97, no release documented	All
35	UPS REDMOND FREIGHT	229 SE FRANKLIN AVE	REDMOND	97756	44.24823953	-121.1877955	FINDS, RCRA-VSQG, ECHO	1000849838	L	Adjacent to alignment, no release, not listed in any database that reports releases or spills, RCRA-VSQG with compliance violations in the late 1990's, no recent compliance violations	All
H36	BABLER BROTHERS	SOUTH HWY 97576	REDMOND	97756	44.2697332	-121.1722835	LUST, UST	S100500318	L	Exact location was difficult to determine without an address, NFA received in 1991.	All
G38	VAN MATRE BULK PLANT (FORMER) - REDMOND	1324 S HWY. 97	REDMOND	97756	44.26464473	-121.1756462	ECSI	S106655859	L	Redeveloped with development of Hwy 97	All
39	OREILLY AUTO PARTS STORE NO 3803	1154 S HWY 97	REDMOND	97756	44.26606699	-121.1745127	RCRA-VSQG	1016975657	L	Separated from alignment by Hwy 97, RCRA VSQG, no release documented	All
I41	GENTLE DENTAL REDMOND	1555 S HIGHWAY 97	REDMOND	97756	44.26116522	-121.1785157	RCRA-SQG	1026834556	L	Along alignment, no release, RCRA-SQG	All
J45	TEXACO CORNER STORE INC, REDMOND FUEL STOP	712 SW 5TH ST	REDMOND	97756	44.2702991	-121.172965	EDR Hist Auto, UST, LUST	1021037691	L	Along alignment, NFA received but some contamination left in place, two different LUSTs both have cleanup completed (1992 and 1997)	All
49	AUTO ELECTRIC & POWER SYSTEMS	2950 S HWY 97	REDMOND	97756	44.24920192	-121.1862888	FINDS, RCRA NonGen/NLR, ECHO	1004769915	L	Adjacent to alignment, no release, no compliance violations	All

K50	REDMOND CARDLOCK	2057 SW HWY 97	REDMOND	97756	44.25275976	-121.1813716	UST	U003418907	L	This Redmond Carlock listing is associated with Fuel Stop (CFN Abbott Petroleum) listing with LUST, see below	All
51	JERRY'S OUTDOOR POWER EQUIPMENT	2524 NE DIVISION	BEND	97701	44.07493153	-121.3055838	UST	U000437733	L	UST decommissioned, no release	All
L53	WRIGHT FORD INC	1835 SW HWY 97	REDMOND	97756-96	44.25890122	-121.1800155	FINDS, RCRA-VSQG, ECHO, LUST, UST	1000234987	L	Adjacent to alignment, NFA received for tank decommissioning and soil excavation and disposal. No GW impact	All
M57	HOME DEPOT USA HD 4032	300 NW QUINCE AVE	REDMOND	97756	44.2985652	-121.1705748	MANIFEST, RCRA-SQG	S109608237	L	Adjacent to alignment, RCRA-SQG, no release	All
K59	ABBOTT PETROLEUM	2057 S HIGHWAY 97	REDMOND	97756	44.25717609	-121.1811284	EDR Hist Auto	1021541462	L	LUST (1998...release of free product),	All
K60	FUEL STOP (CFN ABBOTT PETROLEUM)	2057 S HWY 97	REDMOND	97756	44.25717609	-121.1811284	OR HAZMAT, LUST, AST, HSIS	S103696266	L	soil cleanup and disposal, tank closed, NFA letter, no GW impact	All
N61	SAFEWAY STORE NO 1665	1705 S HWY 97	REDMOND	97756	44.26022764	-121.1791355	MANIFEST, RCRA-VSQG	S117940187	L	Adjacent to alignment, RCRA-VSQG, no release	All
K63	COLVING OIL I LLC 3227	2005 S HIGHWAY 97 HWY	REDMOND	97756	44.25754523	-121.1808819	AST	A100519218	M	Adjacent to alignment, also listed under Redmond Chevron Circle K, see below	All
K64	AMERICAN ENERGY INC	2005 S HIGHWAY 97	REDMOND	97756	44.25754523	-121.1808819	EDR Hist Auto	1020944381		LUST, overfill, pictures on DEQ show spill and does not appear to migrate off-site. GW is not listed as impacted but no closure date is listed. Incident happened in 2014.	All
251	REDMOND CHEVRON	2005 SW HWY 97	REDMOND	97756	44.25754523	-121.1808819	LUST, UST	U002167493			All
67	RITE AID #5394	1651 SW ODEM MEDO RD	REDMOND	97756-95	44.25258369	-121.1862683	RCRA NonGen / NLR	1000991284	L	Close to alignment, no release, RCRA NonGen	All
68	REDMOND TIGER MART	1638 S HWY 97	REDMOND	97756	44.26055001	-121.178437	LUST, UST	U000438124	L	Not adjacent to alignment, LUST cleanup completed in 1995, all tanks decommissioned	All
69	10 BARREL BREWING CO	62950 18TH ST	BEND	97701	44.08577783	-121.2819186	AST, HSIS	S118489389	L	Adjacent to alignment, no release	All
Q71	ALLIED WASTE OF OREGON/BEND GARBAGE	20835 NE MONTANA WAY	BEND	97701	44.08890744	-121.2820248	AST, UST, HSIS	S110121462	L	Not listed in any release database, not adjacent to alignment	All
73	UNOCAL BULK PLANT (FORMER) - REDMOND	260 NE CANAL BLVD.	REDMOND	97756	44.27830975	-121.1691777	VCP, ECSI	S106778135	M	Prior to the development of HWY 97, this site was directly east of the canal. Some contamination left in place, NFA determination received. Not likely to affect canal but this area should be considered medium risk to encounter contaminated soils.	All
L74	REDMOND QUICK STOP INC	1846 S HIGHWAY 97	REDMOND	97756	44.25866005	-121.1796218	EDR Hist Auto	1021060308	L	Not adjacent to alignment, no release, 4 active tanks	All
L75	RD INVESTMENTS 1 LLC	1846 S HWY 97	REDMOND	97756	44.25866005	-121.1796218	RCRA NonGen / NLR	1004771025			
L76	BUY2 021	1846 SW HWY 97	REDMOND	97756	44.25866005	-121.1796218	UST	U003159603	L	Related to Mr. Muffler	All
L77	REDMOND QUICK STOP	1846 S HWY 97	REDMOND	97756	44.25866005	-121.1796218	MANIFEST	S125247375			
R78	LEATHERS OIL CO	652 SW 5TH ST	REDMOND	97756	44.27081087	-121.1728794	EDR Hist Auto	1022051724	L	Adjacent to alignment, non-generator, no release	All
S79	MIDSTATE POWER PRODUCTS	2795 S. HIGHWAY 97	REDMOND	97756	44.24996246	-121.1861005	FINDS	1015748128	L	Large Cleanup site, 900 feet from the canal. Conditional NFA in place onsite. Site is also listed in database as Jeld-Wen, Inc	All
S80	DAN'S EQUIPMENT	2795 S. HIGHWAY 97	REDMOND	97756	44.24996246	-121.1861005	RCRA NonGen / NLR	1015748129			
S81	MEL'S TRACTOR COMPANY	2795 S. HIGHWAY 97	REDMOND	97756	44.24996246	-121.1861005	RCRA NonGen / NLR	1015748127	M	Large Cleanup site, 900 feet from the canal. Conditional NFA in place onsite. Site is also listed in database as Bend Millwork Co	All
T83	BEND MILLWORK CO	62845 BOYD ACRES ROAD	BEND	97701	44.08150274	-121.2980196	SEMS-ARCHIVE, RCRA-VSQG	1015735977			
T84	BEND MILLWORK SYSTEMS (BMS)	62845 BOYD ACRES RD.	BEND	97701	44.08150274	-121.2980196	ECSI, CLR, AST, ENG CONTROLS, OR HAZMAT	S105526566			
T85	JELD-WEN, INC.	62845 BOYD ACRES RD	BEND	97701	44.08150274	-121.2980196	MANIFEST	S122431055			
T86	JELD-WEN, INC.	62845 BOYD ACRES RD	BEND	97701-85	44.08150274	-121.2980196	UST, ICIS, US AIRS, MANIFEST, FINDS	1000183565			
87	MILLER LUMBER COMPANY	2800 S HWY 97	REDMOND	97756	44.25011506	-121.1853814	LUST, UST	U000438104	L	LUST, tank closed, NFA letter, no GW impact	All
R88	MR. MUFFLER	652 S 5TH	REDMOND	97756	44.27089945	-121.1728999	LUST	S102779150	L	LUST, tank closed, NFA letter, no GW impact	All
V91	LAYTON TRUCK FACILITY	20698 BRINSON BLVD.	BEND	97701	44.08436847	-121.2890548	VCP, ECSI	S103842446	L	NFA, not adjacent to alignment	All
W97	PATHEON,PART OF THERMO FISHER SCIENTIFIC	62925 NE 18TH ST	BEND	97701-98	44.08486706	-121.2826925	RCRA-LQG, AST, MANIFEST, HSIS	S122431081	L	Not listed in any release database, not adjacent to alignment	All
X103	FRED MEYER FUEL #650	944 SW VETERANS WAY	REDMOND	97756	44.26767129	-121.176783	UST, AST, HAZMAT, HSIS	U004190918	L	All incidents were addressed and no release to GW , unlikely to impact soils near canal based on distance of the store from the canal and the barrier of the road between the store/parking lot and the canal	All
Y108	NELSON LAUNDRIES & DRY CLEANERS	1741 ODEM-MEDO WAY	REDMOND	97756-95	44.25294056	-121.1868367	FINDS, ECSI	1006852906	L	Site added to ECSI database for tracking purposes only, no release, According to ER/HW staff, site is a dry store and is likely to always have been a dry store. Low priority for further action to confirm the site's status as a dry store.	All
Z112	TESORO ALASKA	614 SW 5TH ST	REDMOND	97756	44.27135708	-121.1730369	EDR Hist Auto	1021410021	L	Not on alignment, NFA and tank decommissioning, soil removal. Some soil left in place but protective of human and environmental health.	All
Z113	SOUTH PACIFIC PROPERTY LLC	612 SW 5TH ST	REDMOND	97756	44.27135708	-121.1729752	UST, LUST	U004016379			All
AA115	PCC SCHLOSSER	345 NE HEMLOCK AVE	REDMOND	97756	44.28395542	-121.1657843	AST, RCRA-SQG, HSIS, UIC, MANIFEST	S108105825	L	Not adjacent to alignment, no release	All
140	ANTLER AVE. AREA GROUNDWATER	ANTLER AVE. & RAILROAD TRACKS	REDMOND	97756	44.27720023	-121.1673012	ECSI	S105614559	L	Water main repairs uncovered contamination in the water supply from bulk plants on either side of railroad and from spills along the railroad. Not adjacent to alignment. Listing was in 2001, two downstream industrial receptors identified. Canal doesn't appear to have been affected. Also listed as ECSI 3142, BNR Redmond Right of Way	All
141	CENTRAL OREGON TRUCK CO	394 NE HEMLOCK AVE	REDMOND	97756	44.28203669	-121.1652843	AST, HSIS	S113909507	L	Not adjacent to alignment, no release	All

146	CAVEL WEST	1607 SE RAILROAD AVE.	REDMOND	97756	44.26160079	-121.1740984	ECSI	S111252652	M	AST removed, excavation of contaminated soil, tank area capped, site is separated from the canal by two properties, HWY 97, and the railroad. NFA received in 2001. ECSI listing is under Deschutes Ready Mix - Redmond	All
153	LARKIN TRACTOR CO	511 S CANAL	REDMOND	97756	44.27203123	-121.171222	UST	U000438100	L	No release associated with this listing, adjacent to alignment. Three tanks decommissioned.	All
165	BNRR - REDMOND RIGHT-OF-WAY	ANTLER AVE. & RR TRACKS	REDMOND	97756	44.2773011	-121.166	ECSI	S106115130	L	Water main repairs uncovered contamination in the water supply from bulk plants on either side of railroad and from spills along the railroad. Not adjacent to alignment. Listing was in 2001, two downstream industrial receptors identified. Canal doesn't appear to have been affected. Also listed as the Antler Ave. Area Groundwater	All
AP171	OVERALL PETROLEUM BULK PLANT - REDMOND	E ANTLER AVE. & NE REDMOND AVE.	REDMOND	97756	44.27679923	-121.1669006	ECSI	S106236622	L	ECSI 3026, also related to ECSI 3025 (Juniper Fuel Bulk Plant), other site names include Standard Oil Bulk Plant - Redmond, Chevron Bulk Plant - Redmond (also Shell Oil Bulk Plant?). NW corner of antler and redmond avenues. Separated from canal by railroad, highway, and another property	All
AQ172	DRY CANYON FORGE	128 E ANTLER AVENUE	REDMOND	97756	44.27646218	-121.1682189	RCRA NonGen / NLR	1015748379	L	Not adjacent to alignment, no release associated with this listing	All
AP174	JUNIPER FUEL INC	213 E ANTLER AVE E	REDMOND	97756	44.276659	-121.1672087	AST, ECSI, HSI, AIRS	S104330500	L	1000' from canal, NFA determination, see also Overall Petroleum Bulk Plant and Chevron Bulk Plant	All
AQ177	KEN MUNKRES INC REDMOND PLT	E ANTLER	REDMOND	97756	44.27652369	-121.167695	RCRA NonGen / NLR	1000124768	L	Not on alignment, no address listed, no violations	All
185	ANTLER PUMP STATION	111 SE RAILROAD BLVD	REDMOND	97756	44.27639822	-121.1675067	LUST, UST	U000438084	L	Not adjacent to alignment, separated by railroad, highway, and another property. Cleanup completed and NFA determination made 1/22/2001	All
200	ODOT - MID-OREGON OIL SITE (FORMER)	2860 N HWY. 97	REDMOND	97756	44.30239904	-121.1730985	VCP, ECSI	S108963064	L	[May 2016] In 2008, DEQ assisted ODOT in reviewing several sites that was subsequently developed for the re-route of Highway 97 around downtown Redmond. Two sites were evaluated in detail: Mid-Oregon Oil (ECSI #4896) and High Country Disposal (ECSI #5060). DEQ issued No Further Action determinations for both.	All
216	9TH ST. & HEMLOCK AVE. INDUSTRIAL SITE	580 NE HEMLOCK AVE.	REDMOND	97756	44.28327895	-121.1634078	ECSI	S106980945	L	Not adjacent to alignment. DEQ reviewed a Phase I Environmental Site Assessment in 2005, and concluded that an NFA determination for the property was appropriate.	All
218	PONDEROSA MOULDINGS	423 E ANTLER AVE	REDMOND	97756	44.27656059	-121.1657808	ECSI	S119161975	L	Not adjacent to alignment, Site was active for more than 60 years as a moulding plant that produced trim primarily for the home interior market. The mill was built in 1937, expanded significantly in 1965, and closed in 2003.	All
221	BIG COUNTRY RV	3111 NW CANAL BLVD.	REDMOND	97756	44.3051089	-121.1708453	VCP, ECSI	S112504462	L	The site is over 1,500 feet NW of the canal, NFA letter received, leaving some contamination in place but migration off-site was not found.	All
BF236	REDMOND STEAM LAUNDRY (FORMER)	SW 4TH & CASCADE	REDMOND	97756	44.27452107	-121.1721774	ECSI	S107421133	L	Several blocks away from the alignment, no closure, status is "suspect, investigation recommended", based on distance, should not have affected the canal. Drycleaners listed in the 1920's-1940's.	All
237	VACANT LOT	SW OF INTERSECTION OF SW 2ND STREET AND SW CASCADE AVE	REDMOND	97756	44.27454567	-121.1700132	US BROWNFIELDS	1017428292	L	The SW corner of the Intersection of Cascade Ave and SW 2nd Street is not currently vacant - developed with an auto repair shop and residence. Not adjacent to alignment, property to the east, along canal appears to be undeveloped/gravel.	All