

## 4 Environmental Considerations

This chapter summarizes previously inventoried or known information and studies related to the Main-McVay Corridor Study Area. The built, natural and social environmental resources, concerns and issues summarized in this chapter may influence the development and screening evaluation of alternatives.

For the Main-McVay Transit Study, only existing inventories, data and studies have been used. If a project emerges from this Study and is advanced for further study, more intensive field reviews, data modeling and analysis will be conducted at that stage.

### 4.1 Introduction

This section documents existing and future conditions in the Main-McVay Corridor, opportunities and constraints for transit improvements, and conclusions to inform conceptual alternatives development and screening-level evaluation.

For each discipline, Appendix B lists references, data sources and relevant regulations, policies and plans.

### 4.2 Acquisitions and Displacements

Property acquisitions can result from a transit corridor project. If property acquisition would be required, LTD would need to follow state property acquisition laws and regulations and, if a federal funding source is used, such as the Federal Transit Administration (FTA) funds (which would be likely), LTD would also be required to follow the federal property acquisition rules.

Federal and state statutes provide regulations and procedures that address property acquisition, displacements, and relocation. In addition, the FTA has issued implementation guidelines for the federal regulations, and the Oregon Department of Transportation (ODOT) has issued implementation guidelines for the state regulations.

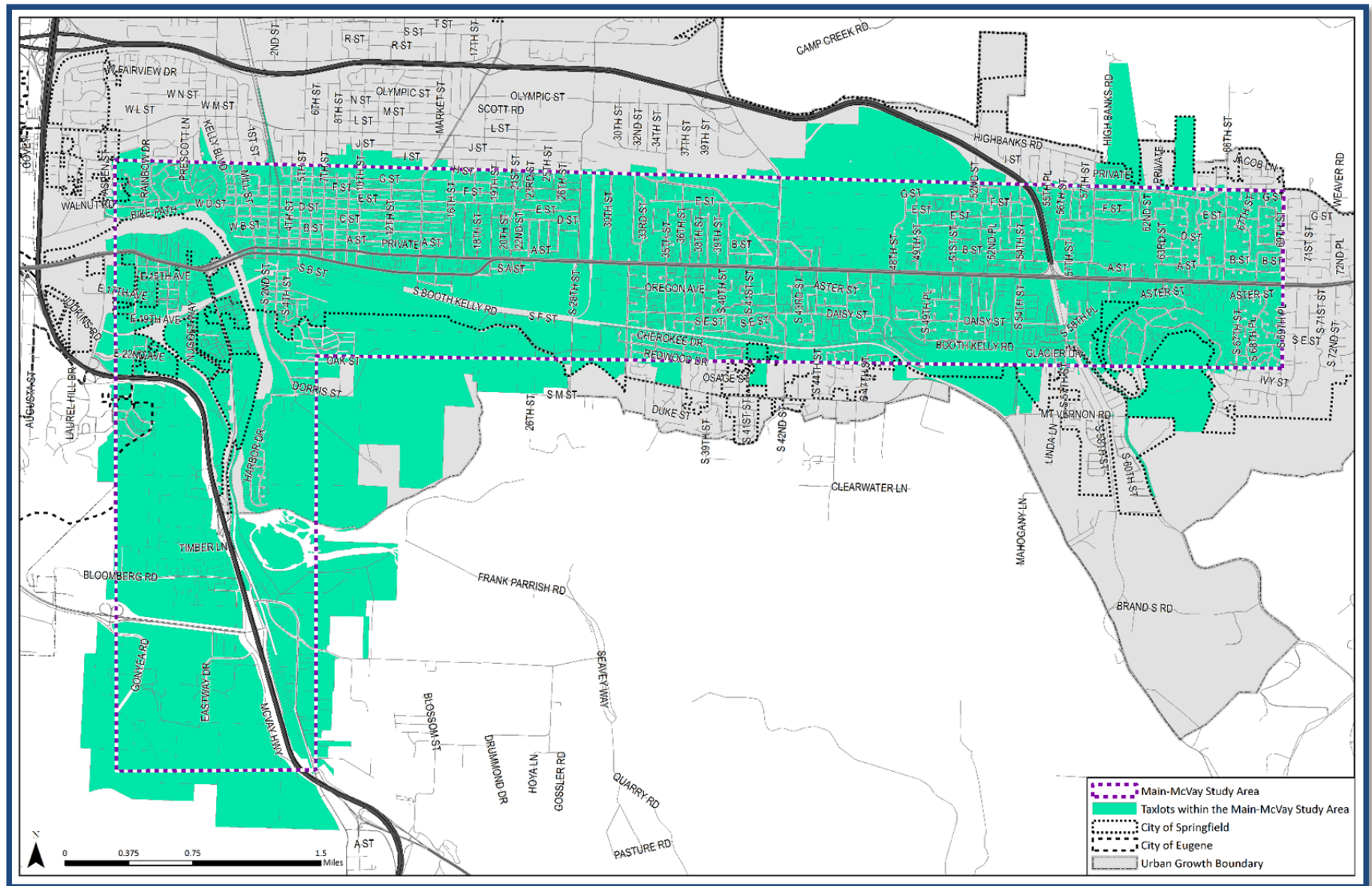
#### 4.2.1 Existing Conditions

There are over 10,000 individual tax lots within the Main-McVay Study Area, shown on Figure 4.2-1. Some businesses are located on a property comprised of multiple tax lots and some tax lots have a non-business use (i.e. residential, open space, vacant).

The location of buildings on the tax lots abutting the corridor is important in determining possible project acquisition and displacement impacts. If buildings are close to the right-of-way, there is a greater likelihood that they would be directly impacted by street widening. Along both the Main Street Segment and McVay Highway Segment, buildings are generally set back from the street. A notable exception is in downtown Springfield, where several buildings, including some historic structures, have been constructed up to the property line abutting the street.

For more information about existing land uses and zoning of properties along the alignment, see section 4.10, Land Use and Prime Agricultural Lands.

Figure 4.2-1. Tax Lots within Main-McVay Study Area



Source: Prepared by Parsons Brinckerhoff, Springfield's MapSpring. 2014.

#### 4.2.2 Future Conditions

Tax lots may be partitioned or subdivided depending on their size and allowed zoning designation. It is likely that in the future some of the properties within the Main-McVay Study Area may divide, resulting in more tax lots than exist today. It is also likely that redevelopment and new development along the corridor creates properties with higher appraised values, which could add cost for a transit project. There is the potential that some new development could be closer to the edge of the right-of-way, which would create additional impacts should the right-of-way need to be expanded.

#### 4.2.3 Opportunities and Constraints

There is an opportunity, should a transit project be identified, to coordinate the project footprint with proposed development and redevelopment plans along the corridor, thereby reducing potential impacts of and costs for the project. New development could be situated to accommodate the future transit project.

Due to the potential costs of acquisition and impacts to businesses and residents, current development may place a constraint on transit options that require additional right-of-way. Constraints are most significant with properties that have structures close to the right-of-way, particularly if the buildings on the opposite side of the street are also close to the right-of-way and form a “pinch point.” The most significant pinch points on the Corridor occur on Main Street in downtown Springfield, where several buildings have been built to the edge of the right-of-way. In some cases, buildings directly opposite from each other on Main Street have no street setback. Street widening along that section of the Corridor will have significant constraints.

There are also pinch points created by transportation structures that will constrain right-of-way expansion. The bridges over the Willamette River cannot be easily widened. Similarly, McVay Highway passing under the train trestle may be difficult to widen due to the limited clearance between the supports for the trestle.

#### 4.2.4 Conclusions

Potential impacts to property, and particularly possible displacements, should be considered during the development and evaluation of transit options. Efforts should be made to avoid options that require street widening in the identified “pinch point” locations.

### 4.3 Air Quality

This section describes the existing and potential future air quality conditions along the Main-McVay corridors. The greater Springfield-Eugene area was a maintenance area for Carbon Monoxide (CO) and a non-attainment area for particulate matter (PM10). Projects located in non-attainment or maintenance areas for a given pollutant must comply with provisions of the 1990 Clean Air Act Amendments. They must also comply with state and federal rules that require a determination of conformity with the State Implementation Plan (SIP).

Recently, however, the EPA has ruled that Eugene Springfield area no longer has to undertake regional Air Quality Conformity or hot spot analyses for Carbon Monoxide (CO). This relatively new decision is based on a track record of 20 years without a violation of the National Air Quality Standards for CO. This means that no air quality analysis for CO needs to be undertaken for any regionally significant project or projects that change the capacity of a significant roadway within the AQ maintenance area. Projects will still need to perform the required PM<sub>10</sub> analyses for regionally significant project, and, as stated in the USDOT Metropolitan Planning Rules, regionally significant projects must be in the Transportation Improvement Program (TIP) and the Statewide TIP and consistent with the Regional Transportation Plan in order to receive federal funds.

Based on these recent changes, the main concern is that the project complies with the PM<sub>10</sub> regulations and that the project will be included in the Transportation Improvement Program (TIP) and the Statewide TIP and consistent with the Regional Transportation Plan.

Air quality in the Study Area is regulated by three agencies: the Environmental Protection Agency (EPA), the Oregon Department of Environmental Quality (ODEQ), and the Lane Regional Air Protection Agency (LRAPA). LRAPA monitors air quality within the region. EPA sets national air quality standards and has oversight authority over LRAPA and ODEQ. The EPA has developed National Ambient Air Quality Standards (NAAQS) for six criteria pollutants to protect the public health and welfare. The NAAQS specify maximum concentrations for carbon monoxide (CO), particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>), particulate matter less than 10 microns in diameter (PM<sub>10</sub>), ozone (O<sub>3</sub>), sulfur dioxide (SO<sub>2</sub>), lead, and nitrogen dioxide (NO<sub>2</sub>). These standards shall not be exceeded by ambient pollutant concentrations that are averaged over defined time intervals ranging from one-hour to one-year averages.

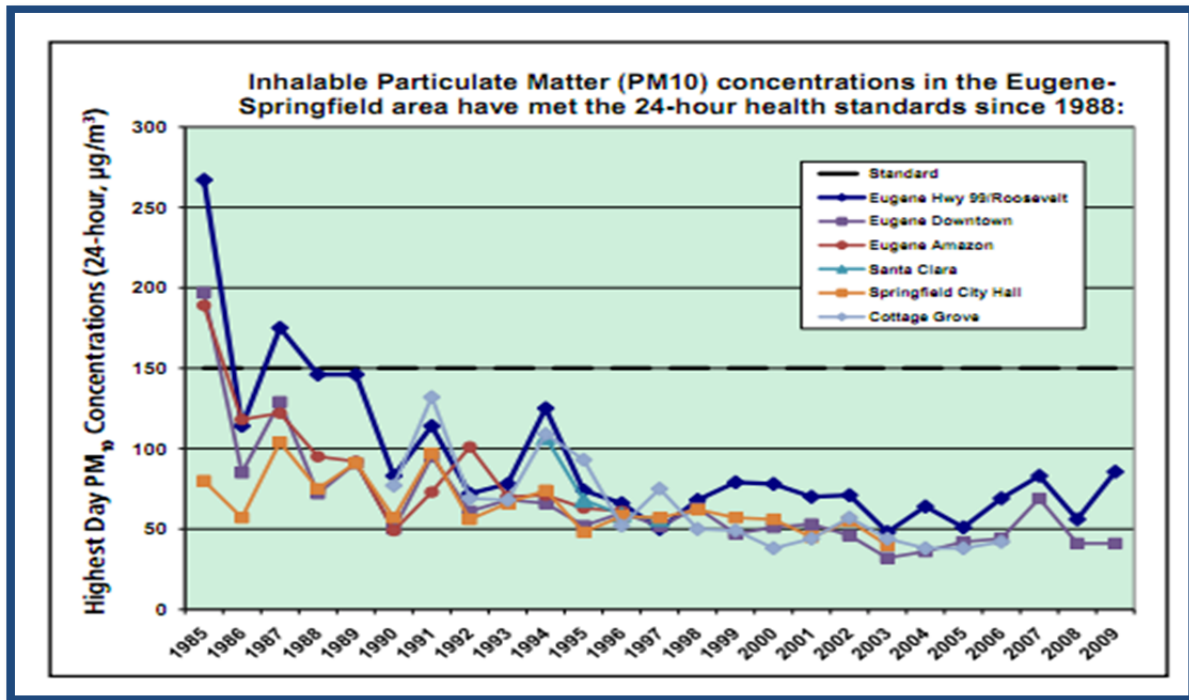
#### **4.3.1 Existing Conditions**

Lane Regional Air Protection Agency (LRAPA) operates monitoring sites for CO, PM<sub>10</sub>, and PM<sub>2.5</sub> in the Eugene-Springfield area. PM<sub>10</sub> and PM<sub>2.5</sub> are monitored at the Amazon Park station at 499 East 29th Street in Eugene and at the Springfield City Hall site, at 225 5th Street. Figure 4.3-1 illustrates trends in particulate concentrations in the Eugene-Springfield region. In the most recently published data from 2009, there were no exceedances of the NAAQS with a 24-hour maximum of 85 ug/m<sup>3</sup> and an annual average of 17 ug/m<sup>3</sup>. Based on the measured data, current PM<sub>10</sub> values are well within the EPA standards.

Carbon monoxide is a pollutant that dissipates rapidly with increasing distance from vehicle traffic, thus, monitoring results from distant sites will not reflect conditions elsewhere. Carbon monoxide concentrations have declined sharply since 1988 at all monitoring sites despite large increases in the number of vehicles and vehicle-miles driven. This is due to improvements in automobile engine technology and the effectiveness of the State's Emission Check (I&M) program. Figure 4.3-2 illustrates trends in CO concentrations at two monitoring sites in Eugene, Sacred Heart Medical Center and Lane Community College.

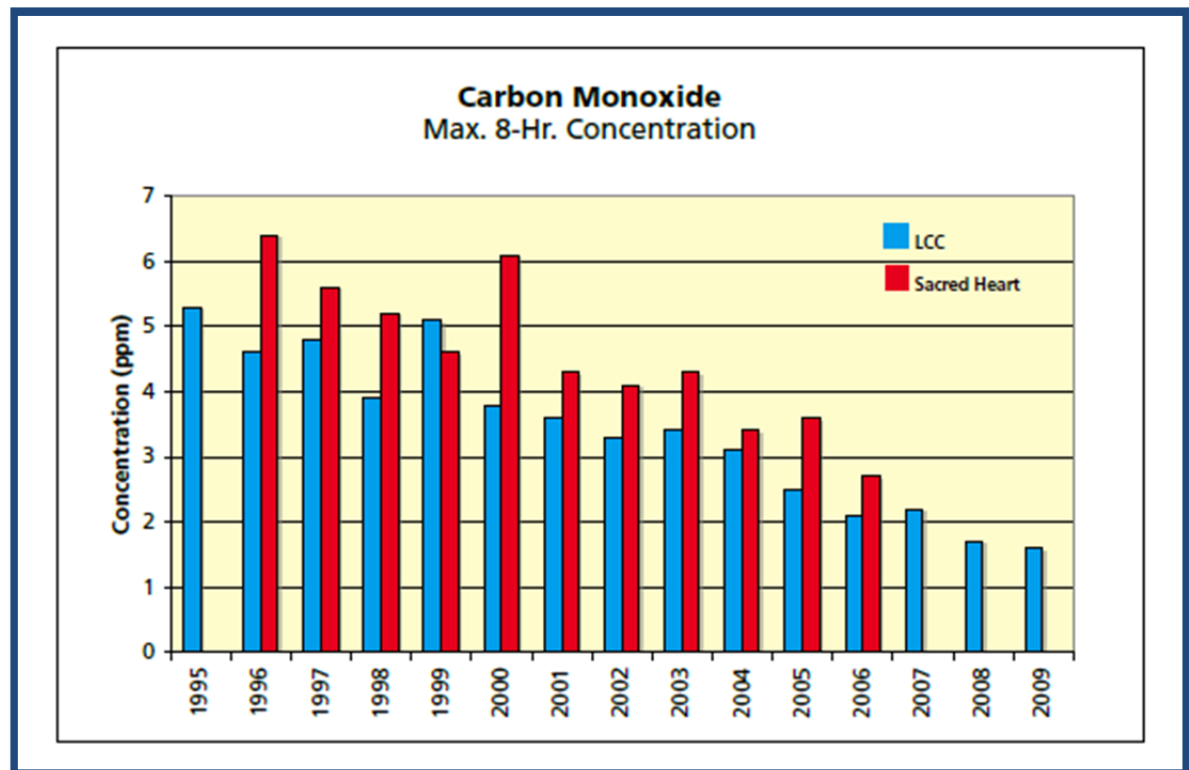


Figure 4.3-1. PM10 Trends



Source: ODEQ 2009 Air Quality Data Summaries

Figure 4.3-2. Carbon Monoxide Trends



Source: ODEQ 2009 Air Quality Data Summaries

The EPA strengthened its 8-hour ozone standard from 0.08 parts per million to 0.075 parts per million in March 2008. Ozone concentrations have declined slowly over the last ten years despite large increases in regional population, employment, and vehicle miles driven. The fact that ozone concentrations have not increased is due to improvements in automobile engine technology, effectiveness of the various State programs such as the Emission Check program, and controls on industrial sources of hydrocarbons, which is one of the precursors of ozone.

#### **4.3.2 Future Conditions**

Based on the projections and monitoring data provided in Figures 4.3-1 and 4.3-2, the air quality in the greater Eugene Springfield area will continue to improve in the future. Therefore, the future conditions are predicted to meet or exceed any of the EPA Ambient Air Quality Standards.

#### **4.3.3 Opportunities and Constraints**

There are no air quality related constraints or opportunities as related to providing improved transit connections and routes in this corridor.

#### **4.3.4 Conclusions**

Although increased traffic, even from a high capacity system, can be assumed to result in degradation in air quality, the reality is that air quality is continuing to improve in virtually all areas of the country. The fact that new vehicles produce much less pollutants than older vehicles has more than offset any adverse effect to the air quality caused by the increased in vehicles miles traveled. Therefore, adding a new or upgraded high capacity transit system in this corridor would not be predicted to cause any new exceedances of the NAAQS, or worsen any existing NAAQS exceedance, and therefore can be considered to meeting all air quality standards. In fact, the extent that improved transit service will reduce auto travel, a transit project within the Corridor can be expected to further improve air quality.

### **4.4 Archaeology**

This archaeological resource review summarizes the results of a review of existing archaeological records and literature for the Study Area for the Main-McVay Corridor. On the basis of this review, areas likely to contain previously unidentified archaeological resources are summarized to assist in potential conflict avoidance during future alternatives design and development for the project. The purpose of the archaeological resource review is to assist the project in complying with laws, regulations, and policies set forth at the federal, state, and local levels. The extent to which these cultural resource laws and regulations might apply to this project will depend upon the resources encountered within the project area. The analysis is part of the compliance process for the National Environmental Policy Act (NEPA), Section 106 of the National Historic Preservation Act (NHPA), applicable state environmental policy legislation, and local and state planning policies.

#### **4.4.1 Existing Conditions**

Documentary research was conducted using primary and secondary source materials on file at Oregon State Historic Preservation Office (SHPO) (to identify properties designated as National Register listed or eligible, or Statewide Planning Goal 5-protected historic resources), Lane County, and other appropriate archives, and included the following sources:

- Oregon SHPO National Register
- Oregon SHPO Archaeology Site Records
- Historical maps and records

#### **4.4.1.1 Records Review**

The archaeological site records maintained by the SHPO in Salem were reviewed to locate previously reported archaeological sites in or near the Study Area (Figure 4.4-1), as well as previous cultural resource surveys and other archaeological investigations that have been conducted in the area. The review of the SHPO site and project files indicate that eight (8) archaeological sites have been recorded in the project area (Table 4.4-1) and 20 cultural resource investigations have been conducted within the boundaries of the project area. Seven (7) of the recorded archaeological sites are prehistoric in nature, while one recorded site contains both prehistoric and historical materials. These sites have been recorded in proximity to water sources (rivers, springs, and drainages) or on high points (knolls and hills).

In addition, five (5) historical features have also been recorded in the Study Area during cultural resource investigations (Table 1). While these features have not been given formal archaeological site numbers, they relate to early industry (railroad yard, trestles, and historic Springfield millrace) and transportation activities (bridges) and demonstrate the potential for historical archaeological resources in the Study Area.

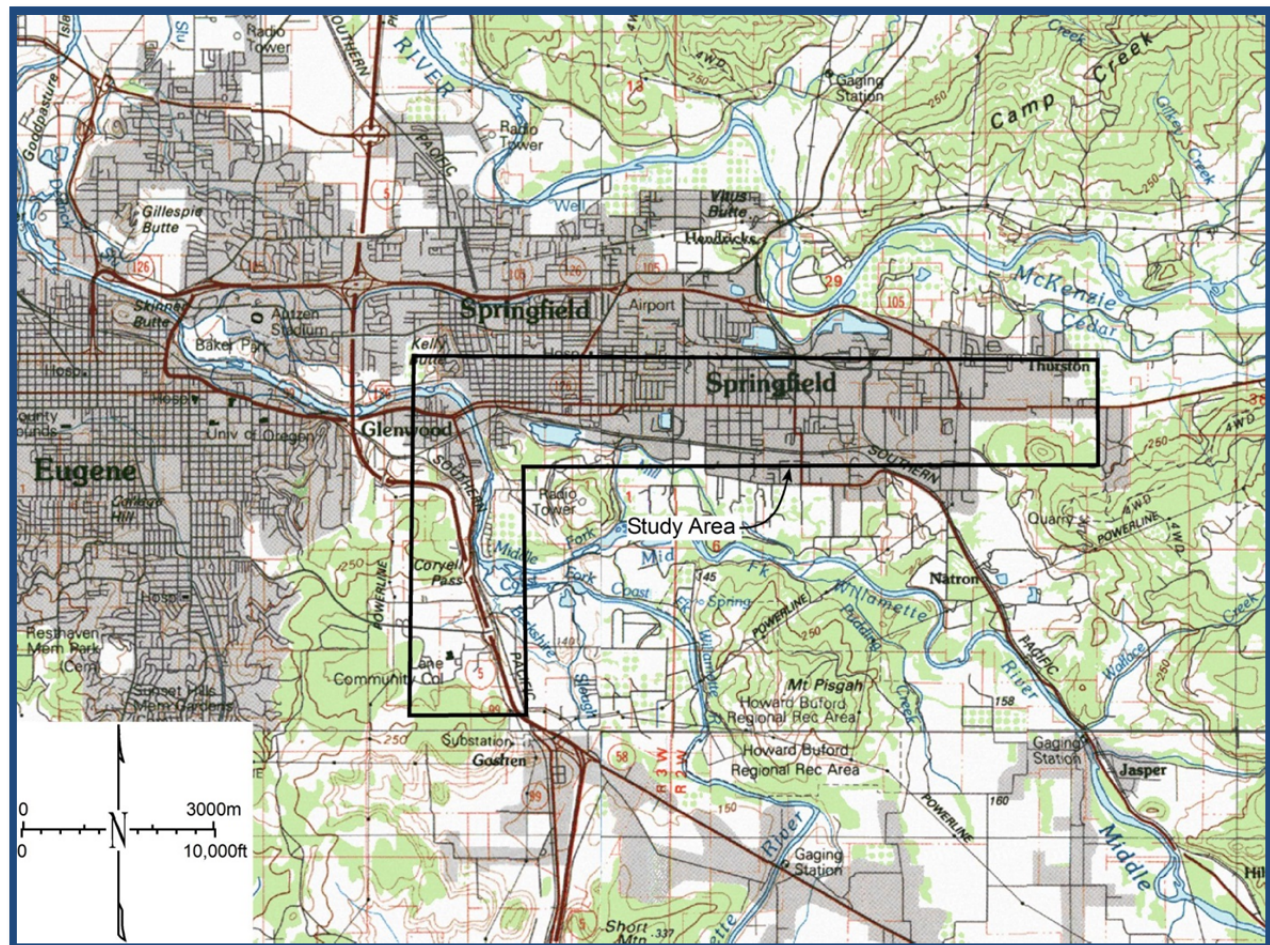
A review of archaeological sites recorded within a mile of the Study Area reiterated the locations where archaeological resources have been previously identified (Table 4.4-2). Eleven (11) additional sites included seven (7) prehistoric sites and four (4) historical archaeological sites that have been formally recorded with the Oregon SHPO. The prehistoric sites were recorded near waterways, and the historical sites included three early 20th century residential sites, including artifact scatters and features relating to homesteads or cabins. In addition, ten (10) isolated finds that do not meet the definition of an archaeological site have been recorded within a mile of the Study Area.

A total of 27 cultural resources reports on file at SHPO present the results of archaeological investigations that have been conducted within the project area (Table 4.4-3).

#### **4.4.2 Future Conditions**

Additional studies may identify new archeological sites, though it is difficult to predict where those may occur.

**Figure 4.4-1. Study Area Location Showing Extent of Development in 1983 between Middle Fork Willamette River and McKenzie River**



Source: USGS McKenzie River quadrangle, 1:100,000 reduced. 2014.

**Table 4.4-1. Previously Recorded Archaeological Resources Recorded within Main-McVay Transit Study Area**

Site No./Name	Location	Description	References
<b>Recorded Archaeological Sites</b>			
35LA137 (unevaluated)	T17S R2W Sec. 35	Prehistoric; lithic scatter (flakes and tools) around former spring; located in filbert orchard	Southard 1970a
35LA179 (unevaluated)	T18S R3W Sec. 2	Prehistoric; artifact scatter (mostly lithic) at Dorris Ranch Living History Farm close to river	Olsen 1971; Carlisle 2009a
35LA255 (unevaluated)	T17S R2W Sec. 34	Prehistoric; lithic scatter (possible campsite) on low terrace near intermittent stream; located in residential development	Henn 1976
35LA376 (unevaluated)	T17S R3W Sec. 35	Prehistoric; very thin artifact scatter (flakes, tools, glass beads) near base of Kelly Butte;	Connolly and Baxter 1980



Site No./Name	Location	Description	References
		former orchard, now garden in residential area	
35LA657 (eligible)	T17S R2W Sec. 34	Prehistoric; campsite on Potato Hill	Baxter and Connolly 1985 Oetting 1995 (SHPO #15338/19160), 2003a (SHPO #19158), 2004a (SHPO #19156)
35LA1261 (eligible)	T17S R2W Sec. 34	Prehistoric; artifact scatter (likely lithic reduction/tool production locus) on slope of Potato Hill ridge	Oetting 2002a, 2002b, 2002c (SHPO #19154), 2003a (SHPO #19158)
35LA1276 (not eligible)	T17S R2W Sec. 34	Prehistoric; artifact scatter (flakes) on slope of Potato Hill ridge	Oetting 2003b, 2004b
35LA1470 (not eligible)	T18S R3W Sec. 2	Multicomponent; concentrations of metal artifacts (largely cans), with a few prehistoric lithic flakes; near historical Tomseth House at Dorris Ranch Living History Farm	Carlisle 2009b
<b>Other Recorded Historical Archaeological Resources</b>			
Springfield Junction Trestle	T18S R3W Sec. 3	Historical (ca. 1926?); spans low-lying ground near Henderson Avenue; similar construction to Willamette River Bridge	Ellis et al. 1999 (SHPO #16707)
Springfield Millrace	T17S R3W Sec. 35	Historical (constructed 1852); built by Elias Briggs, founder of Springfield	Ellis et al. 1999 (SHPO #16707)
Springfield Millrace Trestle	T17S R3W Sec. 35	Historical (constructed ca. 1907); spans the Springfield Millrace for rail line connecting Springfield and Springfield Junction	Ellis et al. 1999 (SHPO #16707)
Former Springfield RR Yard	T17S R3W Sec. 35	Historical (constructed 1891); Southern Pacific completed through Springfield in 1891; yard included freight and passenger depot; other structures added by the 1920s	Ellis et al. 1999 (SHPO #16707)
Willamette River Bridge	T17S R3W Sec. 34, 35	Historical (constructed ca. 1926); crossing for Cascade rail line; replaced earlier (1905–1906) bridge	Ellis et al. 1999 (SHPO #16707)

Source: Oregon State Historic Preservation Office. 2014.

**Table 4.4-2. Previously Recorded Archaeological Resources Recorded within One Mile of Main-McVay Transit Study Area.**

Site No./Name	Location	Description	Reference(s)
<b>Recorded Archaeological Sites</b>			
35LA95 (unevaluated)	T18S R2W Sec. 7	Prehistoric; thin artifact scatter on knoll overlooking the river; partially cultivated for orchard; no evidence of site in 2012	Southard 1970b; Musil 2012a
35LA151 (unevaluated)	T17S R3W Sec. 26	Prehistoric; midden, scattered flakes and FCR observed in gardens flanking street in residential area	Southard 1970c
35LA1109 (unevaluated)	T18S R3W Sec. 10	Prehistoric; low-density lithic scatter on bench overlooking creek; disturbed by earthmoving activities	Lee and Roulette 1993a
35LA1110	T18S R3W	Prehistoric (Middle or Early Archaic); light	Lee and Roulette 1993b



Site No./Name	Location	Description	Reference(s)
(unevaluated)	Sec. 21	lithic scatter (flakes and dart point) on stream terrace and slope above creek; disturbed by pipeline and stock pond construction	
35LA1173 Sohnrey site (unevaluated)	T18S R3W Sec. 14	Prehistoric; lithic scatter (flakes and core) on slope above intermittent drainage	Pettigrew 1996a
35LA1339 SJ Hillside site (unevaluated)	T18S R2W Sec. 5	Prehistoric; resource-processing and lithic reduction locus (lithic scatter with flakes, flaked and ground-stone tools, fire-cracked rock from campfire) on forested hillside above old channel of Willamette River	O'Grady 2007
35LA1456 Eugene Millrace Diversion Dam and Intake (eligible)	T17S R3W Sec. 33	Historical (1891–1955); remains of Eugene Millrace Diversion Dam and Intake along south shore of Willamette River beneath and west of the I-5 bridge	Minor 2007 Minor et al. 2007 (SHPO #21577) Toepel 2008 (SHPO # 22080); Chapman and Punke 2010 (SHPO #23287); Chapman 2010a (SHPO #23349), 2010b (SHPO # 23409)
35LA1465 Reinagel Historical Refuse Scatter (eligible)	T18S R3W Sec. 12	Historical (1920s–1940s); refuse scatter and features associated with former cabin on terrace and slope above Middle Fork Willamette River	Carlisle 2009c
35LA1471 A.W.S. Cabin site (eligible)	T18S R3W Sec. 11	Historical (1930–1941); dense artifact scatter within and surrounding footprint of cabin used by UO Assoc. Women Students, Boy Scouts, and others; situated on low bench above river	Carlisle 2009d
35LA1510 (unevaluated)	T18S R2W Sec. 5	Prehistoric; lithic scatter (flakes, tools, FCR) in plowed field near bank of a filled oxbow channel	Becker 2006
35LA1591 (unevaluated)	T18S R3W Sec. 23	Historical (Depression/WWII era); homestead foundation, construction materials, and furnishings west of Goshen, along creek at base of hill	Perkins 2013
<b>Isolated Finds and Other Features</b>			
Isolate	T18S R3W Sec. 2	Prehistoric; obsidian flake	Lebow 1987 (SHPO #9153)
Isolate 06/1339-BPA-1	T18S R3W Sec. 14	Prehistoric; CCS core, two CCS flake fragments	Boynton et al. 2007 (SHPO #21163)
Rock Wall	T18S R2W Sec. 5	Historical; possible retaining wall on north side of Hwy 222	O'Grady 2005 (SHPO #19632)
Isolate SJ 06-1	T18S R2W Sec. 5	Prehistoric; CCS tested cobble fragment	O'Grady and Ruiz 2007 (SHPO #21282)
Isolate ISO-MP 1.7 West	T18S R2W Sec. 4	Multicomponent; two pieces CCS, possible mano fragment, white glass canning jar lid	O'Grady 2005 (SHPO #19632)

Site No./Name	Location	Description	Reference(s)
Isolate SJ 07-1	T18S R2W Sec. 4	liner Prehistoric; CCS flake	O'Grady and Ruiz 2007 (SHPO #21282)
Isolate SJ 06-4	T18S R2W Sec. 4	Historical; Gillette razor fragment	O'Grady and Ruiz 2007 (SHPO #21282)
Isolate	T18S R2W Sec. 3	Prehistoric; obsidian debitage	Oetting 2003a (SHPO #19158)
Ridge Area 1 Isolate	T18S R2W Sec. 3	Prehistoric; three chert flakes, one obsidian flake, one obsidian endscraper	Oetting 2003a (SHPO #19158)
Ridge Area 2 Isolate	T18S R2W Sec. 3	Prehistoric; two obsidian flakes, one chert flake	Oetting 2003a (SHPO #19158)

Source: Oregon State Historic Preservation Office. 2014.

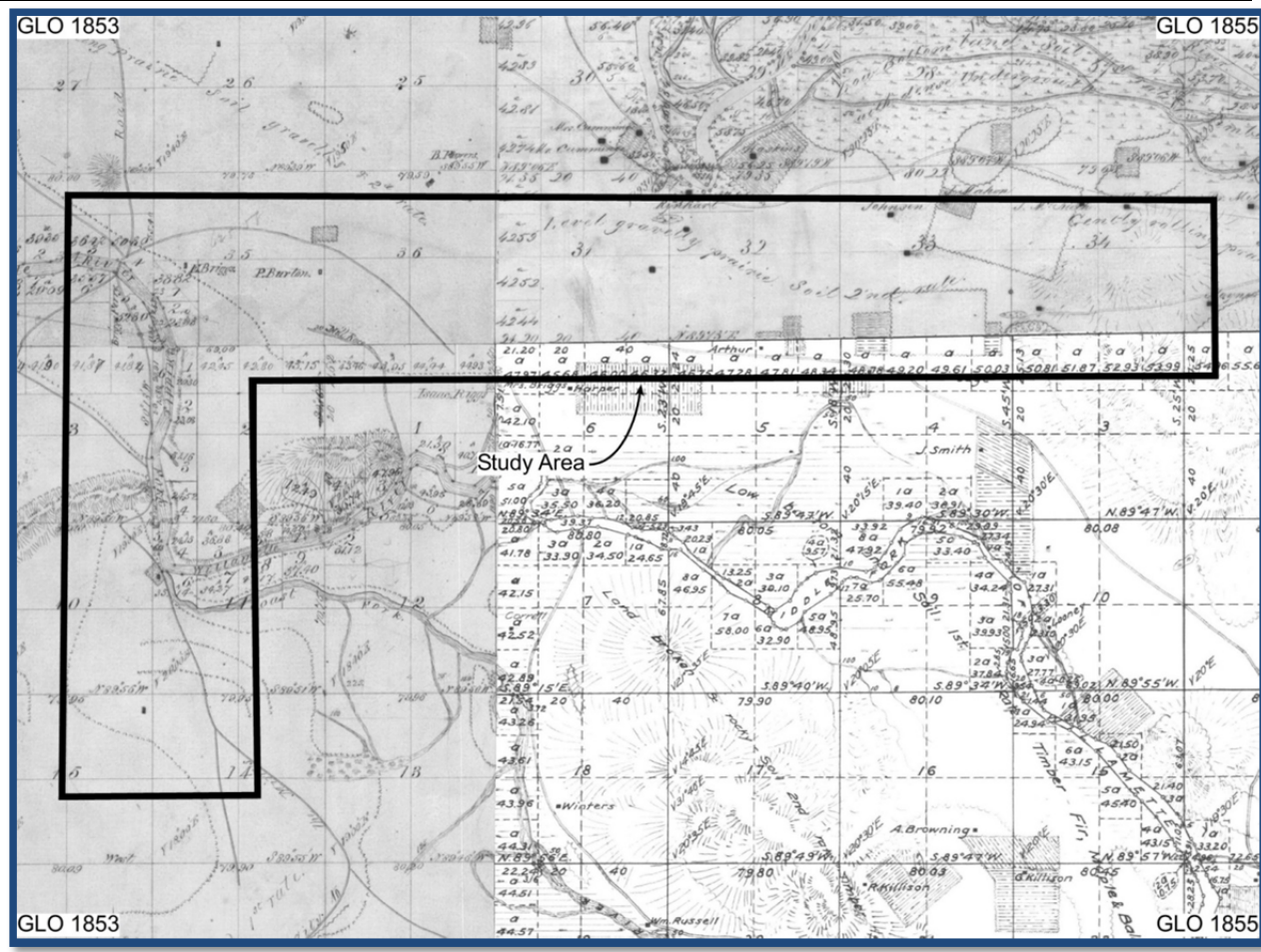
**Table 4.4-3. Previous Archaeological Investigations within Main-McVay Transit Study Area**

Township & Range	Section(s)	Description and Comments	Reference(s)
T17S R2W T17S R3W T18S R2W T18S R3W	31 34, 35, 36 5, 6 3	Survey of proposed fiber optic line from Springfield to Eugene; Springfield Junction Trestle, Springfield Millrace, Springfield Millrace Trestle, Former Springfield RR Yard, Willamette River Bridge recorded	Ellis et al. 1999 (SHPO #16707)
T17S R2W T18S R2W	33 4	Monitoring of the Jasper Road Extension Project; negative results	Musil 2004 (SHPO #19107)
T17S R2W T18S R2W	33 3, 4, 10	Archaeological assessment for the Jasper Road Extension II Project; negative results	Cooper 2005 (SHPO #20102)
T17S R2W T18S R2W	34 3	Archaeological survey of Potato Hill and vicinity; site 35LA657 recorded and several prehistoric and historical isolates noted	Connolly and Baxter 1985 (SHPO #6479)
T17S R2W	34	Reconnaissance and probing to relocate site 35LA657 at MountainGate Development	Oetting 1995 (SHPO #15338/ 19160)
T17S R2W T18S R2W	34 3	Survey and discovery probing at site 35LA657 and several high probability areas at MountainGate Development; four potential site locations identified	Oetting 2003a (SHPO #19158)
T17S R2W	34	Site assessment excavations at site 35LA657 at MountainGate Development	Oetting 2004a (SHPO #19156)
T17S R2W	34	Data recovery investigations at site 35LA1261 at MountainGate Development	Oetting 2002c (SHPO #19154)
T17S R2W	34	Investigation relating to artifacts reported in or near MountainGate Development; possibly associated with 35LA1276 or an unrecorded site on private land	Oetting 2009 (SHPO #22931)
T17S R2W	34	Survey of proposed South 59th & Aster drainage improvement, Springfield; negative results	Pettigrew 2011 (SHPO #24719)
T17S R2W	34	Cultural resource study for Thurston High School cellular facility; negative results	Kent and Willingham 2001 (SHPO #18169)
T17S R2W	34	Survey of property in Springfield for proposed filling of wetlands; negative results	Minor 2003 (SHPO #18743)

Township & Range	Section(s)	Description and Comments	Reference(s)
T17S R2W	34	Survey for MountainGate storm sewer project; negative results	Minor 2004 (SHPO #18905)
T17S R3W T18S R3W	28, 33 3, 4, 10, 11, 13, 14, 23, 24	Survey and shovel testing for I-5 sign replacement project; negative results within 1 mile of the Study Area	Buchanan and Reese 2008 (SHPO # 22141)
T17S R3W	35	Survey of the proposed Francisco Park Subdivision, Springfield; negative results	Aikens 1977 (SHPO #221)
T17S R3W	35	Archaeological assessment for street improvements on "A" and Mill streets, Springfield; negative results	Hart 2012a (No SHPO #)
T17S R3W T18S R2W T18S R3W	35, 36 6, 8 1, 2	Survey of the Springfield Millrace Aquatic Ecosystem Restoration Project Area; negative results	De Freitas et al. 2003 (SHPO #18643)
T18S R2W T18S R3W	5, 6, 7 ,8 1, 2, 11, 12	Survey, monitoring, and testing for the Middle Fork Willamette River Loop Path at Dorris Ranch; sites 35LA1465, 35LA1470, 35LA1471, and four isolates recorded, site form for 35LA179 updated	Carlisle 2009e (SHPO #22365)
T18S R2W T18S R3W	7 1, 11, 12	Survey of the Nature Conservancy's Willamette Confluence Preserve; various farm-related materials noted at Hilger and Compton farms	Musil 2012b (SHPO #26265)
T18S R3W	2	Testing at an early house site at Dorris Ranch	Bowyer and Speulda 1994 (SHPO #23582)
T18S R3W	2	Monitoring for utility excavations related to Dorris Ranch trail; historical artifacts found at 35LA1470, angular debris and FCR found at 35LA179	Kolar and Minor 2013 (SHPO #26235)
T18S R3W	2, 3, 10, 11	Survey of Bridge 08445 (Oregon Hwy 99 over I-5); negative results	Edwards 2004a (SHPO #19467)
T18S R3W	2, 3, 10, 11	Survey of Bridge 08870 (I-5 over Oregon Hwy 99 Connector); negative results	Edwards 2004b (SHPO #19500)
T18S R3W	2, 11	Survey of Dorris Ranch; negative results within 1 mile of the Study Area	Lebow 1987 (SHPO #9153)
T18S R3W	14	Survey of Bridge 06836A (I-5 over Franklin Blvd. and UPRR); negative results	Edwards 2004c (SHPO #19506)
T18S R3W	14	Survey of the Lane Community College Forest Property; negative results within 1 mile of the Study Area	Pettigrew 1996b (SHPO #15569)
T18S R3W	14, 15	Survey and metal detector investigation at Oak Hill School; negative results	McAlister 2013 (SHPO #26084)
T18S R3W	15	Survey for the cellular communications tower site; negative results	Stipe 2013 (SHPO #25899)

Source: Oregon State Historic Preservation Office. 2014.

**Figure 4.4-2. Location of Study Area on 1853 and 1855 General Land Office Cadastral Survey Plats**



Source: General Land Office, 1853a, 1853b, 1855a, 1855b.

#### 4.4.3 Opportunities and Constraints

In general, very little archaeological work has been conducted within the Study Area, much of which is within the urban growth boundary for the City of Springfield. The focus of archaeological studies to date has been along the primary transportation corridors and various waterways. As a result, those are the locations where recorded archaeological sites are clustered. Numerous historical features have been identified relating to the railroad and the Springfield millrace; a few cabin sites or homesteads have also been recorded.

A review of the recorded sites in the Study Area indicates that most of the archeological sites recorded to date are prehistoric in age. These sites are generally lithic scatters and campsites located on slightly elevated terraces above rivers and streams, and also at higher elevations such as knolls and hills offering good visibility and a different range of resources. A handful of sites have also been identified at the ecotone between the base of hills and the floodplain. Fewer sites than might be expected appear to have been documented along the Willamette River; however, this may be the result of repeated flooding of the river and the fact that it has meandered over time, likely scouring some evidence of prehistoric occupation. The General Land Office cadastral survey plats from 1853 and 1855 (Figure 4.4-2)

suggest that the west portion of the Study Area will be likely to contain sites associated with the main course of the Willamette River and its terraces, while the level prairie noted between the Middle Fork Willamette and the McKenzie rivers has fewer features and therefore patterns in the distribution of archaeological sites would be more difficult to predict.

While there is potential for the discovery of additional archaeological sites in the confines of the Study Area, it is likely that most evidence has been destroyed during road construction and residential and commercial development (see Figure 4.4-1 for extent of development as mapped in 1983).

Archaeological features are more likely to be encountered in the Study Area if work is conducted away from long-established roadways, which is unlikely for a transit corridor project. The “L-joint” in the Study Area is situated in the oldest part of town. Judging by the number of sites recorded in the general area beyond the project vicinity, it appears that there is a potential for additional prehistoric and historical archaeological sites to be encountered in areas that are less developed.

If a project is advanced from this study, an intensive survey supplemented with subsurface discovery probes would be the most reliable means of identifying archaeological sites that may be affected by the proposed project.

#### 4.4.4 Conclusions

Given the size of the Study Area, only general observations can be made about the potential for encountering archaeological resources within the Study Area as project design moves forward. The patterning of recorded archaeological sites to date reflects a strong association with water courses and historically used areas, neither of which can be reasonably avoided during project design. Alternatives that follow routes that correspond with existing, more recent development and other areas of disturbance are less likely to encounter previously unrecorded archaeological resources.

### 4.5 Biological Resources and Endangered Species

This section summarizes the review of biological resources and Endangered Species within the Main-McVay Corridor for the purposes of developing and screening transit improvement alternatives. Environmental Science & Assessment, LLC (ES&A) reviewed existing data and, on June 24, 2014, conducted a windshield survey of the project area. The presence of protected biological resources can affect the development of alternatives.

#### 4.5.1 Existing Conditions

The windshield survey identified potential habitat for sensitive plant and wildlife species. Observed wildlife species noted during the survey included red-winged blackbird (*Agelaius phoeniceus*), European starling (*Sturnus vulgaris*), American crow (*Corvus brachyrhynchos*), cedar waxwing (*Bombycilla cedrorum*), rufous-sided towhee (*Pipilo erythrophthalmus*), Canada goose (*Branta canadensis*) and violet-green swallow (*Tachycineta thalassina*). Much of the open space area observed appeared suitable to support deer, raccoon, coyote and other species typical to urban environments.

The Main Street portion of the Study Area is highly developed and consists primarily of residential, commercial and industrial properties. Franklin Boulevard and McVay Highway are also developed, but



contain more undeveloped land than Main Street. The areas near Lane Community College contain mostly open space area consisting of upland and wetland plant communities. Natural resources have been altered significantly within the project area, especially along Main Street, Franklin Boulevard and McVay Highway. Natural resources consist predominately of street trees, wetland pockets and remnant wetland ditches.

#### 4.5.1.1 Listed Species

Table 4.5-1 includes federal and state listed species identified by the Oregon Biodiversity Information Center (ORBIC), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Services (NMFS) and Oregon Department of Agriculture (ODA) as occurring in the vicinity of the Study Area. ORBIC data pertaining to documented occurrences of rare, threatened, and endangered species was reviewed for the area within a two-mile radius of the Study Area. Based on the findings of ES&A's preliminary review, Table 4.5-1 identifies whether the Study Area contains suitable habitat.

**Table 4.5-1. Federal and State Listed Species**

Common ( <i>Scientific</i> ) Name	Federal Status	State Status	Suitable Habitat
<b>Birds</b>			
Northern spotted owl ( <i>Strix occidentalis caurina</i> )	T, CH	T	No
Streaked horned lark ( <i>Eremophila alpestris strigata</i> )	T, CH	SC	Yes
Yellow-billed cuckoo ( <i>Coccyzus americanus</i> )	PT	SC	Yes
<b>Herptiles</b>			
Western pond turtle ( <i>Actinemys marmorata</i> )	SOC	SC	Yes
<b>Insects</b>			
Fender's blue butterfly ( <i>Icaricia icarioides fenderi</i> )	E, CH	None	Yes
<b>Fish</b>			
Bull trout ( <i>Salvelinus confluentus</i> )	T, CH	SC	Yes
Oregon chub ( <i>Oregonichthys crameri</i> )	T, CH	SC	Yes
Upper Willamette River ESU Chinook salmon ( <i>Oncorhynchus tshawytscha</i> )	E, CH, EFH	SC	Yes
Upper Willamette River DPS steelhead ( <i>Oncorhynchus mykiss</i> )	T, CH	SV	Yes
Lower Columbia River Coho salmon ( <i>Oncorhynchus kisutch</i> )	EFH	E	Yes
<b>Plants</b>			
Bradshaw's desert-parsley ( <i>Lomatium bradshawii</i> )	E	E	Yes
Kincaid's lupine ( <i>Lupinus oreganus</i> var. <i>kincaidii</i> )	T, CH	T	Yes
Willamette daisy ( <i>Erigeron decumbens</i> var. <i>decumbens</i> )	E, CH	E	Yes
Wayside aster ( <i>Eucephalus vialis</i> )	SOC	T	Yes
White-topped aster ( <i>Sericocarpus rigidus</i> )	SOC	T	Yes
Shaggy horkelia ( <i>Horkelia congesta</i> ssp. <i>congesta</i> )	SOC	C	Yes

T = Listed Threatened; E = Listed Endangered; PT = Proposed Threatened; SOC = Species of Concern; CH = Critical Habitat has been designated; EFH = Essential Fish Habitat, SC = Sensitive-Critical, SV = Sensitive-Vulnerable, C = Candidate; ESU, Evolutionarily Significant Unit, DPS = Distinct Population Segment

Sources: Oregon Biodiversity Information Center (ORBIC), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Services (NMFS) and Oregon Department of Agriculture (ODA)

Several of the federally listed species potentially occurring in Lane County clearly do not inhabit the project area due to lack of suitable habitat. Species not included in Table 4.5-1 consist of sea turtles (green, leatherback and loggerhead), short-tailed albatross, western snowy plover (Pacific coastal population), and the Oregon silverspot butterfly. All of these species inhabit coastal areas. Marbled murrelet requires old growth forest and are found only in the Coast Range.

#### 4.5.1.2 Birds

*Northern spotted owl* range from southwestern British Columbia to northwestern California, but the majority of the documented nesting population is found in western Oregon (Forsman *et al.*, 1984, Marshall *et al.*, 1996). Preferred nesting and foraging habitat is mature coniferous forests, though spotted owls make extensive use of young forest in areas where old growth habitat is lacking (Forsman *et al.*, 1984, Thomas *et al.*, 1990). Spotted owls may use low to mid-elevation coniferous forest habitat. However, very few northern spotted owls are found in the Willamette Valley (72 FR 32450). Northern spotted owl populations within 8 of 12 Study Areas have been declining since 1994/1995 studies (72 FR 32450). The 2007 Draft Recovery Plan concluded that “barred owls (*Strix varia*) are exacerbating the spotted owl population decline, particularly in Washington, portions of Oregon, and the northern coast of California” (72 FR 32450).

The project area does not support suitable habitat for northern spotted owl. For general information on the habitat requirements and life history of the northern spotted owl, see the Federal Register (FR) notice published on June 12, 2007 (72 FR 32450).

Critical habitat was proposed for the northern spotted owl on June 12, 2007 (72 FR 32450) with revised designations on August 13, 2008 (73 FR 47326). The primary constituent elements (PCEs) essential for the conservation of northern spotted owl includes forest types known to support the northern spotted owl across its geographic range; forest types of sufficient area, quality, and configuration; and dispersal habitat (72 FR 32450). The criteria considered in determining selection of specific areas as critical habitat can be found in the FR published on June 12, 2007 and August 13, 2008 (72 FR 32450 and 73 FR 47326). No critical habitat is designated within the project area (USFWS, 2014).

*Streaked horned lark* is a ground-dwelling, sparrow-sized bird, which breeds west of the Cascade Range from southwest British Columbia to southwest Oregon. It winters in the breeding range and south to northern California.

The habitat of this species consists of open fields, particularly those having bare ground or sparse vegetation. The nest cavity is dug in dry ground in sparse vegetation (Marshall *et al.*, 1996). ODFW has prepared the Oregon Conservation Strategy which articulates goals and identifies actions that conserve and restore Oregon’s species, habitats and ecosystems (ODFW, 2006). The limiting factors for this species include loss and degradation of grassland habitat and nesting failure due to timing of land management practices (i.e., mowing, haying, spraying) (ODFW, 2006). The criteria considered in determining selection of specific areas as critical habitat can be found in the FR published on October 3, 2013 (78 FR 61506). No critical habitat is designated within the project area (USFWS, 2014).

According to ORBIC, there are no known records of the species within two miles of the project site (ORBIC, 2014). Suitable nesting and foraging habitat for this species is present in the project vicinity, however most of the suitable habitat is managed (i.e., agricultural).

*Yellow-billed cuckoo* is found in open woodland, parks, deciduous riparian woodland and nests in tall cottonwood and willow riparian areas (NatureServe, 2014). They need dense foliage near the ground. Loss of riparian habitat to urbanization, agriculture, drainage, grazing and protection from spring flooding has resulted in decline of the species (Marshall *et al.*, 1996). The yellow-billed cuckoo is the only species proposed for listing in Lane County. Habitat conditions exist for this species in the project area.

#### 4.5.1.3 Invertebrates

*Fender's blue butterfly* is endemic to the native upland prairies of the Willamette Valley in Oregon. A few small populations of the species can also be found in southern Washington. Only one-tenth of one percent of the original habitat once available to the Fender's blue butterfly and Kincaid's lupine (*Lupinus sulphureus* var. *kincaidii*) (the butterfly's primary food source), or approximately 400 hectares of prairie, exists today. Fender's blue butterflies live primarily in the upland prairies of Oregon's Willamette Valley. For general information on the habitat requirements and life history of the Fender's blue butterfly, see the FR notice published on January 25, 2000 (65 FR 3875).

Critical habitat was designated for Fender's blue butterfly on October 31, 2006 (71 FR 63862). The primary constituent elements essential for the conservation of Fender's blue butterfly include having enough high-quality habitat to maintain viable populations across the range of the species. This would require habitat restoration to create new sites, expanding the size of existing sites, and creating habitat networks that connect isolated populations (71 FR 63862). The criteria considered in determining selection of specific areas as critical habitat can be found in the FR published on October 31, 2006 (71 FR 63862). No critical habitat occurs within the project area for Fender's blue butterfly (USFWS, 2014).

#### 4.5.1.4 Plants

*Willamette daisy* is listed under both the Endangered Species Act (ESA) (65 FR 3875) and Oregon Endangered Species Act (OESA) (ORBIC, 2013) as an endangered species. Critical habitat was designated October 31, 2006 (71 FR 63862).

*Willamette daisy* is endemic to the Willamette Valley, where historically it was likely widespread (USFWS, 2008b). *Willamette daisy* occurs in native prairie grasslands (ORBIC, 2013), typically on alluvial soils such as Wapato, Bashaw, and Mcalpin Series (USFWS, 2008b). Habitat for the species includes wet tufted hairgrass (*Deschampsia cespitosa*) bottomlands and more well-drained red fescue grasslands (ORBIC, 2013). Sites often occur on relatively undisturbed sites with a diversity of native forb and grass species. A few populations exist on more degraded sites, but the populations at disturbed sites are generally small. For additional information on the habitat requirements and life history of the *Willamette daisy*, see the FR notice published on January 25, 2000 (65 FR 3875).

Willamette daisy has not been documented in the project area (ORBIC, 2014). No critical habitat occurs within the project area for Willamette daisy (USFWS, 2014).

*Bradshaw's desert parsley* is listed under both the ESA (53 FR 38448) and OESA (ORBIC, 2013) as an endangered species. No critical habitat has been designated for the species (USFWS, 2008a).

Bradshaw's desert parsley is endemic to the native wet prairies of central and southern Willamette Valley of Oregon (USFWS, 1993). The majority of populations occur on seasonally saturated or flooded prairies with dense, heavy clay soils (USFWS, 1993). The tufted hairgrass wet meadow community is the most common habitat for the species (USFWS, 1993). For additional information on the habitat requirements and life history of the Bradshaw's desert parsley, see the FR notice published on September 30, 1988 (53 FR 38448).

Bradshaw's desert parsley has not been documented in the project area (ORBIC, 2014).

*Kincaid's lupine* is federally listed as a threatened species (65 FR 3875) and is also listed by the State of Oregon as a threatened species (ORBIC, 2013). Critical habitat was designated for the species on October 31, 2006 (71 FR 63862).

Kincaid's lupine typically occurs in native upland prairie habitats with heavy soils (65 FR 3875). For additional information on the habitat requirements and life history of the Kincaid's lupine, see the FR notice published on January 25, 2000 (65 FR 3875).

Kincaid's lupine has not been documented in the project area (ORBIC, 2014). No critical habitat occurs within the project area for Kincaid's lupine (USFWS, 2014).

#### **4.5.1.5 Fish**

According to StreamNet (2014), NMFS (2014a), USFWS (2014), and ORBIC (2014) data, the McKenzie, Willamette, Coast Fork and Middle Willamette Rivers are used by several salmonid and resident fish species. Oregon Department of State Lands (DSL) (2009) designated Essential Salmonid Habitat (ESH) in the portions of the Willamette River near the project area. Essential Fish Habitat (EFH) has been designated for Chinook and coho salmon in the Willamette and McKenzie Rivers (NMFS, 2014a).

Based on ODFW and StreamNet data, Upper Willamette River Chinook salmon rear in the Willamette and Coast Fork Willamette Rivers, and spawn in the McKenzie and Middle Fork Willamette Rivers (ODFW, 2014 and StreamNet, 2014). Additional rearing for Chinook salmon occurs within McKenzie and Middle Fork Willamette Rivers tributaries (ODFW, 2014 and StreamNet, 2014). Upper Willamette River steelhead rear in the Willamette River and spawn in the Coast Fork and Middle Fork Willamette Rivers (ODFW, 2014 and StreamNet, 2014).

Critical habitat is designated for Chinook salmon in the Willamette River (70 FR 52630). Critical habitat has not been designated for steelhead in the Upper Willamette River south of the Calapooia River confluence (70 FR 52630).

Based on USFWS, ODFW and StreamNet data, bull trout historically utilized the Willamette and Middle Fork Willamette Rivers. Bull trout rear in the McKenzie River (70 FR 56212; ODFW, 2014 and StreamNet, 2014). Critical habitat has been designated for bull trout in the Middle Fork Willamette and McKenzie Rivers (70 FR 56212).

Based on the Oregon Chub Investigations 2013 Annual Progress Report, Oregon chub occur in the McKenzie, Coast Fork and Middle Fork Willamette Rivers (Bangs *et al.*, 2013). Critical habitat has been designated for Oregon chub in creeks and ponds off of the McKenzie and Middle Fork Willamette Rivers, but not in the project area (75 FR 11010, 75 FR 18107 and USFWS, 2014). Habitat conditions may exist for Oregon chub within the project area, therefore confirmation with ODFW regarding Oregon chub presence (or lack of presence) will need to occur.

#### **4.5.1.6 Candidate and Species of Concern**

Candidate species include red tree vole, Northern Oregon Coast Distinct Population Segment (*Arborimus longicaudus*) and whitebark pine (*Pinus albicaulis*). The Study Area does not contain habitat for either the red tree vole or whitebark pine.

In addition to federally listed, proposed for listing and candidate species, ORBIC data includes numerous species of concern, several of which could potentially occur within the proposed project area (ORBIC, 2014). Western pond turtle, wayside aster, white-topped aster and shaggy horkelia are federal species of concern. The wayside and white-topped asters are state listed as threatened species, shaggy horkelia has a state status of candidate, and the state status for the pond turtle is sensitive critical. The Study Area contains suitable habitat for western pond turtle, wayside aster, white-topped aster and shaggy horkelia.

#### **4.5.2 Future Conditions**

Development is anticipated to continue in the area, and impacts to open spaces, upland trees and street trees within the Study Area are likely to occur. Higher value open space and upland forested areas may be preserved.

It is not yet known if any of the transportation projects described in Section 2.2 would alter the future conditions of waterways. The Franklin Boulevard Redevelopment Project could involve bridge work and modification of stormwater treatment and conveyance systems. The Boulevard Study (University of Oregon, 2009) identifies potential new pedestrian bridges over the Willamette River. It is unknown if such future bridge construction would result in impacts to the river.

#### **4.5.3 Opportunities and Constraints**

If a transit project is pursued, construction could result in removal of street trees and upland trees located adjacent to roadways in open spaces. Compliance with Migratory Bird Treaty Act (MBTA) would be required to minimize impacts to migratory birds.

Biological-related constraints to the project include the need for rare plant surveys when alternatives are identified. Alternatives with larger construction areas would require larger rare plant survey areas. If spot improvements are located outside of potential rare plant habitat, the need for extensive rare



plant surveys may be avoidable. However, construction areas located within potential rare plant habitat would need to be surveyed during the appropriate seasons for detecting target rare plant species. This would likely include multiple rare plant surveys in order to accurately survey for multiple target species that bloom at various times between April and September.

Increase in impervious surface could result in increased runoff and pollution into area waterways, impacting the four threatened and endangered fish species (Chinook salmon, steelhead, bull trout, and Oregon chub) that occur in the McKenzie, Willamette, Coast Fork and Middle Fork Willamette Rivers. Runoff from the project area could reach these waterways via the stormwater system(s). The project would most likely be required to treat runoff consistent with NMFS SLOPES V guidance in order to minimize impacts to listed fish species (NMFS, 2014b).

#### **4.5.4 Conclusions**

No direct impacts to plant, invertebrate and avian designated critical habitat are anticipated since none exists within the project area. Listed fish and critical habitat exist in the project area. Detailed rare plant reconnaissance, documentation of street and upland trees, and an assessment of stormwater improvements should be conducted as project planning proceeds in order to guide decision making related to project alternatives.

### **4.6 Energy**

This energy analysis provides a summary of the existing energy usage in the Study Area, including the type, source, and utilization rates for various energy sources. In particular, the discussion of current energy use focuses on electrical and fossil fuel use and the demand for these resources.

#### **4.6.1 Existing Conditions**

##### **4.6.1.1 Electricity**

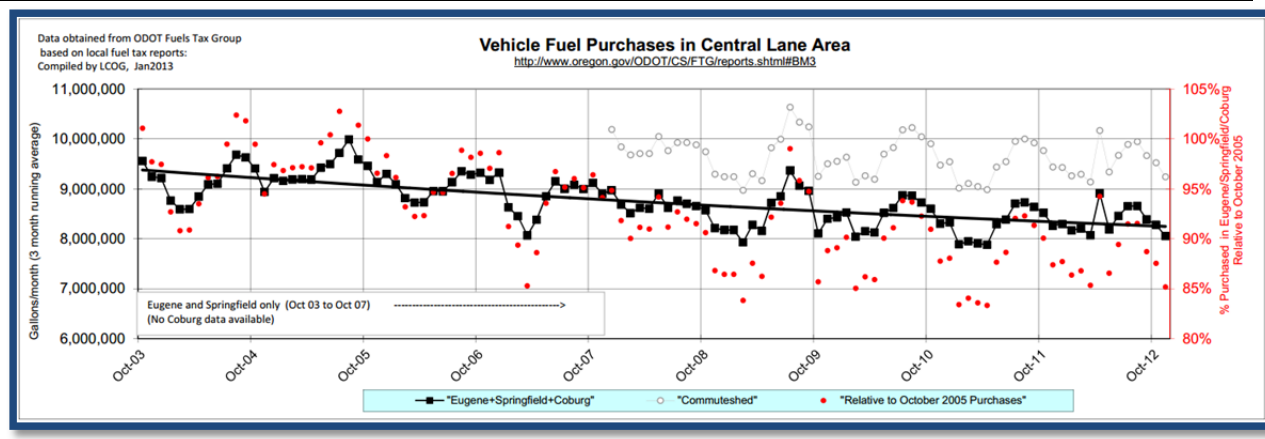
The Springfield Utility Board (SUB) provides electricity and water services to the residents and businesses of the City of Springfield and adjacent suburban areas. SUB serves its customers with power it purchases from Bonneville Power Administration (BPA). SUB's power distribution is dominated by hydroelectric, wind, and other sources. According to BPA, its power resource portfolio in 2013 consisted of 84 percent from hydroelectric generating facilities, 10 percent from nuclear power and the remaining 6 percent from other regional sources (BPA, 2013). The 2013 overall annual average residential consumption for SUB electric customers was 13,620 kWh.

##### **4.6.1.2 Petroleum**

Nationally, there has historically been a consistent increase in year-to-year fuel consumption, the result of increases in vehicle registrations and vehicle miles traveled per year. Transportation comprises the highest use of petroleum in Oregon. However, between 2007 and 2013 fuel consumption in Oregon decreased by about 5 percent as a result of the economic recession and the switch to more fuel-efficient vehicles, including hybrid and electric vehicles.

Based upon local fuel sales tax receipts, gasoline sales in the Central Lane area have been in decline in recent years (Figure 4.6-1). In October 2012, fuel usage was about 87 percent of usage in October 2005. It is anticipated that the levels of use will remain lower than 2005 levels until the economy has made a more complete recovery.

**Figure 4.6-1. Vehicle Fuel Purchases in Central Lane County**



Source: Lane Council of Governments. 2012.

According to the Oregon Department of Environmental Quality, Oregon Motor Fuel Consumption was comprised of approximately 1.59 billion gallons of petroleum in 2007. Approximately 560 million gallons of diesel gasoline was used for on-highway transportation in 2007.

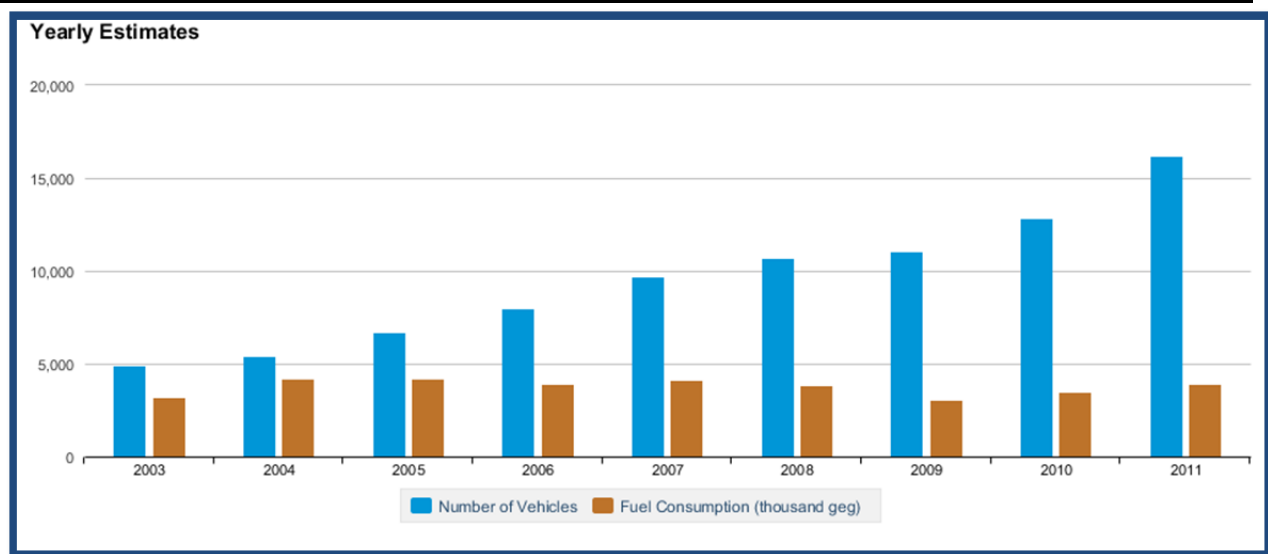
#### 4.6.1.3 Other Transportation Fuel Sources

Alternative fuels used for transportation in Oregon include ethanol, biodiesel, compressed natural gas, liquefied natural gas, liquefied petroleum gas (propane) and electricity. These alternative fuels are used in place of diesel and gasoline, although some are either used with, or partially derived from, petroleum products.

Between 2006 and 2011, vehicles that use alternative fuels have more than doubled. Despite the increase, alternative fuel consumption, measured in Gasoline-Equivalent Gallons (GEG), has stayed constant. This is mostly due to increasing efficiency of these types of vehicles.

At present, ethanol and biodiesel are the main alternatives to gasoline and diesel respectively and are the most commonly used alternative fuels in Oregon. In 2006, Oregonians used more than 95 million gallons of these fuels, up from 60 million gallons in 2002 (Figure 4.6-2). This represents just less than 5 percent of Oregon's gasoline supply. Following ethanol and biodiesel, compressed natural gas and propane are Oregon's most common alternative fuels (LTD, 2014). Biomass can be used to produce biofuels for transportation or stationary equipment.

**Figure 4.6-2. Vehicle Fuel Purchases in Central Lane County**



Source: Lane Council of Governments. 2012.

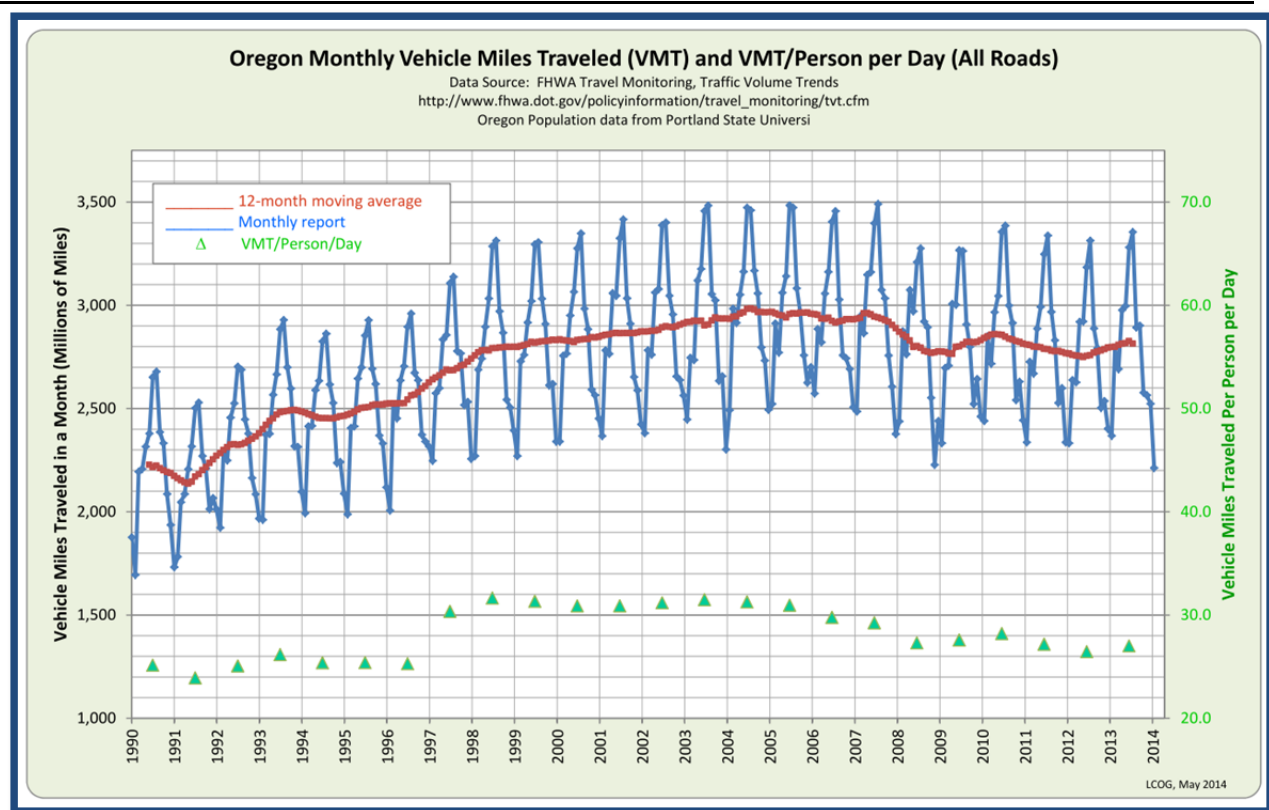
#### **4.6.1.4 Vehicle Miles Traveled**

For more than a decade, the rate of growth of vehicle miles traveled (VMT) in Oregon has been declining and, in recent years, absolute VMT has been decreasing (Figure 4.6-3). Per capita VMT on state highways has declined by about 12 percent from 1999 to 2014. Since 2005, overall VMT has been decreasing both statewide and in Lane County.

In the Eugene-Springfield MPO area, approximately 80 percent of workers reside within the metropolitan area, while 20 percent commute in from areas outside the area. The average round trip travel distance of workers within the metropolitan area is 8 miles for workers residing within the MPO and 48 miles for workers residing outside the MPO (ODOT, 2009).

As a result, the highest percentage of vehicles miles traveled is made by workers who reside outside of the MPO and travel to workplaces located within the MPO (approximately 60 percent of VMT). The GHG emissions for these workers are greater than that for workers residing within the MPO boundaries.

**Figure 4.6-3. Annual VMT in Lane County and Oregon (1990 – 2014)**



Source: Lane Council of Governments. 2014.

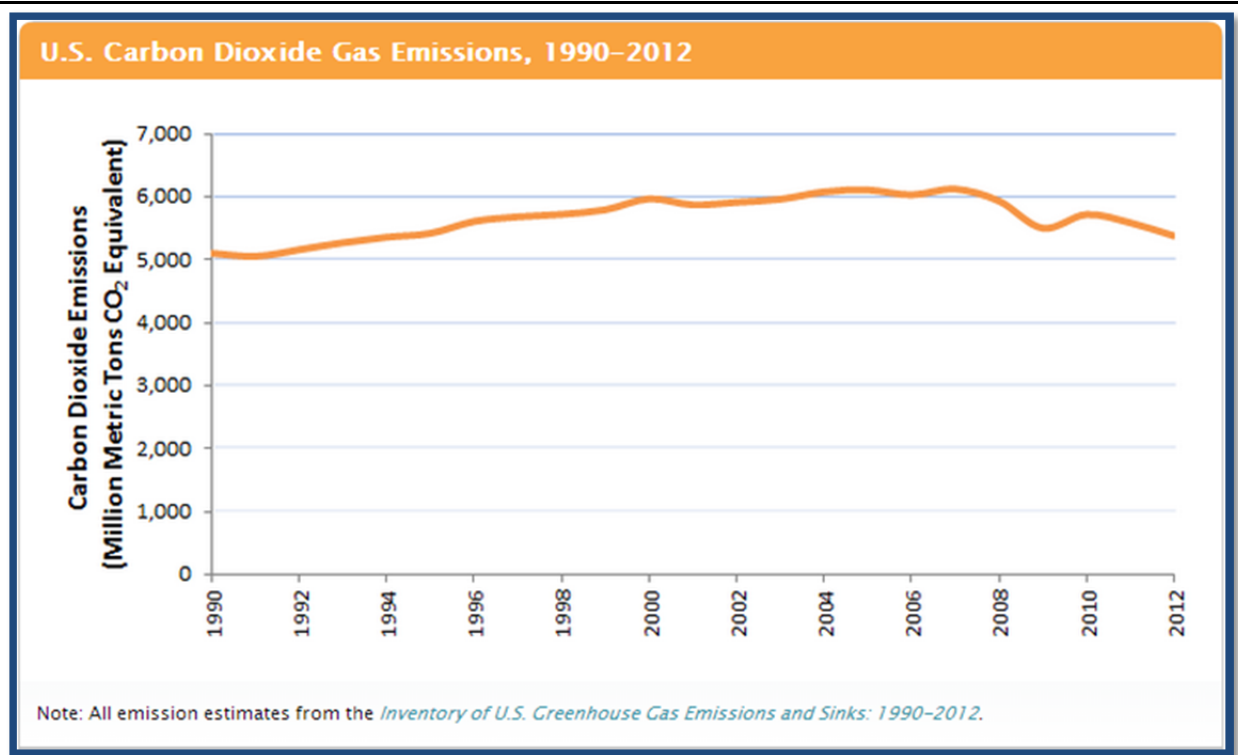
#### 4.6.1.5 Greenhouse Gas Emissions

Carbon dioxide accounts for the majority of greenhouse gas emissions. Nationwide, carbon dioxide emissions in 2007 were 20 percent higher than in 1990 (Figure 4.6-4). However, since 2007, carbon dioxide emissions have decreased, although 2012 emissions were still 5 percent higher than in 1990.

Highway vehicles are responsible for the majority of greenhouse gas emissions in the transportation sector. Highway vehicles were responsible for over 80% of all transportation energy use in 2007. Light duty highway vehicles, which include passenger cars and light duty trucks (sport utility vehicles, pickup trucks, and minivans) accounted for almost 75 percent of the on-road emissions, while heavy duty vehicles (primarily freight trucks) contributed to the remaining 25 percent (ODOT, 2009).

Most U.S. transportation sector carbon dioxide emissions come from petroleum fuels (98 percent). Motor gasoline has been responsible for about 60 percent of U.S. carbon dioxide emissions over the last twenty years.

Figure 4.6-4. US Carbon Dioxide Gas Emissions, 1990-2012



Source: U.S. Environmental Protection Agency. 2014.

Between 1990 and 2011, it is estimated that carbon dioxide emissions for cars, light trucks and motorcycles have increased 11.9 percent, and 70.1 percent for medium and heavy trucks and busses (Transportation Energy Data Book, 2010), for an average increase of 23.5 percent for highway uses (TEDB, 2013; Table 11.7).

This increase in emissions is occurring despite reductions in the carbon footprint of new light vehicles sold in the United States. Between 1975 and 2012, the carbon footprint for light vehicles sold in the United States dropped dramatically. Cars experienced the greatest decrease at 54.0 percent, while the carbon footprint for light trucks decreased by 43.4 percent (TEDB, 2013; Table 11.11).

Within Oregon, emissions from on-road vehicles (cars, trucks, buses, etc.) account for about 80 percent of transportation sector emissions. Of these, light vehicles (those less than 10,000 pounds) account for 75 percent. Light vehicle travel of metropolitan area households accounts for 56 percent of the emissions of all light vehicle travel, or 11.2 percent of all GHG emissions (ODOT, 2009). Within Oregon, the Eugene-Springfield area emits approximately 6 percent of the state's light vehicle greenhouse gas emissions (ODOT, 2009).

#### 4.6.2 Future Conditions

Nationally, the Energy Information Administration is predicting moderate growth in energy consumption, increased use of renewable energy, declining reliance on imported liquid fuels, and projected slow



growth in energy-related carbon dioxide (CO<sub>2</sub>) emissions in the absence of new policies designed to mitigate greenhouse gas (GHG) emissions.

The following summarizes some of these trends as they relate to the transportation sector:

- Transportation-related consumption of fuels is anticipated to grow. Growth in demand for transportation fuels is met primarily by diesel fuel and biofuels.
- Growth in transportation energy use will slow relative to historical trend. The slower growth is a result of changing demographics, improved fuel economy, and increased saturation of personal travel demand. Annual VMT is forecast to increase with continuing demand for transportation services that result from increases in population and GDP. This growth is anticipated to outpace the expected improvements in efficiency that would result from the most recent increases in U.S. CAFE standards.
- New CAFE and emissions standards are anticipated to boost vehicle fuel efficiency. The Energy Independence and Security Act of 2007 requires an average of 35 mpg in 2020.
- Renewable sources will increase as a source of primary energy consumption. In the transportation sector, petroleum's share of liquid fuel use is forecast to decline as consumption of alternative fuels (biodiesel, E85, and ethanol for blending) increases.
- Vehicles using alternative technologies are projected to increase. With more stringent CAFE standards and higher fuel prices, unconventional vehicles (vehicles that use alternative fuels, electric motors and advanced electricity storage, advanced engine controls, or other new technologies) are forecast to increase significantly.

#### **4.6.2.1 Peak Oil and Gas**

Some experts believe the peak in oil and gas resources is imminent or has already happened. Many believe it will occur before 2020. The most optimistic opinions place the peak around 2030. The primary difference revolves around estimates of the Earth's ultimately recoverable reserves and the effect of prices in stimulating advanced recovery and development of unconventional resources.

When peak oil and gas resources are reached and availability becomes more limited, it is likely to have a profound impact on energy production. Oil and natural gas have been relatively inexpensive and easy to produce, but the alternatives will be difficult and expensive to produce. As a result, more capital and energy will have to be allocated to produce alternative sources. In addition, many of the alternatives produce electricity rather than liquid transportation fuels. It could take decades to replace a significant amount of declining oil and natural gas reserves.

In addition to alternative supplies, it will be necessary to increase the efficiency of the energy used. It is anticipated that this will result in major investments in the energy efficiency of cars, homes and buildings, lights, appliances, and industrial processes.

### 4.6.3 Opportunities and Constraints

The Main-McVay Transit Study will have the opportunity to identify corridor solutions that can reduce greenhouse gas emissions in the corridor as well as reduce the reliance on personal automobile vehicles.

### 4.6.4 Conclusions

The impact of the potential transit options on energy is important, but should not dictate the transit options that are considered.

## 4.7 Geology / Geotechnical

This section summarizes the geologic and geotechnical factors within the Main-McVay Study Area. Geologic and geotechnical conditions within the Study Area, and particularly in the areas where transit improvements are most likely to occur, can have an impact on specifications for construction of roadway and structures, which can impact construction costs.

### 4.7.1 Existing Conditions

The majority of soil disturbance required by a project identified by the Main-McVay Transit Study would likely occur within the upper 10 feet of native and fill material currently present. The near surface materials throughout the entire corridor are dominated by unconsolidated alluvium deposits derived from recent river and stream deposits at the ground surface along the creeks and drainages adjacent to and within the Study Area (Figure 4.7-1 and Figure 4.7-2). As shown in the figures, the Main Street Segment is quite uniform in soil type, whereas the McVay Highway Segment is not. There are many types of soils throughout the Study Area. Table 4.7-1 lists the primary soils by area in the corridor.

Generally, the soils within the Main Street Segment are slightly to highly plastic with very high fines contents and are mapped by the Natural Resource Conservation Service as silt and clay loam soils. Such soils are somewhat susceptible to erosion. Because of their plasticity, they typically function poorly as structural fill or trench backfill in areas where post-construction trench backfill settlements may be of concern. This would include road subgrade areas or areas that will need to function as bearing strata such as foundation areas for retaining walls, buildings and etc. As shown on Figure 4.7-2, there are some slight slopes south of Main Street within this segment. The soils along the McVay Highway Segment are generally coarser gravel with some sand and silt and marine-deposited sediment. West of Interstate 5 are steeper slopes and rock outcroppings.

Shallow groundwater is prevalent throughout the Study Area, especially within the Main Street Segment. The USGS indicates that regional groundwater gradients in the Study Area trend downwards toward the Willamette River in a general downstream direction. Surface elevations range from 455 feet to 472 feet. Water well logs within the Study Area generally show water was encountered from 12 to 26 feet below the existing ground surface (WRD, 2014). The level of seasonal fluctuation is not large although water depths can be reduced to a few feet in places during seasons of prolonged, wet weather.

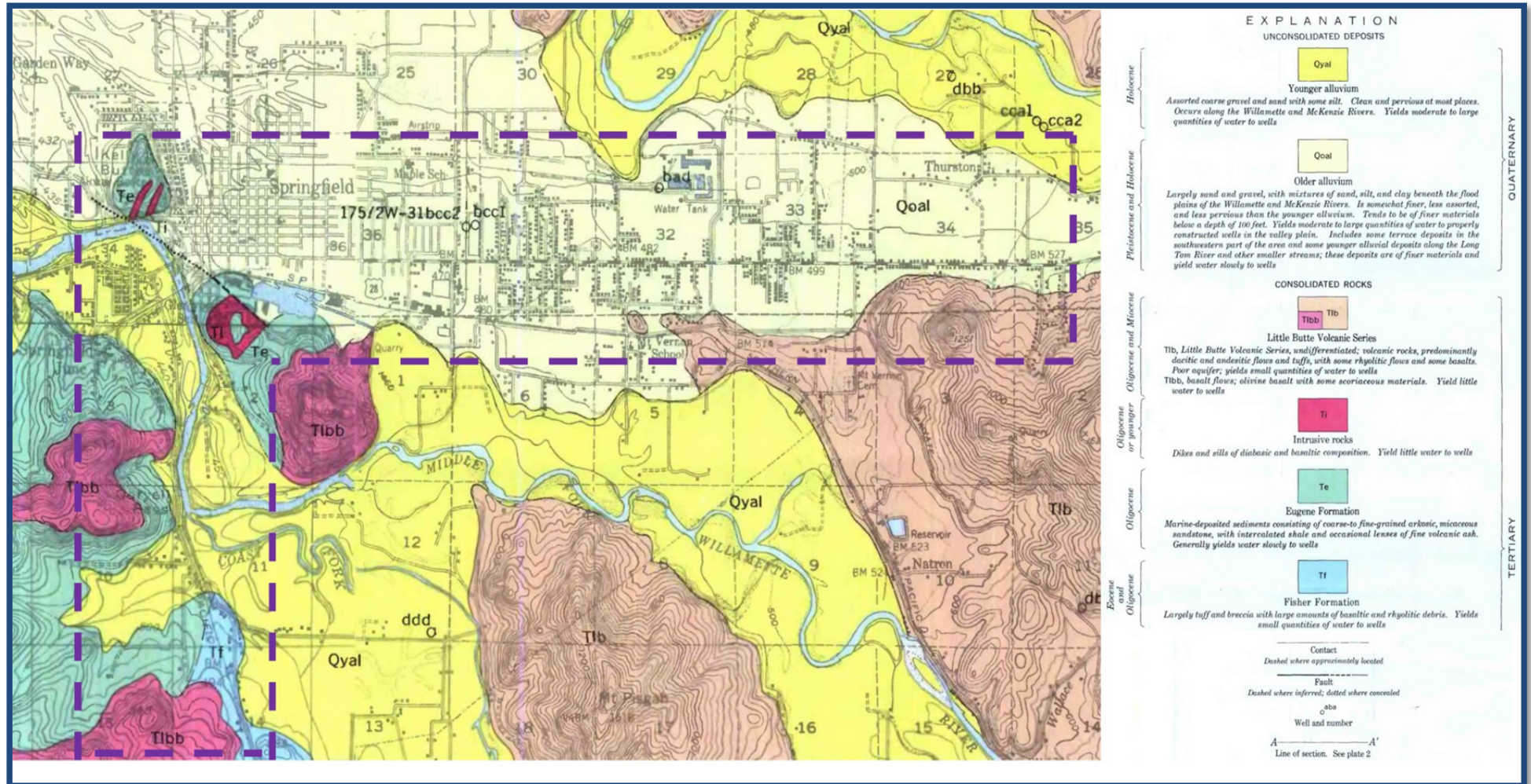
**Table 4.7-1. Primary Soil Types within the Study Area**

Soil Types	Area
Peavine silty clay loam	11%
Klickitat stony loam	8%
Bellpine silty clay loam	8%
Bohannon gravelly loam	8%
Preacher-Bohannon-Slickrock complex	7%
Digger-Rock outcrop complex	4%
Kinney cobbly loam	3%
Honeygrove silty clay loam	2%
Nekia silty clay loam	2%
Ritner cobbly silty clay loam	2%
Preacher loam	2%
Cumley silty clay loam	2%
Dixonville-Philomath-Hazelair complex	2%
Water	2%
Others	38%

Source: U.S. Department of Agriculture. 2013.

The entire Study Area has been mapped as having Lowest to Low hazard potential.

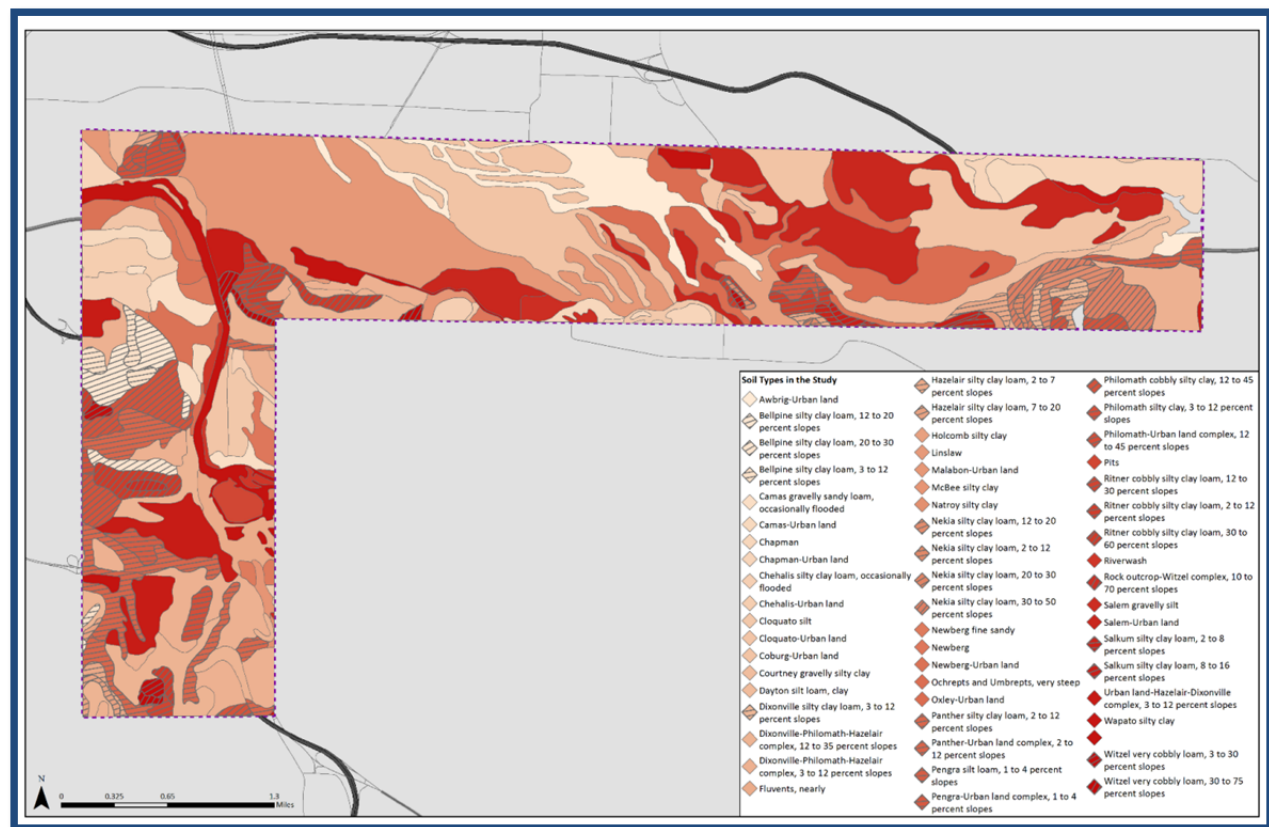
Figure 4.7-1. Unconsolidated Deposits within Main-McVay Study Area



Source: U.S. Geological Service. 1973.



**Figure 4.7-2. Soil Types within the Main-McVay Study Area**



Source: Prepared by Parsons Brinckerhoff from U.S. Department of Agriculture (2013). 2014.

## 4.7.2 Future Conditions

It is not expected that geologic conditions will change significantly within the planning horizon for this study.

## 4.7.3 Opportunities and Constraints

There are no significant geologic or geotechnical opportunities or constraints that would affect the consideration of transit alternatives.

## 4.7.4 Conclusions

Geologic and geotechnical issues should not affect the development and evaluation of transit options.

## 4.8 Hazardous Materials

The Resource Conservation and Recovery Act (RCRA) is a federal law that provides, in broad terms, the general guidelines for the federal waste management program. It includes a Congressional mandate



directing EPA to develop a comprehensive set of regulations to implement the law. The hazardous waste program, under RCRA Subtitle C, establishes a system for controlling hazardous waste from the time it is generated until its ultimate disposal.

EPA regulations, or rulemakings, translate the general mandate of RCRA into a set of requirements for the Agency and the regulated community. The RCRA hazardous waste program regulates commercial businesses as well as federal, State, and local government facilities that generate, transport, treat, store, or dispose of hazardous waste.

The Oregon Department of Environmental Quality (DEQ) is a regulatory agency whose job is to protect the quality of Oregon's environment. DEQ staff use a combination of technical assistance, inspections and permitting to help public and private facilities and citizens understand and comply with state and federal environmental regulations. The Environmental Protection Agency delegates authority to DEQ to operate federal environmental programs within the state, such as the federal Clean Air, Clean Water, and Resource Conservation and Recovery Acts.

DEQ implements Oregon environmental laws through its rules, which make up Chapter 340 of the Oregon Administrative Rules. DEQ authority to develop rules and related programs comes from the Oregon Legislature. The Oregon Environmental Quality Commission is the formal policy and rulemaking body for DEQ that adopts, amends or repeals proposed rules before they become effective.

#### 4.8.1 Existing Conditions

Hazardous waste is defined as a waste product with properties that make it dangerous or potentially harmful to human health or the environment. In regulatory terms, RCRA hazardous wastes fall into the categories of Listed Wastes and Characteristic Wastes, as detailed in Table 4.8-1.

**Table 4.8-1. RCRA Hazardous Wastes**

Waste Category	Regulations
Listed Wastes	
F-list(non-specific source wastes)	EPA 40 CFR §261.31
K-list (source-specific wastes)	EPA 40 CFR §261.32
P-list (discarded commercial chemical products)	EPA 40 CFR §261.33
U-list (discarded commercial chemical products)	EPA 40 CFR §261.33
Characteristic Wastes	
Ignitability	EPA 40 CFR §261.21
Corrosivity	EPA 40 CFR §261.22
Reactivity	EPA 40 CFR §261.23
Toxicity	EPA 40 CFR §261.24

Existing hazardous materials sites were identified by reviewing regulatory agencies' databases for relevant data. Entities included the Environmental Protection Agency (EPA) and the Oregon Department of Environmental Quality (DEQ). The cleanup sites within the Study Area are listed in Table 4.8-2 and shown in Figure 4.8-1.

**Table 4.8-2. EPA and Oregon DEQ Cleanup Sites within the Study Area**

Site Name	Site Location	City	Zip Code	County
<b>EPA Cleanup Sites</b>				
SeQuential Biofuels Station (EPA Brownfield)	86714 McVay Hwy	Eugene	97405	Lane
<b>Oregon DEQ cleanup sites</b>				
Borden Chemical Co. - Springfield	470 S 2nd St.	Springfield	97477	Lane
City of Springfield Chamber of Commerce	101 S "A" St.	Springfield	97477	Lane
Dynea U.S.A., Inc.	475 N 28th St.	Springfield	97477	Lane
Itel Railcar Corp.	303 S 5th St.	Springfield	97477	Lane
Junkyard John's	246 S 16th St.	Springfield	97477	Lane
Murphy Co. - Springfield	291 S 18th St.	Springfield	97477	Lane
Rosboro Lumber Co.	2509 Main St.	Springfield	97477	Lane
Sunny Service Station - Springfield	5737 Main St.	Springfield	97478	Lane
Wood Stave Line - Springfield	Downtown Springfield	Springfield	97477	Lane

Sources: U.S. Environmental Protection Agency. 2014.  
Oregon Department of Environmental Quality. 2014.

#### 4.8.2 Future Conditions

It is not expected that hazardous material conditions will change significantly within the planning horizon for this study.

#### 4.8.3 Opportunities and Constraints

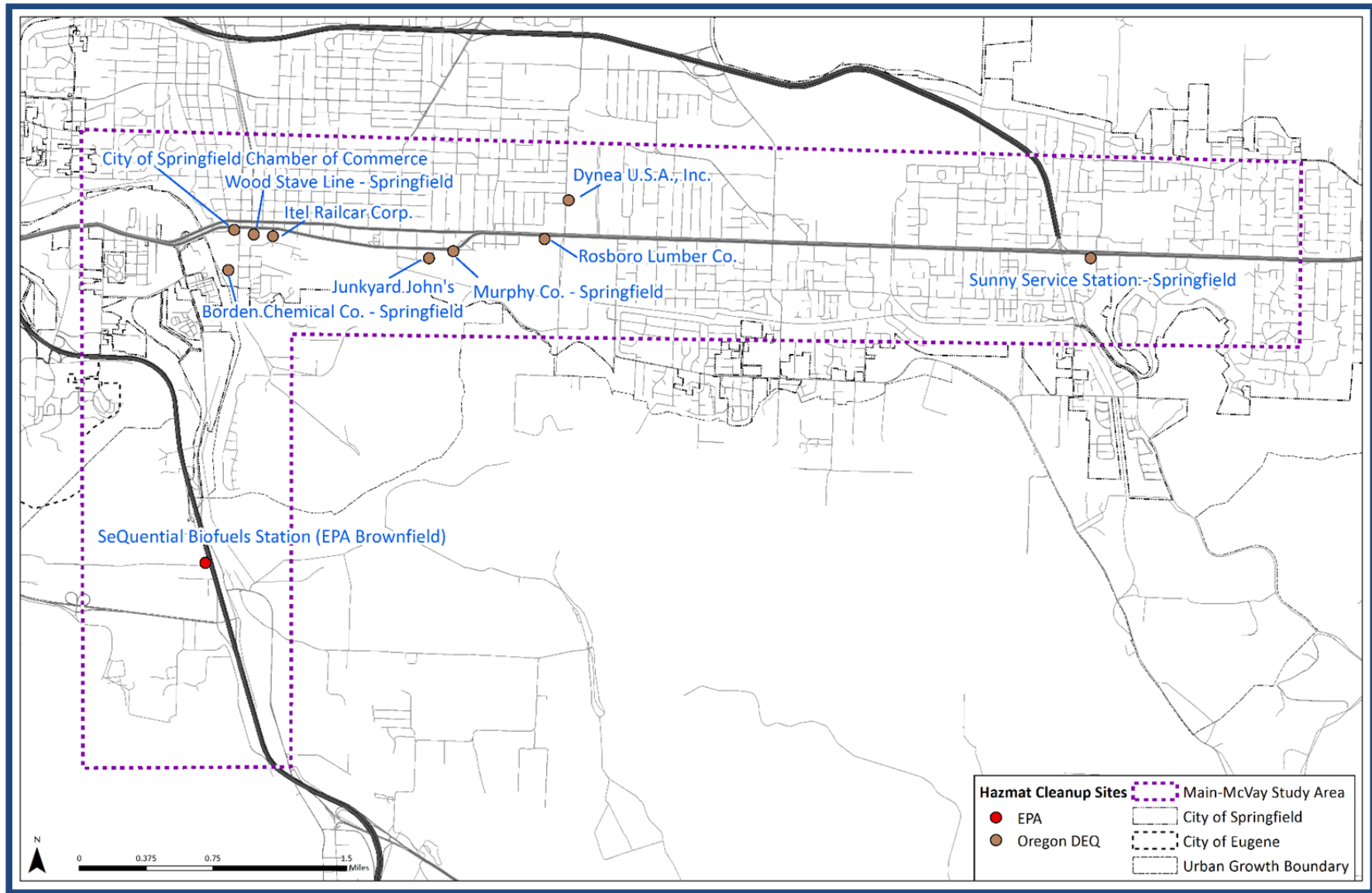
The Main-McVay Transit Study will have the opportunity to identify transit solutions that can reduce production of hazardous materials in the corridor, including reducing reliance on automobile trip making.

The primary constraint placed on this study related to hazardous materials is in regard to transit options impacting potentially contaminated sites, including the Oregon DEQ clean-up sites.

#### 4.8.4 Conclusions

The impact of the potential transit options in hazardous material is important, but should not dictate the transit options that are considered.

**Figure 4.8-1. Hazardous Materials Cleanup Sites Mapped in Study Area**



Source: Prepared by Parsons Brinckerhoff from EPA 2014 and Oregon DEQ 2014 Data. 2014.