4.15 Utilities

4.15.1 Introduction to Resources and Regulatory Requirements

This section analyzes the short-term construction and long-term operation impacts on utility providers and systems that would serve or could be affected by the light rail system and facilities. Utility providers throughout the study area include municipal agencies, public utility districts, and private companies. The study area is defined as the area within 100 feet of the alternative routes and stations and within the project limits for staging areas and maintenance facilities.

The relationship between transportation projects and utilities within the project corridor is regulated by local policies and procedures for Seattle, Mercer Island, Bellevue, and Redmond, as well as Washington Administrative Code (WAC) 468-34 and Washington State Department of Transportation (WSDOT) policies within their right-of-way.

4.15.2 Affected Environment

Sound Transit identified existing and planned utilities in the study area. Utilities considered in this analysis include water, sanitary sewer, storm sewer, electrical power, natural gas, telephone and communications infrastructure, and petroleum products pipelines. Information on existing utilities was obtained through a database research and by contacting local municipalities and utility companies.

Although the East Link corridor would cross a number of jurisdictions, including Seattle, Mercer Island, Bellevue, and Redmond, a number of utility providers are the same in them. Common utility providers in these jurisdictions include Puget Sound Energy for natural gas, Comcast for cable television, and Qwest Communications for telephone service. A number of other companies (e.g., AT&T, Verizon, Level 3 Communications) maintain fiberoptic cables throughout the area as well. Table 4.15-1 summarizes the utility providers in each jurisdiction.

4.15.2.1 Segment A

Electricity in Seattle is provided by Seattle City Light, and electricity on Mercer Island is provided by Puget Sound Energy; Puget Sound Energy provides natural gas in both locations. In Seattle, Seattle Public Utilities manages the water, sewer, and stormwater utilities. Seattle gets 70 percent of its water from the Cedar River watershed, with the remaining 30 percent coming from the South Fork Tolt River and from groundwater wells in the Highline Well Field. Therefore, Seattle Public Utilities owns water transmission lines that go through Mercer Island, Bellevue, and Redmond. In Mercer Island, the City of Mercer Island provides water and sewer services, with water service contracted to Seattle Public Utilities and sewer service contracted to King County Wastewater.

Qwest Communications provides telephone service throughout the entire project vicinity. Telephone lines in urban areas are typically located within street right-of-way, aboveground on utility poles, or underground in duct banks, often shared with other smaller fiberoptic utilities. Several private companies (Verizon, MFS Network Technologies, Level 3 Communications and others) maintain fiberoptic cables and/or provide long-distance telecommunications services in the project vicinity. In addition, local and state agencies have networks of fiberoptics within the roadway and right-of-way for emergency and traffic uses and for roadway lighting.

4.15.2.2 Segments B, C, D, and E and Maintenance Facilities

Puget Sound Energy is the natural gas and electricity provider in Bellevue and Redmond. Electrical substations are located on the south side of Bellevue Way at 112th Avenue NE, on NE 12th Street east of 116th Avenue NE, and on 152nd Avenue NE at NE 21st Street. Puget Sound Energy intends to expand the substation on NE 12th Street before project construction begins. Major transmission lines (115 kilovolt [kV] and 230 kV) are located along 136th Place NE, 140th Avenue NE, 114th Avenue SE, 116th Avenue NE, and NE 51st Street. Seattle City Light owns major transmission lines located along 124th Avenue NE.

The Cities of Bellevue and Redmond provide water, sewer, and stormwater service within their City limits. Both cities are members of the Cascade Water Alliance, which is an association of water and sewer districts that coordinate management of the water supply for the communities of Bellevue, Kirkland, Redmond, Issaquah, Sammamish, Tukwila, Covington, and Skyway. Seattle Public Utilities also maintains water transmission lines within these segments and supplies water to these areas for the Cascade Water Alliance. Olympic Pipe Line maintains two petroleum pipelines, a 16-inch and a 20-inch, that run north-south through east Bellevue, roughly parallel to 136th Place NE.

Major utility upgrades or expansions identified in the study area include the following:

- Puget Sound Energy plans to expand the substation on NE 12th Street east of 116th Avenue NE and gas lines within the study area.
- City of Bellevue is replacing and upsizing several sewer facilities within the study area.

TABLE 4.15-1
Utility Providers in Study Area

Jurisdiction	Utility	Provider
Seattle	Gas	Puget Sound Energy
	Electricity	Seattle City Light
	Water[a] and sewer (wastewater)	Seattle Public Utilities, King County Wastewater
	Stormwater	Seattle Public Utilities
	Cable	Comcast, Broadstripe
	Communications	Qwest Communications, Verizon, others
Mercer Island	Gas	Puget Sound Energy
	Electricity	Puget Sound Energy
	Water and sewer (wastewater)	City of Mercer Island (from Seattle Public Utilities and King County Wastewater)
	Stormwater	City of Mercer Island
	Cable	Comcast
	Communications	Qwest Communications, Verizon, others
Bellevue	Gas	Puget Sound Energy
	Electricity	Puget Sound Energy
	Water and sewer (wastewater)	City of Bellevue, King County Wastewater
	Stormwater	City of Bellevue
	Cable	Comcast, Broadstripe
	Communications	Qwest Communications, Verizon, others
Redmond	Gas	Puget Sound Energy
	Electricity	Puget Sound Energy
	Water and sewer (wastewater)	City of Redmond, King County Wastewater
	Stormwater	City of Redmond
	Cable	Comcast
	Communications	Qwest Communications, Verizon, others

[a] Seattle Public Utilities owns water transmission lines east of Lake Washington in the cities of Mercer Island, Bellevue, and Redmond.

- City of Redmond plans to construct a new stormwater trunk line within the former BNSF railway right-of-way in Downtown Redmond starting in summer 2011.

These projects would require continued coordination with utility agencies.

4.15.3 Environmental Impacts

4.15.3.1 No Build Alternative

Under the No Build Alternative, no light rail improvements would be constructed in the study area. Changes in land use in the project vicinity would determine the demand for utilities with or without light rail. Typically, automobile-oriented land uses are more spread out and less dense than transit-oriented development patterns. This could lead to development of more land area, creating demand for increased utility infrastructure to cover a greater area.

4.15.3.2 Impacts during Operation

Sound Transit conducted an inventory of impacts on utilities for the East Link Project. These utilities were divided into major utilities and minor utilities, with major utilities defined as follows:

- Water mains of 16-inch diameter or greater
- Sanitary sewer force mains and gravity sewers of 16-inch diameter or greater
- Storm drains of 36-inch diameter or greater
- 115-kV and greater electrical transmission lines
- High-pressure and intermediate-pressure gas lines with a 6-inch diameter or greater
- Telephone and fiberoptic duct banks with three or more conduits
- Petroleum product pipelines

Minor utilities were not inventoried; however, information obtained on the major utilities adequately depicts the degree to which alternatives could impact various utilities and could present potential construction and/or operation impacts. According to this inventory, major utilities affected by all alternatives include storm and sanitary sewers, aboveground electric lines, underground water and

natural gas mains, and underground telephone and fiberoptic lines.

As stated in the Utilities Element of the City of Bellevue's Planning and Community Development Policies, existing overhead utilities (power and communications) that require relocation as part of any project are to be relocated underground, which would apply to the utility relocations that are part of the East Link Project. The City of Redmond has a similar ordinance. For power lines, this would not apply to 115-kV and 230-kV transmission lines.

Electricity for the light rail project would be provided by Seattle City Light for the City of Seattle in Segment A and Puget Sound Energy for Mercer Island and in Segments B, C, D, and E. Puget Sound Energy also provides electric services to portions of the I-90 bridge. As discussed in Section 4.10, Energy Impacts, operating the light rail system would increase electricity demand in the study area but would reduce overall transportation energy consumption through reduced automobile use. The energy needed to power the East Link light rail vehicles would not require Seattle City Light or Puget Sound Energy to seek additional energy resources. Availability of power supply to each of the project's traction power substations might, in some cases, require that additional distribution lines to the substation be constructed. The specific needs will not be known until further coordination with Seattle City Light and Puget Sound Energy occurs during final design.

Under Sound Transit's Sustainability Initiative, adopted in 2007, Sound Transit would integrate efficient operating practices at existing and new facilities and use equipment to reduce energy and water demand and recycle water. Implementing these and other sustainability initiatives would reduce consumption and demand on utilities. The Sustainability Initiative is further discussed in Section 4.10, Energy.

The proposed light rail line would use up to four-car electric trains operating on direct-current (DC) power taken from the 26-kV electric distribution facilities. Lighting installed at stations and safety lighting along the routes, the maintenance facilities, parking areas, and other light rail facilities would increase electrical demand. The maximum peak demand for all alternatives would be similar, at approximately 245 million British thermal units (Btu) per day. This represents less than 0.1 percent of the total 2006 generation for Seattle City Light and Puget Sound Energy combined.

To distribute power along the corridor, traction power substations (TPSS) would be located approximately every 2 miles that would provide power to the overhead contact system that powers the light rail vehicles. These stations would be powered by 26-kV electric lines connecting to the nearest power pole. In Segment C, alternatives that require tunnels would have greater electricity requirements, and for all segments, longer alternatives would require more electricity than shorter ones. For further information on energy demands of the project and any additional infrastructure required, see Section 4.10, Energy Impacts. Stray electrical current from the light rail's traction power electrical system can cause damage to nearby utilities if not properly controlled. Section 4.13, Electromagnetic Fields, addresses indirect effects of stray currents from light rail vehicles.

No substantial differences among alternatives are expected in long-term utility service within any of the segments. Major service disruptions to utility customers during light rail repair and maintenance operations are unlikely. The light rail route would be located so that access to utilities for maintenance and repair could be maintained. In some cases, sewer holes, pipes, vaults, and other access points might have to be relocated. During design, Sound Transit would work closely with utility providers to provide required access to these utilities and any relocated sewer holes and vaults, utility mains, fire hydrants, and other features.

Maintenance Facilities

There are no impacts on major utilities from maintenance facilities during operation. At all potential sites, the proposed maintenance facilities would require new water supply connections for vehicle washing and other uses. Approximately 95 percent of maintenance base water demand is for vehicle washing. Vehicle washwater would be recycled. The additional demand would not greatly affect the water providers' existing and projected water supplies. Similarly, water demand would not likely compromise flow for fire protection, but demand should be coordinated with fire departments and water suppliers in order to avoid impacts.

The maintenance facilities drainage system would be designed to filter and recycle a high percentage of the wash and rinse water. Solids, oils, soaps, and other contaminants would be filtered, settled to a sludge tank, and periodically hauled for disposal in accordance with applicable regulations. Some disposal to the local sanitary sewer system would be expected from the recycled, filtered washwater. The water discharged to the sanitary sewer system would be

disposed of according to local and state regulations. For the potential sites, existing sewer lines on adjacent streets are available for sewer connections. Any needed stormwater detention facilities and infrastructure to collect storm- and wastewater would connect to both the existing sewer system and stormwater conveyances. Impacts on stormwater are discussed in Section 4.9, Water Resources.

4.15.3.3 Impacts during Construction

Impacts Common to All Build Alternatives

Sound Transit identified utility conflicts for each alternative either where underground utilities would be within the project limits or where the project route and existing utilities would intersect. The goals of identifying these conflicts are to plan for relocating the utilities during construction and, thus, remove conflicts with project construction; to prevent disturbing the route during future maintenance of underground utilities; to keep the profile—whether underground, surface, or elevated—clear of the minimum required distance from overhead utilities; and to account for the relocation costs.

Potential impacts during construction include relocating utility poles supporting overhead lines; constructing new distribution lines to provide power to substations; relocating underground utilities from under the alternatives, station areas, and maintenance facility sites (particularly at-grade segments constructed in road right-of-way); and inspecting, repairing, and encasing underground utilities at track crossings. In some cases, aboveground utilities located on poles could be relocated to taller poles or a different type of pole. Access to underground utilities, such as sewer holes or vaults, for maintenance activities could be affected depending on the location of light rail facilities. In some cases, these access points might need to be relocated. Relocating water mains could also affect access to and use of fire hydrants. In some cases, establishing a parallel water main to avoid utility lines crossing under the trackway might be considered. Some of these impacts might be substantial to some utility service providers in terms of relocation costs incurred, staff time and resources, and temporary loss of existing access to utilities. Relocation approaches and associated costs would be evaluated by Sound Transit on a case-by-case basis. Generally, the terms of a private utility's franchise agreement would be applied to determine the rights of the private utility in the public right-of-way and the responsibility for relocation costs. For public utilities, Sound Transit would seek to establish formal agreements with the public utility, and the relocation costs would be allocated pursuant to local ordinances or codes.

Typically, water lines and high-pressure gas mains are located about 3 to 6 feet underground and sewer pipes located 6 or more feet below the surface. Smaller pipes, fiberoptic cables, telephone lines, and other utilities are often buried less than 3 feet deep. Water, sewer, and storm drain pipelines typically run parallel beneath streets, placed in various locations ranging from the center to the roadway periphery, while fiberoptic cables, telephone lines, underground electrical conduits, and smaller pipes are often located beneath sidewalks. These utilities might or might not be affected during construction, depending on their depth, material composition, the excavation limits, exact location of the proposed route, and other factors. However, most underground utilities crossed by the proposed route are located within approximately 6 feet of the surface and within 35 feet of segment columns. Underground utilities would be relocated or otherwise protected to allow for excavation and to minimize potential load impacts on existing utilities from the weight of the light rail vehicles.

Generally, cut-and-cover construction, followed by at-grade construction, would have the greatest impacts on utility infrastructure, because these segments would relocate more underground pipes and aboveground utility poles for trackways, stations, and right-of-way curb and sidewalk acquisition. At-grade routes and cut-and-cover stations could require relocating longer sections of underground pipes and cables in street rights-of-way.

In most cases where an at-grade profile crosses an underground utility, a split casing could be installed, which is a steel pipe that serves as casing around the utility line or pipe, allowing the utility company to remove or install utilities at that location in the future without disturbing the ground above. Underground utilities, located within public road rights-of-way, parallel to and near or under the alternative would be moved to a different location within the right-of-way. As much as possible, piers for elevated guideways would be located to avoid conflicting with underground utilities. Retained-cut profiles could accommodate underground utilities that are under cross streets, but utilities outside of cross streets may present design problems. Bored tunnel profiles generally avoid utility conflicts except at stations, where temporary conflicts with underground utilities would occur during cut-and-cover construction of the station. For overhead electric lines, conflicts could occur where elevated guideways either run directly underneath the lines or where they cross the lines,

which would require raising the lines to go over the overhead catenary system at the required minimum distance of 35 feet from the top of rail for 115-kV lines and 37 feet for 230-kV lines.

Disruptions to utility service during utility relocations would likely be minimal because temporary connections to customers would typically be established before relocating utility conveyances. However, inadvertent damage to underground utilities could occur during construction if utility locations are uncertain or misidentified. Although such incidents do not occur frequently, the numerous relocations required during project construction under any alternative make accidents more likely. Such accidents could temporarily affect service to customers served by the affected utility. Efforts to minimize impacts would include potholing and preconstruction surveys to identify utility locations and outreach to customers to inform them regarding potential service disruptions. Sound Transit would also coordinate with utility providers to establish replacement procedures and standards of facilities as applicable.

Exhibits 4.15-1 through 4.15-4 show areas of major utility conflicts for Segments B, C, D, and E. Table 4.15-2 summarizes the conflicts for each alternative. Where utilities would be directly under or above the project limits, the length of the relocation is provided. Ranges are provided in Segments C and D where different design options would result in varying impacts for the same utilities. Where utilities would intersect with an alternative, the number of crossings is identified because the length of the relocation has not yet been determined, but it would be determined during final design. For many underground intersecting utilities, only a split casing would need to be installed.

Segment A

No utility conflicts are anticipated with *Preferred Interstate 90 Alternative (A1)*, and no utilities would need to be relocated. Utilities presently run underneath or along the side of the I-90 bridge decks and are accessed by the utility companies from underneath. East Link Project construction would not relocate any of these utilities, and future maintenance of these utilities would not disturb light rail operation.

Segment B

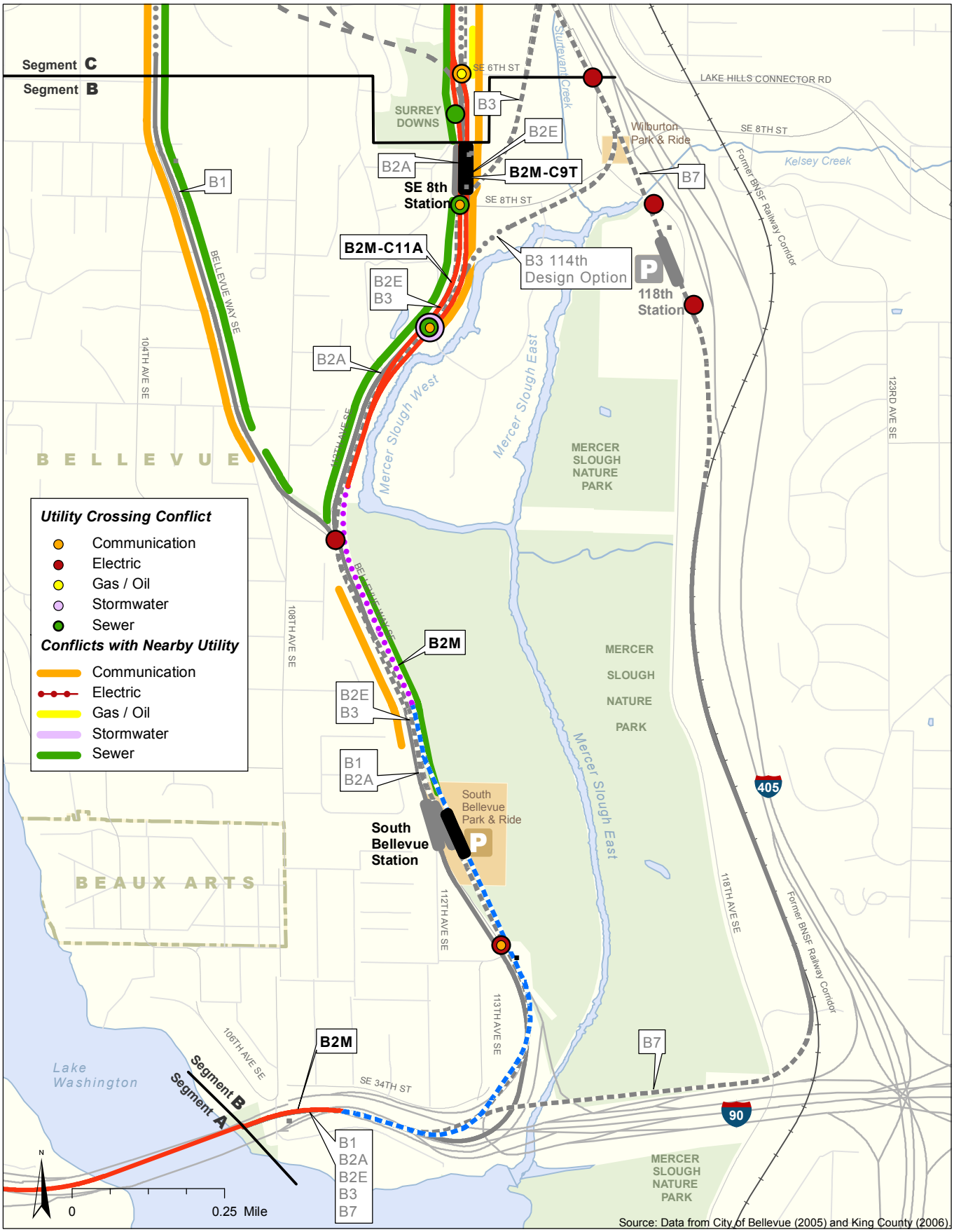
Within Segment B, the Bellevue Way Alternative (B1) would require the most utility relocations, and the BNSF Alternative (B7) would require the fewest. *Preferred 112th SE Modified Alternative (B2M)* and 112th SE At-Grade (B2A), 112th SE Elevated (B2E), and 112th SE Bypass (B3) Alternatives would require similar utility relocations.

For *Preferred Alternative B2M*, approximately 500 feet of sanitary sewer line owned by King County would be impacted by the roadway work along Bellevue Way; 300 feet of this line is located in the South Bellevue Park-and-Ride. Puget Sound Energy power transmission lines would conflict with the elevated track where they cross Bellevue Way near SE 30th Street and 112th Avenue SE.

With connections to *Preferred Alternative C11A,* 900 feet of a Qwest Communications conduit located along 112th Avenue SE between SE 15th and SE 8th Streets would be relocated; most of this relocation would result from the construction associated with widening 112th Avenue SE. With the connection to *Preferred Alternative C9T*, 200 feet of a Qwest communications conduit, and associated cabinets would be relocated at the intersection of 112th Avenue SE and SE 15th Street. With a connection to *Preferred Alternative C11A,* 800 feet of a PSE gas line located on the east side of 112th Avenue SE between SE 8th and SE 6th Streets would be relocated; most of this relocation would result from the construction associated with widening 112th Avenue SE. With the connection to *Preferred Alternative C9T*, 500 feet of a PSE gas line located on the east side of 112th Avenue SE between SE 8th and the Segment C boundary would be relocated.

For *Preferred Alternative B2M* to *Preferred Alternative C11A*, a storm drain on 112th Avenue SE, south of SE 15th Street, owned by the City of Bellevue, would be relocated due to track excavation. When connecting to *Preferred Alternative C9T*, this same storm drain would be relocated as well as the east outlet of the storm drain. When connecting to *Preferred Alternative C11A,* along 112th Avenue SE between SE 15th and SE 8th Streets, more than 1,100 feet of sanitary sewer owned by the City of Bellevue would be relocated. When connecting to *Preferred Alternative C9T*, 600 feet of this same sanitary sewer line would be relocated.

At the intersection of SE 8th Street and 112th Avenue SE, with either connection to *Preferred Alternative C11A* or *C9T*, a fiberoptic vault, conduit, and cable owned by multiple agencies would be relocated. Also at this intersection, with either connection to Segment C, segments of Comcast cable would be relocated due to potential track excavation impacts to the duct banks. A City of Bellevue sewer pump station is currently located in the 1300 block of 112th Avenue SE, although the City plans to relocate and expand this facility as part of their Capital Investment Program (CIP).



Preferred Alternative B2M
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives B2A
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- P New and/or Expanded Park-and-Ride Lot

Exhibit 4.15-1
Utility Conflicts
Segment B
East Link Project

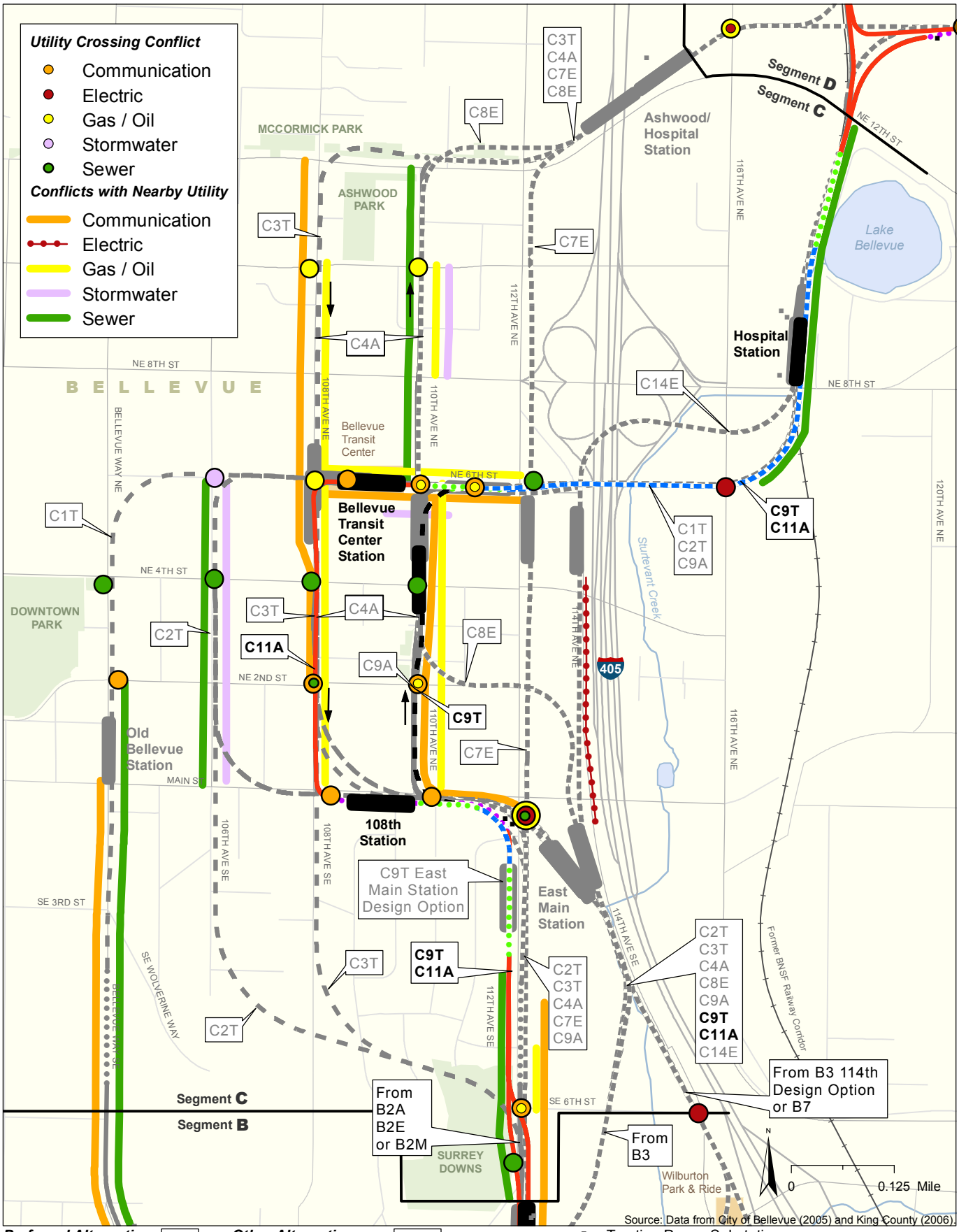
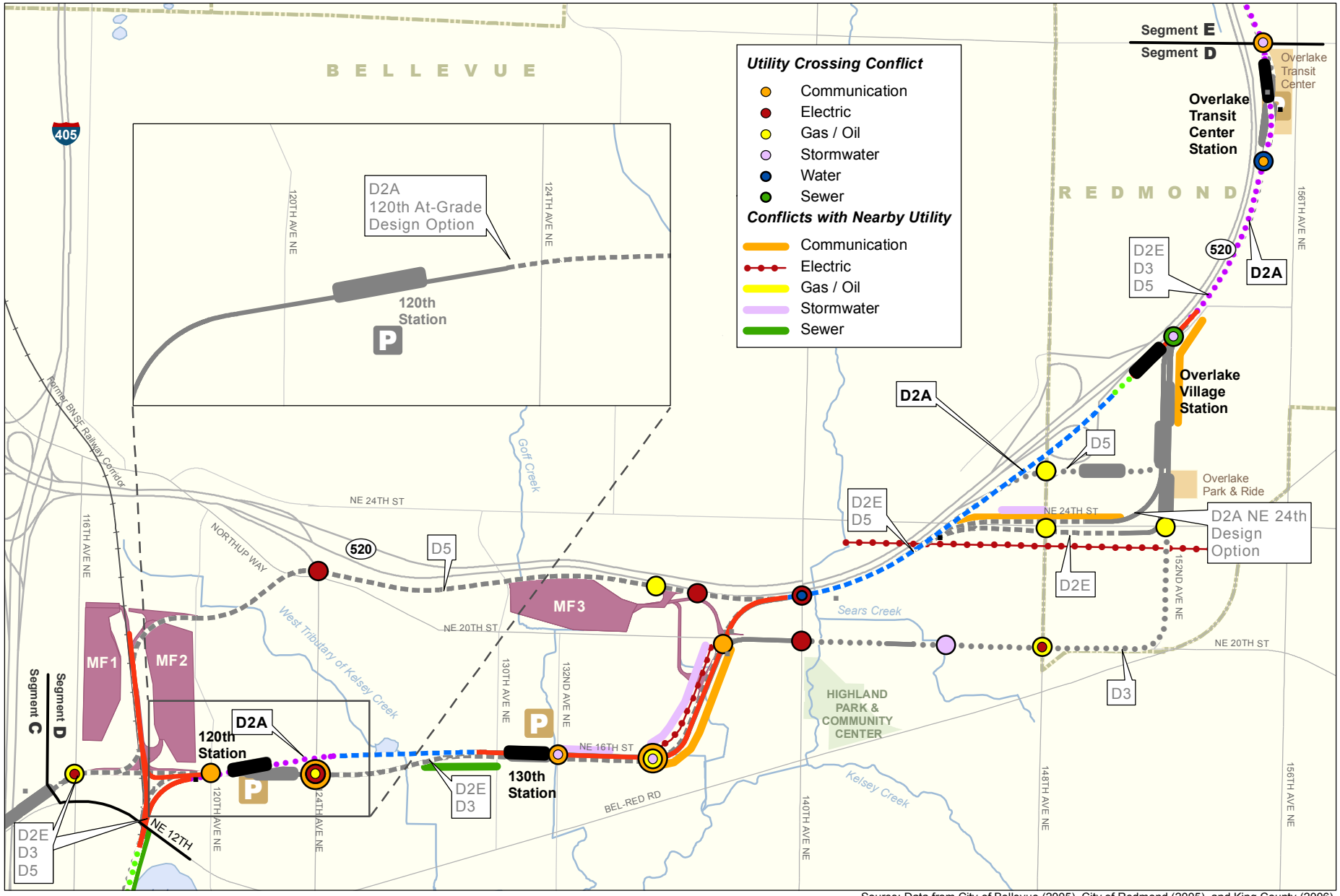


Exhibit 4.15-2
Utility Conflicts
Segment C
East Link Project



Source: Data from City of Bellevue (2005), City of Redmond (2005), and King County (2006).

Exhibit 4.15-3
Utility Conflicts
Segment D
East Link Project

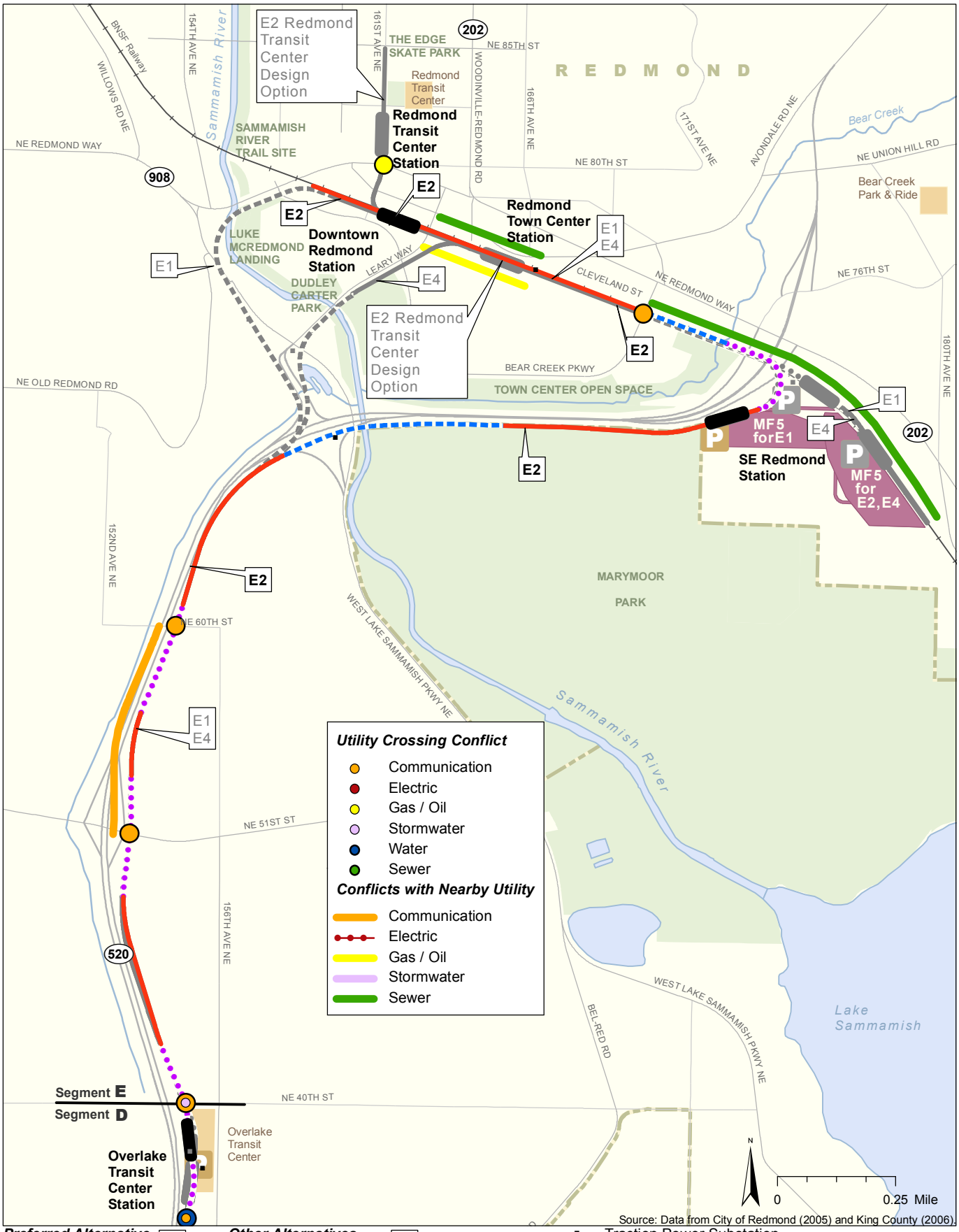


Exhibit 4.15-4
Utility Conflicts
Segment E
East Link Project

TABLE 4.15-2
Utility Conflict Summary Approximate Length of Relocations and Number of Crossings

Alternative		Power Line	Water Line	Sanitary Sewer Line	Gas Line	Communications[a]	Storm Drain
Segment A, Interstate 90							
Preferred Interstate 90 Alternative (A1)		None	None	None	None	None	None
Segment B, South Bellevue							
Preferred 112th SE Modified Alternative (B2M)	To *Preferred Alternative C11A*	2 crossings	None	1,200 feet, 2 crossings	800 feet	1,300 feet, 2 crossings	1 crossing
	To *Preferred Alternative C9T*	2 crossings	None	500 feet, 2 crossings	500 feet	7000 feet, 2 crossings	100 feet
Bellevue Way Alternative (B1)		100 feet, 3 crossings	None	5,200 feet	None	4,200 feet, 1 crossing	None
112th SE At-Grade Alternative (B2A)		100 feet, 2 crossings	None	7,300 feet	None	600 feet	None
112th SE Elevated Alternative (B2E)		100 feet, 1 crossing	None	3,400 feet	None	600 feet	None
112th SE Bypass Alternative (B3)		100 feet, 1 crossing	None	3,400 feet	None	600 feet	None
B3 - 114th Extension Design Option		300 feet, 1 crossing	None	3,500 feet, 1 crossing	None	700 feet, 1 crossing	100 feet
BNSF Alternative (B7)		3 crossings	None	1 crossing	None	None	None
Segment C, Downtown Bellevue							
Preferred 108th NE At-Grade Alternative (C11A)		300 to 600 feet	None	2,400 to 2,500 feet, 2 crossings	1,100 to 1,600 feet, 2 crossings	6,200 to 8,000 feet	100 feet
Preferred 110th NE Tunnel Alternative (C9T)[b]		1 crossing (from Alternative B7 only)	None	2,100 feet, 1 crossing (from Alternatives B3 and B7 only)	2,500 to 3.400 feet	10,400 to 12,300 feet	100 feet
Bellevue Way Tunnel Alternative (C1T)		1 crossing	None	2,700 feet, 3 crossings	2 crossings	2,100 feet, 2 crossings	300 feet, 2 crossings
106th NE Tunnel Alternative (C2T)		200 feet (from Alternative B7 only), 1 crossing	None	2,100 to 2,600, 1 or 2 crossings	1 or 2 crossings	1 crossing	1,500 to 1,600 feet
108th NE Tunnel Alternative (C3T)		4,100 feet (from Alternative B7 only)	None	0 to 500 feet, 1 or 2 crossings	500 feet, 0 or 1 crossing	300 feet, 1 crossing	None
Couplet Alternative (C4A)		300 feet (from Alternative B7 only)	None	0 to 1,100 feet, 1 or 2 crossings	4,600 to 5,000 feet, 3 or 4 crossings	4,800 feet, 1 crossing	700 feet, 1 crossing
112th NE Elevated Alternative (C7E)		300 feet (from Alternative B7 only)	None	1,000 feet (from Alternative B2A only)	0 to 400 feet	None	None

TABLE 4.15-2 CONTINUED
Utility Conflict Summary Approximate Length of Relocations and Number of Crossings

Alternative	Power Line	Water Line	Sanitary Sewer Line	Gas Line	Communications[a]	Storm Drain
110th NE Elevated Alternative (C8E)	1,700 feet (from Alternative B7 only)	None	None	700 feet	None	690 feet
110th NE At-Grade Alternative (C9A)	300 feet 200 feet, 1 crossing (from Alternative B7 only)	None	2,200 feet	1,200 feet	7,700 feet	100 feet
114th NE Elevated Alternative (C14E)	1,500 feet	None	None	None	None	None
Segment D, Bel-Red/Overlake						
Preferred NE 16th At-Grade Alternative (D2A)[c]	2,900 feet	100 feet	900 feet	900 feet	4,600 feet	1,000 feet
D2A - NE 24th Design Option	3,300 feet	100 feet	1,000 feet, 1 crossing	800 feet, 3 crossings	8,200 feet	1,500 feet
NE 16th Elevated Alternative (D2E)	2,100 feet, 4 crossings	1 crossing	Up to 1 crossing	None	1 crossing	1 crossing
NE 20th Alternative (D3)	1 crossing	2 crossings	None	4 crossings	1 crossing	100 feet, 3 crossings
SR 520 Alternative (D5)	3 crossings	2 crossings	None	1 crossing	1 crossing	1 crossing
Segment E, Downtown Redmond						
Preferred Marymoor Alternative (E2)	None	None	1,100 feet, 1 crossing	1,100 feet, 2 crossings	6 crossings	None
E2 - Redmond Transit Center Design Option	None	None	1,100 feet, 1 crossing	1,100 feet, 3 crossings	6 crossings	None
Redmond Way Alternative (E1)	None	None	1,000 feet	1,100 feet, 1 crossing	6 crossings	None
Leary Way Alternative (E4)	None	None	1,000 feet	800 feet	6 crossings	None

[a] Communication utilities include fiberoptic, telephone, and cable.

[b] The C9T - East Main Station Design Option connecting from *Preferred Alternative B2M* would not result in a change to impacts on either *Preferred Alternative C9T* or *B2M*.

[c] Impacts for D2A - 120th Station Design Option would not vary from those of *Preferred Alternative D2A*.

Note: As-built utility data were used to determine impacts of major utilities; some segments in as-built data might not represent full segment and will be finalized with field check. Length of relocations is rounded.

The pump station would be relocated to a site that does not conflict with the light rail route before East Link construction begins. Once the pump station has been relocated, sewer lines along 112th Avenue SE would be installed as part of the East Central Business District (CBD) Sewer Trunkline Improvements Project.

Similar to *Preferred Alternative B2M,* Alternative B1 would relocate an existing 115-kV electrical transmission line pole and approximately 100 feet of electrical line owned by Puget Sound Energy near vicinity of Bellevue Way SE at 112th Avenue SE. Also, approximately 5,200 feet of sewer lines and sewer holes owned by King County Wastewater would be relocated along Bellevue Way. Communication ducts owned by Qwest Communications are also present along the west side of Bellevue Way SE, and approximately 4,200 feet would be relocated. A conflict would also occur with a Qwest Communication duct that crosses under Bellevue Way SE north of SE 30th Street, where the duct would be relocated deeper below the roadway.

With Alternative B2A, overhead 115-kV electrical lines owned by Puget Sound Energy would conflict with this alternative where they cross Bellevue Way near SE 30th Street and would be raised. Approximately 3,800 feet of 27-inch sewer lines and sewer holes owned by King County Wastewater would be relocated under Bellevue Way where a conflict would occur in front of Mercer Slough Nature Park. Approximately 1,900 feet of 14-inch sewer force main owned by the City of Bellevue would be relocated under 112th Avenue SE between Bellevue Way and SE 15th Street. Approximately 1,650 feet of sewer pipes under 112th Avenue SE between SE 15th Street and 11th Place SE would also need to be relocated.

With Alternative B2E, overhead 115-kV electrical lines owned by Puget Sound Energy would conflict with this alternative and would be raised where they cross Bellevue Way near SE 30th Street and just before 112th Avenue SE. Approximately 1,500 feet of 27-inch sewer lines and sewer holes owned by King County Wastewater and 1,880 feet of sewer lines owned by the City of Bellevue would be relocated under Bellevue Way where a conflict would occur in front of Mercer Slough Nature Park.

With Alternative B3, overhead 115-kV electrical lines owned by Puget Sound Energy would conflict with this alternative where they cross Bellevue Way near SE 30th Street and would be raised. Approximately 450 feet of sewer lines and sewer holes owned by King County Wastewater would be relocated under Bellevue Way SE where a conflict would occur in front of Mercer Slough Nature Park. Approximately 3,000 feet of sewer force main owned by the City of Bellevue would be relocated under 112th Avenue NE between Bellevue Way and SE 15th Street.

The utility impacts with the B3 - 114th Extension Design Option would be similar to those for Alternative B3 between *Preferred Alternative A1* and the Winters House along Bellevue Way SE. Just north of the Winters House, approximately 100 feet of a Qwest Communications duct bank and associated cabinets and 100 feet of a City of Bellevue-owned sanitary sewer line would be relocated due to track excavation. Where the elevated light rail track crosses 114th Avenue SE, more than 100 feet of a 115-kV overhead power line owned by Puget Sound Energy would be relocated.

Alternative B7, overhead 115-kV electrical lines owned by Puget Sound Energy would conflict with this alternative where they cross 114th Avenue SE at three different locations. This would also be required for all Segment C alternatives that connect to Alternative B7.

Segment C

All Segment C alternatives would require extensive utility relocation, many related to cut-and-cover construction of tunnels or stations. Alternatives C7E and C14E are the only alternatives with the potential for few or no conflicts. No water utility lines would be impacted by any of the Segment C alternatives. Where conflicts occur in cut-and-cover construction areas, the utilities would be worked around or temporarily relocated. Bored tunnels would be deep enough to avoid utility conflicts. For tunnel construction, Sound Transit would use industry-standard methods to mitigate the impacts of soil settlement on underground utilities and special infrastructure concerns.

Generally, unless otherwise noted, utilities impacted by *Preferred 108th NE At-Grade Alternative (C11A)* are due to track excavation and the duct banks or pipes work. Along 112th Avenue SE between the end of Segment B and just north of SE 4th Street, approximately 2,000 feet of fiberoptic line owned by City of Bellevue and Integra/Verizon Business would be relocated. West of the 108th Station, 300 feet of Qwest Communication line would be relocated.

Between the beginning of *Preferred Alternative C11A* and SE 6th Street along 112th Avenue SE, more than 400 feet of City of Bellevue sanitary sewer line would be relocated. Beginning at the intersection of 108th Avenue and NE 2nd Street, gas pipe (500 feet), communications line (more than 800 feet), fiberoptic line (more than 1,500 feet), and cable line (800 feet) utilities would be relocated. At the intersection of

NE 4th Street and 108th Avenue, more than 1,000 feet of fiberoptic network and 200 feet of City of Bellevue sanitary sewer would be relocated because track excavation might impact the duct banks and pipes in this area.

North of NE 4th Street, adjacent to the proposed staging area, 600 feet of Puget Sound Energy gas line and 400 feet of Qwest Communications line would be relocated. Along NE 6th Street, between 110th and 112th Avenues NE, 800 feet of Qwest Communications telephone line, 600 feet of fiberoptic network (owned by multiple agencies, and 200 feet of Puget Sound Energy gas line would be relocated.

East of the Bellevue Transit Center Station, several utilities at the intersection of NE 6th Street and 110th Avenue NE would be relocated due to track excavation; these utilities include a Qwest Communications line, a Puget Sound Energy gas pipe, and a fiberoptic duct banks. Where the elevated track crosses 116th Avenue NE, overhead power lines owned by Puget Sound Energy would be relocated to prevent them from interfering with the elevated guideway.

Beginning at the south end of the Hospital Station, 2,000 feet of a sanitary sewer owned by King County would be relocated due to load restrictions. Adjacent to the Hospital Station, a City of Bellevue storm drain and pipes would be relocated due construction impacts to the catch basin and pipes underneath the station.

During tunnel construction for *Preferred Alternative C9T*, utilities located above the tunnel alignment along 110th Avenue NE between Main and NE 6th Streets would be temporarily supported in place and worked around. These utilities include more than 4,700 feet of telephone line owned by Qwest Communications, more than 3,000 feet of fiberoptic line owned by multiple agencies, 1,300 feet of Comcast cable, more than 2,500 feet of Puget Sound Energy gas line, and more than 100 feet of City of Bellevue sanitary sewer line.

Near the intersection of 112th Avenue SE and SE 6th Street, 900 feet of Puget Sound Energy gas line would be relocated due to potential track excavation impacts to the pipe. Also near this intersection, more than 1,500 feet of fiberoptic line, 200 feet of City of Bellevue sanitary sewer, and 300 feet of Qwest Communications line would be relocated.

More than 1,200 feet of Qwest Communications telephone line along NE 6th Street would be relocated due to the potential track excavation impacts to the duct bank. Due to load restrictions, more than 2,000 feet of King County sanitary sewer along the former BNSF Railway corridor near the Hospital Station would be relocated. Similar to *Preferred Alternative C11A*, constructing the Hospital Station would relocate a storm drain catch basin and 50 feet of pipes underneath the station.

With Alternative C1T, utility conflicts would occur in cut-and-cover areas where City of Bellevue storm sewers run under Bellevue Way from SE 6th Street to NE 2nd Street and Qwest Communications ducts run under Bellevue Way from SE 6th Street to Main Street. A Puget Sound Energy natural gas line and Qwest Communications duct would also conflict at the crossing of 108th Avenue NE. A 54-inch concrete storm drain pipe would conflict where this alternative crosses 106th Avenue NE, as would an 18-inch sanitary sewer pipe where it crosses 112th Avenue NE. Overhead 115-kV electrical lines owned by Puget Sound Energy would conflict with this alternative where it becomes elevated and would be raised across 116th Avenue NE. An underground 6-inch gas line that runs under 108th Avenue NE would conflict with the proposed Bellevue Transit Center Station, and the alternative would cross a 12-inch line in 110th Avenue NE at NE 6th Street.

With Alternative C2T, when connected to Alternative B3, B3 - 114th Extension Design Option, or Alternative B7, a conflict would occur with a sanitary sewer crossing and a 12-inch gas line crossing at 112th Avenue SE, coming out of the East Main Station. A 24-inch sanitary sewer line would conflict in the cut-and-cover area where the sewer line crosses 112th Avenue SE for connections to Alternative B3, B3 - 114th Design Option, B7, or B2A. City of Bellevue sanitary and storm sewers also run under 106th Avenue NE and would be worked around during cut-and-cover construction. A City of Bellevue 72-inch storm sewer line would also conflict with the cut-and-cover along NE 6th Street. Overhead 115-kV electrical lines owned by Puget Sound Energy would conflict with this alternative where it becomes elevated and would be raised across 116th Avenue NE. Underground 6-inch gas lines that run under 108th Avenue NE would conflict with the proposed Bellevue Transit Center Station and the alternative would cross a 12-inch line in 110th Avenue NE at NE 6th Street.

With Alternative C3T, cut-and-cover construction would conflict with a 24-inch sanitary sewer line where the sewer line crosses 112th Avenue SE for connections to Alternative B3, B3 – 114th Design Option, B2A, or B7. A Puget Sound Energy natural gas line and Qwest Communications ducts would conflict with the proposed station on 108th Avenue NE. Qwest

Communications ducts would again need to be worked around on 108th Avenue NE just south of NE 12th Street, as well as under the crossing of NE 12th Street. Six-inch gas lines located along NE 12th Street and 112th Avenue SE would be relocated due to potential conflicts with the light rail alignment. A conflict with a 12-inch natural gas line would occur if connecting to Alternative B3, B3 – 114th Design Option, or B7 at 112th Avenue SE near the East Main Station. For Alternative C3T, the 6-inch natural gas line and Qwest Communications fiberoptic lines that run under 108th Avenue NE would not conflict with the alternative because the tunnel could be bored beneath these lines, except at the Bellevue Transit Center Station, which would be cut-and-cover.

With Alternative C4A, a 24-inch sanitary sewer line would conflict where the sewer line runs under 112th Avenue SE for 1,100 feet, as well as where the alternative would cross a King County sanitary sewer line at NE 4th Street. The existing storm detention system under 110th Avenue NE would be relocated for approximately 700 feet. A conflict would occur with a Puget Sound Energy natural gas line where it crosses NE 10th Street, and approximately 4,600 feet would be relocated under 108th Avenue NE. An additional 400 feet of a 12-inch gas line would be relocated between SE 6th and SE 4th Streets when connecting to Alternative B2A, and a conflict with the same gas line would occur if connecting to Alternative B3, B3 - 114th Design Option, or B7 at 112th Avenue SE near the East Main Station. Six-inch gas lines located along NE 12th Street, 112th Avenue NE, and NE 8th Street would also be relocated due to potential conflicts with the light rail alignment. Another conflict with a Puget Sound Energy gas line would occur at 110th Avenue NE (between NE 10th and NE 2nd Street). Approximately 4,800 feet of Qwest Communications fiberoptic ducts would be relocated under 108th Avenue NE so they would not be directly under the westbound couplet route.

With Alternative C7E, a conflict would occur with a Puget Sound Energy natural gas line where it crosses NE 10th Street. If this alternative were to connect with Alternative B2A, then a 24-inch sanitary sewer line would conflict where the sewer line parallels 112th Avenue SE for approximately 900 feet north of SE 6th Street, and a 12-inch natural gas line would be relocated for approximately 400 feet north of SE 6th Street. A conflict with the same gas line would occur if connecting to Alternative B3, B3 – 114th Design Option, or B7 at 112th Avenue SE near the East Main Station.

With Alternative C8E, the existing storm detention system under 110th Avenue NE would be relocated for approximately 700 feet because it would conflict with the project limits. Approximately 700 feet of a 12-inch gas line would be relocated between NE 8th and NE 10th Streets, and approximately 1,700 feet of overhead electric lines would be relocated if this alternative were to connect with Alternative B7 or B3 – 114th Design Option. A conflict with the same gas line would occur at 112th Avenue SE near the East Main Station.

With Alternative C9A, along 110th Avenue NE between Main and NE 6th Streets, more than 3,000 feet of Qwest Communication line would be relocated due to impacts to duct banks from track excavation. Additional communications line along NE 6th Street between 110th and 112th Avenues NE would be relocated. More than 3,500 feet of fiberoptic networks located between Main and NE 6th Streets along 110th Avenue NE, owned by multiple agencies, would be relocated due to impacts to the duct bank located under the proposed track. Along 110th Avenue NE, between NE 2nd and NE 6th Streets, more than 1,200 feet of Puget Sound Energy gas line would be relocated due to track excavation impacts. In the former BNSF Railway corridor, 2,000 feet of King County sanitary sewer line would be relocated near SE 8th Street. Additional sanitary sewer line at the intersection of 110th Avenue NE and NE 4th Street would be relocated. Sanitary sewer would be relocated for Alternative C9A due to duct bank impacts from track excavation or load restrictions. Comcast cable would be relocated at the intersections of 110th Avenue NE and Main Street and 110th Avenue NE and NE 2nd Street due to track excavation impacts to duct banks. Where the track crosses 116th Avenue NE, a segment of a Puget Sound Energy overhead power line would be relocated due to the conflict with the elevated track. With a connection to Alternative B7 or B3 – 114th Extension Design Option, a segment of a Puget Sound Energy overhead power line would be relocated due conflicts with the elevated track south of SE 6th Street along 112th Avenue SE. With connections to Alternative B3, no major utility impacts would occur.

With Alternative C14E, the only major utilities that would be impacted are overhead power lines owned by Puget Sound Energy. These impacts would be where the elevated light rail track would conflict with overhead power lines. Along 114th Avenue SE, beginning at SE 6th Street, 200 feet of 115-kV Puget Sound Energy overhead power lines would be relocated. Along 114th Avenue NE, between Main and NE 2nd Streets, more than 1,000 feet of 115-kV

overhead power lines would be relocated. Additional power lines would be relocated where Alternative C14E crosses 116th Avenue NE.

Segment D

Although all Segment D alternatives would require extensive utility relocations, Alternative D3 would present the greatest challenges for utility relocations because of the amount of retained cuts. For all alternatives, a City of Redmond stormwater vault in the southwest quadrant of the NE 40th Street and 156th Avenue NE intersection would be beneath the proposed alternative and would be modified to support the weight of the rail system. With *Preferred NE 16th At-Grade Alternative (D2A)*, west of the 120th Station, more than 300 feet of fiberoptic line would be relocated because the duct bank would potentially be impacted from track excavation. Where the track crosses 124th Avenue NE, a section of a Puget Sound Energy gas pipe and Qwest Communications line would be relocated. Between 124th Avenue NE and the 130th Station, 900 feet of sanitary sewer and associated sewer holes owned by King County would be relocated. At the intersection of 132nd Avenue NE and NE 16th Street, sections of Comcast cable line, Qwest Communications line, and City of Bellevue storm drains would be relocated due to potential track excavation impacts. A storm drain sewer hole would also be relocated. At the intersection of 134th Avenue NE and NE 16th Street, 100 feet of City of Bellevue storm drain and associated sewer holes would be relocated.

Where the alignment runs at-grade along 136th Place NE to NE 20th Street, Puget Sound Energy would replace the towers supporting the power lines due to potential conflict with the light rail overhead power lines. Along 136th Place NE between NE 16th and NE 20th Streets, more than 1,800 feet of Qwest Communications fiberoptic line and a vault would be relocated. At the intersection of NE 20th Street and 136th Place NE, a fiberoptic line and storm drain would be relocated due to potential impacts from track excavation.

The *Preferred Alternative D2A* elevated guideway would be too close to elevated 115-kV overhead power lines owned by Puget Sound Energy, and the power lines would be reinstalled on higher steel poles where the route crosses 140th Avenue NE. Additional Puget Sound Energy overhead power lines near NE 24th Street would be relocated due to potential conflict with the overhead track power lines.

North of the NE 36th Street SR 520 overpass, a Microsoft fiberoptic line, Qwest Communications line, and City of Redmond water line would be relocated because track excavation could impact the duct banks and pipes. North of the Overlake Village Station at 152nd Avenue NE and SR 520, a City of Redmond storm drain pipe would be relocated. This alternative would also conflict with two petroleum pipelines owned by Olympic Pipe Line, and split casings would be installed around these pipes.

With the D2A - NE 24th Design Option, major utility impacts would be similar to *Preferred Alternative D2A* between NE 12th and NE 24th Streets and between 152nd Avenue NE and the Overlake Transit Center Station. Along 24th Street, 900 feet of Puget Sound Energy overhead power lines would be relocated due to conflicts with the elevated track. Also along NE 24th Street, more than 800 feet of Qwest Communications line and 400 feet of City of Bellevue storm drain would be relocated. This communication line and storm drain is located underneath and parallel to the tracks and would be relocated to avoid the columns. Along 152nd Avenue NE north of the Overlake Village Station, more than 2,800 feet of fiberoptic and telephone line owned by multiple companies, would be relocated due to potential track excavation impacts to the duct banks. At the end of 152nd Avenue NE, at SR 520, a sanitary sewer catch basin and a storm drain pipe and catch basin would be relocated due to potential track excavation impacts.

For Alternatives D2E, D3, and D5, two overhead transmission lines would be relocated to avoid conflicts with the construction of Segment D alternatives connecting from Alternative C3T, C4A, C7E, or C8E. With Alternative D2E, for the light rail crossings at 124th Avenue NE, 134th Avenue NE, 136th Place NE, and 140th Avenue NE, electrical overhead power lines would conflict with the elevated guideway. The towers supporting these lines would be raised or replaced in this area. The alternative would also conflict with overhead lines along NE 24th Street near 148th Avenue NE, which would require raising these lines for 2,100 feet.

With Alternative D3, the westbound trackway running along NE 16th Street near 134th Avenue NE and between SR 520 and Microsoft Road would be located over a 36-inch stormwater pipe owned by the City of Bellevue that would be relocated to the north. A 48-inch City of Redmond storm drain crosses this alternative under NE 20th Street where the guideway would be in a retained cut, and the storm drain would be redesigned to accommodate this cut. An 8-inch gas line under 148th Avenue NE and a 6-inch gas line under NE 24th Street would conflict with the retained cut under this road but would be accommodated in the road crossings over these cuts. This alternative

would also conflict with two petroleum pipelines owned by Olympic Pipe Line, and split casings would be installed around these pipes. Similar to *Preferred Alternative D2A*, Puget Sound Energy towers along 140th Avenue NE and 136th Place NE would be relocated, as well as towers along 124th Avenue NE. A conflict would also occur between NE 20th and NE 24th Streets where the Interlaken Substation is located on the east side of the road. Underground feeders running north and south from this substation on 152nd Avenue NE would need to be relocated.

With Alternative D5 at 124th Avenue NE, the elevated guideway would conflict with 230-kV electrical overhead transmission lines that run north-south. Conflicts with 115-kV electrical overhead transmission lines would occur at 140th Avenue NE south of NE 24th Street. The towers supporting these lines would be raised or replaced in this area. Conflicts with electric transmission lines also would occur on the south side of NE 24th Street west of 148th Avenue NE. A natural gas line also owned by Puget Sound Energy crosses under NE 24th Street east of 148th Avenue NE and would be relocated beneath the retained cut. A 20-inch water line that runs under SR 520 at NE 36th Street would be relocated under the retained cut. This alternative would also conflict with two petroleum pipelines owned by Olympic Pipe Line, and split casings would be installed around these pipes.

Segment E

For all Segment E alternatives, telephone and fiberoptic conduits owned by Verizon would be relocated where they would conflict with the retained cuts at NE 51st and NE 60th Streets, as would communications conduits owned by Level 3 Communications at NE 60th Street. All alternatives would have sewer, gas, and communications conflicts that are similar.

With *Preferred Alternative E2*, on Redmond Way under the SR 520 crossing, 1,100 feet of a King County Wastewater 42-inch sewer line would be relocated so that it would not be below the trackway. Between Leary Way and 166th Avenue NE, 1,100 feet of an 8-inch gas line owned by Puget Sound Energy would be relocated so that it would not be below the trackway.

The E2 - Redmond Transit Center Design Option would have similar impacts as the *Preferred Alternative E2* up to where 161st Avenue NE meets the former BNSF Railway. At the Redmond Way and NE 80th Street intersection, a Puget Sound Energy 6-inch gas line would be relocated due to its proximity to the alignment.

With Alternative E1, a Verizon/MCI communications vault is located beneath the alternative where it would cross 170th Avenue NE, and would be relocated. An 8-inch natural gas line runs under the trackway for approximately 1,100 feet east between Leary Way and 166th Avenue NE. This gas line would be installed in a casing or relocated out of the project limits. A 42-inch City of Redmond storm sewer would also be relocated for approximately 1,000 feet from 170th Avenue NE to Bear Creek.

With Alternative E4, beneath the trackway in the former BNSF Railway corridor between Leary Way and 166th Avenue NE, approximately 800 feet of an 8-inch gas line owned by Puget Sound Energy would be relocated so that it would not be below the guideway. An 8-inch Puget Sound Energy gas line near the Leary Way and NE 76th Street intersection would also be relocated. Beneath the former BNSF Railway corridor between SR 520 and 170th Avenue NE, approximately 1,000 feet of a 42-inch sanitary sewer owned by King County would be relocated so that it would not be below the guideway. A Verizon/MCI communications vault is located beneath the route where it would cross 170th Avenue NE. This vault would be relocated.

The City of Redmond plans to locate a stormwater pipe and trail within the former BNSF Railway corridor in downtown Redmond, while also accommodating regional utilities and infrastructure, including Sound Transit's light rail project. Corridor space constraints could require that light rail be shifted to accommodate the stormwater pipe and trail. If this occurs for any of the Segment E alternatives, additional utility relocations may be required.

Maintenance Facilities

No impacts on utilities are anticipated during construction of any of the maintenance facilities.

4.15.4 Potential Mitigation Measures

No adverse impacts on utilities during light rail operation are anticipated; therefore, no mitigation is proposed. The project includes implementing design measures and coordinating with utility providers and the public to minimize impacts on utilities during light rail construction. These measures include potholing and preconstruction surveys to identify utility locations. Sound Transit would continue to work with utility providers to minimize any potential service interruptions and perform outreach to notify the community of potential service interruptions.