

## 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, either during construction or during operation. 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 WAC 468-34 and 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 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 these jurisdictions. Common utility providers in these jurisdictions include Puget Sound Energy for natural gas, Comcast for cable television, and Qwest for telephone service. A number of other companies (e.g., AT&T, Verizon, Level 3 Communications) maintain fiber optic 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 sewer, 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 fiber optic utilities. Several private companies (Verizon, MFS Network Technologies, Level 3 Communications and others) maintain fiber optic cables and/or provide long-distance telecommunications services in the project vicinity. In addition, local and state agencies have networks of fiber optics 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 prior to when this project would begin construction. Major transmission lines (115 kilovolt [kV] and 230 kV) are located along 124th Avenue NE, 136th Place NE, 140th Avenue NE, 114th Avenue SE, 116th Avenue NE, and NE 51st Street.

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 line, that run north-south through east Bellevue, roughly parallel to 136th Place NE.

The only major utility upgrade or expansion identified in the study area is an expansion of the Puget Sound Energy substation on NE 12th Street, east of 116th Avenue NE. Puget Sound Energy is also planning to expand gas lines, and the City of Bellevue is upgrading several sewer facilities within the study

**TABLE 4.15-1**  
Utility Providers in Study Area

Jurisdiction	Utility	Provider
Seattle	Gas	Puget Sound Energy
	Electricity	Seattle City Light
	Water* and Sewer (Wastewater)	Seattle Public Utilities, King County Wastewater
	Stormwater	Seattle Public Utilities
	Cable	Comcast, Broadstripe
	Communications	Qwest, 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, 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, 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, Verizon, others

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

area, and therefore continued coordination with utility agencies would be important.

### 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. This could cause a shift to more automobile-oriented land use patterns, which are typically 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. Under the No Build Alternative, utilities may need to be expanded 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 fiber optic 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 affect

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, above ground electric lines, underground water and natural gas mains, and underground telephone and fiber optic lines.

The City of Bellevue has a requirement that existing overhead utilities (power and communications) that require relocation as part of any project 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, which is applied when funding is available. 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 in Segment A and Puget Sound Energy in Segments B, C, D and E. 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 may, in some cases, require the construction of additional distribution lines to the substation. The specific needs will not be known until further design and coordination with Seattle City Light and Puget Sound Energy.

Under Sound Transit's Sustainability Initiative, adopted in 2007, Sound Transit would integrate efficient operating practices at existing and new facilities, use equipment to reduce energy and water demand, and recycle water. The implementation of 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 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, manholes, 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 manholes 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 wash water would be recycled. The additional demand would not substantially 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 and 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 in accordance with local and state regulations. For the potential sites, existing sewer lines on adjacent streets are available for sewer connections. Any necessary stormwater detention facilities and infrastructure to collect storm- and wastewater would require connections both to the existing sewer system and to 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 relocation of the utilities during construction and thus remove conflicts with project construction; to prevent disturbance to 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 relocations of utility poles supporting overhead lines; relocation of underground utilities from under the alternatives, station areas, and maintenance facility sites (particularly at-grade segments constructed in road right-of-way); and inspection, repair, and encasement of 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 manholes or vaults, for maintenance activities could be affected depending on the location of light rail facilities. In some cases these access points may 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 may be considered. Some of these impacts may 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 costs of the relocation 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 are located 6 or more feet below the surface. Smaller pipes, fiber-optic 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 fiber-optic cables, telephone lines, underground electrical conduits and smaller pipes are often located beneath sidewalks. These utilities may or may not be affected during construction, depending on their depth below grade, 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 require more relocations of 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 have the potential to require relocation of 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 a 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 road 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 can 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 and 4.15-2 show areas of major utility conflicts for Segments B, C, D and E. Table 4.15-2 provides a summary of 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 would be determined during final design. For many underground intersecting utilities, only the installation of a split casing would be required.

### Segment A

No utility conflicts are anticipated in this segment, and no relocation of utilities would be required. Utilities presently run underneath or along the side of the I-90 bridge decks and are accessed by the utility companies from underneath. Construction of the East Link Project would not require relocation of 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 greatest utility relocations, and the BNSF Alternative (B7) would require the least. The 112th SE At-Grade (B2A), 112th SE Elevated (B2E), and

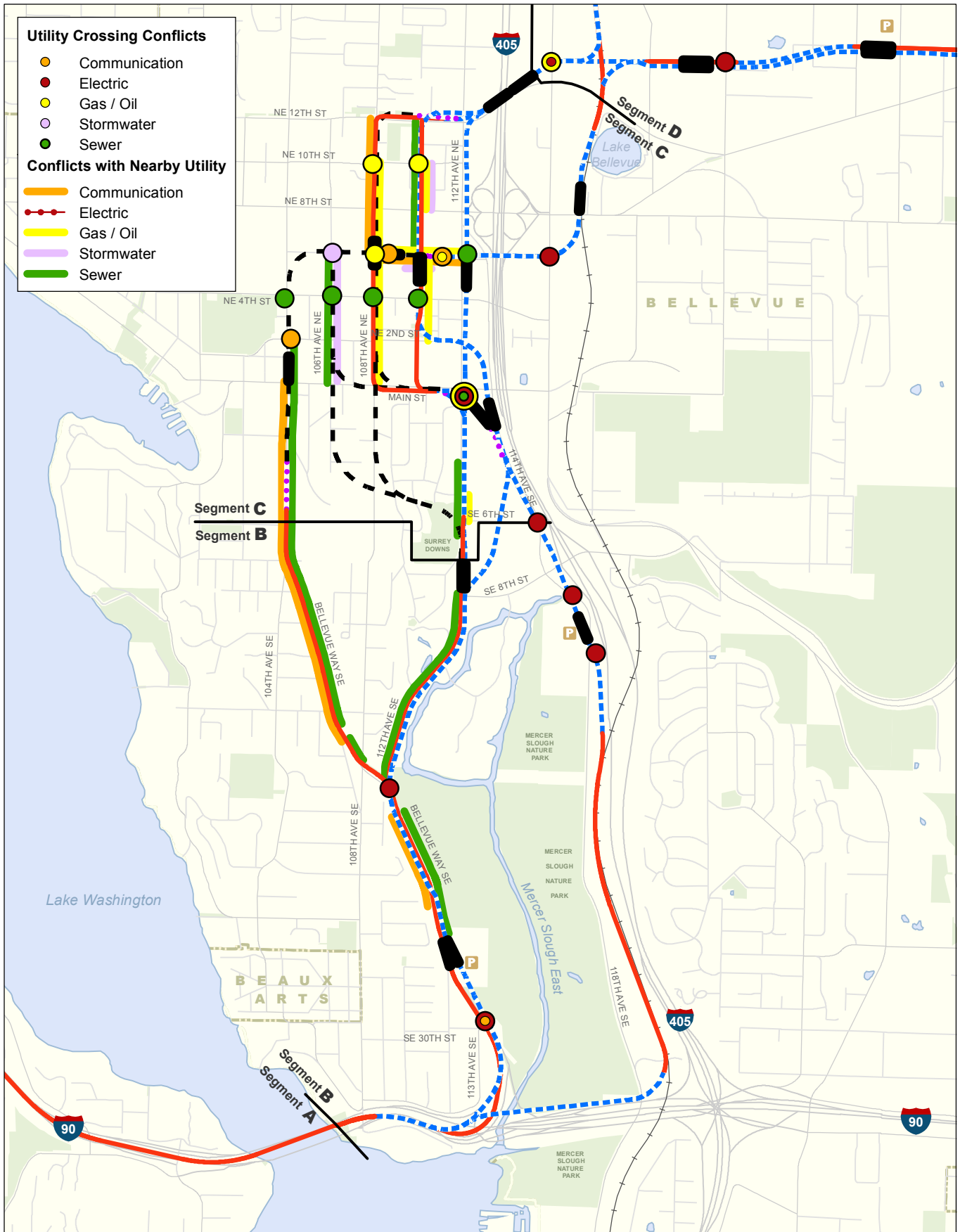
112th SE Bypass (B3) alternatives would have similar utility relocation requirements.

**Bellevue Way Alternative (B1).** An existing 115-kV electrical transmission line pole and approximately 100 feet of electrical line owned by Puget Sound Energy would need to be relocated in the vicinity of Bellevue Way SE at 112th Avenue SE. Approximately 5,200 feet of sewer lines and manholes owned by King County Wastewater would need to be relocated along Bellevue Way. Communication ducts owned by Qwest are also present along the west side of Bellevue Way SE, and approximately 4,200 feet would need to 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 need to be relocated deeper below the roadway.

**112th SE At-Grade 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 need to be raised. Approximately 3,800 feet of 27-inch sewer lines and manholes owned by King County Waste Water would need to be relocated under Bellevue Way where a conflict would occur in front of Mercer Slough Park. Approximately 1,900 feet of 14-inch sewer force main owned by the City of Bellevue would need to 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.

**112th SE Elevated Alternative (B2E).** Overhead 115-kV electrical lines owned by Puget Sound Energy would conflict with this alternative and would need to 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 manholes owned by King County Waste Water and 1,880 feet of sewer lines owned by the City of Bellevue would need to be relocated under Bellevue Way where a conflict would occur in front of Mercer Slough Park.

**112th SE Bypass 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 need to be raised. Approximately 450 feet of sewer lines and manholes owned by King County Waste Water would need to be relocated under Bellevue Way SE where a conflict would occur in front of Mercer Slough Park. Approximately 3,000 feet of sewer force main owned by the City of Bellevue would need to be relocated



Source: Data from City of Bellevue (2005) and King County (2006) modified by CH2M HILL.

- At-Grade Route
- - - Elevated Route
- · · Retained-Cut Route
- - - Tunnel Route

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

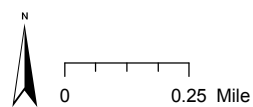
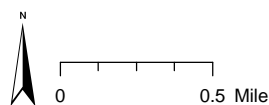


Exhibit 4.15-1  
**Utility Conflicts**  
**Segments B and C**  
 East Link Project



Source: Data from City of Bellevue (2005), City of redmond (2007), and King County (2006) modified by CH2M HILL.

- |                    |                                       |
|--------------------|---------------------------------------|
| At-Grade Route     | Proposed Station                      |
| Elevated Route     | Maintenance Facility and Access Track |
| Retained-Cut Route | New and/or Expanded Park-and-Ride Lot |
| Tunnel Route       |                                       |



**Exhibit 4.15-2**  
**Utility Conflicts**  
**Segments D and 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	Storm Drain
<b>Segment A, Interstate 90</b>						
A1, I-90	None	None	None	None	None	None
<b>Segment B, South Bellevue</b>						
B1, Bellevue Way	100 feet, 3 crossings	None	5,200 feet	None	4,200 feet, 1 crossing	None
B2A, 112th SE At-Grade	100 feet, 2 crossings	None	7,300 feet	None	600 feet	None
B2E, 112th SE Elevated	100 feet, 1 crossing	None	3,400 feet	None	600 feet	None
B3, 112th SE Bypass	100 feet, 1 crossing	None	3,400 feet	None	600 feet	None
B7, BNSF	3 crossings	None	1 crossing	None	None	None
<b>Segment C, Downtown Bellevue</b>						
C1T, Bellevue Way Tunnel	1 crossing	None	2,700 feet, 3 crossings	2 crossings	2,100 feet, 2 crossings	300 feet, 2 crossings
C2T, 106th NE Tunnel	200 feet (from B7 only), 1 crossing	None	2,100-2,600, 1 or 2 crossings	1 or 2 crossings	1 crossing	1,500-1,600 feet
C3T, 108th NE Tunnel	4,100 feet (from B7 only)	None	0-500 feet, 1 or 2 crossings	500 feet, 0 - 1 crossing	300 feet, 1 crossing	None
C4A, Couplet	300 feet (from B7 only)	None	0-1,100 feet, 1 or 2 crossings	4,600 – 5,000 feet, 3 or 4 crossings	4,800 feet, 1 crossing	700 feet, 1 crossing
C7E, 112th Avenue NE Elevated	300 feet (from B7 only)	None	1,000 feet (from B2A only)	0-400 feet	None	None
C8E, 110th Avenue NE Elevated	1,700 feet (from B7 only)	None	None	700 feet	None	690 feet
<b>Segment D, Bel-Red/Overlake</b>						
D2A, NE 16th At-Grade	2,100 feet, 2 crossings	1 or 2 crossings	Up to one crossing	3 crossings	1 crossing	100 feet, 2 crossings
D2E, NE 16th Elevated	2,100 feet, 4 crossings	1 crossing	Up to 1 crossing	None	1 crossing	1 crossing
D3, NE 20th	1 crossing	2 crossings	None	4 crossings	1 crossing	100 feet, 3 crossings
D5, SR 520	3 crossings	2 crossings	None	1 crossing	1 crossing	1 crossing
<b>Segment E, Downtown Redmond</b>						
E1, Redmond Way	None	None	1,000 feet	1,100 feet, 1 crossing	6 crossings	None
E2, Marymoor	None	None	1,100 feet, 1 crossing	1,100 feet, 2 crossings	6 crossings	None
E4, Leary Way	None	None	1,000 feet	800 feet	6 crossings	None



under 112th Avenue NE between Bellevue Way and SE 15th Street.

**BNSF 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 the BNSF Alternative (B7).

### Segment C

All Segment C alternatives would require extensive utility relocation, many related to cut-and-cover construction of tunnels or stations. The 112th NE Elevated Alternative (C7E) is the only alternative with the potential for few or no conflicts. All other connections to Segment B would result in relocation of one type of utility only. Where conflicts occur in cut-and-cover construction areas, the utilities would need to 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.

**Bellevue Way Tunnel 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 need to 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.

**106th NE Tunnel Alternative (C2T).** For design options that connect to the 112th SE Bypass Alternative (B3) or the BNSF 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 Street Station. A 24-inch sanitary sewer line would conflict in the cut-and-cover area where the sewer line crosses 112th Avenue SE for design options that connect to alternatives B3, B7, and the 112th SE At-Grade Alternative (B2A). City of

Bellevue sanitary and storm sewers also run under 106th Avenue NE and would need to 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 need to 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.

**108th NE Tunnel Alternative (C3T).** Cut-and-cover construction would conflict with a 24-inch sanitary sewer line where the sewer line crosses 112th Avenue SE for the B2A, B3, and B7 alternatives. 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 in 108th Avenue NE just south of NE 12th Street, as well as under the crossing of NE 12th Street. A conflict with a 12-inch natural gas line would occur if connecting to B3 or B7 at 112th Ave SE near the East Main Station. For the 108th NE Tunnel Alternative (C3T), the 6-inch natural gas line and Qwest fiber optic 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.

**Couplet 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 need to 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 need to be relocated under 108th Avenue NE. An additional 400 feet of a 12-inch gas line would need to be relocated between SE 6th and SE 4th streets when connecting to B2A, and a conflict with the same gas line would occur if connecting to B3 or B7 at 112th Avenue SE near the East Main Station. Approximately 4,800 feet of Qwest fiber optic ducts would need to be relocated under 108th Avenue NE so they would not be directly under the westbound couplet route.

**112th NE Elevated Alternative (C7E).** A conflict would occur with a Puget Sound Energy natural gas line where it crosses NE 10th Street. If this alternative

connects with the 112th SE At-Grade Alternative (B2A), 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 need to be relocated for approximately 400 feet north of SE 6th Street. A conflict with the same gas line would occur if connecting to B3 or B7 at 112th Avenue SE near the East Main Station.

**110th NE Elevated Alternative (C8E).** The existing storm detention system under 110th Avenue NE would need to be relocated for approximately 700 feet because it would conflict with the project limits. Approximately 700 feet of a 12-inch gas line would need to be relocated between NE 8th and NE 10th streets, and approximately 1,700 feet of overhead electric lines would need to be relocated if this alternative connects to the BNSF Alternative (B7). A conflict with the same gas line would occur at 112th Avenue SE near the East Main Station.

#### Segment D

Although all Segment D alternatives would require extensive utility relocations, the NE 20th 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 need to be modified to support the weight of the rail system. A communications duct bank is also located in this area of the intersection; however, the owner is no longer in business and the facility has been abandoned in place, and it is unknown if it is still in use.

**NE 16th At-Grade Alternative (D2A).** The elevated guideway of this alternative would be too close to elevated 115-kV overhead power lines owned by Puget Sound Energy, and the power lines would need to be reinstalled on higher steel poles where the route crosses 140th Ave NE, and for 2,100 feet along NE 24th Street in the vicinity of 148th Avenue NE. This alternative would also conflict with two petroleum pipelines owned by Olympic Pipe Line, and split casings would be installed around these pipes.

**NE 16th Elevated Alternative (D2E).** For the light rail crossings of 124th 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 need to be raised or replaced in this area. The alternative would also conflict with overhead lines along NE 24th in the

vicinity of 148th Avenue NE, which would require raising these lines for 2,100 feet.

**NE 20th 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 require relocation 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 need to 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.

**SR 520 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 and south of NE 24th Street. The towers supporting these lines would need to 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 need to be relocated beneath the retained cut. A 20-inch water line that runs under SR 520 at NE 36th Street would need to be relocated under the retained cut.

#### Segment E

For all alternatives, telephone and fiber optic conduits owned by Verizon would be need to be relocated where they would conflict with the retained cuts at NE 51st Street and NE 60th Street, 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.

**Redmond Way Alternative (E1).** A Verizon/MCI communications vault is located beneath the alternative where it would cross 170th Avenue NE, and would need to 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 that would need to be installed in a casing or relocated out of the project limits. A 42-inch City of Redmond storm sewer would also be under the route for

approximately 1,000 feet from 170th Avenue NE to Bear Creek and would need to be relocated outside the project limits.

**Marymoor Alternative (E2).** On Redmond Way under the SR 520 crossing, 1,100 feet of a 42-inch sewer line owned by King County Waste Water would need to 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 need to be relocated so that it would not be below the trackway, similar to E1.

**Leary Way Alternative (E4).** Beneath the trackway in the BNSF right-of-way between Leary Way and 166th Avenue NE, approximately 800 feet of an 8-inch gas line owned by Puget Sound Energy would need to be relocated so that it would not be below the guideway. Beneath the BNSF trackway between SR 520 and 170th Avenue NE, approximately 1,000 feet of a 42-inch sanitary sewer owned by King County Waste Water would need to 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 and would need to be relocated.

#### **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 design measures and coordination with utility providers and the public to minimize impacts on utilities during light rail construction. These measures would include potholing and preconstruction surveys to identify utility locations, and outreach to inform customers of potential service disruptions. Sound Transit would continue to work with utility providers to minimize any potential service interruptions.