

Downtown Bellevue Light Rail Alternatives Concept Design Report

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PREPARED FOR



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Introduction

Sound Transit is studying an extension of the region's light rail system from downtown Seattle east to Bellevue and Redmond (Figure 1). The East Link Project would connect the Eastside's biggest population and employment centers, serving 45,000 – 50,000 daily riders, on one of the region's most congested travel corridors. Sound Transit is currently preparing a Final Environmental Impact Statement (Final EIS) as well as preliminary engineering drawings for the approximately 14-mile extension.

During the past three years, Sound Transit has developed numerous route and station alternatives for the portion of the route that would serve downtown Bellevue—Segment C. The City of Bellevue (the City) has expressed a preference for a tunnel route, in part to avoid the traffic conflicts that would affect the reliability of the light rail system and the downtown street network. The Sound Transit Board favors an at-grade profile because it would be cost-effective and directly serve the downtown Bellevue core without the visual effects of an elevated guideway. In May 2009, after the completion of the East Link Project Draft Environmental Impact Statement (Draft EIS), the Sound Transit Board identified a preferred alternative that included an at-grade couplet in downtown Bellevue running on 108th Avenue NE and 110th Avenue NE (C4A).

The Sound Transit Board also identified a tunnel on 108th Avenue NE (C3T) for future consideration as preferred and if additional funding is found. Since then, both Sound Transit and the City have experienced significant revenue pressure from declining sales tax receipts. Sound Transit is examining ways to reduce the capital cost of all of its projects, including East Link.

At the time of this report, the City is engaged with the downtown stakeholders and Sound Transit to identify potential funding for a tunnel alternative. Recognizing their mutual interest in developing an alternative for downtown that effectively serves the downtown, and has the support of Bellevue's residents and businesses, Sound Transit and the City instructed their respective staffs to develop information on a range of new alternatives, both tunnel and non-tunnel, and to prepare a report that clearly describes the characteristics of each of those designs.

The Sound Transit Board intends to reconsider the preferred alternative for downtown Bellevue by spring 2010; if this deadline is not met, the schedule for funding and implementation, including final design and construction, will be delayed. As East Link is an essential element of the Sound Transit 2 Plan (ST2 Plan), project delay is not a desirable outcome.

In November 2009, staff from the City of Bellevue and Sound Transit met and jointly refined three new alternatives based on suggestions from Sound Transit peer review and value analysis panels – two at-grade alternatives and one tunnel alternative. In addition, the Sound Transit Board agreed to evaluate an elevated profile alternative at the request of the Bellevue City Council. The City and Sound Transit agreed to evaluate each alternative based upon a set of mutually agreed-upon criteria. Members of both staffs agreed that a visual simulation of each alternative would be helpful in describing how each alternative would look and operate in downtown Bellevue. The evaluation has been completed through a collaborative process where staff from Sound Transit and the City worked closely with support from the consultant team led by CH2M HILL.

The identification of a single Segment C alternative for the project preferred alternative will be made by the Sound Transit Board of Directors after a review of input from the City of Bellevue and community stakeholders. Sound Transit staff and consultants will then complete preliminary engineering and environmental review for the project. Future project phases include final design, permitting, and construction.

The report provides a basis for comparing the alternatives to one another, but it does not make a recommendation. It also represents an evaluation of conceptual designs and a screening level analysis of environmental impacts. The review contained in this report is based on existing data and information. As additional work is completed on the preferred alternative, and as additional information becomes available, the cost, performance, and environmental impacts reported here will continue to be refined. Additionally, designs that reduce construction risk and impacts, as well as other impacts, may be considered.

This report includes a summary of the evaluation of the new Segment C alternatives. It also includes an overview of the alternatives and of the agreed upon criteria and the methods used to assess each alternative. Finally, it includes a narrative describing the relative trade-offs of the new alternatives and a series of visual simulations and graphics illustrating how each alternative would look in downtown Bellevue.

Description of Alternatives

The Downtown Bellevue light rail alignments (Segment C) travel between SE 6th Street and NE 12th Street and extend east of I-405 to include the Hospital Station. This segment of the East Link Project transitions from the primarily single-family residential and commercial area of south Bellevue to the dense central business district of downtown Bellevue, which is a major regional urban center. Key destinations in the area are Bellevue's downtown core and transit center and, on the east side of I-405, Overlake Hospital, Group Health, and Children's Hospital medical centers. Within downtown Bellevue, city forecasts anticipate adding 13,000 housing units and 44,000 jobs between 2000 and 2030.

This Concept Design Report includes four new alternatives and two alternatives from the Draft EIS.

New Alternatives

C9T: 110th NE Tunnel

C9A: 110th NE At-Grade

C11A: 108th NE At-Grade

C14E: 114th NE Elevated

Alternatives from Draft EIS

C4A: At-Grade Couplet

C3T: 108th Avenue NE Tunnel

In addition, Sound Transit is re-evaluating the connector from Segment C to the Preferred Alternative B3S route in Segment B: South Bellevue between SE 8th Street and Main Street. One connector alternative would travel in the center of 112th Avenue SE (similar to Alternative B2A in the Draft EIS); this alternative was recommended as a cost-saving measure during the value analysis review of the project. B3S, the 112th Bypass, would travel through privately owned parcels west of 114th Avenue SE. This analysis assumes the preferred alternative (B3S). Differences between the alternatives are noted in this report. This report does not include an evaluation of Segment B beyond these connection options.



1 Move B3 to at-grade on the east side of Bellevue Way SE and 112th Avenue SE, subject to further evaluation.

2 Future consideration of C3T tunnel as the preferred alternative, if additional funding sources are identified.

3 Locate D2A on the north side of NE 24th Street, subject to further evaluation.

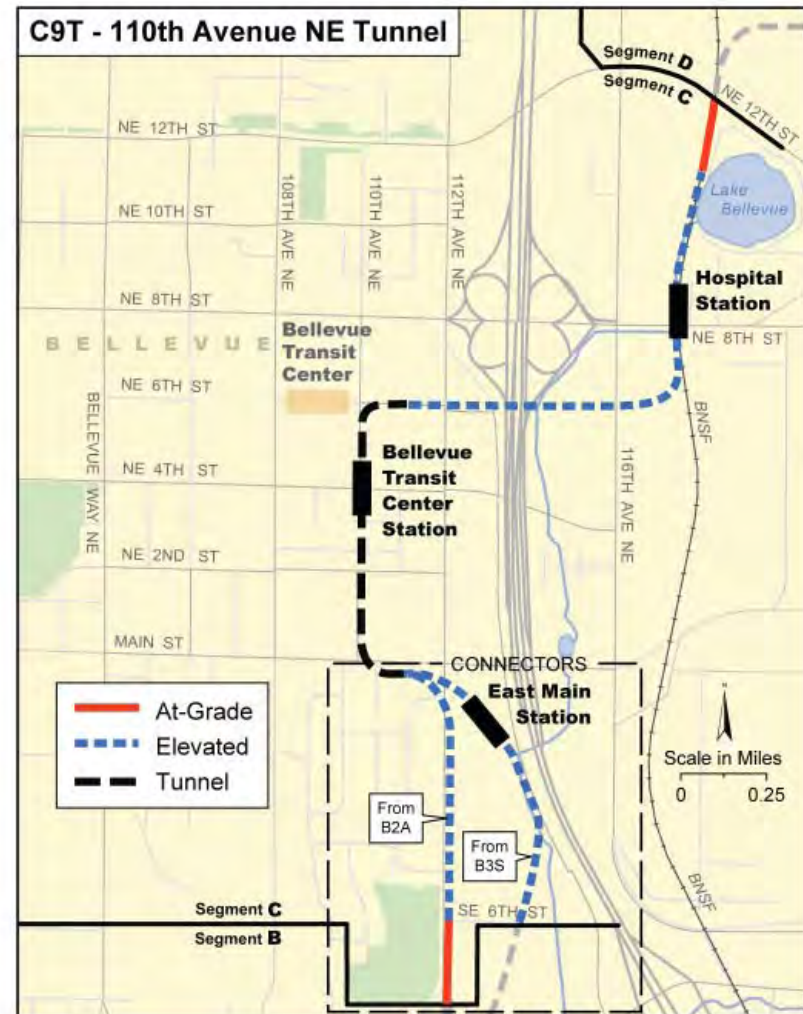
4 New location for the Downtown Redmond Station, subject to further evaluation.

Figure 1. East Link Project

C9T: 110th NE Tunnel (New Alternative)

With the 110th NE Tunnel Alternative (C9T), light rail would travel between Main Street and NE 6th Street in a cut-and-cover tunnel on 110th Avenue NE. After crossing over 112th Avenue NE south of Main Street, the tunnel would begin at 110th Avenue NE and end on NE 6th Street east of 110th Avenue NE. After leaving the tunnel, light rail would cross over 112th Avenue NE and I-405. C9T is fully grade-separated.

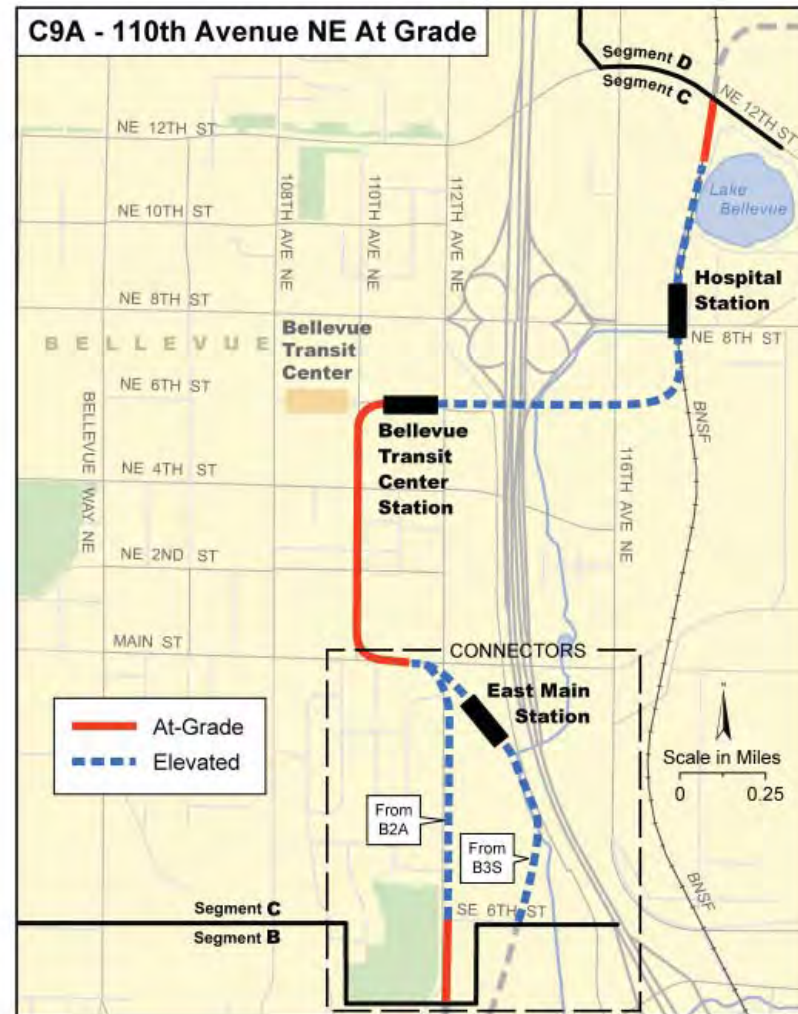
The underground Bellevue Transit Center Station would be located under 110th Avenue NE at NE 4th Street south of the existing Bellevue Transit Center. The elevated Hospital Station would be located at NE 8th Street in the former BNSF Railway corridor and includes a grade-separated pedestrian crossing of NE 8th Street. The East Main Station would be located on the southeast corner of Main Street and 112th Avenue SE.



C9A: 110th NE At-Grade (New Alternative)

With the 110th NE At-Grade Alternative (C9A), light rail would cross over 112th Avenue NE, then travel between Main Street and NE 6th Street at-grade in the center of 110th Avenue NE. East of 110th Avenue NE on NE 6th Street, light rail would cross over 112th Avenue NE and I-405. C9A is 24 percent street running and 76 percent grade-separated.

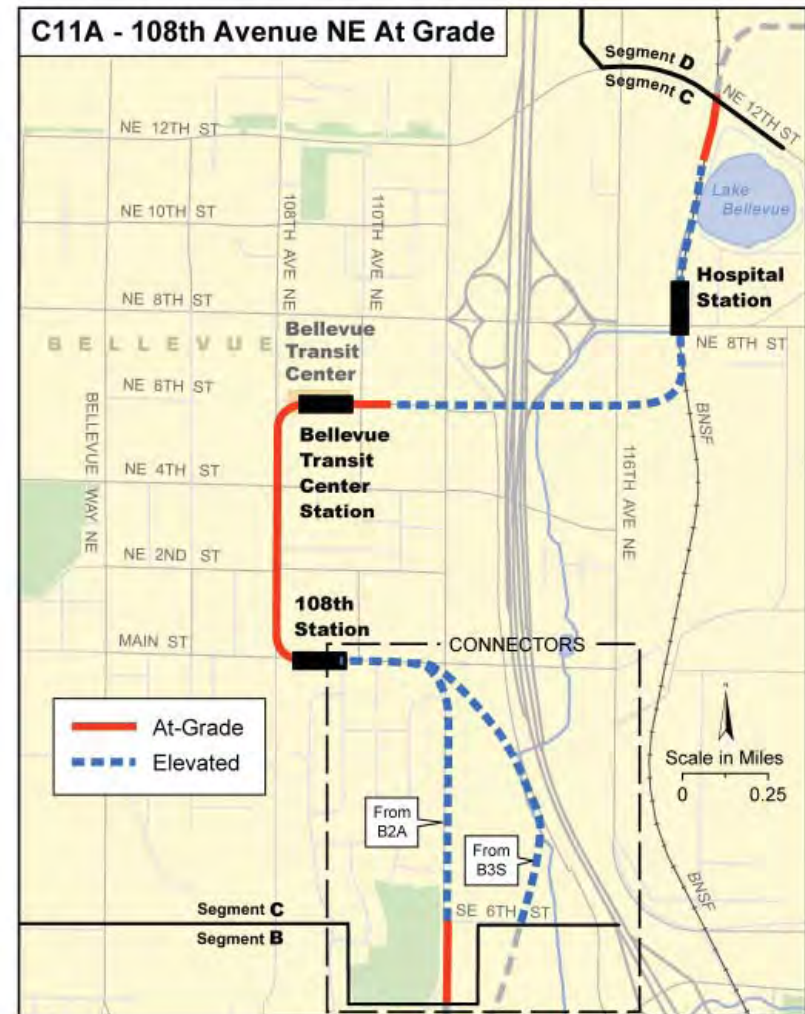
The Bellevue Transit Center Station would be elevated on NE 6th Street east of 110th Avenue NE near the existing Bellevue Transit Center. The east end of this station would be elevated, though access from the existing Bellevue Transit Center would be at-grade. The Hospital Station would be located at NE 8th Street in the former BNSF Railway corridor and includes a grade-separated pedestrian crossing of NE 8th Street. The East Main Station would be located on the southeast corner of Main Street and 112th Avenue SE.



C11A: 108th NE At-Grade (New Alternative)

With the 108th NE At-Grade Alternative (C11A), light rail would cross over 112th Avenue NE, then travel in the center of 108th Avenue NE. On NE 6th Street east of 110th Avenue NE, light rail would climb to a structure and cross over 112th Avenue NE and I-405. C11A is 27 percent street running and 73 percent grade-separated.

The Bellevue Transit Center Station would be located at-grade at the existing Bellevue Transit Center on NE 6th Street between 108th Avenue NE and 110th Avenue NE. The elevated Hospital Station would be located at NE 8th Street in the former BNSF Railway corridor and includes a grade-separated pedestrian crossing of NE 8th Street. The 108th Station would be located on the south side of Main Street between 108th Avenue and 110th Avenue NE. Alternately, the East Main Station described for C9T and C9A could be constructed with this alternative.



C14E: 114th NE Elevated (New Alternative)

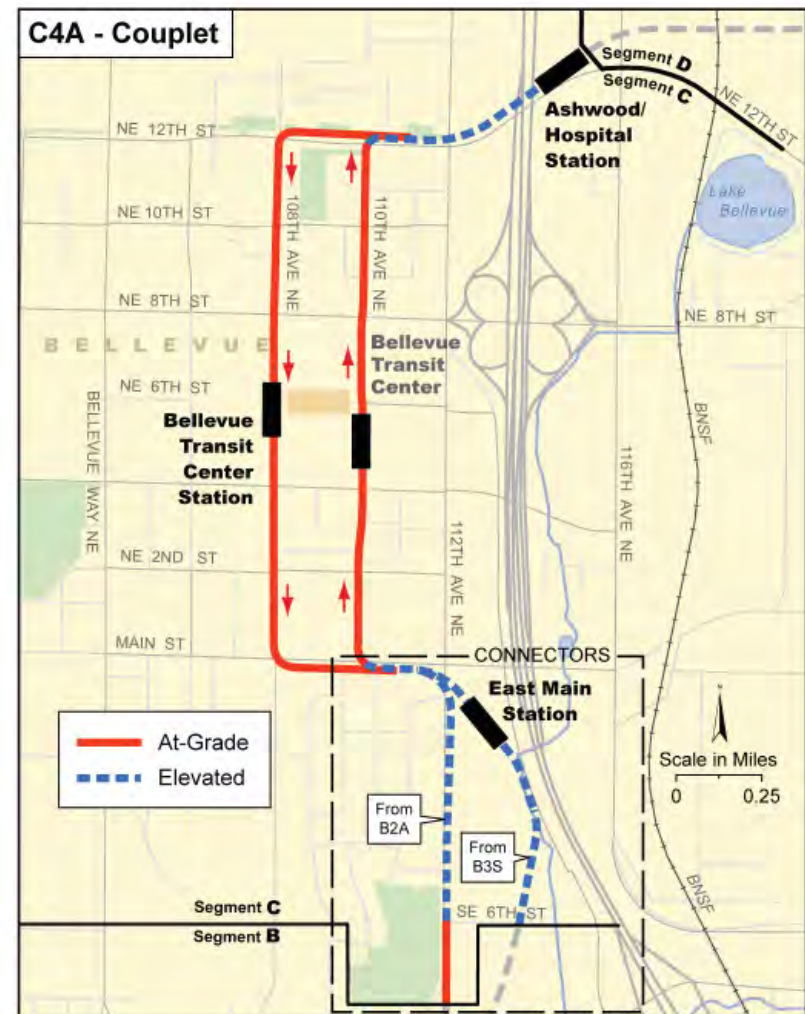
With the 114th NE Elevated Alternative (C14E), light rail would follow 114th Avenue NE from Main Street to the south side of the I-405/NE 8th Street interchange. This alternative would be elevated for its entire distance and cross over I-405 beginning at NE 6th Street. C14E is fully grade-separated.

The Bellevue Transit Center Station would be located on an elevated structure above 114th Avenue NE, between NE 4th Street and NE 6th Street, east of the existing Bellevue Transit Center. To provide better access from the Bellevue Transit Center, a moving sidewalk would connect the station to City Hall Plaza. The elevated Hospital Station would be located in the former BNSF Railway corridor north of NE 8th Street, further north than in the other alternatives. Pedestrian access across NE 8th Street would be at-grade. The East Main Station is not included in this alternative.



C4A: At-Grade Couplet (Sound Transit Preferred Alternative, May 2009)

With the At-Grade Couplet Alternative (C4A), light rail would travel between Main Street and NE 12th Street as an at-grade couplet running counter-flow to traffic on one-way roadways (northbound track on the east side of 110th Avenue NE and the southbound track on the west side of 108th Avenue NE). Vehicle traffic on these avenues would be converted to one-way in the opposite direction of light rail travel. Both tracks would combine on NE 12th Street to cross over 112th Avenue NE and I-405. South of downtown, C4A would connect from Segment B as an elevated structure and transition to at-grade on Main Street. The Bellevue Transit Center Station would be on 108th and 110th avenues NE south of NE 6th Street near the existing Bellevue Transit Center, and the Ashwood/Hospital Station would be located east of I-405 on the north side of NE 12th Street.



**C3T: 108th NE Tunnel
(Tunnel for Future Consideration
as Preferred, May 2009)**

The 108th NE Tunnel Alternative (C3T) would travel under 108th Avenue NE in a tunnel until turning east at NE 12th Street and transitioning to an elevated guideway to cross over 112th Avenue NE and I-405. The Bellevue Transit Center Station would be located underground on 108th Avenue NE at NE 6th Street, immediately west of the existing Bellevue Transit Center. The Ashwood/Hospital Station would be located east of I-405 on the north side of NE 12th Street.



Evaluation of the Alternatives

To identify and compare differences among the new alternatives, Sound Transit and the City of Bellevue agreed to use criteria grouped into eight categories based generally on criteria used in the Draft EIS and on City policy. The criteria categories, criteria, and measures are shown in Table 1.

Criteria category	Criteria	Measure
Cost	Capital cost	Capital cost (\$2007)
Land Use accessibility/ Walk distance	Land use within walking distance of stations	Percent of 2030 forecast downtown jobs and residents within 5-minute walk of an East Link station
		Percent of 2030 forecast downtown jobs and residents within 10-minute walk of an East Link station
Ridership	Estimated 2030 ridership and light rail travel time	System ridership
		Segment C ridership
		Segment C light rail travel time
Traffic operations	Downtown traffic congestion for vehicles	Average intersection delay
		Vehicle demand served into and out of downtown
		East-west and north-south vehicular travel time
Environmental impacts	Displacements	Number of displaced residences and businesses
	Noise and vibration	Qualitative assessment of potentially affected sensitive uses and extent of possible mitigation
	Parks	Acres of parks affected
	Ecosystems	Assessment of sensitive natural resources affected
Construction effects	Construction effects	Qualitative assessment of street-level effects during construction
		Qualitative assessment of duration of construction
Construction risk	Construction risk	Qualitative assessment of construction risks to schedule and budget
Consistency with City plans and policies	Consistency with policies related to downtown alignments	Qualitative assessment of consistency with City of Bellevue Comprehensive Plan, and adopted Council interest statements

Table 1. **Criteria Categories, Criteria, and Measures**

Summary of Evaluation of Segment C: Downtown Bellevue Alternatives

Table 2 summarizes the evaluation of each new Segment C alternative using the methods described in this report.

New Segment C: Downtown Bellevue Alternatives					
Criteria	Measure	C9T 110th NE Tunnel	C9A 110th NE At-Grade	C11A 108th NE At-Grade	C14E 114th NE Elevated
Cost	Estimated cost in millions (\$2007)	\$990	\$640	\$680	\$560 ¹
	Difference between ST2 Plan budget (\$705 M) and alternative cost	(\$285)	\$65	\$25	\$145
2030 Ridership	Segment boardings	8,000	7,500	8,000	6,000 ²
	East Link ridership	51,000	48,500	49,000	48,500
Alternative characteristics	Light rail travel time (minutes)	6	9	9	4
	Segment C length (miles)	1.6	1.7	1.9	1.3
	Number of stations	3	3	3	2
2030 Downtown jobs within walking distance of a station (79,000 jobs)	Percent within 5-minute walk	44%	51%	76%	27%
	Percent within 10-minute walk	97%	96%	99%	79%
2030 Downtown residents within walking distance of a station (19,000 residents)	Percent within 5-minute walk	21%	28%	53%	7%
	Percent within 10-minute walk	66%	63%	92%	46%
Traffic operations	Southbound vehicle travel time (minutes)	6.5	8.0	7.4	6.5
	Northbound vehicle travel time (minutes)	5.8	6.5	5.6	5.8
	Eastbound vehicle travel time (minutes)	5.0	4.9	5.3	5.0
	Westbound vehicle travel time (minutes)	4.9	5.2	5.8	4.9
	Percent of vehicle demand into and out of downtown served	78%	78%	77%	78%
	Average downtown vehicle delay (seconds)	67	73	70	67
	Average vehicle delay at key affected intersections (seconds)	78	85	87	78
Environmental impacts	Displacements (residential/business)	1/17	1/18	1/34	0/22
	Extent of noise mitigation needed	Slightly Lower	Higher	Slightly Higher	Higher
	Extent of vibration mitigation needed	Average	Average	Higher	Slightly Lower
	Park impacts in acres	.16	.14	0	0
	Linear feet of impacts to Sturtevant Creek	650	650	650	650
Construction risk	Relative risk to schedule and budget	Higher	Moderate	Moderate	Lower
Construction effects	Relative street level effects	Higher	Moderate	Moderate	Lower
	Construction duration	Longest	Intermediate	Intermediate	Shortest

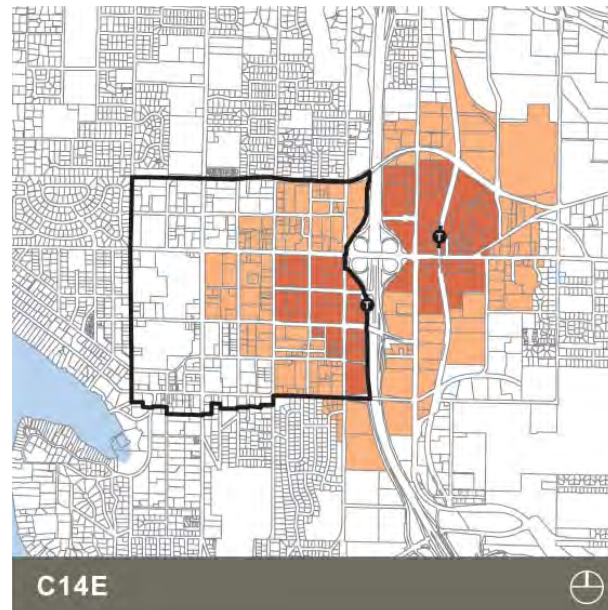
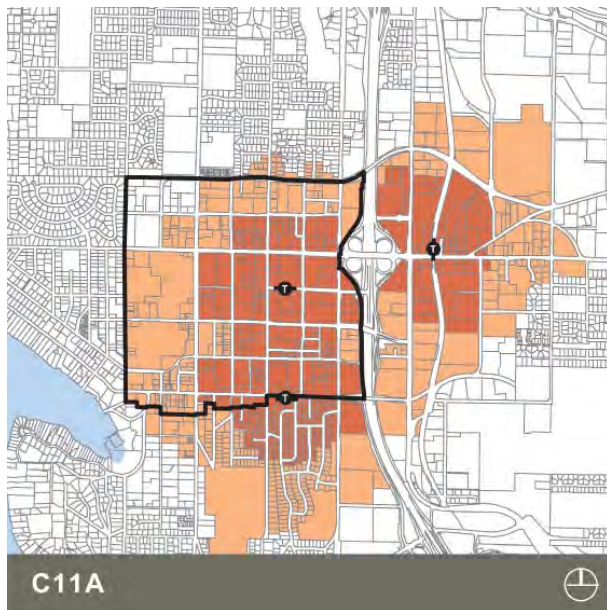
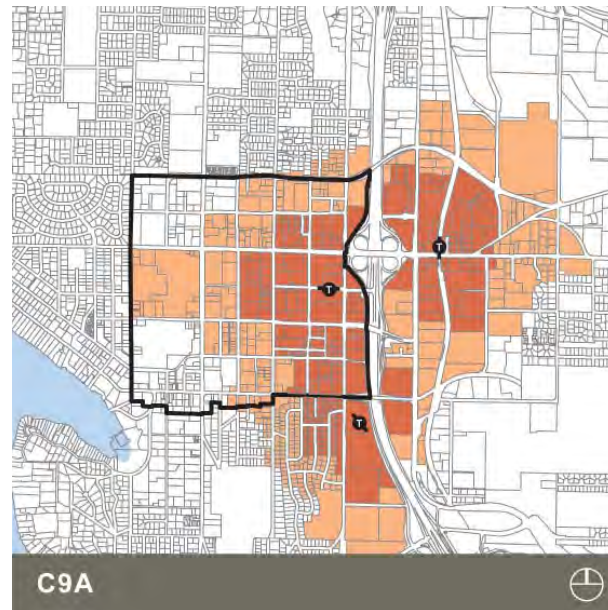
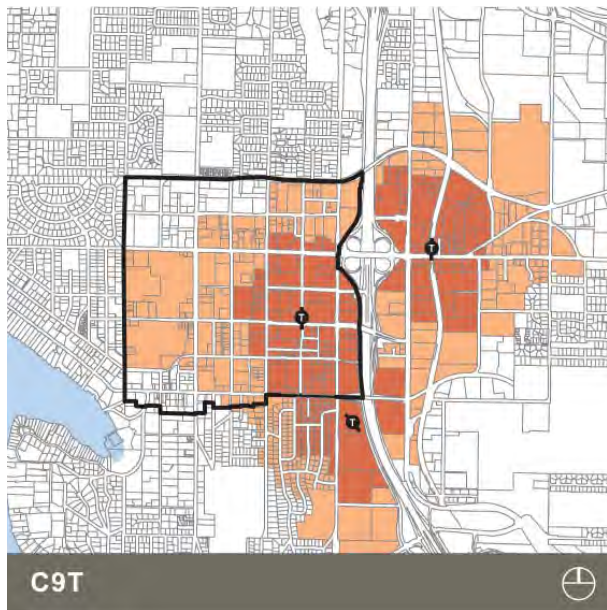
Notes:

¹ The cost estimate for C14E does not include the addition of a circulator bus and park-and-ride lot. The addition of these amenities would add \$70 million to project cost.

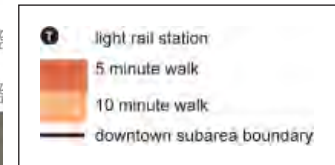
² The addition of the circulator bus or circulator bus and park-and-ride lot at Metro site does not appreciably change segment ridership.

Total East Link Project is expected to cost approximately \$2.7 billion.

Table 2. Summary of Segment C: Downtown Bellevue Alternatives Evaluation



Land Use Accessibility
Walk Distance to East Link Stations



City of Bellevue Policy Consistency Review

The purpose of the East Link project is to fulfill adopted regional policies such as the Puget Sound Regional Council's VISION 2040 and Destination 2030 plans by providing high capacity transit connections among the region's major population and employment centers. Seattle and Bellevue are designated "metropolitan cities" within King County in VISION 2040; therefore East Link is a critical component to realizing the land use and transportation visions for the region and the City of Bellevue, particularly downtown. The East Link Project is generally consistent with Bellevue's land use and transportation vision as described in the City's Comprehensive Plan. At a more detailed policy level, each of the new Segment C alternatives is more consistent or less consistent with individual policies, but these do not constitute a "fatal flaw" for any of the alternatives.

This review is intended to provide context for the policy related evaluation criteria discussed in this report. The focus was on policies that directly relate to discussions about the downtown alignment alternatives. Policies were compiled from the City's Comprehensive Plan (including adopted light rail best practices policies) and the Council's "Future High Capacity Transit Interest Statement" (adopted 6-20-2005). Policy TR-75.8 served as the general policy screen as it was the light rail best practices policy that was specifically intended to address the downtown alignment and it directly relates to the evaluation criteria in the report: serving downtown; pedestrian environment, urban design and safety; residential and commercial impacts; and transportation system functionality.

A summary of policy consistency is provided in Table 3.

Policy-Related Evaluation Criteria	Downtown Alignment Policy Screen – TR-75.8: Advocate for an alignment for downtown Bellevue that advances the adopted land use vision for an urban downtown by (see items 1 – 5 below):	C9T (110th Tunnel)	C9A (110th At-Grade)	C11A (108th At-Grade)	C14E (114th Elevated)	
2030 station boardings and East Link ridership	<p>1) Optimizing ridership, system performance, and user convenience; 2) Locating stations in proximity (i.e. within a 10-min walk) to existing and planned employment and residential concentrations in the downtown subarea.</p> <p>Related policies:</p> <ul style="list-style-type: none"> Locate major office and high intensity growth in the Downtown core (S-DT-4, S-DT-8) Accommodate Bellevue’s share of regional growth (LU-3) Advocate for transportation options that are consistent with local plans (TR-75.7) Connect downtown Bellevue with other major regional centers (TR-75.6, ETP-31, Council Interest Statement 6-20-2005) 	<ul style="list-style-type: none"> 8,000 boardings and 51,000 riders 44% of jobs and 21% of residents within 5-min. walk 97% of jobs and 66% of residents within 10-min. walk 3 stations in Segment 	<ul style="list-style-type: none"> 7,500 boardings and 48,500 riders 51% of jobs and 28% of residents within 5-min. walk 96% of jobs and 63% of residents within 10-min. walk 3 stations in Segment 	<ul style="list-style-type: none"> 8,000 boardings and 49,000 riders 76% of jobs and 53% of residents within 5-min. walk 99% of jobs and 92% of residents within 10-min. walk 3 stations in Segment 	<ul style="list-style-type: none"> 6,000 boardings and 48,500 riders 27% of jobs and 7% of residents within 5-min. walk 79% of jobs and 46% of residents within 10-min. walk 2 stations in Segment 	
2030 Downtown Residential and Jobs within 5- & 10-min. walking distance of a station		<p>3) Address aesthetic concerns and promote superior urban design integration, within established urban context.</p> <p>Related policies:</p> <ul style="list-style-type: none"> Develop an aesthetically attractive Downtown (S-DT-3) Ensure access to sunlight in public places (UD-32) Promote context sensitive design to mitigate impacts and incorporate light rail into streetscape (TR-75.14) Retain and enhance views of Downtown (S-WI-40) Visibility of station platform from streets (Tr-75.23) 	<ul style="list-style-type: none"> Underground station is weather protected Platform is not visible from street Elevated structure at both ends of Segment 	<ul style="list-style-type: none"> At-grade station with canopies provides some weather protection West end of platform is visible from street, integrated into streetscape East end of platform is not visible from street Elevated structure at both ends of Segment 	<ul style="list-style-type: none"> At-grade station with canopies provides some weather protection Platform is visible from street and integrated with Elevated structure at both ends of Segment bus operations at BTC, integrated into streetscape 	<ul style="list-style-type: none"> Covered station is weather protected Moving sidewalk is pedestrian connection to plaza Platform is not visible from street Elevated structure throughout Segment
Segment C stations			Serving Downtown			
Please refer to the visuals for each alternative in the body of the report	Pedestrian Environment Urban Design & Safety					

Table 3. City of Bellevue Policy Consistency Summary

Policy-Related Evaluation Criteria	Downtown Alignment Policy Screen – TR-75.8: <i>Advocate for an alignment for downtown Bellevue that advances the adopted land use vision for an urban downtown by (see items 1 – 5 below):</i>		C9T (110th Tunnel)	C9A (110th At-Grade)	C11A (108th At-Grade)	C14E (114th Elevated)
<p>Construction effects</p> <hr/> <p>Environmental Impacts: Displacements; Noise mitigation needed; Vibration mitigation needed; Park impacts; Sturtevant Creek impacts</p>	Residential & Commercial Impacts	<p>4) minimize impacts on businesses and residents during construction.</p> <p>Related policies:</p> <ul style="list-style-type: none"> • Protect residential and commercial areas by minimizing environmental, traffic and noise impacts (TR-75.17) • Minimize impacts of transportation system on environment and quality of life (Transportation Goal) • HCT should maximize amenities while being sensitive to neighborhood and quality of life (Council Interest Statement 6-20-2005) <p>*NOTE: Noise and vibration are not described in the policy review as some noise and vibration impacts and commensurate mitigation is assumed for each of the alternatives.</p>	<ul style="list-style-type: none"> • Longer duration of street reconstruction • 1 residential, 17 commercial displacements • Tracks next to residential areas • Maintains existing access after construction 	<ul style="list-style-type: none"> • Shorter duration of in-street construction • 1 residential, 18 commercial displacements • Tracks next to residential areas • Alters access along 110th after construction 	<ul style="list-style-type: none"> • Shorter duration of in-street construction • 1 residential, 34 commercial displacements • Tracks next to residential areas • Alters access along Main and 108th after construction 	<ul style="list-style-type: none"> • Shorter duration of street reconstruction • No residential, 22 commercial displacements • Avoids residential areas • Alters access along 114th after construction
<p>Traffic operations and travel time</p>	Transportation System Functionality	<p>5) minimize overall impacts of light rail on operation of downtown street network.</p> <p>Related policies:</p> <ul style="list-style-type: none"> • Provide reliable, high performance, attractive alternatives to SOV travel by providing service to city's major employment and residential areas, add capacity rather than replace existing (TR-75.5, Council Interest Statement 6-20-2005) 	<ul style="list-style-type: none"> • Maintains existing travel lanes • Light rail system performance and reliability not vulnerable to street traffic issues/incidents 	<ul style="list-style-type: none"> • Reduces travel lanes for 3 blocks on 110th, eliminates northbound left turns at 2nd and 4th • Light rail system performance and reliability vulnerable to street traffic issues/incidents 	<ul style="list-style-type: none"> • Reduces travel lanes for 3 blocks on 108th, eliminates northbound left turns at 2nd and 4th • Light rail system performance and reliability vulnerable to street traffic issues/incidents 	<ul style="list-style-type: none"> • Maintains existing travel lanes • Light rail system performance and reliability not vulnerable to street traffic issues/incidents

Table 3. City of Bellevue Policy Consistency Summary (cont.)

Summary of Methodology by Criteria Category

Capital Cost

Sound Transit calculated capital costs in 2007 dollars for the Draft EIS; these include estimates for construction, right-of-way, construction cost markups for general conditions, overhead, profit, and sales tax. Construction costs also include a design allowance and allocated contingency. Other costs include construction management, design (environmental review, preliminary engineering, final design, permitting), agency administration, construction contingency, and project reserve.

As with the estimates reported here, the cost estimates for the ST2 Plan adopted in 2008 include a 15% project reserve above the

base project estimate. Subsequent declines in revenue due to the recession currently require that Sound Transit manage to the base project estimates. Sound Transit is seeking opportunities to reduce scope and budget to restore a project reserve within currently available revenues.

Once the Sound Transit Board identifies the Segment C preferred alternative, the team will complete preliminary engineering for that alternative, which will then be used to prepare a more detailed cost estimate. This information will be presented in the Final EIS and used to develop a financial plan for the project.

Table 4 presents a summary of the items included in the cost estimates by alternative. The following subsections describe the elements included in the cost estimate for each alternative.

		Alternative C9T 110th NE Tunnel	Alternative C9A 110th NE At-Grade	Alternative C11A 108th NE At-Grade	Alternative C14E 114th NE Elevated
Stations	Number (Segment C)	3	3	3	2
	East Main (108th for C11A)	Elevated, side platform	Elevated, side platform	At-grade, side platform	Not included
	Bellevue Transit Center (BTC)	Underground, center platform	Elevated, center platform	At-grade, side platform	Elevated, center platform
	Hospital	Elevated, center platform	Elevated, center platform	Elevated, center platform	Elevated, center platform
Substantial street reconstruction		110th Avenue NE, NE 6th Street	110th Avenue NE, 4th Street, 6th Street	108th Avenue NE, 6th Street	Portions of 114th Avenue NE, widening of NE 6th Street
Other items		Temporary decking on 110th Avenue NE to maintain access		Reconstruction of BTC bus facilities	Flyer stop on new NE 6th Street structure
					Moving walkway from City Hall to BTC station
					Pedestrian connection from Meydenbauer Center to BTC station

Table 4. **Summary of Items Included in Cost Estimates by Alternative**

C9T: 110th NE Tunnel

The cost estimate for C9T includes three stations: elevated East Main Station with side platforms, underground Bellevue Transit Center Station with a center platform, and elevated Hospital Station with a center platform. It also includes reconstruction of 110th Avenue NE for the tunnel, due to cut-and-cover construction, and NE 6th Street to accommodate transitions between elevated and tunnel profiles.

C9A: 110th NE At-Grade

The cost estimate for C9A includes three stations: elevated East Main Station with side platforms, elevated Bellevue Transit Center Station with a center platform, and an elevated Hospital Station with a center platform. It also includes reconstruction and modification of 110th Avenue NE to accommodate at-grade light rail, NE 4th Street to accommodate tracks through the 4th Street/110th Avenue NE intersection, and of NE 6th Street to accommodate transitions between at-grade and elevated profiles.

C11A: 108th NE At-Grade

The cost estimate for C11A includes three stations: at-grade 108th Station with side platforms, at-grade Bellevue Transit Center Station with side platforms, and an elevated Hospital Station with a center platform. It also includes reconstruction and modification of 108th Avenue NE to accommodate at-grade light rail and of NE 6th Street to accommodate transitions between at-grade and elevated profiles, and reconstruction of the existing Bellevue Transit Center to integrate with the light rail station.

C14E: 114th NE Elevated

The cost estimate for C14E includes two stations: elevated Bellevue Transit Center Station with a center platform and an elevated Hospital Station with a center platform. This option does not include an East Main Station. The cost estimate also includes a moving walkway with weather protection from City Hall Plaza to the Bellevue Transit Center Station and a pedestrian bridge from the Meydenbauer Center to the walkway. It also includes widening of NE 6th Street adjacent to the Bellevue Transit Center Station; this widening will be designed to include a bus flyer stop, travel lanes, and a multi-use path on the south side of the street to accommodate the City's future plans to extend NE 6th Street across I-405.

Costs for two additional amenities to serve the Bellevue Transit Center Station are called out separately in the estimate for this alternative. The first amenity would be a circulator bus that loops through downtown to the BTC station. The second would be an underground parking structure that would be implemented as part of a larger development project with a plaza and other features on the Metro site; one floor (200 spaces) is assumed to be used as park-and-ride. Only that one floor is included as a potential cost add-on for C14E.

Ridership

Sound Transit developed 2030 ridership projections for each alternative. These projections reflect the most recent Puget Sound Regional Council (PSRC) 2030 land use projections which include the City of Bellevue's Bel-Red and Redmond's Overlake plans that were not reflected in the Draft EIS. The regional transit network is based on the system approved by voters in 2008. The ridership category also includes a comparison of Segment C light rail travel times.

Land Use Accessibility/Walk Distance

The City of Bellevue performed a walk distance analysis to better understand the differences in pedestrian capture areas associated with new Segment C station locations. This analysis was conducted by assessing the percent of 2030 downtown employment and residential population within a 5-minute and 10-minute walk distance of each station. Using an average walk speed of 3 miles per hour, the 5-minute walk represents the higher-capture, 1/4-mile distance for transit users. The 10-minute walk represents the 1/2-mile distance as identified in the Bellevue Light Rail Best Practices Report and reflected in the City's Comprehensive Plan.

The City converted the 5-minute and 10-minute walk times to more precise distances than a standard 1/4-mile and 1/2-mile measure based on two main factors: (1) the need for vertical circulation at some stations and (2) the presence of moving sidewalks in Alternative C14E (see page 53 for a description of this alternative). Stations requiring vertical circulation were assigned a walk time "penalty" for the rider to reach the sidewalk. C14E was assigned a "bonus" of reduced walk time due to the inclusion of a moving sidewalk.

Traffic Operations

This traffic analysis provides information that allows the stakeholders to compare the downtown alternatives with regard to their effects on the downtown Bellevue transportation system.

In undertaking the traffic operations analysis, the City of Bellevue used the Bellevue-Kirkland-Redmond (BKR) travel demand model (rather than the PSRC travel demand model, which was used for the Draft EIS) to produce vehicle travel demand forecasts. Forecasts for each alternative were based on the same set of land use and transportation network assumptions; with some variability in the local street network to reflect the configuration of the two at-grade alternatives. For purposes of the traffic analysis, the same overall network assumptions are assumed to be consistent for C9T and C14E, since these are both grade-separated alternatives; therefore, the data reported for each of these alternatives are the same. The analysis did not take into account a park-and-ride garage for C14E. It should also be noted that, to be consistent with the Draft EIS, some roadway assumptions are different than previous City planning and analysis efforts.

Using these forecasts, the City, Sound Transit and consultant staff collaboratively prepared a traffic operations analysis and simulation of the downtown transportation system. For the City, all previous Downtown traffic analysis (as part of the Downtown Plan) was completed for a 2020 time horizon. To be consistent with the

EIS the time horizon for this analysis is 2030. Lastly, the analysis focuses on the PM peak hour conditions. This generally is the most congested time of the day in downtown Bellevue. The greatest changes in vehicle congestion between now and 2030 are due to growth in downtown Bellevue.

Data was produced for both the downtown transportation system as a whole and for specific intersections. For this report, the following system-wide or composite measures are reported for the 2030 PM peak hour:

- **Vehicle Travel Times:** Travel times are calculated between two points along key north-south and east-west roads. The four measures below describe the values presented in this report:
 - **Southbound and Northbound Vehicle Travel Times:** These measures report the average travel times for a composite of key north-south Downtown arterials between Bellevue Way and 112th Avenue NE (from Main Street to NE 12th Street
 - **Eastbound and Westbound Vehicle Travel Times:** These measures report the average travel times for a composite of key east-west Downtown arterials between Main Street and NE 12th Street (from Bellevue Way to 112th Avenue NE).
- **Percent of Vehicle Demand Served Into and Out of Downtown Bellevue:** This measures the percentage of vehicles able to

enter or exit Downtown as compared to total expected number of trips based on the 2030 land use forecast. It was measured at key arterials encompassing the core of Downtown Bellevue (Main Street, 112th Avenue NE, NE 12th Street, Bellevue Way).

- **Average Vehicle Delay at Intersections:** Intersection delay measures the amount of time a vehicle is expected to wait at an intersection. This measure is provided for two areas; the larger downtown transportation system bounded by Bellevue Way, 112th Avenue NE, Main Street and NE 12th Street (Downtown); and a more focused study area surrounding the light rail alternatives in southeast downtown, which is an area bounded by 106th Avenue NE, Main Street, 112th Avenue NE, and NE 8th Street. Individual vehicle intersection delays are weighted by the number of vehicles served at each intersection to provide a composite average delay experienced in each of the two values reported.

Environmental Impacts

Sound Transit used a subset of the environmental impacts analyzed in the Draft EIS to provide a comparison of key environmental factors likely to differentiate among the alternatives or otherwise be critical to community decision-making.

Displacements

Sound Transit counted displacements based on properties identified by project civil engineers as requiring demolition of buildings. The number of businesses affected was determined based on property site visits during 2007 for the Draft EIS.

Noise and Vibration

Sound Transit identified potential noise impacts by determining the total number of sensitive noise receptors potentially affected by light rail noise, according to a screening level noise model. The relative extent of sensitive receptors with the new alternatives was qualitatively compared to the average number of potentially affected sensitive receptors. Sensitive noise receptors generally include places where people typically sleep—homes and hotels in the study area.

Sound Transit identified potential vibration impacts by making a qualitative assessment of the number of sensitive receptors located near the light rail tracks for each alternative as compared to the average number of potentially affected receptors reported for all alternatives. Sensitive receptors include the Meydenbauer Center and nearby hospitals, residences, and hotels. The analysis used a screening-level approach based on distance from the track; it is assumed that surface and tunnel profiles cause vibration impacts at a greater distance than elevated profiles.

Ecosystems

Sound Transit calculated ecosystem impacts by overlaying conceptual designs of the alternatives over maps representing ecosystem resources and data collected during preparation of the Draft EIS. Sturtevant Creek could be affected between Main Street and SE 6th Street and under the Hospital Station at NE 8th Street. These impacts are reported in the analysis of the connectors between the Segment C alternatives and Segment B.

Parks

Sound Transit calculated park impacts by overlaying conceptual designs of the alternatives over park maps from the City of Bellevue.

Construction Effects and Risks

Construction Risks

Sound Transit developed a qualitative assessment of the construction risks for each alternative by assessing the schedule and budget risks for different types of construction (at-grade, retained cut and fill, elevated, cut-and-cover tunnel) for each construction stage and then by assessing the proportion of each route that would be constructed with each method. Construction risks are generally defined as items that could result in extra expense or a schedule delay. Generally, at-grade and elevated construction carries the lowest risk and retained cut and fill and cut-and-cover tunnel construction carries a higher risk.

Construction Duration

Sound Transit developed a construction schedule for each alternative based on construction type and typical production rates for each construction type. The reported qualitative comparison reflects a typical project. The actual construction schedule will be dependent on the contracting mechanism, the contractor's methods, timing of the start of construction, and other factors that will not be known until final design.

Street-Level Construction Effects

Sound Transit developed a qualitative assessment of the disruption to businesses and street-level activity associated with each alternative. This measure is intended to highlight the differences between the most intense construction phases—the time that those who live, work, or do business in downtown Bellevue are most likely to be affected by construction activities—for each alternative. Generally, at-grade and elevated construction require major disruption for a shorter period in any specific area, and cut-and-cover tunnel or retained cut-and-fill construction requires major disruption for a longer period of time in any specific area. Three of the alternatives would have some impacts to the parking garage and public space at City Hall Plaza. Effects at City Hall Plaza are reported in the alternative evaluation section of this report.

This report reflects planning-level assumptions about construction methods, risks, and effects. Other construction methods will be evaluated by Sound Transit during the design process.

C9T: 110th NE Tunnel

Technical Analysis

Alternative C9T would cost about \$990 million (\$2007), the highest cost of any of the new alternatives. An estimated 8,000 riders would board the system within Segment C, and 44 percent of downtown Bellevue's forecast jobs would be within a 5-minute walk of an East Link station; 97 percent would be within a 10-minute walk, fewer than with C9A or C11A, but more than C14E. Light rail travel time is 6 minutes for the segment and includes the time for trains to stop at three stations.

This alternative would cause the most construction disruption because of the extended time required for underground guideway construction and restoration of the street. This alternative would have the greatest effect on City Hall Plaza. The parking garage would be modified and one plaza will be rebuilt

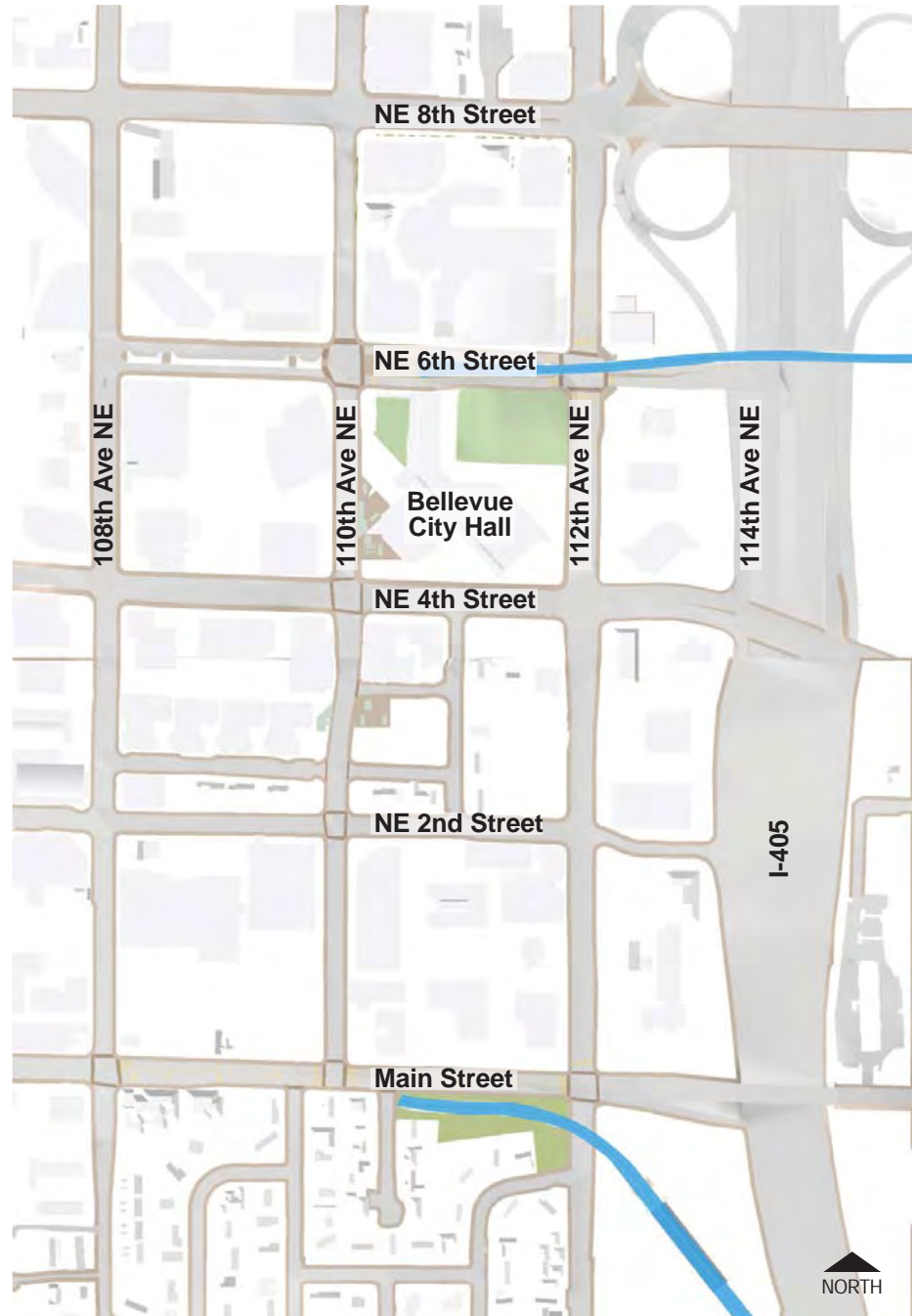
Alternative C9T would require potential mitigation for slightly fewer sensitive noise receptors than the average, and a similar number of vibration receptors; impacts to any of these receptors could likely be mitigated. This alternative would displace one home near the

corner of Main Street and 112th Avenue SE and 17 businesses primarily on the south side of Main Street, and on 116th Avenue NE by the Hospital Station. It would have a small impact on the 110th Avenue Pocket Parks.

Alternative C9T is fully grade-separated, and along with C14E has the shortest southbound vehicle travel times, and similar or better northbound travel times compared to the at-grade alternatives. East-west travel time was generally similar among all alternatives as all alternatives had the same east-west signal operations. Alternative C9T, along with Alternative C14E, has less vehicle delay at intersections than the at-grade alternatives for the downtown as a whole. Within the smaller subarea, C9T, along with C14E, had approximately 10 percent less delay at intersections than the at-grade alternatives. Percent of vehicle demand served was comparable among all alternatives, reflecting expected overall congested conditions in downtown.

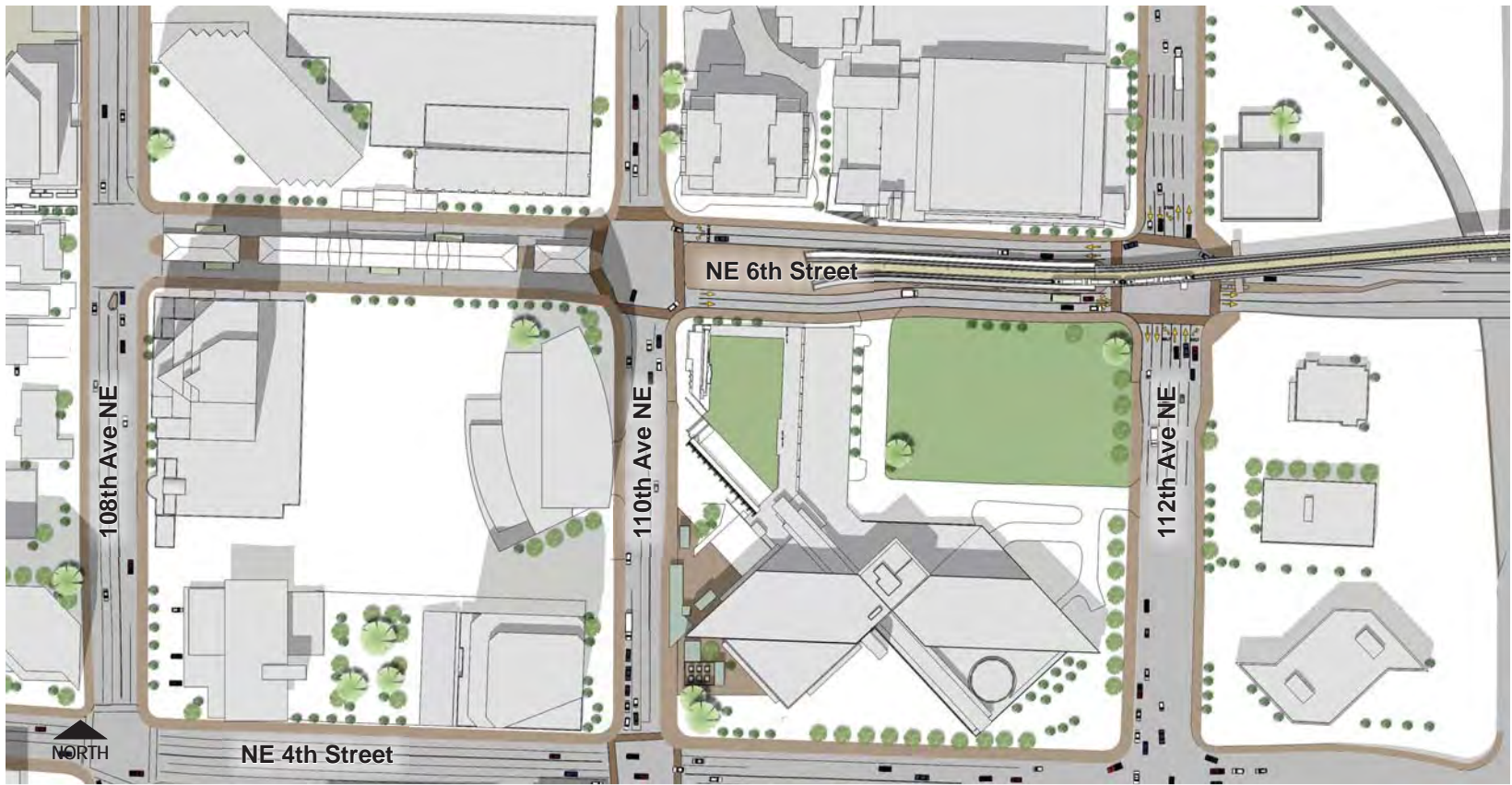
Evaluation Summary: C9T – 110th NE Tunnel		
Criteria	Measure	C9T 110th NE Tunnel
Cost	Estimated cost in millions (\$2007)	\$990
	Difference between ST2 Plan budget (\$705 M) and alternative cost	(\$285)
2030 Ridership	Segment boardings	8,000
	East Link ridership	51,000
Alternative characteristics	Light rail travel time (minutes)	6
	Segment C length (miles)	1.6
	Number of stations	3
2030 Downtown jobs within walking distance of a station (79,000 jobs)	Percent within 5-minute walk	44%
	Percent within 10-minute walk	97%
2030 Downtown residents within walking distance of a station (19,000 residents)	Percent within 5-minute walk	21%
	Percent within 10-minute walk	66%
Traffic operations	Southbound vehicle travel time (minutes)	6.5
	Northbound vehicle travel time (minutes)	5.8
	Eastbound vehicle travel time (minutes)	5.0
	Westbound vehicle travel time (minutes)	4.9
	Percent of vehicle demand into and out of downtown served	78%
	Average downtown vehicle delay (seconds)	67
	Average vehicle delay at key affected intersections (seconds)	78
Environmental impacts	Displacements (residential/business)	1/17
	Extent of noise mitigation needed	Slightly Lower
	Extent of vibration mitigation needed	Average
	Park impacts in acres	.16
	Linear feet of impacts to Sturtevant Creek	650
Construction risk	Relative risk to schedule and budget	Higher
Construction effects	Relative street level effects	Higher
	Construction duration	Longest

C9T: 110th NE Tunnel Alternative – Overall Plan





C9T: 110th NE Tunnel Alternative – South Portal at Main Street



C9T: 110th NE Tunnel Alternative – North Portal at NE 6th Street



C9T: 110th NE Tunnel Alternative – South Portal at Main Street Looking West



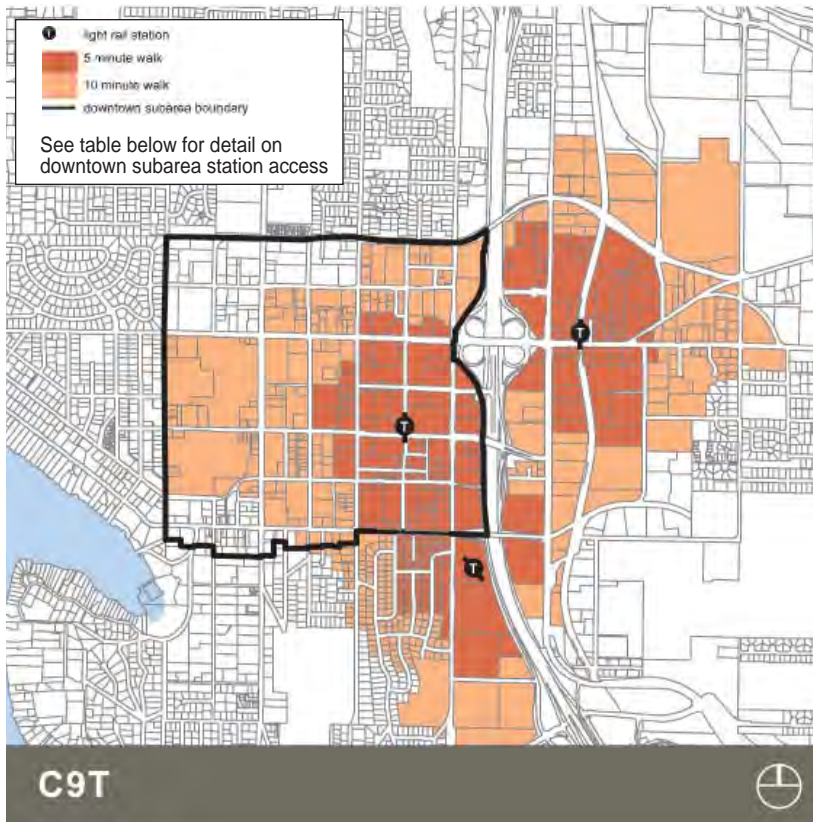
C9T: 110th NE Tunnel Alternative – North Portal on NE 6th Street Looking Southeast



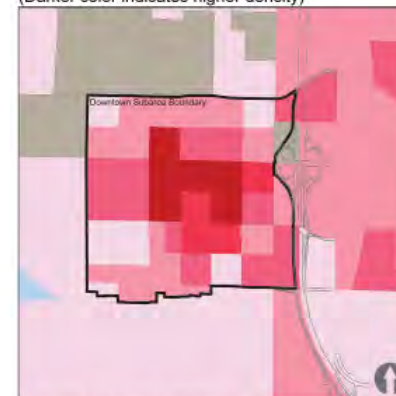
C9T: 110th NE Tunnel Alternative – North Portal at City Hall Plaza Looking Northeast



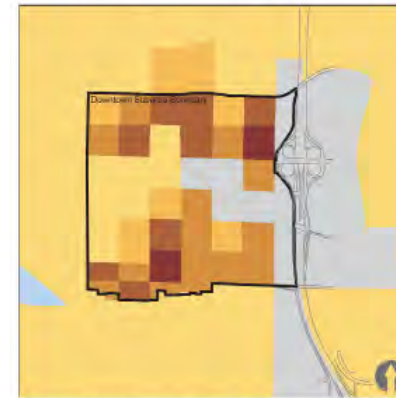
C9T: 110th NE Tunnel Alternative – North Portal at 112th Avenue NE Looking Northwest



FORECAST LAND USE DENSITIES
(Darker color indicates higher density)



Forecast 2030 Employment Density by TAZ (Jobs/Acre)



Forecast 2030 Housing Density by TAZ (HHs/Acre)

Downtown Subarea Forecast	2030 Downtown Jobs		2030 Downtown Residents	
	Within High-Capture 5-min. walk (1/4 mile)	Within 10-min. walk (1/2 mile)	Within High-Capture 5-min. walk (1/4 mile)	Within 10-min. walk (1/2 mile)
C9T Alternative				
Primary 110th Ave Tunnel Station				
Downtown Land Use within Walk Distance	34,755	75,908	3,940	12,345
Percent of 2030 Downtown Subarea Total	44%	97%	21%	66%
Station Composite (110th Ave Tunnel, East Main, Hospital Station)				
Downtown Land Use within Walk Distance	34,755	75,908	3,940	12,345
Percent of 2030 Downtown Subarea Total	44%	97%	21%	66%

C9A: 110th Avenue NE At-Grade Alternative – Downtown Land Use Accessibility

C9A: 110th NE At-Grade

Technical Analysis

Alternative C9A would cost about \$640 million (\$2007), less than C9T or C11A, but more than C14E. An estimated 7,500 riders would board the system within Segment C with Alternative C9A, fewer than with C9T or C11A. 51 percent of downtown Bellevue's forecast jobs would be within a 5-minute walk of a station; 96 percent would be within a 10-minute walk, more than with C9T or C14E, but fewer than C11A. Light rail travel time is 9 minutes for the segment and includes the time for trains to stop at three stations.

Alternative C9A would require potential mitigation for more sensitive noise receptors than average, and a similar number of vibration receptors; impacts to any of these receptors could likely be mitigated. This alternative would displace one residence near 112th Avenue SE and Main Street and 18 businesses primarily on the south side of Main Street and on 116th Avenue NE near the BNSF Railway right-of-way at the Hospital Station. It would have a small impact on 110th Avenue Pocket Parks.

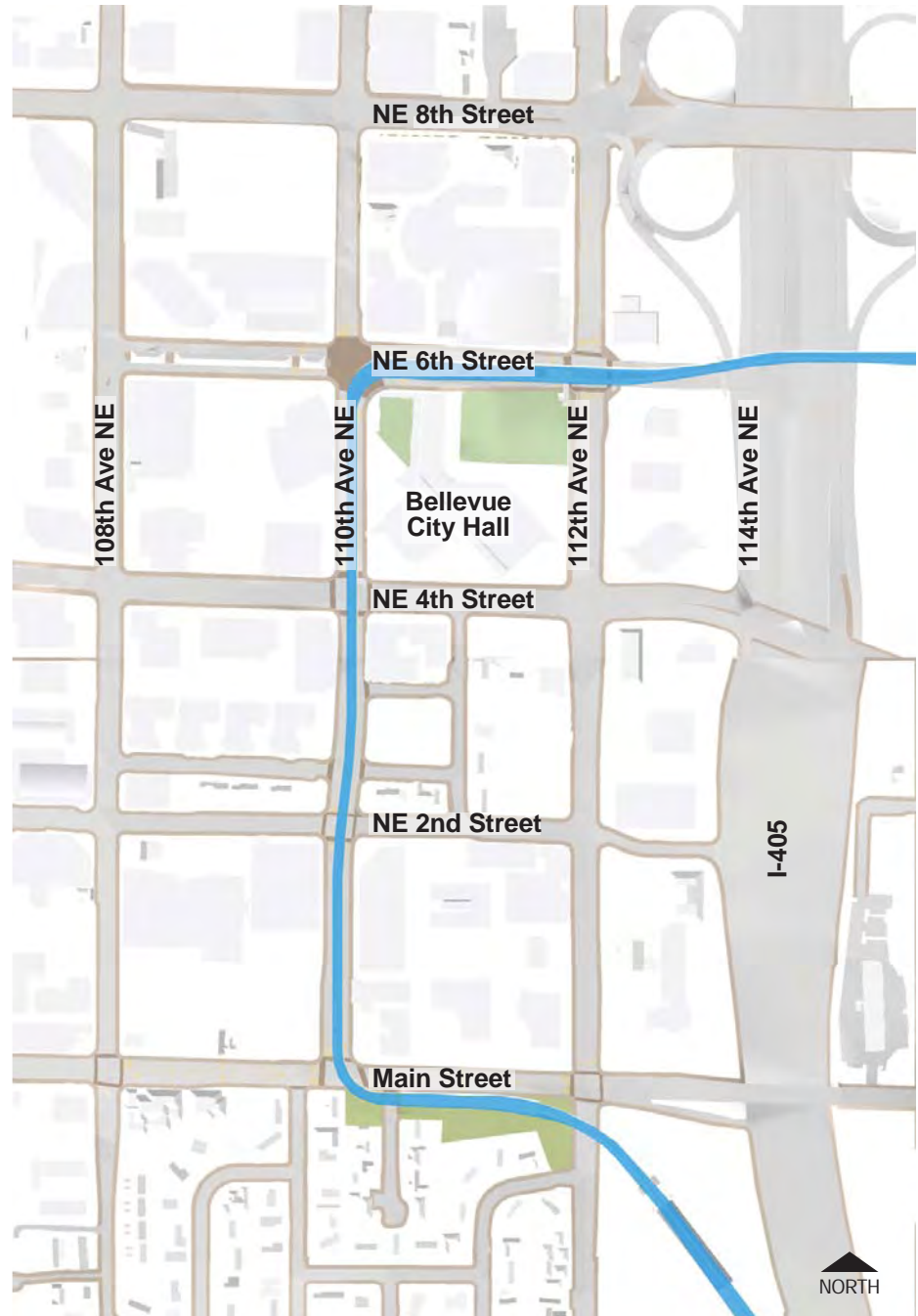
This alternative would have some impacts on City Hall Plaza. The parking garage would be modified, but it would be open for use during construction. The plaza would be rebuilt along with the project.

The transition structure along Main Street between 112th Avenue NE and 110th Avenue NE would be lower than with C11A because this alternative does not include the 108th Station. This is illustrated in the visual simulation "South Transition Structure at Main Street Looking West."

Alternative C9A crosses 4 signalized intersections in an at-grade alignment along 110th Avenue NE between Main and NE 6th Street. C9A has greater northbound and southbound travel times than the other alternatives. East-west travel time was generally similar among all alternatives as all alternatives had the same east-west signal operations. Alternative C9A has higher vehicle delay at intersections than the other alternatives for the downtown as a whole. Within the smaller subarea, C9A has approximately 10% more delay at intersections than the grade-separated alternatives. Percent of vehicle demand served was comparable among all alternatives, reflecting expected overall congested conditions in downtown.

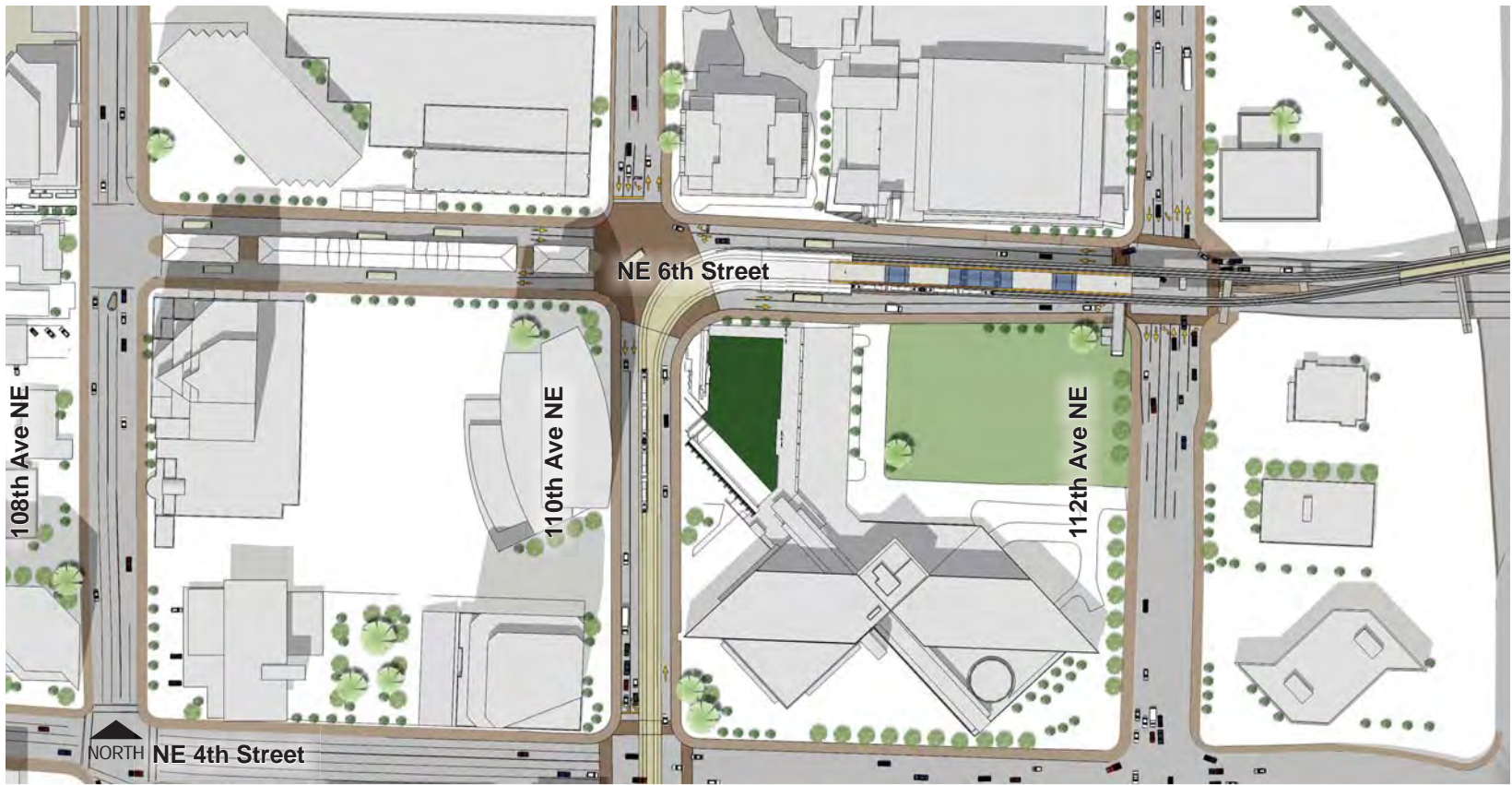
Evaluation Summary: C9A – 110th NE At-Grade		
Criteria	Measure	C9A 110th NE At-Grade
Cost	Estimated cost in millions (\$2007)	\$640
	Difference between ST2 Plan budget (\$705 M) and alternative cost	\$65
2030 Ridership	Segment boardings	7,500
	East Link ridership	48,500
Alternative characteristics	Light rail travel time (minutes)	9
	Segment C length (miles)	1.7
	Number of stations	3
2030 Downtown jobs within walking distance of a station (79,000 jobs)	Percent within 5-minute walk	51%
	Percent within 10-minute walk	96%
2030 Downtown residents within walking distance of a station (19,000 residents)	Percent within 5-minute walk	28%
	Percent within 10-minute walk	63%
Traffic operations	Southbound vehicle travel time (minutes)	8.0
	Northbound vehicle travel time (minutes)	6.5
	Eastbound vehicle travel time (minutes)	4.9
	Westbound vehicle travel time (minutes)	5.2
	Percent of vehicle demand into and out of downtown served	78%
	Average downtown vehicle delay (seconds)	73
	Average vehicle delay at key affected intersections (seconds)	85
Environmental impacts	Displacements (residential/business)	1/18
	Extent of noise mitigation needed	Higher
	Extent of vibration mitigation needed	Average
	Park impacts in acres	.14
	Linear feet of impacts to Sturtevant Creek	650
Construction risk	Relative risk to schedule and budget	Moderate
Construction effects	Relative street level effects	Moderate
	Construction duration	Intermediate

C9A: 110th NE At-Grade Alternative – Overall Plan





C9A: 110th NE At-Grade Alternative – South Transition Structure at Main Street



C9A: 110th NE At-Grade Alternative – North Transition Structure and Station at NE 6th Street



C9A: 110th NE At-Grade Alternative – North Transition Structure and Station at City Hall Plaza Looking Northeast



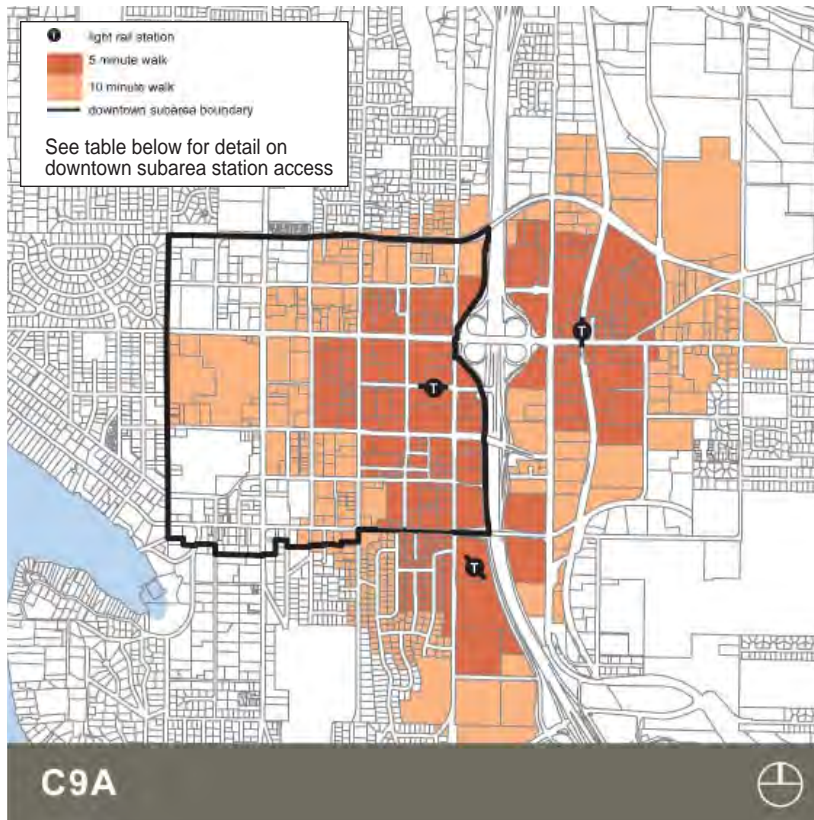
C9A: 110th NE At-Grade Alternative – South Transition Structure at Main Street Looking West



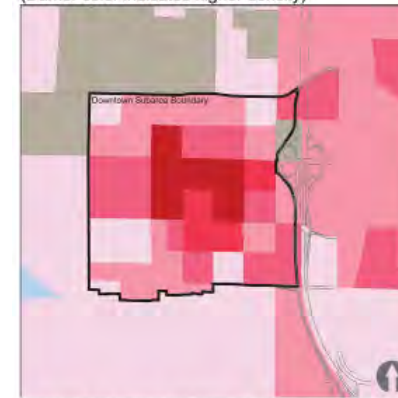
C9A: 110th NE At-Grade Alternative – North Transition Structure and Station at 110th Avenue NE Looking Southeast



C9A: 110th NE At-Grade Alternative – North Transition Structure and Station at 112th Avenue NE Looking West



FORECAST LAND USE DENSITIES
(Darker color indicates higher density)



Forecast 2030 Employment Density by TAZ (Jobs/Acre)



Forecast 2030 Housing Density by TAZ (HHs/Acre)

	2030 Downtown Jobs		2030 Downtown Residents	
Downtown Subarea Forecast	79,000		19,000	
Walk Distance	Within High-Capture 5-min. walk (1/4 mile)	Within 10-min. walk (1/2 mile)	Within High-Capture 5-min. walk (1/4 mile)	Within 10-min. walk (1/2 mile)
C9A Alternative				
Primary NE 6th Station at City Hall				
Downtown Land Use within Walk Distance	37,315	75,210	4,159	11,580
Percent of 2030 Downtown Subarea Total	47%	96%	22%	62%
Station Composite (NE 6th at City Hall, East Main, Hospital Station)				
Downtown Land Use within Walk Distance	39,938	75,298	5,221	11,826
Percent of 2030 Downtown Subarea Total	51%	96%	28%	63%

C9A: 110th NE At-Grade Alternative – Downtown Land Use Accessibility

C11A: 108th NE At-Grade

Technical Analysis

Alternative C11A would cost about \$680 million (\$2007), more than C9A or C14E, but less than C9T. An estimated 8,000 riders would board the system within Segment C with Alternative C11A, and 76 percent of downtown Bellevue's forecast jobs would be within a 5-minute walk of an East Link station; 99 percent would be within a 10-minute walk. C11A has the highest percentage of downtown jobs and residents with walking distance of a station of any of the new alternatives. Segment ridership for C11A is equal to C9T and higher than for either C9A or C14E. Unlike the other alternatives, C11A has a station on Main Street east of 108th Avenue. Light rail travel time is 9 minutes for the segment and includes the time for trains to stop at three stations.

Alternative C11A would potentially require potential mitigation for more sensitive noise and more vibration receptors than average; impacts to any of these receptors could likely be mitigated. This alternative would displace one residence near 112th Avenue SE and Main Street, and 34 businesses primarily on the south side of Main Street, and on 116th Avenue NE near the BNSF Railway right-of-way at the Hospital Station. This option would displace more businesses on Main Street than the other options. It would not affect any park land.

This alternative would have some impacts on City Hall Plaza and the garage related to roadway widening to the south. The parking garage would be modified, but it would be open for use during construction. The plaza would be rebuilt along with the project. This alternative would also require reconstruction of the Bellevue Transit Center.

The transition structure along Main Street between 112th Avenue NE and 108th Avenue NE would be higher than with C9A to ensure that the 108th Station at the top of the hill is at-grade and level. This is illustrated in the visual simulation "South Transition Structure at Main Street Looking West."

Alternative C11A crosses 5 signalized intersections in an at-grade alignment along 108th Avenue NE between Main and NE 6th Street. C11A has greater southbound travel times and similar northbound travel times than the grade separated alternatives. East-west travel time was generally similar among all alternatives as all alternatives had the same east-west signal operations. Alternative C11A has higher vehicle delay at intersections than the grade separated alternatives for the downtown as a whole. Within the smaller subarea, C11A has approximately 10% more delay at intersections than the grade-separated alternatives. Percent of vehicle demand served was comparable among all alternatives, reflecting expected overall congested conditions in downtown.

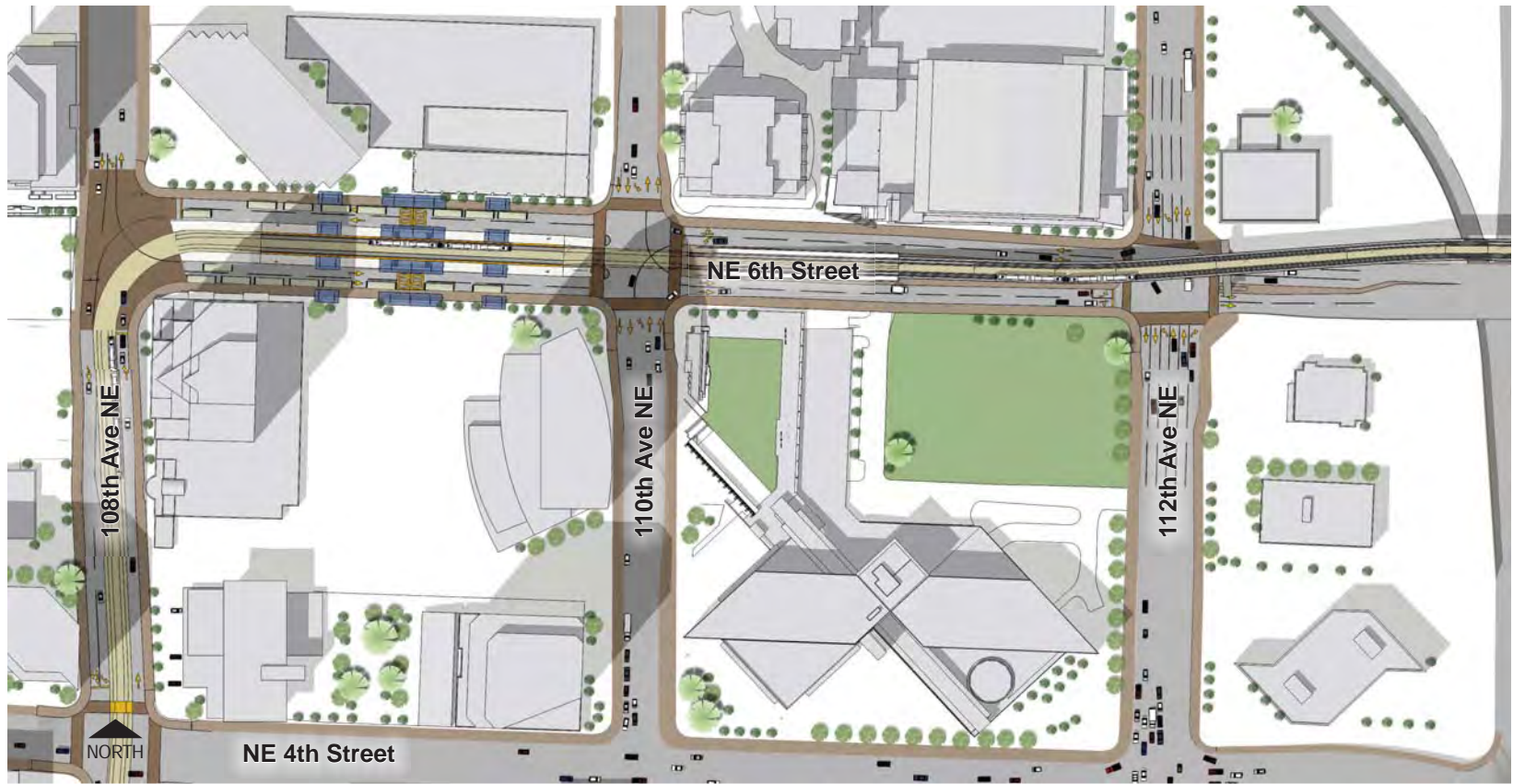
Evaluation Summary: C11A – 108th NE At-Grade		
Criteria	Measure	C11A 108th NE At-Grade
Cost	Estimated cost in millions (\$2007)	\$680
	Difference between ST2 Plan budget (\$705 M) and alternative cost	\$25
2030 Ridership	Segment boardings	8,000
	East Link ridership	49,000
Alternative characteristics	Light rail travel time (minutes)	9
	Segment C length (miles)	1.9
	Number of stations	3
2030 Downtown jobs within walking distance of a station (79,000 jobs)	Percent within 5-minute walk	76%
	Percent within 10-minute walk	99%
2030 Downtown residents within walking distance of a station (19,000 residents)	Percent within 5-minute walk	53%
	Percent within 10-minute walk	92%
Traffic operations	Southbound vehicle travel time (minutes)	7.4
	Northbound vehicle travel time (minutes)	5.6
	Eastbound vehicle travel time (minutes)	5.3
	Westbound vehicle travel time (minutes)	5.8
	Percent of vehicle demand into and out of downtown served	77%
	Average downtown vehicle delay (seconds)	70
	Average vehicle delay at key affected intersections (seconds)	87
Environmental impacts	Displacements (residential/business)	1/34
	Extent of noise mitigation needed	Slightly Higher
	Extent of vibration mitigation needed	Higher
	Park impacts in acres	0
	Linear feet of impacts to Sturtevant Creek	650
Construction risk	Relative risk to schedule and budget	Moderate
Construction effects	Relative street level effects	Moderate
	Construction duration	Intermediate

C11A: 108th NE At-Grade Alternative – Overall Plan





C11A: 108th NE At-Grade Alternative – South Transition Structure at Main Street



C11A: 108th NE At-Grade Alternative – North Transition Structure at NE 6th Street



C11A: 108th NE At-Grade Alternative – South Transition Structure at Main Street Looking West



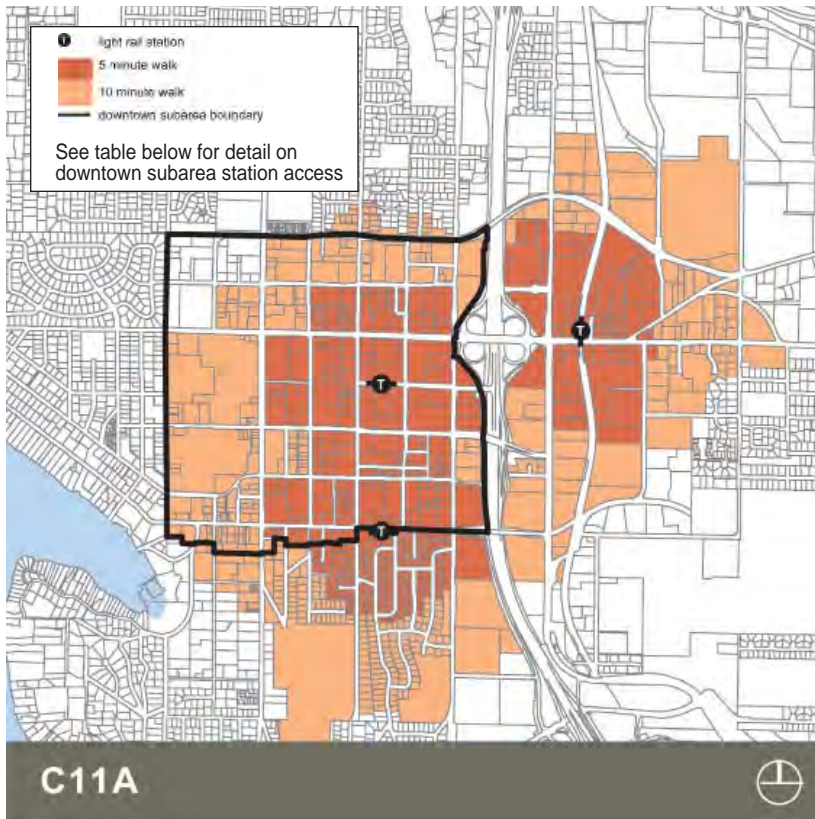
C11A: 108th NE At-Grade Alternative – Station at NE 6th Street and 108th Avenue NE Looking Southeast



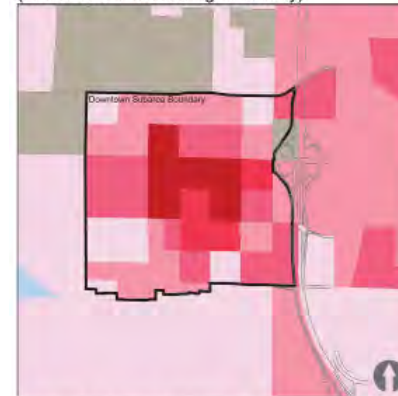
C11A: 108th NE At-Grade Alternative – North Transition Structure at City Hall Plaza Looking Northeast



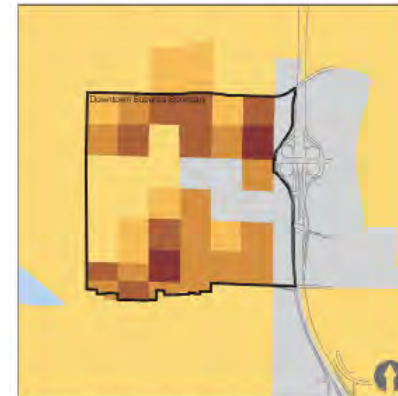
C11A: 108th NE At-Grade Alternative – North Transition Structure at 112th Avenue NE Looking West



FORECAST LAND USE DENSITIES
(Darker color indicates higher density)



Forecast 2030 Employment Density by TAZ (Jobs/Acre)



Forecast 2030 Housing Density by TAZ (HHs/Acre)

	2030 Downtown Jobs		2030 Downtown Residents	
Downtown Subarea Forecast	79,000		19,000	
Walk Distance	<u>Within High-Capture</u> 5-min. walk (1/4 mile)	Within 10-min. walk (1/2 mile)	<u>Within High-Capture</u> 5-min. walk (1/4 mile)	Within 10-min. walk (1/2 mile)
C11A Alternative				
Primary NE 6th Station at BTC				
Downtown Land Use within Walk Distance	55,370	76,914	5,857	15,190
Percent of 2030 Downtown Subarea Total	70%	98%	31%	81%
Station Composite (NE 6th at BTC, Main at 108th, Hospital Station)				
Downtown Land Use within Walk Distance	60,059	77,824	9,929	17,157
Percent of 2030 Downtown Subarea Total	76%	99%	53%	92%

C11A: 108th NE At-Grade Alternative – Downtown Land Use Accessibility

C14E: 114th NE Elevated

Technical Analysis

Alternative C14E would cost about \$560 million (\$2007), the lowest of any new alternative. An estimated 6,000 riders would board the system within Segment C with Alternative C14E, the fewest of any new alternative. 27 percent of downtown Bellevue's forecast jobs would be within a 5-minute walk of a Segment C station; 79 percent would be within a 10-minute walk, the fewest of any new alternative. The inclusion of a circulator bus and a 200-space park-and-ride lot would add \$70 million to the cost, but would not increase segment ridership substantially. The light rail travel time is 4 minutes for the segment and includes the time for trains to stop at two stations.

Construction for this alternative would cause less disruption than the tunnel and at-grade options because of the limited extent of construction in Downtown Bellevue.

Alternative C14E would potentially affect more sensitive noise receptors and fewer sensitive vibration receptors than average for

all alternatives. This alternative would displace 22 businesses—primarily on 116th Avenue NE near the BNSF Railway right-of-way at the Hospital Station. It would not affect any park land.

Alternative C14E is fully grade-separated, and along with C9T has the shortest southbound vehicle travel times, and similar or better northbound travel times compared to the at-grade alternatives. East-west travel time was generally similar among all alternatives as all alternatives had the same east-west signal operations. Alternative C14E, along with Alternative C9T, has less vehicle delay at intersections than the at-grade alternatives for the downtown as a whole. Within the smaller subarea, C14E, along with C9T, had approximately 10 percent less delay at intersections than the at-grade alternatives. Percent of vehicle demand served was comparable among all alternatives, reflecting expected overall congested conditions in downtown.

If C14E is modified to connect to B7, ridership would be lower because that alignment would not serve the South Bellevue Park-and-Ride.

Evaluation Summary: C14E – 114th NE Elevated		
Criteria	Measure	C14E 114th NE Elevated
Cost	Estimated cost in millions (\$2007)	\$560 ¹
	Difference between ST2 Plan budget (\$705 M) and alternative cost	\$145
2030 Ridership	Segment boardings	6,000 ²
	East Link ridership	48,500
Alternative characteristics	Light rail travel time (minutes)	4
	Segment C length (miles)	1.3
	Number of stations	2
2030 Downtown jobs within walking distance of a station (79,000 jobs)	Percent within 5-minute walk	27%
	Percent within 10-minute walk	79%
2030 Downtown residents within walking distance of a station (19,000 residents)	Percent within 5-minute walk	7%
	Percent within 10-minute walk	46%
Traffic operations	Southbound vehicle travel time (minutes)	6.5
	Northbound vehicle travel time (minutes)	5.8
	Eastbound vehicle travel time (minutes)	5.0
	Westbound vehicle travel time (minutes)	4.9
	Percent of vehicle demand into and out of downtown served	78%
	Average downtown vehicle delay (seconds)	67
	Average vehicle delay at key affected intersections (seconds)	78
Environmental impacts	Displacements (residential/business)	0/22
	Extent of noise mitigation needed	Higher
	Extent of vibration mitigation needed	Slightly Lower
	Park impacts in acres	0
	Linear feet of impacts to Sturtevant Creek	650
Construction risk	Relative risk to schedule and budget	Lower
Construction effects	Relative street level effects	Lower
	Construction duration	Shortest

Notes:

¹ The cost estimate for C14E does not include the addition of a circulator bus and park-and-ride lot. The addition of these amenities would add \$70 million to project cost.

² The addition of the circulator bus or circulator bus and park-and-ride lot at Metro site does not appreciably change segment ridership.

C14E: 114th NE Elevated Alternative – Overall Plan





C14E: 114th NE Elevated Alternative – Elevated Alignment at Main Street



C14E: 114th NE Elevated Alternative – Station at 114th Avenue NE



C14E: 114th NE Elevated Alternative – Alignment at Main Street Looking West



C14E: 114th NE Elevated Alternative – Station at 114th Avenue NE Looking Northwest



C14E: 114th NE Elevated Alternative – Station at 114th Avenue NE Looking Northwest with Cover Shown as Transparent



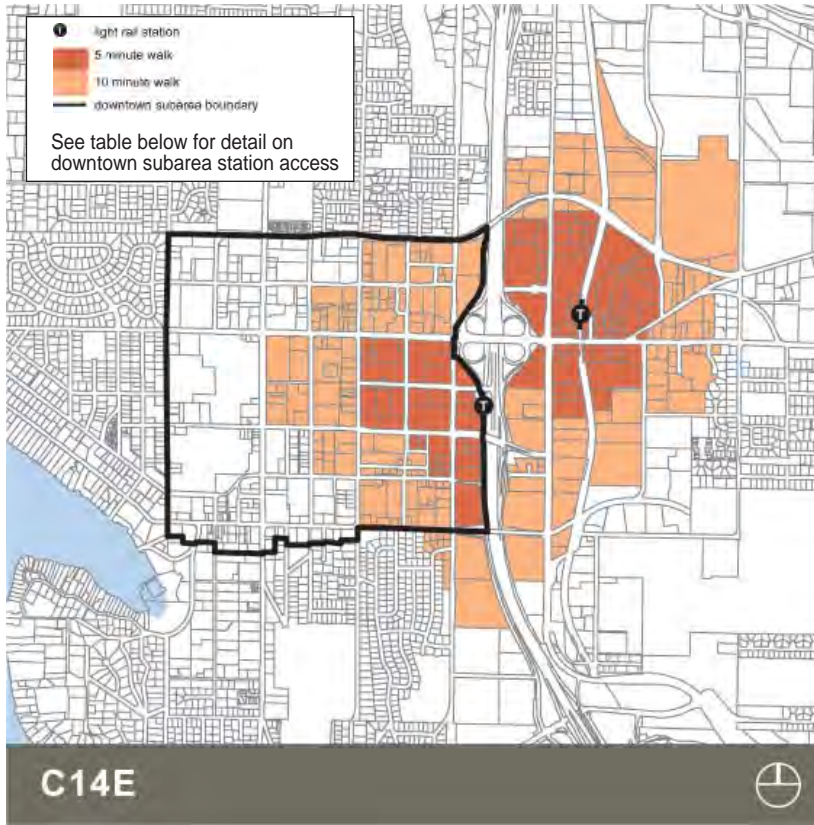
C14E: 114th NE Elevated Alternative – Pedestrian Access to Bellevue Transit Center at NE 6th Street Looking West



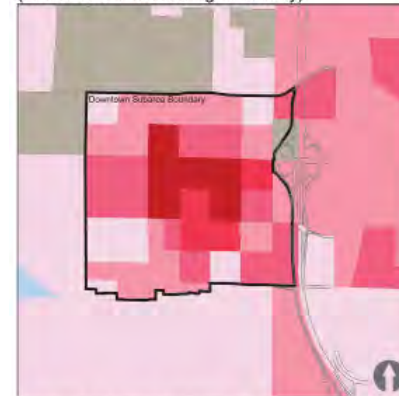
C14E: 114th NE Elevated Alternative: Elevated Alignment and Station at NE 4th Street Overpass Looking Northwest



C14E: 114th NE Elevated Alternative – Pedestrian Access to Bellevue Transit Center at City Hall Plaza Looking Northeast



FORECAST LAND USE DENSITIES
(Darker color indicates higher density)



Forecast 2030 Employment Density by TAZ (Jobs/Acre)



Forecast 2030 Housing Density by TAZ (HHs/Acre)

	2030 Downtown Jobs		2030 Downtown Residents	
Downtown Subarea Forecast	79,000		19,000	
Walk Distance	Within High-Capture 5-min. walk (1/4 mile)	Within 10-min. walk (1/2 mile)	Within High-Capture 5-min. walk (1/4 mile)	Within 10-min. walk (1/2 mile)
C14E Alternative				
Primary 114th Ave Elevated Station				
Downtown Land Use within Walk Distance	21,249	62,023	1,258	8,628
Percent of 2030 Downtown Subarea Total	27%	79%	7%	46%
Station Composite (114th Ave Elevated, Hospital Station)				
Downtown Land Use within Walk Distance	21,249	62,023	1,258	8,628
Percent of 2030 Downtown Subarea Total	27%	79%	7%	46%

C14E: 114th NE Elevated Alternative – Downtown Land Use Accessibility

Alternatives to Connect to Segment B

Alternatives to Connect to Segment B

In May 2009, Sound Transit identified a preferred alternative for the South Bellevue portion of East Link – the 112th NE Bypass (B3S). This alternative approaches downtown Bellevue on a new right-of-way east of 112th Avenue and behind commercial buildings and is the approach that is assumed in the evaluation of the new downtown Bellevue alternatives.

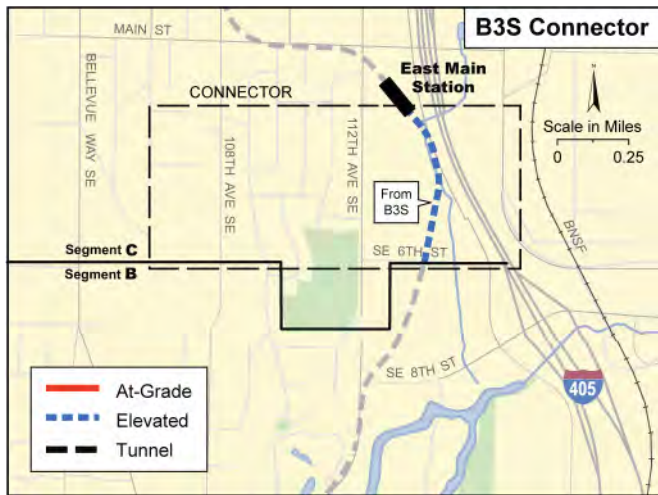
Recently, Sound Transit received a report from a value analysis panel that was convened to study design changes that might reduce overall project costs. One of the panel’s recommendations for reducing costs is to use a median-running alignment on 112th NE for the approach into downtown. The City of Bellevue has requested that the evaluation of the value analysis recommendation include a consideration of two other alignments on 112th Avenue:

- A side running at-grade alignment on 112th Avenue
- A side running alignment in a retained cut on 112th Avenue

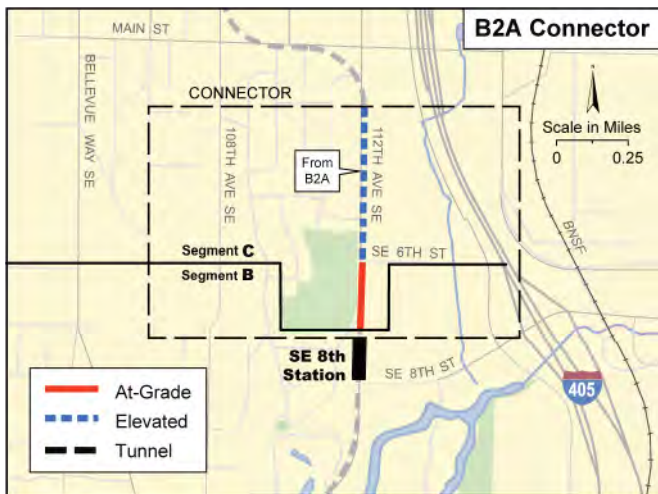
In order to provide information on the range of potential costs and impacts, this section presents a comparison of the 112th Bypass (B3S) option with the 112th NE At-Grade (B2A) option from the Draft EIS. The analysis was prepared for each of the downtown alternatives. When matched with the B2A alternative, three of the downtown alternatives (the tunnel and two at-grade alternatives) are \$50 to \$100 million less expensive. The C14E alignment is assumed to connect only to the 112th NE Bypass (B3S) or the BNSF alternative (B7) which does not have substantially different costs than the B3S approach to downtown. A summary of these costs and the differences in environmental impacts is shown in Table 5.

		Via B3S – 112th NE Bypass				Via B2A – 112th NE At-Grade		
		C9T	C9A	C11A	C14E	C9T	C9A	C11A
Estimated cost in millions (\$2007)		\$990	\$640	\$680	\$560	\$890	\$540	\$630
Difference between ST2 Plan budget (\$705 M) and alternative cost		(\$285)	\$65	\$25	\$145	(\$185)	\$165	\$75
Environmental impacts	Displacements (residential/business)	1/17	1/18	1/34	0/22	1/16	1/17	1/33
	Extent of noise mitigation needed	Slightly Lower	Higher	Slightly Higher	Higher	Slightly Higher	Higher	Higher
	Extent of vibration mitigation needed	Average	Average	Higher	Slightly Lower	Average	Average	Slightly Lower
	Park impacts (acres)	.16	.14	0	0	.16	.14	0
	Linear feet of impacts to Sturtevant Creek	650	650	650	650	550	550	550

Table 5. Evaluation of Connector Options



B3S Connector – 112th Bypass



B2A Connector – 112th At-Grade

Next Steps

This report will serve as the basis for a policy discussion about the future of a light rail route in downtown Bellevue. The report will be reviewed by the Sound Transit Board of Directors, the Bellevue City Council, business and neighborhood groups in Bellevue, and the general public at an open house. After collecting input through each of these activities, the Sound Transit Board of Directors will identify a preferred alternative.

Once a preferred alternative for downtown Bellevue is identified, Sound Transit will complete preliminary engineering for the downtown Bellevue segment (similar to the work currently being done in the other segments). Sound Transit will also publish the project's Final EIS at the end of 2010. Sound Transit expects to begin final design in 2011 and begin construction as soon as 2013.

