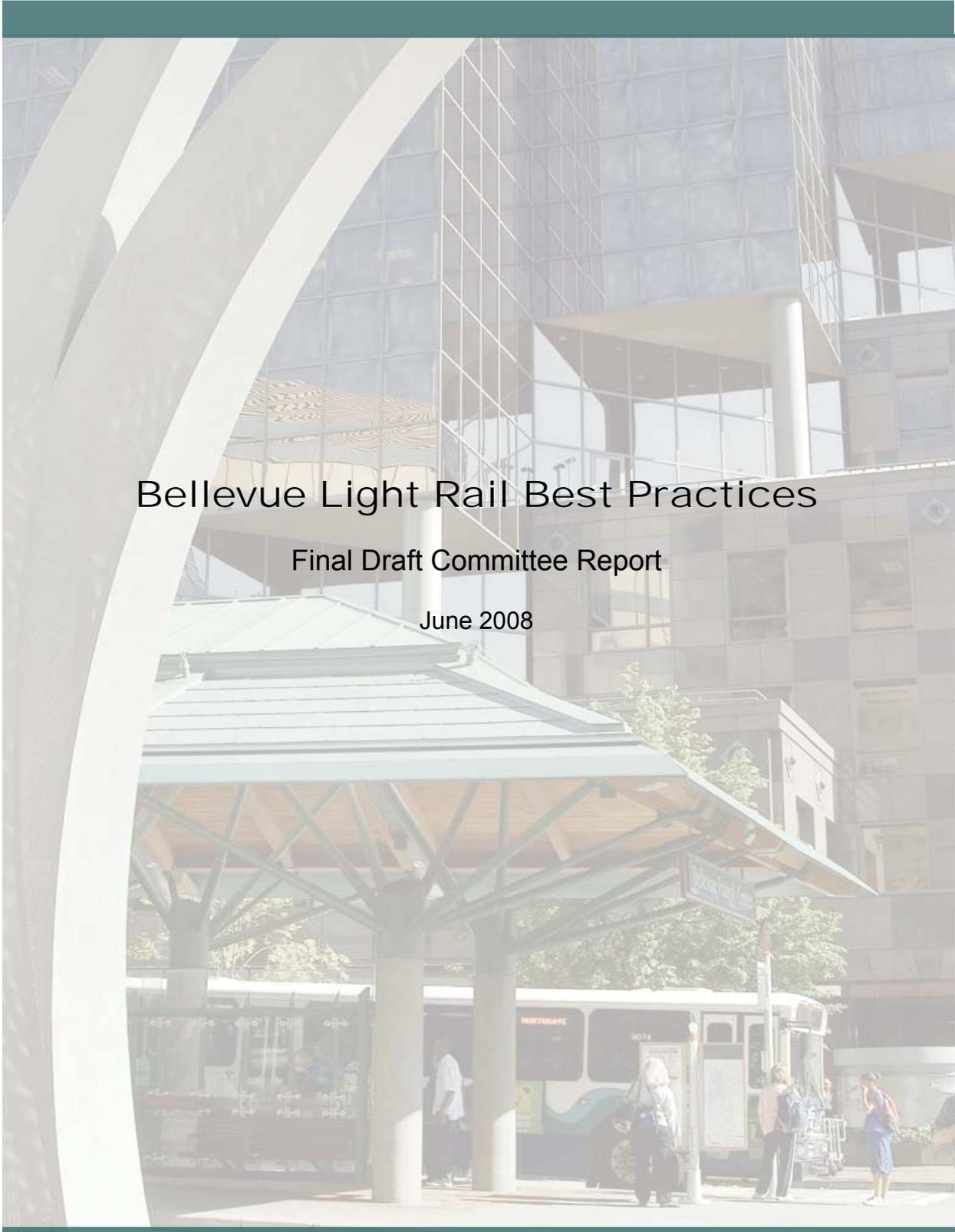




# Bellevue Light Rail Best Practices

Final Draft Committee Report

June 2008



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Joel Glass, Co-chair; Transportation Commission  
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## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY</b> .....	i
<b>I. INTRODUCTION</b> .....	1
Background.....	1
Committee Charge.....	2
Roles and Responsibilities.....	3
<b>II. PROJECT METHODOLOGY</b> .....	5
Issues Formulation and Topics Development.....	5
Draft Research Findings.....	6
Case Study City Tours.....	6
Public Input Opportunities.....	8
<b>III. LIGHT RAIL BEST PRACTICES CATALOG</b> .....	9
Organization of the Best Practices.....	9
Guiding Principles.....	12
Topics.....	17
Community and Neighborhoods.....	17
Community Involvement.....	25
Connecting People to Light Rail.....	31
Land Use.....	39
Street Design and Operations.....	47
Elevated, At-grade, and Tunnel.....	55
Property Values.....	67
Station Security.....	73
Construction Impacts and Mitigation.....	79
<b>IV. NEXT STEPS</b> .....	95
<b>APPENDICES</b> .....	A-C
A. Best Practices Research Papers.....	
B. Case Study Cities Memo.....	
C. Public Involvement Report.....	



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# EXECUTIVE SUMMARY

## Executive Summary

### The Context

Sound Transit will begin service on the region’s first light rail line, Central Link, in 2009. East Link is a potential future extension of the light rail system through Bellevue that is currently under study by Sound Transit. The Draft Environmental Impact Statement (DEIS), including the analysis of several alternative alignments through portions of South Bellevue, Downtown, and the Bel-Red subarea, is due for release in fall 2008.

### The Project

The City Council initiated the Light Rail Best Practices Project to help the City Council clearly articulate the City’s standards and expectations for the design, construction, and operation of light rail within the city of Bellevue. This project helped Bellevue “get smart” about light rail by learning from the experiences of other cities and preparing for important decisions related to the integration of light rail in Bellevue.

### The Committee and Process

The Light Rail Best Practices Committee, composed of citizens representing four city Boards and Commissions and the City Council, was charged by the Council to engage the public in review of how other jurisdictions have implemented light rail, develop a “catalog” of best practices for implementing light rail in Bellevue, and develop policy recommendations for consideration by the City Council. The Committee was not charged to draw any conclusions about specific light rail routing or station locations. The Committee engaged in a process of identifying research issues, reviewing national practices, visiting case study cities, and considering public input to develop the findings, policy, and action recommendations contained in this report.



East Link would extend light rail from downtown Seattle, across I-90, to downtown Bellevue, Overlake, and Redmond. (Source: City of Bellevue)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

#### *Light Rail Best Practices Committee:*

**Jennifer Robertson**, Co-chair; Planning Commission

**Joel Glass**, Co-chair; Transportation Commission

**Douglas Mathews**; Planning Commission

**Lise Northey**; Transportation Commission

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**Faith Roland**; Parks and Community Services Board

**David Karle**; Parks and Community Services Board

**Claudia Balducci**; City Council liaison; City Council member

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EXECUTIVE SUMMARY



Effective community involvement efforts provide information and engage the public in the planning and design of the system. (Source: City of Bellevue)

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



Downtown Portland's at-grade light rail system combines landscaping, high quality finishes, convenient transit connections, stations at multiple downtown destinations, and a comfortable pedestrian environment to attract riders. (Source: David Evans and Associates)

## Public Involvement

The citizens of Bellevue played a major role in initiating, shaping, and informing the project. The project was initiated in response to community concerns about light rail. Public comments and concerns were used to frame the research into the project's eight topic areas:

- Community and Neighborhoods;
- Connecting People to Light Rail;
- Land Use;
- Street Design and Operations;
- Elevated, At-Grade, and Tunnel;
- Property Values;
- Station Security; and
- Construction Impacts and Mitigation.

Public input was sought during all phases of the project through open houses, email communications, comment periods during every Committee meeting, and the project website. The Committee received hundreds of comments throughout the project, and this input was carefully considered by the Committee as the recommendations were developed.

## The Report

The Light Rail Best Practices Report contains the following elements:

**Findings:** A summary of the Committee's findings based on a review of national research and case study tours.

**Best Practices:** Processes, methods, and activities that will be most effective at delivering the desired outcome for Bellevue.

**Actions:** Five categories of actions – Comprehensive Plan Policies, Codes and Standards, Other City Policies/Procedures, City Capital Investments, and Expectations of Sound Transit – for the city to pursue throughout the development of the East Link Project. Actions are assigned to categories based on the timing, intent, and level of specificity of each recommendation.



# EXECUTIVE SUMMARY

## Guiding Principles

The Committee identified five Guiding Principles from the Light Rail Best Practices Project:

1. Connect “somewhere to somewhere” by conveniently serving the places where people live, work, and play.

Light rail is about connecting places. These places should be destinations for the community, places where people live, work, and play. Connecting places is more than optimizing ridership and meeting regional transportation needs. It serves the community and advances the local and regional land use vision.

2. Light rail should be developed in a manner that complements, not diminishes, the character and quality of Bellevue.

Light rail systems should be planned, designed, and built to fit appropriately into the local context and provide community enhancements, without shifting the community character. East Link should be designed to improve the “places” in Bellevue through context-sensitive design, high quality materials, and innovative urban design approaches that can protect neighborhoods and property values and provide a safe and secure environment for transit riders and neighbors.

3. Anticipate impacts and advocate for exceptional mitigation.

Light rail is critical to reinforce Bellevue’s role in the region as the population, economic, and cultural center of the Eastside. However, the benefits of the system cannot be achieved without some short-term disruption and inconvenience during construction and without making some long-term changes to the existing environment. Proven techniques to avoid, minimize, and mitigate these impacts can be employed to make the short-term impacts manageable. The City should expect and advocate for



The design of the Alum Rock station in San Jose utilizes an appropriately scaled shelter, landscaping, and art to create a pleasant environment that fits into the surrounding community. (Source: City of Bellevue)



The San Diego State University tunnel serves the heart of the campus as well as the surrounding community. Multi-modal connections are facilitated with a pedestrian bridge and adjacent transit center. The tunnel station incorporates high-quality finishes, art, and natural light to create a comfortable waiting environment. (Source: David Evans and Associates)



Appropriately scaled and well-integrated art can make light rail stations attractive and complement the surrounding community. (Source: City of Bellevue)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

# EXECUTIVE SUMMARY



EXECUTIVE SUMMARY



INTRODUCTION

PROJECT METHODOLOGY



CATALOG

NEXT STEPS

Pedestrian, bicycle, and transit connections support ridership and make the system accessible to many users. (Source: top: San Francisco Department of Parking and Traffic report entitled, "San Francisco's Shared Lane Pavement Markings", above: City of Bellevue)

exceptional mitigation throughout the project phases and seek to leverage additional local investments through light rail development.

4. Alignment profile should consider the unique qualities of each part of the community.

There is not a one-size-fits-all solution for alignment profiles – at-grade, elevated, and tunnel – in Bellevue. There are trade-offs when selecting profiles for each of the three segments in Bellevue. The profile should advance the land use vision for each of the areas it travels through, conveniently connect destinations, optimize ridership, and minimize impacts.

5. An early, ongoing public involvement program is essential for success in Bellevue.

An early, ongoing, and comprehensive program to engage stakeholders is absolutely essential to the success of light rail in Bellevue. Providing transparency about project information and decisions will increase public understanding of and comfort with the project. Engaging the community in the design of the system, particularly stations, will result in more sensitive designs and build the public's sense of ownership. Transparently sharing information and engaging the community in a meaningful two-way, ongoing planning process will increase the success of the system.



# EXECUTIVE SUMMARY

## Next Steps

The Light Rail Best Practices Committee will sunset in June 2008 and transmit the Final Report to the City Council in July for their consideration. The Planning Commission will review the Comprehensive Plan policy recommendations in July and forward their recommendations to the Council in late July. It is the hope of the Committee that the findings and recommendations of the report will be supported by the Council, that the proposed Comprehensive Plan policies will be adopted into the Comprehensive Plan, and that the other action recommendations of the report will be pursued over the course of the East Link Project.

As specified in the Committee charge, the Committee hopes that the findings and recommendations of the report complement the information provided through Sound Transit's East Link environmental review and assist the community and Council in evaluating and determining Bellevue's light rail routing preferences. Ultimately, the Committee hopes the report is useful in communicating community expectations for Sound Transit's development of light rail in Bellevue and that the City Council will pursue the actions recommended within the report to leverage this historic investment for the best outcome for Bellevue.



The presence of law enforcement or security personnel discourages loitering and vandalism at stations, increases the level of surveillance and security, and helps reduce fare evasion. (Source: David Evans and Associates)

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS

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## I. Introduction

### Background

Sound Transit, the designated provider of high capacity transit<sup>1</sup> for the region, will begin service on Seattle's Central Link light rail line in 2009. East Link is a potential future extension of the light rail system through Bellevue that is currently under study. An analysis of several alignment alternatives in a Draft Environmental Impact Statement (DEIS) is being prepared by Sound Transit. The general corridor under consideration would bring light rail across I-90 to South Bellevue, into downtown, through the Bel-Red subarea, and on to Overlake and Redmond.

Light rail service could be transformative for Bellevue, as it has been for many other cities around the country. Many of the light rail systems, particularly in the western United States, have been constructed in existing railroad right-of-way with the expectation or hope that supportive land uses will develop around the light rail. In the Puget Sound region, the land use vision is in place and the transformation is already occurring. High capacity transit is vital to reinforcing Bellevue's role as the principal city on the east side of Lake Washington and to furthering the City's vision for better mobility choices, continued growth in downtown, and redevelopment in the Bel-Red corridor.

Bellevue is a dynamic and growing city. With nearly 120,000 residents and 139,000 jobs, it is the retail, office, and cultural center for the east side of the Puget Sound region, and its importance is growing. There are over 1.9 million square feet of office space and 3,000 housing units now under construction in downtown Bellevue. The Bel-Red corridor that the City has planned for redevelopment will substantially increase the choices for Eastside businesses and residents over the next 20 years. A balanced transportation system is needed to support new and existing residents and jobs in Bellevue and throughout the Puget Sound region.

<sup>1</sup> High capacity transit (HCT) is defined as various types of transit systems (including light rail) operating on fixed guideway or dedicated right-of-way designed to carry a large number of riders at higher speeds.



East Link would extend light rail from downtown Seattle, across I-90, to downtown Bellevue, Overlake, and Redmond. (Source: City of Bellevue)



An image of a potential Sound Transit light rail train and station in Bellevue. (Source: Sound Transit)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS

The principal task for the City of Bellevue and Sound Transit in this stage of the planning for East Link is to evaluate how light rail can be added to the City in keeping with local standards for public investments while maintaining the quality of life of the community. The very legitimate concerns of Bellevue citizens must be addressed and be balanced with the opportunity that light rail presents to the City and the region.

## Committee Charge

The City Council initiated the Light Rail Best Practices Project to help the City Council clearly articulate the City's standards and expectations for the design, construction, and operation of light rail within the City of Bellevue. The City Council is committed to addressing citizen concerns, maximizing the opportunity presented by light rail, and minimizing or eliminating adverse impacts. In short, the purpose of the Light Rail Best Practices Project is "finding the right fit for Bellevue."

The Best Practices Committee has been working since July 2007, and this report is the culmination of its efforts. The Committee believes the report should be used to affirm Bellevue's community vision; to communicate the City's expectations to Sound Transit; to minimize adverse impacts; and to provide information and guidance on how light rail may be developed in a way that meets Bellevue's standards and expectations.

As Sound Transit considers the options for extending light rail through Bellevue and on to Redmond, the mayor and City Council wanted Bellevue to learn from the "best practices" of other communities with light rail systems. They also wanted the City to be in a position to influence decisions that will be made by the Sound Transit Board regarding the location, design, and operation of light rail in Bellevue.

The Light Rail Best Practices Committee has been working with city staff and a consultant team on the following charge:

1. *Provide direction to and review of the staff and consultant work on the Best Practices technical study;*



2. *Engage the public in a dialogue that provides information about how other jurisdictions have implemented light rail and how to apply those lessons to Bellevue;*
3. *Create a “catalog” of best practices and outcomes from other jurisdictions that the Committee identifies as desirable for light rail implementation in Bellevue; and*
4. *Based on “lessons learned,” develop guiding principles and policy recommendations, including draft Comprehensive Plan amendments, for consideration by the City Council.*

*The draft policies generated by the Light Rail Best Practices Project are expected to address a range of issues about light rail design, construction, operation, and mitigation in order to maximize local opportunities and minimize local impacts. The Committee will not draw any conclusions about specific light rail routing or station locations, but its recommendations will ultimately assist the community and City Council in evaluating and determining Bellevue’s light rail routing preferences.*

## Roles and Responsibilities

As the regional transit provider, Sound Transit has the responsibility for designing, constructing, and operating the East Link light rail project. The City of Bellevue has some local permitting authority related to construction and street use; however, much of the design and operation of the system is outside of the City’s authority to regulate. It is in the best interest of both the City and Sound Transit to work cooperatively to achieve their mutual and individual objectives. In the case study tours, the Committee learned that a close, working relationship between the transit agency and the city was vitally important to the success of the system. Most of the actions proposed by the Committee in this report are predicated upon Bellevue and Sound Transit working in partnership to fulfill the objectives of this best practices project.



Light rail is a critical component of Bellevue’s vision for a transportation system to meet the needs of the rapidly growing downtown. (Source: City of Bellevue)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE  
SUMMARY

**INTRODUCTION**

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS

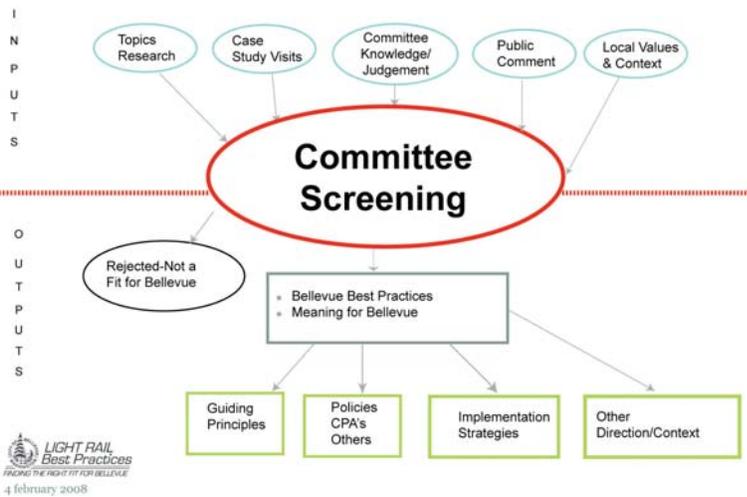
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## II. PROJECT METHODOLOGY

The Committee followed a process to achieve the goal of developing a catalog of Light Rail Best Practices. Key steps included issues formulation, best practices topics development, research, public input opportunities, and Light Rail Best Practices Final Report. The figure below and this section describe the steps in the process.

### COMMITTEE PROCESS: Getting to Bellevue Best Practices



LIGHT RAIL Best Practices  
FINDING THE RIGHT FIT FOR BELLEVUE  
4 february 2008

### Issues Formulation and Topics Development

Sound Transit actively sought the input and concerns of Bellevue citizens through outreach efforts associated with the initial environmental scoping process for the East Link Project. The Committee developed an initial list of issues, concerns, and ideas based on public comments received by the City and by Sound Transit about light rail. These were analyzed and organized into eight topics that became the best practices areas of research. For each of these topic areas, a series of questions were generated so that the research would reflect the concerns and issues related to Bellevue. The eight topic areas are listed to the right.

#### 8 Topic Areas:

The eight topic areas that were developed at that early phase and continued throughout the process are:

- Community and Neighborhoods;
- Connecting People to Light Rail;
- Land Use;
- Street Design and Operations;
- Elevated, At-Grade, and Tunnel;
- Property Values;
- Station Security; and
- Construction Impacts and Mitigation.

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



A Sound Transit light rail car at the SODO maintenance facility. (Source: Sound Transit)

## Draft Research Findings

Research of the topic areas consisted of reviewing published papers on national experiences and best practices and touring case study systems. A series of memoranda summarizing research findings was prepared exploring how cities around the country addressed the eight topic areas. The memos provided specific answers to the Committee’s questions, referenced research and interviews, and provided photographs, lessons learned, and overall findings related to the topic area regarding the state of the practice. The memoranda were not adopted or approved by the Committee; rather, they were viewed as a source of information on the “state of the art” in light rail, a tool to create a tour agenda for the case study cities, and a basis for discussion on best practices. The memoranda were made available to the public and have helped improve the public’s understanding of how light rail works in other communities. The memoranda of research findings are included as Appendix A in this report.

## Case Study City Tours

The Committee and city staff toured three cities with similar attributes to Bellevue and the planned East Link light rail system: San Diego, San Jose, and Portland. Staff also toured the Dallas system and concluded it did not offer the same opportunities for comparison as the other three case study systems.

These cities were chosen because they have modern light rail systems that travel through similar urban forms; have similar roles in the regional transportation system; have examples of at-grade, elevated, and tunnel profiles in multiple land use forms; and demonstrate success and lessons learned that could apply to Bellevue.

Case study tours provided the opportunity for the Committee members to experience light rail—to ride the system, talk with riders, and explore the relationship with surrounding land uses. Prior to the tours, the Committee received background information on the city they were



# PROJECT METHODOLOGY

visiting, the local transit agency, and the light rail transit system cost and performance. Tours included meeting with transit agency and city staff to discuss challenges, lessons learned, and applications of best practices. In Portland, the Committee also met with a neighborhood representative and a local developer to understand their perspectives. A Sound Transit staff member accompanied the group on the tours so that Sound Transit could also explore the best practices being considered by Bellevue. Touring case study systems was an important component of the project because it gave Committee members the opportunity to critically assess the national best practices and begin to formulate key lessons and priorities for Bellevue. The Case Study Cities Memo is included as Appendix B.

Sound Transit provided the Committee with a guided tour of the Central Link light rail system being constructed from downtown Seattle to SeaTac airport. Highlights included walking tours of the maintenance facility in SODO and the elevated station in Tukwila, north of the airport. The driving tour included most of the line, except for the downtown tunnel and the last segment to the airport. The Committee had the opportunity to see elevated and at-grade profiles and stations along Martin Luther King Jr. Way and to ask questions of Sound Transit staff about the agency's practices.

Another Committee tour that occurred early in the process involved driving along or near the various East Link alignment options being analyzed in the DEIS. The purpose of the tour was to familiarize the Committee with the areas for a better understanding of the local context in which the best practices might be applied. The East Link and Central Link tours both provided useful background and baseline information for the Committee's later tours of the case study cities.



The Light Rail Best Practices Committee toured the Portland, OR light rail system in February 2008. The Committee met with a representative of the Goose Hollow Neighborhood to learn about the neighborhood's experiences integrating light rail into the community. The image above shows the Goose Hollow neighborhood station and art donated by the community, with the Committee in the background. (Source: David Evans and Associates)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



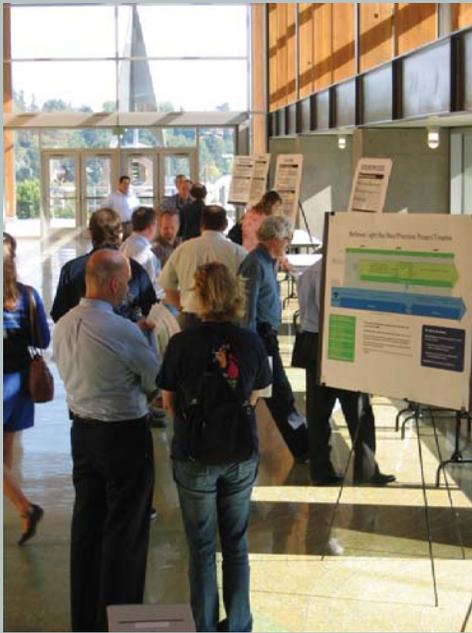
EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



Open houses are one method for sharing information and gathering public input. (Source: City of Bellevue)

## Public Input Opportunities

The study included regular opportunity for input, review, and feedback to the Committee through the project website, at Committee meetings, and at public open houses.

The Committee met initially in July 2007. Starting in September 2007, the Committee held meetings once or twice monthly through June 2008. All meetings were open to the public and provided opportunity for public comment.

Four special public meetings were held for the project: an open house early in the process to affirm the issues and the proposed topic areas; two round table sessions to discuss the research memos on each of the topics; and a final open house to review and comment on the draft report of proposed best practices and action items. The special meetings drew a combined total of over 200 people who provided hundreds of comments covering the full range of topics. Several additional comments and questions were received via the project e-mail address ([LRBestPractices@bellevuewa.gov](mailto:LRBestPractices@bellevuewa.gov)). An ad hoc committee of residents from the Surrey Downs neighborhood also compiled and submitted a binder of information on other light rail systems for the Light Rail Best Practices Committee.

The project web page, [www.ci.bellevue.wa.us/light\\_rail\\_best\\_practices\\_info.htm](http://www.ci.bellevue.wa.us/light_rail_best_practices_info.htm), included contact and updated project information and a link to the Sound Transit East Link website. The web page also included an opportunity for citizens to sign up to receive email updates, and to view and download agendas and meeting materials. A public involvement report is included as Appendix C.



## III. LIGHT RAIL BEST PRACTICES CATALOG

### Organization of the Best Practices

The best practices are organized into the topic areas selected by the Committee. A ninth topic, Community Involvement, was added in order to highlight the importance of including the public in all phases of design, construction, and operation of light rail in Bellevue. Each best practices topic has three sections:

#### Summary of Research and Findings:

Provides a summary of the findings of the Committee for the topic.

#### Best Practices:

Articulates the Committee’s best practices for implementation for the topic.

A general definition of a “best practice” is a technique, method, process, or activity that has demonstrated a superior level of effectiveness at achieving a desired outcome. The Committee’s charge included identifying best practices from other jurisdictions that the Committee deemed as desirable for light rail in Bellevue. Thus, for purposes of this project, a best practice is a technique, method, process, or activity that will be most effective at delivering the desired outcome for light rail in Bellevue.

#### Actions:

Specific actions designed to implement the best practices which are organized into five categories:

1. Comprehensive Plan Policies  
These actions are specific Committee recommendations for new and revised policies to the Comprehensive Plan for consideration by the Planning Commission and the City Council before the issuance

#### *Best Practice:*

A technique, method, process, or activity that will be most effective at delivering the desired outcome for light rail in Bellevue.

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

of the DEIS on the East Link Project. The policies that are ultimately adopted by the City Council will become amendments to the Comprehensive Plan and will thereafter reside outside of this report and the context in which they are recommended. For that reason it is important that the policies be clear regarding action and responsibility, be broad in scope, and have application throughout most or all of the 20-year planning horizon. Additional amendments could occur during future phases of the East Link Project once an alignment is selected and final design begins. However, these amendments are beyond the scope of this project and the charge of the Committee.

## 2. Codes and Standards

Several of Bellevue's regulations pertaining to city permits and design standards are recommended for amendment as an outcome of this Light Rail Best Practices Project. The two sections of city regulations that will most directly relate to a light rail project are the street design manual, which governs design and construction of improvements within the right-of-way, and the development code, which includes the requirements for project design and development on public and private property. This report does not recommend specific language for adoption, because that language will be developed and adopted through a separate process. These amendments to Bellevue regulations and standards will need to be in place before Sound Transit begins the final design of the light rail system or prior to applications for permits.

## 3. Other City Policies/Procedures

This category includes the other actions that the City can take to implement best practices. Not all policies are appropriate to include in the Comprehensive Plan. The City Council uses Council Interest Statements to articulate its position on an immediate or short-term local or regional issue of importance to Bellevue. These interest statements must be consistent with Comprehensive Plan policies, and they may also complement them by being more specific and short-



# LIGHT RAIL BEST PRACTICES CATALOG

term in scope. For example, interest statements issued by the City Council regarding regional mobility in 2004 and high capacity transit in 2005 have provided part of the foundation for the Light Rail Best Practices Project. The City Council may develop specific language for the interest statements as a separate deliberation, potentially as part of the decision-making process for Bellevue's preferred alignment for light rail. Other examples include joint or cooperative actions by the City and Sound Transit, such as interlocal agreements that articulate roles and responsibilities during design, construction, and/or operation of the system.

## 4. City Capital Investments

This category includes recommendations on the types of capital improvements to support light rail that may be advanced by the City. Specific projects will be determined later through the City's regular budget process. The City's expectation is that the East Link Project budget will address all capital improvements and mitigation required as part of the project. However, there will also be other capital improvements that may be needed outside of the project design and mitigation requirements. For example, the City will continue to fill in gaps and make improvements to the pedestrian and bicycle networks as part of the City's Capital Improvement Program (CIP) and may choose to prioritize investments that optimize access to light rail stations.

## 5. Expectations of Sound Transit

This section constitutes the longest list of actions in the report. It includes both general and specific actions. Many of these will be pursued by Sound Transit without prompting from the City. However, the Committee felt it was important to specify all of the best practices that were deemed applicable and appropriate to Bellevue. The Committee recognizes that some actions may not be appropriate in all circumstances. In addition, Sound Transit may have

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

alternative or additional practices to address the issues discussed in this report. In those instances, the City should review the Committee’s intent and objectives in recommending the actions in this category, evaluate the trade-offs of the different approaches, and consider whether the Sound Transit proposal achieves an outcome that is as good as or better than the Committee recommendation. Recommendations also include the tools for working through issues with Sound Transit, such as interlocal agreements, conduct of construction agreements, or memoranda of understanding. The actual agreements would be developed over the course of the project and approved by the City Council.

Under state statute, Sound Transit has sole responsibility as the “regional transit provider ” for the planning, design, construction, and operation of the light rail system. Local jurisdictions have limited regulatory authority, but they do have an important role in terms of coordination with Sound Transit. Many of the best practices identified by the Committee fall under the purview of the regional transit provider, emphasizing the importance of coordination between Bellevue and Sound Transit and, when appropriate, negotiating for items that are critical to achieving the best fit for Bellevue.

## Guiding Principles

The Committee identified the following principal findings for the Light Rail Best Practices Project. These findings synthesize many of the details and lessons within multiple topic areas and through all phases in the development of a light rail project and serve as guiding principles during the development of a light rail project.

### **1. Connect “somewhere to somewhere” by conveniently serving the places where people live, work, and play.**

Light rail is about connecting places. These places should be destinations for working, living, or recreating. Connecting places also means optimizing ridership,



# LIGHT RAIL BEST PRACTICES CATALOG

meeting regional transportation needs, and advancing the local community vision. Bellevue's Comprehensive Plan envisions the City as the residential, employment, and cultural center of the Eastside. Connecting Bellevue to the region's other major urban destination, downtown Seattle, increases access and mobility between the two cities and reinforces Bellevue's prominent role within the region. Within Bellevue, light rail can link downtown with Bel-Red and residential neighborhoods.

## **2. Light rail should be developed in a manner that complements, not diminishes, the character and quality of Bellevue.**

The Committee found that light rail is not just about moving people, it is also about shaping community. Light rail systems can be planned, designed, and built to fit appropriately into the local context and provide community enhancements, without shifting the community character. East Link should be designed to improve the "places" in Bellevue through context-sensitive design, high quality materials, and innovative urban design approaches that can protect neighborhoods and property values and provide a safe and secure environment for transit riders and neighbors. The City should increase the value of the light rail investment by providing complementary improvements such as sidewalks near stations. The benefits to the community will be enhanced through early and ongoing participation by the community in project development and implementation.

## **3. Anticipate impacts and advocate for exceptional mitigation.**

The long-term benefits for Bellevue from light rail are significant for both the transportation system and the advancement the community land use and economic vision. Light rail is critical to reinforce Bellevue's role in the region as the population, economic, and cultural center of the Eastside. However, the benefits of the system cannot be achieved without some short-term disruption and inconvenience during construction and without making some long-term changes to the existing environment.

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

Proven techniques to avoid, minimize, and mitigate these impacts can be employed to make the short-term impacts manageable. The longer-term changes that will be required to incorporate light rail into Bellevue will require careful balancing of community values, priorities, and trade-offs between long-term needs and benefits and the existing features. The City should expect and advocate for exceptional mitigation throughout the project phases and seek to leverage additional local investments through light rail development. Bellevue's efforts to be prepared and willingness to act to protect and advance Bellevue's interests position the city to ensure that the project is developed to be a net benefit for the city.

#### **4. Alignment profile should consider the unique qualities of each part of the community.**

There is not a one-size-fits-all solution for vertical alignments in Bellevue. There are trade-offs when selecting profiles for each of the three segments in Bellevue. The profile should advance a land use vision for each of the areas it travels through, connect destinations conveniently, optimize ridership, and minimize impacts to street operations. The system and station design should employ urban design features to enhance safety and community integration. While many cities shaped their land use visions around light rail, Bellevue has clearly articulated land use visions for each of the three areas light rail will travel through. Light rail is a critical tool to achieving the growth vision in downtown and Bel-Red and can be designed to enhance these growing urban places with both expanded transportation capacity and place-making features. Light rail can also be molded to fit within the unique character and context of established residential areas through context-sensitive design of stations and the trackway.

#### **5. An early, ongoing public involvement program is essential for success in Bellevue.**

An early, ongoing, and comprehensive program to engage stakeholders is absolutely essential to the success of light



# LIGHT RAIL BEST PRACTICES CATALOG

rail in Bellevue. Light rail is a major public investment. Providing transparency about project information and decisions will increase public understanding of and comfort with the project. Light rail will change the look of streets and places. The community deserves the opportunity to help guide the design and development of the system. Engaging the community in the design of the system, particularly stations, will result in more sensitive designs and build the public's sense of ownership. Transparently sharing information and engaging the community in a meaningful two-way, ongoing planning process will increase the success of the system.

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

**CATALOG**

NEXT STEPS



EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

**CATALOG**

NEXT STEPS

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# COMMUNITY AND NEIGHBORHOODS

While every topic section of the report addresses community and neighborhood issues and promotes a process that provides meaningful public involvement, the Community and Neighborhoods topic focuses on developing an efficient light rail transit system designed to be well-integrated into the neighborhoods through which it travels. The construction and operation of light rail in Bellevue represents a substantial change in the City’s transportation infrastructure. The Committee explored how other cities have integrated light rail into their communities, including a review of practices for enhancing neighborhoods and mitigating negative impacts.

EXECUTIVE SUMMARY

## Summary of Research and Findings

The Committee found that light rail can be successfully integrated into communities by engaging the community in the discussion about the function of individual stations, using good urban design techniques, and tailoring stations and facilities to reflect community character and context. Protecting neighborhoods from potential impacts, including noise, vibration, parking infringement, station access, intrusive lighting and station security are common in nearly every city that implements light rail transit. To inform Bellevue decisions about light rail these neighborhood concerns are explored in this topic and related topics.

The Committee learned from agencies that have already implemented light rail transit that early, frequent, and ongoing communication with the communities along the light rail line was critical to the success of their systems. The Committee found that successful projects have had agency representatives who developed mutually respectful relationships with community members and local city staff. Those relationships begin during project development and can continue for years beyond the opening of the line.

The ideal light rail station is one that becomes an extension of the community. This can be accomplished through good urban design that uses quality materials; makes generous use of landscaping; includes pedestrian-oriented development; and incorporates art, parks, and safe public spaces. Good design also provides defined transitions between public and private properties that can help integrate light rail transit stations into communities and signal that the station is an



Alum Rock single family neighborhood in San Jose. Landscaping, art and quality finishes along the line and at stations improve the appearance and “fit” of the system. (Source: LRBP tour)

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY



Minimalist station design in downtown San Jose, CA. (Source: LRBP tour)

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

important and cared-for public space.

Like any major capital improvement project, the construction of light rail provides opportunities to integrate the light rail system in ways that can also enhance the community. Some improvement projects could result from mitigation required of the project. Additionally, other improvements could be funded by the city or the community itself and constructed with the light rail project to reduce costs and minimize disruption. The improvement projects could be different in each community, but may include such items as undergrounding utilities, constructing sidewalks, adding new neighborhood spaces like parks and greenbelts, and installing new street furniture.

The Committee learned that identifying and incorporating mitigation into the planning and design phases is much more effective and cost efficient than retrofitting solutions after the system is built. On-going approaches to minimize operational impacts may also be needed. For example, managing parking demand around stations can be addressed by evaluating parking at or near select stations during the design process and developing and enforcing neighborhood parking restrictions once the system is operational.



# COMMUNITY AND NEIGHBORHOODS

## Best Practices

### A. Establish a clear vision and confirm the community goals for the light rail system.

Community “ownership” of the station will be increased if the community participates in design decisions. The community, Sound Transit, and the City of Bellevue will each approach light rail transit with their own set of objectives. All stakeholders should be engaged early in the project to develop an understanding of issues, concerns and objectives, recognize community values, and establish the local and regional project vision and goals. The vision and goals will influence light rail design and provide the basis for reconciling the different objectives of each party. Planning for the area around stations is a common practice by cities with light rail systems and offers a complementary means of engaging the stakeholders.

### B. Design light rail facilities and stations to be an extension of the community.

Two key objectives that may be common among Sound Transit, neighbors, and the City are to create an efficient system to optimize ridership and to design facilities to be an integrated asset of the community. Transit facilities and infrastructure, including stations, track bed, supports, power poles, noise walls, ancillary buildings, etc., should apply the principles of context-sensitive design to be better integrated with Bellevue neighborhoods. Station design should utilize urban design techniques such as complementary building materials and high quality connections to the neighborhood. Landscaping, including planting trees, along the lines and within and around stations was also identified as a best practice by the Committee. In San Jose, the transit agency plants saplings at a project tree farm in the early planning phase for a light rail project. When the project is nearing completion several years later, mature trees can be installed to create a more aesthetic, vegetated, and established appearance that provides immediate benefits. Project mitigation measures are another important component of system integration. Mitigation should be



This San Diego station uses architectural detailing that is consistent with the surrounding community, complementing the area’s established identity. (Source: David Evans and Associates)



Site-relevant artwork installed at the Mission Station on LA’s Metro Gold Line instills a sense of place and identity. Landscaping and seating allow transit users and community members to enjoy the plaza (Source: [www.tndwest.com/missionmeridian.html](http://www.tndwest.com/missionmeridian.html)).

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY



Art integrated into a San Jose, CA station. (Source: LRBP tour)

incorporated as early as possible into the design and engineering of the project.

### C. Use the investment in light rail as the foundation for other community enhancements.

Communities can use the investment in light rail as the foundation for other community enhancements. Light rail provides an opportunity to make a number of physical improvements to the adjacent neighborhood. The regional transit provider is responsible for mitigating project impacts. The City is responsible for the quality of streets, sidewalks, parks, and public spaces outside the scope of the light rail project. The two agencies should work with the community to provide for a “bundle” of neighborhood improvements that are implemented when light rail is constructed. In addition to project funding from Sound Transit and traditional capital improvement funds from the City, there may be other potential funding sources that should be explored.

### D. Be proactive in addressing potential operational impacts to adjacent neighborhoods.

“Spillover” issues that may affect neighborhoods adjacent to transit stations include parking on neighborhood streets, cut-through traffic, and noise. The best practice for preventing unwanted parking is a residential parking permit program like the one already used in certain areas of Bellevue. Traffic-calming measures and enforcement of residential speed limits could help to reduce neighborhood cut-through traffic that may result from transit construction or operation. Signage and regular enforcement of these strategies are critical to effectiveness. Noise issues that arise typically relate to train horns, crossing bells, and wheel noise on curved track. Track maintenance and automatic greasing mechanisms can address wheel noise. Horns and crossing bells can often be softened and/or shortened while maintaining safety levels.

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



Residential parking permit program to prevent transit patrons from parking in adjacent residential areas. (Source: David Evans and Associates)



## Action Plan

### Comprehensive Plan Policies

1. Develop and maintain a strong working relationship with the regional transit provider to ensure a collaborative and cooperative effort to implement these light rail policies and best practices.
2. Partner with the regional transit provider to design transit stations and facilities incorporating neighborhood objectives and context-sensitive design to better integrate facilities into the community, including but not limited to the following techniques:
  - Using good urban design, complementary building materials, and public art; and
  - Providing substantial landscaping, including retained trees and transplanted non-sapling trees.
3. Formulate standards and guidelines that can be applied by the regional transit provider to create stations that are a valued place in the community by providing:
  - Access and linkages to the surrounding community;
  - A comfortable place to be, not just pass through;
  - A place that works for both large and small numbers of people; and
  - Design that encourages social interaction among people.
4. Work with neighborhood groups, business owners, other stakeholders, and the regional transit provider to identify and fund additional improvements that can be constructed more efficiently in conjunction with project construction.
5. Advocate for actions by the regional transit provider that minimize environmental, traffic, and noise impacts in order to protect Bellevue’s residential and commercial neighborhoods within and surrounding potential light rail alignments.

#### *Discussion:*

Context-sensitive design, as it relates to transportation projects, asserts that all decisions in transportation planning, project development, operations, and maintenance should take into consideration the communities and land uses that the project passes through (“the context”). Context-sensitive design seeks to balance the needs of the project with other desirable outcomes, including environmental sustainability, community character, and the creation of vital public places. Typical considerations of context-sensitive design include building materials and texture, building scale relative to nearby structures, and relationship to streets and adjacent uses.

#### *Cross reference:*

See existing **Comprehensive Plan Transportation Policy TR-46** for policy supporting calming measures to reduce cut-through traffic; **Policy TR-70** for policy supporting transit system planning that protects nearby neighborhoods from undesirable impacts; and **Policy TR-119** for policy supporting residential parking zone programs to reduce spillover parking. See existing **Urban Design Policy UD-47** for policy supporting a cooperative regional transit design process to ensure facilities reflect the general character of Bellevue and the surrounding neighborhoods.

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS

6. Protect residential neighborhoods adjacent to light rail facilities from spillover impacts, including parking and cut-through traffic, resulting from system construction and/or operation with techniques such as residential parking zone programs, parking patrols, and traffic-calming measures. Monitor the outcomes of these efforts and make adjustments as needed to ensure their effectiveness.
7. Place a priority on the use of noise avoidance or absorption techniques over noise deflection in residential neighborhoods when discussing mitigation measures with the regional transit provider. Monitor the outcomes of these efforts and pursue adjustments with the regional transit provider as needed to ensure their effectiveness.

## Codes and Standards

8. Amend the code to incorporate context-sensitive design for light rail facilities.
9. Amend the code to include design standards for commercial and multi-family buildings adjacent to stations to incorporate pedestrian-friendly and transit-supportive design features such as entrances fronting the street, pedestrian areas, convenient neighborhood services (e.g., cleaners, cafes, grocers), separation of public and private spaces, weather protection, street trees, and durable building materials.

## Other City Policies/Procedures

10. Evaluate a parking program for areas adjacent to stations.
11. In collaboration with Sound Transit, create a management plan for safety and security, maintenance and operations, and where appropriate, marketing and economic activities in stations and public spaces.
12. In collaboration with Sound Transit, undertake a station area design and planning effort that engages



the community about specific issues for each station once the sites are selected.

## City Capital Investments

13. Consider accelerating CIP projects in the vicinity of light rail stations and lines to allow for earlier construction in coordination with light rail construction.

## Expectations of Sound Transit

14. Sound Transit station design should reflect the character of the community through context-sensitive design and use of building materials and landscaping, including retained and transplanted non-sapling trees.
15. Sound Transit stations should be designed to be a “place, not a project” and should include high quality furnishings and public art.
16. In collaboration with the City, Sound Transit should undertake a station area design and planning effort that engages the community about specific issues for each station once the sites are selected.
17. Sound Transit should conduct frequent community involvement during the design and construction of the project to keep the community informed of project developments, upcoming events, and opportunities to participate in developing the system.
18. Sound Transit should, in collaboration with the City, create a management plan for safety and security, maintenance and operations, and (where appropriate) marketing and economic activities in stations and public spaces.
19. Sound Transit should use computer simulations to demonstrate and analyze the visual impacts of the various profiles and in designing stations. This technique is a useful tool for engaging the public in a dialogue about mitigation and design issues.

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

**CATALOG**

NEXT STEPS

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# COMMUNITY INVOLVEMENT

Bellevue has a history of public interest and involvement in projects that range from the local to the regional level. The proposed light rail project has generated considerable public interest due to the fact that its impacts and benefits will be experienced at the neighborhood, community and city wide levels. This topic explores how meaningful community involvement efforts have been used in other cities to provide better information and understanding, engage the public in the planning and design, and create a better system in the process. Community Involvement is not one of the original eight topic areas designated by the Committee. However, because every other topic has some aspect of community involvement contained within one or more best practice or action, the Committee felt it was useful to create a new topic area that emphasizes the importance of engaging the public in the various stages of a light rail project.

## Summary of Research and Findings

The Committee concluded that the lessons of community involvement from other cities should be applied to Bellevue to make better decisions and to foster a sense of community ownership of the system. Full and complete disclosure of information and community involvement throughout the process help to build community trust as well as community support for light rail by minimizing misinformation, reducing anxiety about project impacts, and preventing project delays. Better projects typically result when communities are involved in decisions that affect them, because they tend to feel some ownership of the project.

The Committee found that some transit agencies, such as TriMet in Portland, provide an exceptionally high level of citizen involvement. For each of the light rail line extensions, TriMet, along with METRO (Portland's regional government), forms a citizen advisory committee at the beginning of the environmental analysis process. The committee reviews and affirms the scope of the environmental impact statement (EIS) and other tasks such as station area planning. During the EIS phase, the committee meets regularly and receives briefings on the findings in the technical reports as they are completed and before publication of the draft EIS.

There are a wide variety of approaches among transit agencies to involving the public in the planning, design, construction, and operation of light rail systems. All of the transit agencies provide a baseline level of public involvement through public hearings connected with the environmental process. Most supplement this level



Effective community involvement efforts provide information and engage the public in the planning and design of the system. (Source: City of Bellevue)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

# COMMUNITY INVOLVEMENT



EXECUTIVE SUMMARY



of involvement with other open house opportunities. All agencies also provide some level of information through web pages, newspaper advertisements, and direct mail to affected businesses and neighborhoods. When compared to the efforts of other agencies included in the research, Sound Transit's overall public involvement program incorporates many of the best practices identified.

INTRODUCTION

An early, on-going public involvement process is essential for the success of light rail in Bellevue. (Source: City of Bellevue)

PROJECT METHODOLOGY



Computer simulation is a useful technique for depicting pre- and post-construction scenarios. This visual simulation shows light rail trains crossing the I-90 bridge. (Source: Sound Transit)

CATALOG

NEXT STEPS



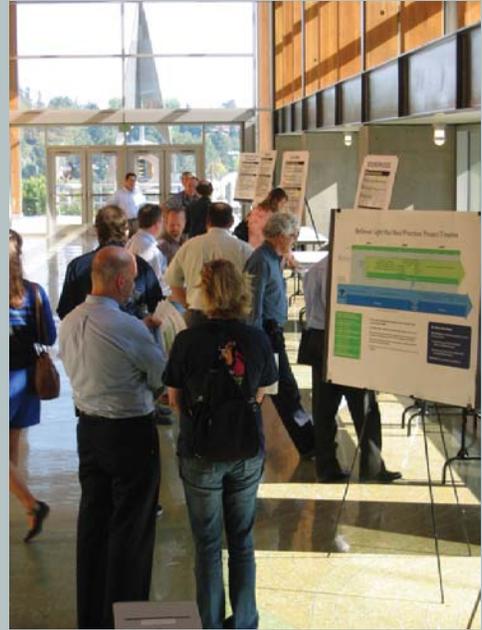
## Best Practices

### A. Create a sense of ownership by engaging the community in the planning, design, construction, and operation of the system.

The Committee believes that engaging the community in all phases of the design and development process will help build support and create a better project. Sound Transit and the City should work together to create effective engagement at several levels, including advisory committees, public forums, and web-based information. An important aspect of community engagement is disclosure of information throughout the process: review of environmental analysis of alternatives; selection of preferred alternative; design of project; identification of impacts and mitigation; and construction and implementation of mitigation. Computer simulation was identified by other systems as a useful technique for depicting pre- and post-construction scenarios.

### B. Form a citizen advisory committee for the East Link Project.

Sound Transit and the City of Bellevue should jointly form a citizen advisory committee. The committee could be charged with a variety of tasks, including reviewing major project technical and policy issues and providing advice to Sound Transit and the City. In keeping with the guiding principles, such a committee should be engaged on the East Link Project as soon as possible.



Open houses are one method for sharing information and gathering public input. (Source: City of Bellevue)



A meaningful public involvement process increases the community's comfort with a project. (Source: City of Bellevue)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

*Cross reference:*

See existing **Comprehensive Plan Transportation Policy TR-28** for policy supporting neighborhood involvement in the planning and design of transportation systems; **Policy TR-69** for policy supporting partnerships that promote regional transit services to commuters, residents, and employers; **Urban Design Policy UD-47** for policy supporting a cooperative regional transit design process to ensure facilities reflect the general character of Bellevue and the surrounding neighborhoods; and **Community Participation Policies** for guidance on expanding public participation.

## Actions

### Comprehensive Plan Policies

1. Provide ample opportunity for meaningful public involvement by residents, neighborhood groups, business leaders, and other informal and formal stakeholders in a cooperative and coordinated community involvement program with the regional transit provider. Members of the community should have opportunities throughout any light rail planning and implementation process to help shape the ultimate configuration of any light rail system in Bellevue and throughout the Eastside.
2. Encourage the regional transit provider to work closely with affected neighborhoods in the design of any light rail transit facility to ensure that the design of the facility incorporates neighborhood objectives and context-sensitive design.
3. Develop and implement an early and ongoing program with regional transit providers to provide assistance to residents and businesses affected by construction.

### Codes and Standards

None proposed.

### Other City Policies/Procedures

4. In collaboration with Sound Transit, jointly appoint a citizen advisory committee for early and ongoing involvement in the project. The committee could be charged with a variety of tasks, including reviewing major project technical and policy issues and providing advice to Sound Transit and the City.
5. In collaboration with Sound Transit and stakeholders, develop a construction management program that includes participation by and assistance to affected residents and business owners.



6. Dedicate city staff to work with Sound Transit to manage the project and resolve issues on the City's behalf.

## City Capital Investments

None proposed.

## Expectations of Sound Transit

7. In collaboration with the City, jointly appoint a citizen advisory committee for early and ongoing involvement in the project. The committee could be charged with a variety of tasks, including reviewing major project technical and policy issues and providing advice to Sound Transit and the City.
8. Conduct frequent public forums and use web-based communication throughout the duration of the project to broaden the reach of public involvement efforts.
9. In collaboration with the City and stakeholders, develop a construction management program that includes participation by and assistance to affected residents and business owners.
10. Coordinate with city staff dedicated to manage the project and resolve issues on the City's behalf.
11. Use computer simulations to demonstrate and analyze the visual impacts of the various profiles and in designing stations. This technique is a useful tool for engaging the public in a dialogue about mitigation and design issues.
12. Involve the contractor in meetings with the public to share information and respond to questions and concerns about construction.

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

**CATALOG**

NEXT STEPS

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# CONNECTING PEOPLE TO LIGHT RAIL

An effective and successful light rail transit system provides safe and convenient access to the community it serves. In Bellevue, transit riders will access light rail on foot, by bicycle, in buses or shuttles, and in carpools and single occupant vehicles. The design and quality of the connections will have a significant influence on transit use and community impacts. The Connecting People to Light Rail Section focuses on developing an efficient and accessible light rail system by effectively coordinating light rail with pedestrian and bicycle facilities, transit, and parking.

EXECUTIVE SUMMARY

## Summary of Research and Findings

Research indicates that people are willing to walk about one-half mile to a light rail station – this translates to an actual walk time of approximately ten minutes rather than a one-half mile distance radius. For this reason, the pedestrian environment within a ten-minute walk of transit stations is very important to encouraging ridership. The Committee found that the most successful transit systems developed safe, comfortable walking environments within this area and accommodated riders of all ages and abilities. Wayfinding near stations and on the platforms was noted by the Committee as critical to riders’ understanding, comfort, and security.

Every light rail transit rider enters and exits the station platform as a pedestrian. The waiting environment on the platform should be spacious enough to accommodate expected volumes. Seating, art, and street furniture can help to humanize the environment. Bicycle storage was provided to reduce the number of automobile trips and parking spaces and usually was provided on or very near the station platform. Kiss-and-ride, taxi, shuttle, and transit drop-off zones were an integral part of the best stations. Having these zones near the station platform was important so riders could move quickly and safely from one mode to another. Station waiting areas were large enough to accommodate the expected crowds, but were not overly spacious.

On system tours, the Committee learned about the use of public and private transit and shuttle connections that effectively extended light rail access to a greater area. The Committee also experienced the value of a complementary bus transit system that delivers riders

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



Bus stops in close proximity to light rail stations with short, direct pedestrian crossings make transit and pedestrian connections safe and convenient. (Source: City of Bellevue)



Bike parking at stations should be protected from poor weather and in plain view to prevent theft -- note glass enclosure above. (Source: David Evans and Associates)

# CONNECTING PEOPLE TO LIGHT RAIL



EXECUTIVE SUMMARY



to the light rail system, provides a backup to service interruptions, can reduce parking need at light rail stations, and can introduce more activity to stations.

The Committee concluded that park and ride lots can be an important contributor to ridership and that whether and where to provide them is a function of station purpose and context. For example, Committee consensus was that some areas such as downtown are not appropriate for a park and ride, yet park and rides may be necessary in other areas, such as Bel-Red, to serve Bellevue neighborhoods. There was also agreement that while some park and ride lots such as South Bellevue serve a more regional purpose, the Committee would like to see more emphasis on providing local access to light rail. Decisions about siting or expanding park and rides must balance available space, the ridership being served, and local impacts. Residents of areas not directly served by park and rides can utilize shared parking with land uses near stations (i.e., within the ten-minute walk area) in addition to enhanced public transit and private shuttle services that connect other neighborhoods and major activity centers with light rail stations.

INTRODUCTION

PROJECT METHODOLOGY

Sharrows along JFK Boulevard through San Francisco's Golden Gate Park alert motorists to share roadway with bicyclists. (Source: San Francisco Department of Parking and Traffic report entitled, "San Francisco's Shared Lane Pavement Markings")

CATALOG

NEXT STEPS



Bike racks aboard the Hiawatha light rail line in Minneapolis. (Source: David Evans and Associates)



## Best Practices

### A. Provide connections to the station that are safe, secure, and convenient for pedestrians and bicycle riders.

Direct, well-lighted, and well-maintained sidewalks should connect stations to the adjacent community. Connections to nearby buildings should be pedestrian friendly. Bus stops should be near the station and have clear, direct pedestrian connections to the station platform. For transit-riding bicyclists, there should be dedicated bike lanes and paths, ramps or “runnels” for access to platforms, and adequate, secure bike storage at stations.

### B. Provide transit feeder service to light rail.

Enhanced public and private transit and shuttle services should connect Bellevue neighborhoods and major activity centers to light rail. This extends light rail access to a much greater population and reduces parking demand at light rail stations. Regional public and private providers, including Metro, Sound Transit, taxis, shuttles, and employer-provided transit, should coordinate system improvements with light rail planning.

### C. Design stations to be accessible and identifiable to all transit riders irrespective of their language, age, or ability.

The Committee concluded that the Americans with Disabilities Act standards are the minimum required and that the best practice applied to the design of stations and connections to the stations should incorporate the principles of universal design. Universal design is generally defined as a design that accommodates the widest range of potential users, including people with mobility and visual impairments and other special needs, such as people with bicycles, baby strollers, and handcars. Street crossings should be safe and easy to cross. Wayfinding signs should use universal icons to communicate key features and destinations. The Committee also found the use of etched stone and similar



Landscaped pedestrian walkway in Dallas connects a bus transit center and park & ride lot to light rail station. (Source: LRBP tour)



Parking structures in Boulder, CO wrapped in commercial uses and designed to fit into architectural style of surrounding area. (Source: David Evans and Associates)



Pedestrians cross a street outside a station in California with no crossing protection because it is the quickest way to get to their destination. (Source: David Evans and Associates)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



This development, located near Denver Union Station, the transit hub for RTD's light rail system, provides pedestrian connections across a nearby freight line to the neighborhood beyond. (Source: David Evans and Associates)



Kiss-and-ride facilities should be clearly marked and accompanied by sufficiently large pedestrian waiting areas (Flickr sources: Mike\_fj40).

materials to be an effective, more attractive alternative to the typical “yellow tactile strip.”

**D. Park and ride facilities should be located where they can provide convenient access to light rail for Bellevue neighborhoods not directly served by light rail, and they should be integrated contextually with the surrounding environment.**

Park and ride facilities are needed to serve transit riders from Bellevue and other communities. However, this need should be balanced against the potential negative land use and transportation consequences.



# CONNECTING PEOPLE TO LIGHT RAIL

## Actions

### Comprehensive Plan Policies

1. Develop and maintain a safe and convenient pedestrian network to light rail stations that is intended to:
  - Provide short, direct routes within a ten-minute walk;
  - Incorporate principles of universal design to facilitate access by all users;
  - Maximize safety for all pedestrians at street crossings; and
  - Give priority to pedestrian access and safety in station areas.
2. Provide reliable access to the system for Bellevue residents in cooperation with transit providers by ensuring that adequate existing and new park and ride lot capacity, neighborhood bus connections, and local and regional express bus services are available.
3. Facilitate intermodal transfers and increased access to transit stations through partnerships with public and private providers of transit and shuttle services. Encourage transit-to-transit, transit-to-pedestrian, and transit-to-bicycle transfers, with an emphasis on safety for pedestrians and bicyclists.
4. Develop and implement an integrated wayfinding system, incorporating principles of universal design and multiple languages, in conjunction with regional transit providers, to facilitate transit ridership by all users.
5. Evaluate proposed new park and ride facilities and expansion of existing park and ride facilities to serve light rail transit, for their effectiveness to serve the community and any light rail system, and for their potential environmental and community impacts. New or expanded park and ride facilities should be consistent with the Comprehensive Plan vision of the specific locations.

#### *Discussion:*

According to the Universal Design Alliance ([www.universaldesign.org](http://www.universaldesign.org)), “Universal Design is the design of products and environments to be usable by all people, to the greatest extent possible, without adaptation or specialized design.” It goes beyond ADA requirements that are intended for people with mobility and sensory impairments to include people with other equipment such as bicycles, baby strollers, and handcars. There are seven principles of Universal Design and guidelines for their application. These principles are consistent with the other best practices that address access and safety at station areas and ensure a high quality pedestrian environment in the vicinity of stations.

#### *Cross reference:*

See existing **Comprehensive Plan Transportation Policy TR-56** for policy supporting partnerships that improve pedestrian and bicycle access to transit services and facilities; **Policies TR-62 – 65** for guidance regarding park and ride facilities; **Policy TR-79** for policy supporting pedestrian and bicycle projects that provide accessible linkages to the transit system; **Policy TR-80** for policy supporting improved pedestrian and bicycle linkages to transit and school bus systems; and Urban Design **Policy UD-49** for policy supporting transit facilities design that includes bike racks, wheelchair access, and pedestrian amenities.

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

## Codes and Standards

None proposed.

## Other City Policies/Procedures

6. Work with transit providers and major employers to provide transit and shuttle linkages to light rail stations.

## City Capital Investments

7. Install marked pedestrian crossings and use traffic-calming techniques to provide safe pedestrian connections within the station area.
8. Coordinate with citywide sidewalk priorities to complete network of sidewalks located within a ten-minute walk of stations, including lighting and safety improvements on major arterials.
9. Invest in bicycle infrastructure within the station area, including bicycle-sensitive loop detectors at intersections, bicycle lanes, and wide curb lanes with sharrows.
10. Install signage within a ten-minute walk of station areas to provide directions to light rail transit stations and facilitate pedestrian activity.

## Expectations of Sound Transit

11. Station design that incorporates:
  - An emphasis on transit patron safety that utilizes techniques such as “Z” crossings;
  - Entrances that minimize conflicts between bicyclists, pedestrians, automobiles, and buses;
  - Bicycle parking in convenient, well-lighted, and secure locations;
  - Maps showing pedestrian and bicycle routes



# CONNECTING PEOPLE TO LIGHT RAIL

connecting stations and local destinations; and

- Physical features that promote use of alternatives to single-occupant vehicle (SOV), such as:
  - preferential parking for non-SOVs relative to demand at each location;
  - clearly marked and visible loading and unloading areas for drop-offs and taxis; and
  - convenient bus stops and comfortable waiting areas.

12. Pedestrian connections to bus facilities should minimize walking distances and, where possible, avoid street and driveway crossings.
13. Coordinate with other transit and shuttle providers to provide feeder bus service for patrons living more than one-half mile from the station.
14. Universal design principles should be used in the design of stations and platforms to facilitate access to high capacity transit by all riders.
15. Real-time arrival information should be provided at stations and nearby major activity centers (e.g., Meydenbauer Center and Bellevue Square) for light rail and regional transit services.
16. Include pedestrian and bicycle infrastructure in station planning and construction to facilitate use by these rider groups.
17. Evaluate demand for additional park and ride facilities as part of the East Link Project. Consider how the development of new or expansion of existing park and ride facilities would serve local communities, support ridership, and impact the surrounding environment. Design park and ride lots to be consistent with the land use vision and community context of each unique location.

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

**CATALOG**

NEXT STEPS

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Transit can have a powerful impact on land uses, but only when the community, the market, and the regulatory environment encourage change. The citizens of Bellevue want to enjoy the development and redevelopment opportunities that transit promises, but also want to protect Bellevue’s neighborhoods and land use vision. The Committee explored successful and unsuccessful experiences of other communities for lessons on how to inform Bellevue’s decisions on land use changes. While every topic section addresses neighborhood impact issues, the Land Use topic focuses on light rail planning and other actions that support the Comprehensive Plan land use vision.

EXECUTIVE SUMMARY

## Summary of Research and Findings

In Bellevue light rail is proposed through or adjacent to healthy residential neighborhoods; a wetland of regional significance; an existing railroad right-of-way; freeway commercial uses; a densely developed, vibrant downtown; and commercial/light industrial areas that are planned for redevelopment. Light rail can affect land uses differently depending on the objectives of the community and the nature of the land use, and development can affect the success of the light rail system. For example, the City’s land use and transportation vision for Bel-Red and Downtown are dependent on high capacity transit. Although suburban residential areas and office parks can benefit from improved access to light rail, the Comprehensive Plan does not envision land use changes south of downtown.

Land use has an impact on transit and transit has an impact on land use. More densely populated land uses result in increased transit ridership. A mix of land uses -- including retail, entertainment, housing, and employment centers -- support all-day ridership, resulting in an increased productivity of the transit investment.

The installation of a light rail system does not mean that pedestrian-friendly transit development will spring up along the tracks. Such development typically requires supportive public policies, especially zoning, building codes, and infrastructure investment. The community has the opportunity to shape whether and how the land use will take advantage of the presence of light rail, especially when a vision is clarified early. A common practice of other cities with light rail systems is to prepare “station area plans” for the areas immediately



In San Jose, the transit authority developed a manual of best practices for integrating land use and transportation to encourage transit-supportive development around stations. Recent office developments, such as this building in Mountain View, have responded by placing the building entrance at the front of the street and putting parking lots in the back of the building, resulting in shorter walking distances from the light rail station to buildings and supporting street level pedestrian activity. (Source: David Evans and Associates)

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY



INTRODUCTION

In San Jose, the transit authority has worked closely with local jurisdictions to facilitate desired residential development around stations. At Whisman Station, town homes were developed immediately adjacent to the light rail line. (Source: David Evans and Associates)

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

surrounding stations. These plans are typically initiated by the city and involve the community and the regional transit provider in developing strategies to address issues like land use, parking, and access related to that station.

The Committee visited a number of transit-oriented developments. Transit-oriented development (TOD) is high density, mixed-use, pedestrian-oriented development that maximizes the functional relationship between land use and transit. TOD has a dual purpose as a transportation node and as a place for people. It comes about as a result of a clear planning vision that favors such development. TOD is most successful when transit service precedes or coincides with regional growth and when there are policy tools designed to focus growth. Successful TOD also incorporates good automobile access to provide for the full range of mobility needs. The policies and expectations that apply to TOD are the same as those that should apply to other well-designed, mixed-use, urban developments. What distinguishes a TOD project is proximity to a rail station and the achievable densities.

The Downtown Bellevue urban center supports, and will continue to support, transit-oriented development. Additionally, the draft Bel-Red Subarea Plan supports redevelopment of light industrial areas into new transit and pedestrian-oriented “nodes” around light rail transit-stations at Overlake Hospital, 122nd Avenue and NE 15th, 130th Avenue and NE 16th, and adjacent to Redmond’s Overlake station. These higher density nodes will provide a range of commercial, office and housing uses, have active street fronts, enhance walkability, foster a sense of community, and support alternatives to single occupant vehicles, including transit.

The character of the “proximity” is extremely important. The TOD must be accessible to light rail stations with high quality pedestrian connections. Park and ride spaces or structures should not be placed between the TOD and the station. The TOD should integrate into the surrounding community and provide a transition from higher densities to lower densities. High quality TOD incorporates community amenities including parks, trails,



greenways, and public spaces. These amenities increase the attractiveness and desirability of the properties. Most TODs include high quality urban design elements, crime prevention through environmental design (CPTED) principles for safety, and pedestrian, bike, and vehicle connectivity.

The Committee learned that successful TOD projects were the result of long-term visioning and early planning efforts with the community, appropriate zoning, land assembly, and infrastructure. Unsuccessful TOD projects were often “islands” that were not well integrated into the surrounding land use. Agencies recommended establishing measures for successful incremental development, such as land banking and the conversion of surface parking, providing infrastructure for pedestrian connectivity, identifying priority corridors early, and promoting density. Agencies should define the roles in the TOD process and minimize risks and roadblocks in the development process.



Light rail station across from residences in San Jose, CA. (Source: LRBP tour)

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



Orenco Station TOD in Hillsboro, OR includes 450 single-family detached and townhouse units and 1,384 apartments at a density of 9.2 units per acre. (Source: David Evans and Associates)



The Market Common at Clarendon (VA) development incorporates pedestrian facilities, transit-oriented design, and auto access to support a variety of uses and transition from a new development area into a historic neighborhood. (Source: David Evans and Associates)

## Best Practices

### A. Support the land use vision in Bellevue's Comprehensive Plan for each neighborhood adjacent to light rail.

Light rail should be consistent with the City's Comprehensive Plan goals and policies. Specific goals to be affirmed include:

- Preserve existing residential neighborhoods in the Mercer Slough/South Bellevue area;
- Continue the urban intensification of downtown; and
- Encourage the redevelopment of the Bel-Red corridor with an emphasis on transit-oriented development.

### B. Where consistent with the City's land use vision, encourage the development of projects adjacent to light rail that exhibit the following characteristics:

- An emphasis on being "a place, not a project";
- Includes housing as well as other uses;
- Higher urban scale densities;
- Pedestrian oriented;
- Density tapers down to adjacent lower density communities; and
- Integrated into the station and/or the neighborhood.

Successful transit-oriented development uses the advantage of proximity to light rail to create active and inviting public places, services for neighborhood residents, and densities that will enhance ridership. It does so in a high quality way that makes the development an attraction for people and an enhancement to the community.

## C. Invest in infrastructure to make stations and adjacent development successful.

The most important infrastructure investment is in sidewalks. Transit riders are pedestrians during some part of their journey. Quality pedestrian connections from stations to adjacent neighborhoods and to adjacent development are essential. The City and Sound Transit share responsibility for making these improvements.

## D. Develop “station area plans” once the locations are known and before design and development of the stations.

Station area plans can be developed by the City in conjunction with the community and Sound Transit to address the specific issues related to development of the station and the immediate vicinity. These plans can be used to preserve existing residential areas south of downtown and to encourage transit-oriented development downtown and in the Bel-Red corridor.



Fruitvale Station in Oakland, CA is a redevelopment project on a commercial strip near a Bay Area Rapid Transit station that includes retail, office, and housing elements. (Source: David Evans and Associates)

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY

*Discussion:*

The land use and transportation vision is the ideal, integrated outcome expressed in the City's Comprehensive Plan. Both land use and transportation work together to provide mobility and to shape a high quality urban environment, less dominated by the auto and more sensitive to air quality, energy conservation, and protection of livable neighborhoods.

INTRODUCTION

PROJECT METHODOLOGY

*Cross reference:*

See existing **Comprehensive Plan Transportation Policy TR-1** for policy supporting integration of land use and transportation decisions to ensure that the transportation system supports the Land Use Vision; and **Policy TR-70** for policy supporting transit system planning that promotes transit use and land use objectives.

CATALOG

NEXT STEPS

## Actions

### Comprehensive Plan Policies

1. Advocate for light rail service that is consistent with regional and local land use and transportation plans. Light rail planning should further the achievement of the City's land use and transportation visions.
2. Ensure consistency with the Comprehensive Plan land use vision around the specific system facility locations:
  - Some potential station areas (e.g., Bel-Red) could support more intense redevelopment that includes density increases that support transit;
  - Some potential station areas (e.g., Downtown) could sustain a more transit-supportive design and orientation without changes to land use intensity; and
  - Land use changes would be precluded in existing single-family designations and environmentally sensitive areas.

### Codes and Standards

3. Review and update building codes and land use regulations, including parking standards, to encourage transit-oriented development in downtown and Bel-Red.
4. Develop design guidelines applicable to transit station area projects.
5. Develop interim zoning to provide an immediate framework for transit-oriented development and to prevent unwanted uses.



## Other City Policies/Procedures

6. Assess development potential and necessary improvements before a final decision on station locations and alignments.
7. Develop station area plans for each of the sites ultimately selected. Plans should address station design, integration with the community, mitigation and amenities, transportation, land use, parking, and operational issues and engage the public and Sound Transit in the development of the plans.

## City Capital Investments

8. Evaluate targeted infrastructure investments as an incentive for redevelopment in desired areas.

## Expectations for Sound Transit

9. Provide adequate resources for pedestrian connections, art, and other amenities that will complement adjacent development and enhance the community.
10. Cooperate with Bellevue on station area plans for each of the sites ultimately selected.

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

**CATALOG**

NEXT STEPS

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# STREET DESIGN AND OPERATIONS

Light rail may share Bellevue streets with pedestrians, bicycles, automobiles, buses, and other vehicles. The Committee explored design and operation practices that create a safe and efficient street environment.

## Summary of Research and Findings

Light rail trains operate in busy street environments when the alignment and stations share the right-of-way. Pedestrians, bicycles, and other vehicles moving at various speeds and directions, in various light and weather conditions, make street design critical to assuring safety for all users. Trains must stay on schedule to deliver a predictable, attractive service. Travel times along routes must be efficient and consistent to ensure that scheduled station stops are predictable and reliable.

The tools used to design and operate light rail in the street environment have been improved as the experience of light rail systems has increased. The Committee found that the best practices emphasize reducing opportunities for conflict; improving visibility for everyone in the roadway environment; improving the predictability of pedestrians, bicyclists, and automobiles in the transit environment; and employing intelligent transportation tools to improve traffic operations.

Practices related to reducing conflict in the street environment include separating the light rail vehicles from other vehicles, either physically with grade separation (i.e., elevated or tunnel), with barriers, or with the use of separate, distinct signals. The Transportation Research Board recommends providing an entirely distinct set of signals for light rail and also recommends that the signal system be employed consistently throughout the light rail system. Signals are needed for use by light rail drivers, and special signals are needed to announce the approaching light rail vehicle to pedestrians and drivers.

Visibility is critical to a safe environment. Safe designs ensure that the train operator has a clear view of the station, trackways, and crossing areas. Train operators must be able to see the station area and crossing



Tactile warnings and distinctive paving patterns and colors indicate to pedestrians that the zone is shared with a transit line, as shown here in Sacramento, CA. (Source: David Evans and Associates)



Distinct signals for light rail trains reduce confusion for motorists and help to prevent collisions. The horizontal light bar on the left is for light rail trains; the standard street signal on the right is for other vehicles. (Source: David Evans & Associates)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY



INTRODUCTION

A "z-crossing" forces pedestrians to turn and look down the light rail track for potential on-coming trains before crossing trackway. (Source: David Evans and Associates)

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

areas to be sure they are clear of pedestrians, bicycles, and other vehicles. Successful design also provides pedestrians, drivers, and bicyclists a clear view of tracks, roadways, and sidewalks so they can make decisions about maneuvering. Lighting is important at the pedestrian and street level, but lighting design must also ensure that nearby neighborhoods are protected from light pollution.

The safety of roadway and station areas can be enhanced by increasing the predictability of drivers, bicyclists, and pedestrians. This can be achieved by limiting their choices based on design elements. For example, right-turn bays indicate to a train driver that other vehicles will be turning right. Bedstead barriers, which are barriers that are staggered or offset like a maze, force bicyclists to dismount before crossing tracks, providing more predictability for train operators.

For light rail to operate efficiently in an urban environment, transit signal priority systems are important. Transit signal priority provides an advance or extended green light for the light rail vehicle and the vehicles traveling in the same direction as the light rail vehicle, causing a slight delay to the vehicles in the opposing intersection legs. Priority does not conflict with the preemption provided to emergency vehicles. Typically the intersection can recover to standard operations in one or two cycle lengths.



## Best Practices

### A. Minimize confusion and maximize predictability for all street users.

Use street design features, materials, street signage, and lane markings to provide clear, unambiguous direction to drivers, pedestrians, and bicyclists. Apply traffic control devices uniformly and consistently throughout the Bellevue portion of the system, including distinct light rail signals. When safety dictates (e.g., to prevent non-rail vehicles from crossing or driving on tracks), use physical barriers to separate trains from other vehicles.

### B. Increase visibility at transit stops, intersections, and railroad crossings.

Consider visibility at decision points from the perspective of train operators, other vehicle drivers, bicyclists, pedestrians, and wheelchair users. Consideration should be given to the fact that pedestrian visibility, and therefore safety, is also a function of the size, age, and ability of the individual pedestrian.

### C. Employ design features at stations to enhance pedestrian and bicyclist safety.

Design elements, such as bedstead barriers that force bicyclists to dismount before crossing tracks, separate entrances for pedestrians and automobiles, pedestrian crossing gates, and tactile warning strips all serve to increase pedestrian and bicyclist safety.



Exclusive and shared use trackway delineation in Jersey City, NJ. (Source: David Evans and Associates)



Minneapolis trackway with brick pavers sidewalk. (Source: David Evans and Associates)



Pedestrian safety gates at Beaverton Transit Center, a busy station serving buses and light rail. (Source: David Evans and Associates)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

EXECUTIVE SUMMARY



Fences can deter people from running across the tracks, shown here in Charlotte, NC. (Source: David Evans and Associates)

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



Pedestrian gates force pedestrians to slow down and be aware of trains while crossing the trackway. (Source: David Evans & Associates)



Street configuration and tactile curbs in San Jose. (Source: LRBP tour)

## D. Design the light rail stations and line, and any street modifications, to avoid and minimize potential impacts.

Thoughtful design can prevent many negative impacts to surrounding communities. Design station and track lighting to illuminate the platform and pedestrian access area while preventing light pollution in adjacent areas. Design stations and approaches to have clear sight lines to increase visibility and safety. Where negative impacts cannot be prevented through system design, physical mitigation measures should be designed to be context sensitive and attractive by building at an appropriate scale for the surrounding area and incorporating high-quality materials.

## E. Apply principles of universal design in the design of streets and sidewalks adjacent to light rail stations.

Universal design is generally defined as a design that accommodates the widest range of potential users, including people with mobility and visual impairments and other special needs, such as people with bicycles, baby strollers, and handcars. These principles are consistent with the other best practices that address safety at station areas and ensure a high quality pedestrian environment in the vicinity of stations.

## F. Employ Transit Signal Priority to optimize transit operation, balanced with pedestrian, bicycle, and other vehicle movements.

Provide for efficient light rail operation and minimize delay while still accommodating vehicle movements. Adjust signal phasing to optimize transit and vehicle movements and incorporate transit signal priority at major intersections where light rail travels in a shared right-of-way. Minimize pedestrian delay at intersections. Minimize track curves in right-of-way shared with other vehicles to reduce potential conflicts and traffic delays.



## Actions

### Comprehensive Plan Policies

1. Maximize the efficient usage of the transportation network through utilization of transit signal priority (TSP) technology. Provide for efficient light rail operation and minimize delay while still accommodating non-rail vehicle movements.
2. Promote the use of context-sensitive design and high quality materials to prevent and mitigate impacts and incorporate the light rail system appropriately into the streetscape.
3. Maintain and enhance the safety of Bellevue's streets when incorporating light rail through the use of street design features, materials, signals, street signage, and lane markings that provide clear, unambiguous direction to drivers, pedestrians, and bicyclists.
4. Employ principles of universal design in street designs to accommodate the widest range of potential users, including people with mobility and visual impairments and other special needs.

### Codes and Standards

5. Require distinctive, paved (i.e., no tie and ballast) treatment of trackway when located in street right-of-way for pedestrian-oriented residential and commercial areas.
6. Require quality design and materials in system facilities (for example, stations, tracks, supports, access areas, and power substations) that mitigate impacts related to safety and aesthetics and enhance the public regard for the system.

#### *Cross reference:*

See existing **Comprehensive Plan Transportation Policy TR-67** for policy supporting preservation of necessary right-of-way for regional transit facilities.

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS

7. Address pedestrian safety issues in street standards:
  - Use traffic calming techniques to reduce vehicle speeds;
  - Reduce pedestrians' exposure to risk while crossing;
  - Increase predictability of driver and pedestrian behavior;
  - Use passive safety devices to indicate safe crossing and waiting areas;
  - Minimize line-of-sight obstructions for light rail transit and other vehicle drivers;
  - Reduce people's ability to rush across the tracks;
  - Make safety devices accessible to the visually impaired;
  - Provide audible and visible warnings; and
  - Apply traffic control devices uniformly and consistently throughout the Bellevue portion of the light rail system.
8. Review and update Street Design Manual to reflect "best practices" for integrating light rail into city streets. Include in the review the following items:
  - Lighting that does not create light pollution on neighboring properties, and consider landscaping, sight lines, and pedestrian levels in evaluating illumination requirements;
  - Paving material with high visual contrast for nighttime conditions (for example, a bright white stripe);
  - Landscaping, including retained and transplanted non-sapling trees, that helps to screen the catenary and similar, unaesthetic system equipment while maintaining sight lines for safety and security;
  - Textural separators between bicycles, automobiles, and light rail where they travel together along the same street;



- Vehicle turning to minimize conflicts with light rail; and
- Light rail signals that are clearly distinguishable from traffic signals.

9. Review and update signal cycles to:

- Reduce pedestrian delay and give priority to pedestrians when light changes; and
- Incorporate transit signal priority within shared right-of-way.

### Other City Policies/Procedures

10. Consider station access requirements and integration with the existing street environment when selecting an alignment profile and station location. Evaluate in the concept design phase.

### City Capital Investments

11. Establish a CIP project to complement the light rail investment by Sound Transit with improvements in street design, signal operations, and pedestrian-related features.

### Expectations of Sound Transit

12. Design light rail stations and intersections to direct pedestrians to safe, direct street crossings.
13. Use distinctive, paved (i.e., no tie and ballast) treatment of trackway when located in street right-of-way for pedestrian-oriented residential and commercial areas.
14. Require quality design and materials in system facilities (for example, stations, tracks, supports, access areas, and power substations) that mitigate impacts related to safety and aesthetics and enhance

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS

# STREET DESIGN AND OPERATIONS



EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS

the public regard for the system.

15. Minimize line-of-sight obstructions for light rail transit drivers.
16. Reduce people's ability to rush across the tracks.
17. Make safety devices accessible to the visually impaired.
18. Provide audible and visible warnings.
19. Apply traffic control devices uniformly and consistently throughout light rail system.
20. Provide light rail signals that are clearly distinguishable from traffic signals.



# ELEVATED, AT-GRADE, AND TUNNEL

Light rail in Bellevue may include elevated, at-grade, and tunnel profiles. The Committee explored how other systems have integrated these alignment profiles into existing residential and developed downtown environments, and how other systems have used different profiles to support transit-oriented development. The research included a review of advantages and disadvantages and land use opportunities and challenges associated with each profile. The Committee has expanded the scope of this topic as a result of their visits to the case study cities. In discussions with city and transit agency staff in each of the case study cities, the Committee explored why certain decisions were made by the agencies and whether, in hindsight, they would have made different choices. While remaining true to their charge, the Committee learned some useful lessons about the potential trade-offs of the different profiles that they deem important to include in the report.

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

## Summary of Research and Findings

The Committee found that each community considered many factors in choosing an alignment profile and that the decisions reflected local conditions, not any nationally recognized best practice. The factors influencing the choice of alignment profile include desired operating speed, ridership, topography, environmental conditions, urban design objectives, land use objectives, traffic impacts, and cost.

In the cities visited by the Committee, as in most western cities, tunnel and elevated alignments were used only for distinct short sections. In most cases, the primary reason for choosing an elevated or tunnel alignment was a natural or built feature that made an at-grade alignment impractical. Natural features that might preclude an at-grade alignment include waterways, wetlands, ravines, terrain, and the types of soils and geological formations. Built features that might preclude an at-grade alignment include highways, streets, utilities, and a dense urban development. Most systems include a combination of at-grade, tunnel, and elevated sections to achieve optimal design objectives.

The Committee found that there are both transportation system and community-centered considerations when selecting light rail profiles. For the transportation system, considerations include travel time, ridership, cost, and impact to the existing system. Community-centered considerations include land use objectives, urban design, and impacts to adjacent communities. For example, a tunnel profile that is bored or mined



At-grade light rail separated from street in San Jose, CA. (Source: David Evans and Associates)



The San Diego State University tunnel employs design features including natural light and air, high quality finishes, and art to create a comfortable waiting environment. (Source: David Evans and Associates)

# ELEVATED, AT-GRADE, AND TUNNEL



EXECUTIVE SUMMARY



INTRODUCTION

The open design of this elevated station in San Jose maximizes visibility while employing urban design techniques to minimize the bulk of the structure. Pedestrian infrastructure connects the station to the adjacent neighborhood, transit center, and shopping center. (Source: David Evans and Associates)

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

will have much less impact on street activities during construction compared to a “cut and cover” trench approach or an at-grade system in the street right-of-way. However, tunnel construction typically requires larger construction staging areas and more truck traffic to haul away the spoils. The degree and duration of the disruption can be mitigated to some extent for each of the profiles, but not eliminated. When evaluating the different profiles, it is important to understand the impacts and trade-offs for the alternatives in the specific circumstances. A more comprehensive list of advantages and disadvantages can be found in the research paper on this topic in Appendix A. The following table compares some of the basic trade-offs for each profile.

ADVANTAGES	DISADVANTAGES
<b>Elevated</b>	
<ul style="list-style-type: none"> <li>▪ Exclusive trackway compared to some at-grade;</li> <li>▪ Minimal conflicts with other vehicles and pedestrians compared to at-grade;</li> <li>▪ Maximum train speed;</li> <li>▪ Greatest visibility to potential riders; and</li> <li>▪ Lower cost per mile to construct than tunnel.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Higher cost per mile to construct than at-grade;</li> <li>▪ Most visually intrusive trackway and stations; and</li> <li>▪ Rider access more difficult than at-grade.</li> </ul>
<b>At-Grade</b>	
<ul style="list-style-type: none"> <li>▪ Lowest cost per mile to construct;</li> <li>▪ Easiest access to stations for riders;</li> <li>▪ Easiest for riders to transfer to other modes;</li> <li>▪ Enhances and encourages street-level activity; and</li> <li>▪ Fits several environments.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Highest potential for conflicts with other vehicles;</li> <li>▪ Higher potential for noise, vibration, and acquisition impacts; and</li> <li>▪ Slower operating speeds.</li> </ul>
<b>Tunnel</b>	
<ul style="list-style-type: none"> <li>▪ Exclusive trackway compared to some at-grade;</li> <li>▪ Little potential for conflicts with other vehicles and pedestrians;</li> <li>▪ Maximum train speed; and</li> <li>▪ Higher system capacity.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Highest cost per mile to construct;</li> <li>▪ Less active at street level;</li> <li>▪ Rider access more difficult than at-grade; and</li> <li>▪ Least visibility to potential riders.</li> </ul>



# ELEVATED, AT-GRADE, AND TUNNEL

For the Committee, these trade-offs were exemplified through a number of the examples within the case study systems:

- San Diego’s Green Line connects Old Town, shopping centers, residential areas, and San Diego State University (SDSU) using at-grade, elevated, and tunnel configurations. The selection of the tunnel to serve SDSU and the elevated profile crossing the San Diego River multiple times came at greater expense than other potential alignments, but was chosen in order to directly serve activity areas, build ridership, and advance the local land use vision. The tunnel in particular illustrates the trade-offs of serving the community and building a productive system, despite the higher cost. The Committee identified the SDSU station as illustrating many station best practices they would like to see in an underground station in Bellevue – i.e., high ceilings, generous lighting, and large open areas with natural light and air.
- San Diego’s downtown segment was built at-grade as part of the first line built in 1981. The line helped stimulate redevelopment downtown and made the presence of light rail known to potential users. As the system has expanded, demand for service through downtown has exceeded the street capacity. Consequently, transit service is slow and negatively impacts operations of the larger downtown network. San Diego’s downtown blocks are shorter than Bellevue’s and, as a result, longer trains (e.g., 3 and 4 cars) block intersections when the train is at a station. San Diego is currently exploring options to provide adequate light rail and vehicle capacity through downtown. Transit agency officials indicated that if they had the chance to “redo” the system and money were no object, a tunnel through downtown would be a better profile in their opinion.
- San Jose’s downtown segment travels at-grade through a pedestrian-oriented, one-way street couplet. The at-grade profile was selected to help

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

# ELEVATED, AT-GRADE, AND TUNNEL



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

stimulate growth and reinvestment in the downtown core to transition into an urban area. The speed limitation of 9-10 mph constrains system capacity by limiting the number of trains that can travel through the downtown segment. While staff from the city of San Jose regard the choice of at-grade as the right choice because of the community objectives, transit agency staff stated that the limited train capacity constrains the ridership and growth of the light rail system and, in hindsight, a tunnel would have been a better choice for operational reasons. Unlike Portland, and to a lesser extent San Diego, the downtown area of San Jose is not the major destination in the light rail system. The Committee also experienced a service interruption in downtown when a portion of the line was closed for most of the day due to a building fire on the transit mall. The transit agency immediately activated a “bus bridge” to create a temporary link around the closure, but it highlighted for the Committee how quickly service can be interrupted. The Committee recognized the atypical event and realized similar circumstances could affect the service of any profile. However, the Committee questioned whether an at-grade system in a downtown setting may be more susceptible to interruption because of the potential conflicts with pedestrians, other vehicles, and general traffic congestion.

- At-grade light rail is currently being added to the downtown Portland transit mall. The transit mall was previously a bus-only mall, and the city and transit agency selected an at-grade profile over a tunnel because of significantly higher costs for a tunnel, the opportunity for street activation, and revitalization of the transit mall with the addition of light rail. Of the three case study cities, Portland’s downtown tends to be a more significant destination on the overall system rather than an area that the lines travel through to somewhere else. Portland has one three-mile tunnel segment including one underground station at Washington



# ELEVATED, AT-GRADE, AND TUNNEL

Park. The Committee made several observations about this segment:

- Traveling through the tunnel was louder than expected;
- The station felt dark and confining due to its size, shape, and lack natural light;
- The tunnel was more difficult to construct than anticipated; and
- The tunnel offered high performance in terms of speed and crowd capacity for the large events at Washington Park.

Bellevue should consider a balance of both transportation system and community objectives when selecting a preferred alignment. Priority transportation system objectives include selecting an alignment that minimizes travel time, maximizes ridership, provides easy access to the system, and considers the long-term need of the entire transportation network. Community objectives include serving residents, advancing the City’s land use vision, capturing growth benefits, creating a dynamic urban environment within downtown, and providing access while balancing neighborhood and environmental impacts in areas south of downtown.

The Committee visited two established single-family neighborhoods where light rail was built, the Goose Hollow Neighborhood adjacent to downtown Portland and the Alum Rock neighborhood of San Jose. In both cases, the Committee observed attractive, well-maintained residences and community businesses. The Committee found that factors critical to ensuring neighborhood protection include developing an attractive station design, employing high quality materials, incorporating art, employing mitigation measures that are responsive to the community’s desires, and delivering mitigation in a timely, sensitive manner. Through discussions with a Goose Hollow resident, the Committee learned that the development of a mutually respectful relationship between the neighborhood and transit agencies, the forthright sharing of information, and the willingness of both sides

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

# ELEVATED, AT-GRADE, AND TUNNEL



EXECUTIVE SUMMARY



Elevated trackway in Vancouver, B.C.  
(Source: David Evans and Associates)

INTRODUCTION

PROJECT METHODOLOGY



Urban tunnel portal in San Jose, CA.  
(Source: David Evans and Associates)

CATALOG

NEXT STEPS

to negotiate led to an outcome on alignment and station siting that was mutually beneficial.

Many cities have introduced light rail on abandoned railroad corridors, with the land use planning following. For these cities, building light rail on existing railroad right-of-way was less expensive than acquiring new right-of-way and easier to construct because of the space available and lack of surrounding development. Higher speeds are possible because of longer distances between stops and because of fewer conflicts with other vehicles when the trains are not operating within a street network. Cities have been able to achieve high ridership along these lines by promoting intensive redevelopment around station areas and/or developing extensive systems of park and ride lots. Building light rail on the existing railroad right-of-way allowed these cities to establish a system, pursue transit-oriented development, and serve communities through park and ride connections, but didn't provide direct light rail service to established activity centers.

The development of light rail in Bellevue is unique compared to most other places in the country because of the city's established land use form and vision. Under the various alternatives being analyzed by Sound Transit, East Link would travel through four primary types of land uses. In downtown Bellevue, vigorous urban development is under way. In Bel-Red, a more dense, transit-oriented land use vision has been articulated. In these areas, fully achieving the land use vision endorsed by the community is dependent on the timely implementation of high capacity transit. South of downtown, the existing residential areas and Mercer Slough are valued by residents and the community as a whole. Because any of the alignments under consideration south of downtown would pass near residential areas and the Mercer Slough, introducing light rail in this area is a matter of fitting it into the existing fabric with context-sensitive design and meaningful community engagement. Choosing the alignment that best advances the adopted land use vision is the critical next step.



# ELEVATED, AT-GRADE, AND TUNNEL

## Best Practices

### A. Connect “somewhere to somewhere.”

Alignments should connect major activity areas in order to maximize ridership. Although it can be more expensive to build a light rail line in an already developed area, it is important to provide service to the areas with higher concentrations of people (i.e., potential riders). This supports both the transit system’s ridership objectives and local land use vision.

### B. Build it right the first time.

Light rail is a massive investment of the region’s capital. The alignment needs to meet regional transportation needs while maintaining capacity in the local transportation network. The system should be built to accommodate long-term population and employment growth. The system also should be thoughtfully designed to maximize benefits and minimize potential impacts.

### C. The alignment profile should support the land use plan for each of the areas it travels through.

The light rail alignment selected for Bellevue should advance the adopted land use plans within the area and support the city’s goal of providing multiple travel options. In south Bellevue, the alignment should fit in with the existing context and provide local access while balancing neighborhood and environmental impacts. In downtown, the alignment should allow for maximization of development opportunities, provide convenient access for riders, and improve the quality of the urban environment. In Bel-Red, the alignment should be consistent with the Bel-Red subarea plan.



At-grade light rail stop in downtown Portland, OR. (Source: David Evans and Associates)



Elevated trackway in Portland, OR. (Source: David Evans and Associates)



Underground station serving two-car light rail trains in Portland, OR. (Source: David Evans and Associates)

EXECUTIVE SUMMARY

INTRODUCTION

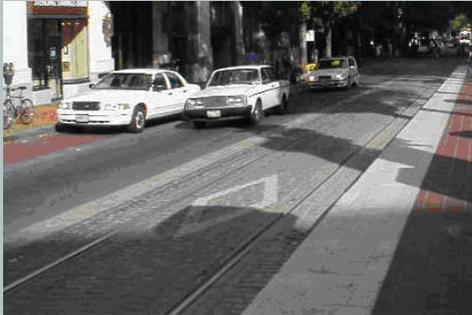
PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY



Belgium block in at-grade trackway in downtown Portland, OR. (Source: David Evans and Associates)

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



An at-grade light rail station in Minneapolis, MN. (Source: David Evans and Associates)

## D. The alignment profile should minimize impacts on street operations.

Traffic operations will be impacted in different ways by each of the alignment profiles. The selected alignment should minimize degradation of street operations.

## E. The alignment profile should optimize ridership.

Ridership is heavily influenced by travel speeds and density of development adjacent to stations. Grade-separated alignments have faster travel times and better ridership through challenging terrain and highly urbanized areas with limited right-of-way. Elevated alignments are generally preferable and faster outside of urbanized areas where there are critical grade-separated crossings (e.g., freeways, railroads, challenging terrain). At-grade alignments may be slower, but can serve dense urban areas and provide easier access for patrons, facilitating ridership. The choice of alignment should consider these different trade-offs and their relationship to system ridership.

## F. Employ urban design features to enhance safety and community integration.

Quality design and materials can create a sense of ownership by the community, enhance visual appeal, improve safety, and deter vandalism. The design of stations should reflect community character but also be visible, attractive, and easy to find. Portals, station access areas, and ancillary facilities should be integrated into the community fabric.



## Actions

### Comprehensive Plan Policies

1. Work with regional transit providers to provide reliable, high-performance, attractive alternatives to single-occupant vehicle travel by providing service to the city’s major employment centers and residential areas. Add new travel capacity using light rail within its own right-of-way in order to maximize speed and reliability for light rail without adversely impacting other modes.
2. Support plans by regional transit providers to connect Bellevue, Seattle, and Redmond activity centers, including downtown Bellevue and the developing center of Bel-Red, with service that optimizes convenience for riders. Light rail should connect “somewhere-to-somewhere.”
3. Develop a light rail system in collaboration with regional transit providers that advances local needs and benefits, including long-term transportation and land use objectives; minimizes environmental and neighborhood impacts; and balances regional system performance.
4. Minimize environmental, traffic, and noise impacts in order to protect Bellevue’s residential and commercial neighborhoods within and surrounding potential light rail alignments.
5. Advocate for an alignment for downtown Bellevue that advances the adopted land use vision for an urban downtown by:
  - optimizing ridership and user convenience;
  - locating stations in proximity to existing and planned employment concentrations;
  - addressing aesthetic concerns and integrating with the urban design;
  - minimizing impacts on businesses and residents during construction; and
  - minimizing overall operational impacts.

#### *Cross reference:*

See existing **Comprehensive Plan Transportation Policy TR-1** for policy supporting integration of land use and transportation decisions to ensure that the transportation system supports the Land Use Vision; and **Policy TR-70** for policy supporting transit system planning that promotes transit use and land use objectives.

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

6. Advocate for an alignment south of downtown Bellevue that advances the adopted land use vision by:
  - protecting the character of existing neighborhoods;
  - minimizing impacts to wetlands and other natural resources;
  - maintaining access for Bellevue neighborhoods; and
  - optimizing ridership and user convenience.
7. Advocate for an alignment in the Bel-Red corridor that is consistent with Bel-Red Subarea Plan.
8. Protect environmentally sensitive areas of local and regional significance.

### **Codes and Standards**

None proposed.

### **Other City Policies/Procedures**

None proposed.

### **City Capital Investments**

None proposed.

### **Expectations of Sound Transit**

9. Public art for the project should be coordinated with the Bellevue Arts Commission and consistent with city policies on public art.
10. Use urban design features to enhance safety and community integration, including but not limited to:



# ELEVATED, AT-GRADE, AND TUNNEL

- Integrated public art, design, and finishes at stations to improve aesthetics;
- Use of larger, non-sapling trees and other landscaping along the guideway to visually screen the catenary system.

## 11. At-grade systems should feature:

- Distinctive trackway treatment (i.e., no tie and ballast) and landscaping as a design element;
- Landscaping, low bollards, chains, or ornamental fencing or art projects to define pedestrian areas;
- Integrated public art, design, and finishes at stations to improve aesthetics;
- Design techniques such as “Z-crossings” in locations other than intersections to increase pedestrian awareness and safety;
- Design and maintenance techniques that mitigate operational noise on adjacent properties;
- Designs that prevent train headlights from blinding oncoming motorists or creating a nuisance for nearby land uses; and
- Trackway finishes that complement community objectives and fit the budget.

## 12. Elevated systems should feature:

- Integrated public art, design, and finishes at stations and on support structures to improve aesthetics;
- Design and maintenance techniques that mitigate operational noise on adjacent properties;
- Placement of supports to accommodate motorist sight lines and avoid creation of visual and pedestrian barriers;
- Placement and design of aerial and support structures that address shadow effects; and
- Designs that prevent train headlights from creating a nuisance for adjacent land uses.

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS

# ELEVATED, AT-GRADE, AND TUNNEL



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

## 13. Tunnel systems should feature:

- Integrated public art, design, and finishes at stations to improve aesthetics;
- Portals and associated facilities integrated into the surrounding area;
- Portal design that prevents unauthorized vehicles and pedestrians from entering tunnel;
- Station entrances that create a recognizable visual signal that transit service is “available here”;
- Design and maintenance techniques that mitigate operational noise for riders waiting on station platforms;
- Underground station entrances that provide easy access for all patrons and avoid impeding pedestrian movements; and
- Underground stations that use high ceilings, natural light and air, or other design techniques to create bright, open, and safe feeling platforms.



For most people, a home or business represents the single largest financial investment of their lifetime. The introduction of light rail into a community raises fear and uncertainty about the short- and long-term effects on the value of that property. Research conducted on changes in value for properties near light rail lines around the country was reviewed for this project. The research revealed practices that could help protect properties from the factors that could decrease values as well as maximize values where more urban development or redevelopment is desired. Appraisal procedures for purposes of property acquisition and condemnation are strictly regulated by state and federal law and are outside the scope of this project.

EXECUTIVE SUMMARY

## Summary of Research and Findings

Research conducted over the past 20 years on several systems around the country found that property values tend to increase with the introduction of light rail because of improved transit access for residents, employees, and visitors. There are always multiple factors that influence property values, and these studies were designed to isolate the effects of the light rail to the extent possible and draw conclusions about whether there was any effect, positive or negative. Another finding of the research is that the radius of influence for property values around a station is one-quarter to one-half mile, or a five- to ten-minute walk, though some real estate sellers promote the benefit of being “near a light rail station” for properties up to a mile away. Beyond that distance, other factors that influence property values are difficult to discern from the effects, if any, of light rail. As with any large public infrastructure project, acquisition of private residences and businesses will have individual effects on those properties and the people associated with them.

For residential properties, some of the studies found a decrease in value for residential properties located in very close proximity to stations, while others found no change. In general, the studies indicated that residential properties typically increased in value when they were located near a light rail station due to improved transportation access. One finding of the research was that important factors in determining whether there were negative impacts on properties within one or two blocks of stations was the quality of the design, safety, security, and noise.

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



Goose Hollow Station, adjacent to downtown Portland, OR, integrated into an established single-family neighborhood with distinctive trackway. (Source: LRBP tour)



Pathways connect Orenco Gardens, a multi- and single-family development at Orenco Station in Hillsboro, OR. (Source: City of Bellevue)



Residential transit-oriented development in San Jose, CA. (Source: David Evans and Associates)



EXECUTIVE SUMMARY



INTRODUCTION



PROJECT METHODOLOGY

CATALOG

Two single-family properties adjacent to light rail lines in Hillsboro, OR. In the top image, a light rail train is visible beyond the hedge. In the lower image, light rail tracks are adjacent to the home, on the left side of the photo. (Source: David Evans & Associates)

NEXT STEPS



The design, finishes, art and colors of this at-grade station in San Jose integrate the station with the neighborhood. (Source: David Evans and Associates)

The Committee recognizes that the citizens of Bellevue are also concerned about those properties that are adjacent to tracks but not near a station. Some citizens worry that they will “get all the impacts with none of the benefit.” Finding real estate pricing information on these properties was more difficult. Most studies reported results related to proximity to stations. By extrapolation, these studies would suggest that the farther a property is from the station, the lower the benefit. Some studies found that beyond one-quarter mile from the station, no real value increase was indicated.

Overall, the studies indicated that commercial properties that are served by high quality public transit typically maintain higher property values than properties without adequate transit service. Rental rates for commercial properties are also generally higher for properties with better transit service. The inference from these studies is that commercial properties that are near stations tend to have higher value to tenants as well. The increase in commercial property values and rents ranged from 12 to 72 percent for buildings served by transit.

The Committee concluded from the research and the case studies that designing and maintaining a quality system are the best practices that can be applied to protect the value of properties along the light rail line and around stations. These practices are intended to preserve the environment that contributes to the value of that property in areas not intended for development and to encourage redevelopment where that is desired. In all cases, there are also mitigations, design techniques, and other practices to address issues such as noise, parking, traffic, aesthetics, and security that can be applied to protect the value of surrounding properties.



## Best Practices

### A. Design and maintain high quality stations that are an asset to the community.

The stations need to reflect the standards of the City of Bellevue. Neighborhoods and downtown are well maintained, and the light rail facilities should reflect a similar commitment. The stations should be constructed with high quality, durable materials, have good pedestrian connections into the adjacent neighborhoods, receive regular and frequent security and maintenance attention, and be designed to maximize positive effects and minimize negative effects on adjacent properties.

### B. Develop a comprehensive strategy for limiting and mitigating negative impacts from light rail construction and operation.

Bellevue citizens deserve assurance that negative impacts will be minimized. Providing this assurance will require that Sound Transit and the City deliver a coordinated response to citizen concerns about impacts. Sound Transit issues include noise and vibration. City issues include traffic circulation and parking. Issues for both agencies include safety and security.



Materials, landscaping, and architecture at Orenco Station in Hillsboro, OR, reflect community history. Orenco takes its name from the “Oregon Nursery Company,” the original landowner. Vegetation and art play a significant role at the station and surrounding developments. (Source: David Evans and Associates)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY

*Cross reference:*

See existing **Comprehensive Plan Transportation Policy TR-46** for policy supporting calming measures to reduce cut-through traffic; **Policy TR-70** for policy supporting transit system planning that protects nearby neighborhoods from undesirable impacts; and **Urban Design Policies UD-47–49** for guidance on the design of transit facilities.

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

## Actions

### Comprehensive Plan Policies

1. Encourage quality design and construction in the high capacity transit system that enhance the public regard for the system by:
  - Including durable materials in design and construction to ensure facilities retain appearance, functionality, and community value; and
  - Incorporating art, public spaces, and other features as community assets.

### Codes and Standards

2. Adopt station design guidelines that reflect the character of adjacent neighborhoods.

### Other City Policies/Procedures

3. Collaborate with Sound Transit on developing a comprehensive mitigation strategy to assign responsibility for a full range of potential impacts including noise, vibration, traffic, safety, and security.
4. Coordinate with Sound Transit on traffic-calming and diversion techniques to mitigate for cut-through traffic in residential areas.
5. Coordinate infrastructure improvements with regional transit providers to minimize disruptions and identify efficiencies in construction timing.

### City Capital Investments

None proposed.



## Expectations of Sound Transit

6. Coordinate with City of Bellevue on traffic-calming and diversion techniques to mitigate for cut-through traffic in residential areas.
7. Coordinate infrastructure improvements with City of Bellevue to minimize disruptions and identify efficiencies in construction timing.
8. Provide a high level of maintenance at stations and along tracks in order to meet community standards and protect property values.
9. Collaborate with Bellevue on developing a comprehensive mitigation strategy to assign responsibility for a full range of potential impacts including noise, vibration, traffic, safety, and security.

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

**CATALOG**

NEXT STEPS

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# STATION SECURITY

One of the concerns expressed by Bellevue citizens about light rail is that it will facilitate criminal activity at and near stations. The Committee explored this subject in detail through research on the experiences of other cities that have light rail systems. The research included a review of station design techniques and operating practices that can help deter criminal activity.

## Summary of Research and Findings

The Committee found that the concerns expressed in Bellevue are similar to those expressed in other communities: that light rail will bring crime from the urban core to suburban communities or generate crime that wasn't there before. A primary finding of the research was that crime rates near a station are closely related to the community around it. Communities that had criminal activity before light rail continued to have it. Communities that were relatively crime-free continued to be relatively crime-free. If light rail brings development into an undeveloped area, crime activity may increase proportional to the amount of new development and increase in activity. The vast majority of crimes that did occur were nuisance or quality of life crimes, such as pan handling and vandalism.

The Committee found that a proactive approach to security in and around light rail systems is key to ensuring crime does not become an issue. The most effective practices identified by the Committee to deter criminal activity are to establish a "fare paid zone," employ a regular presence of uniformed transit and law enforcement personnel, and incorporate technology (e.g., closed circuit television cameras) and specific design techniques at stations. These are most effective if implemented in the design of new stations and in adjacent park and rides and bus transfer facilities. One of the lessons learned from the case study cities is that whether crime is an actual or perceived problem, it is a real issue to riders and potential riders that must be addressed with a proactive approach.



This suburban San Jose station offers protection from weather, while capturing natural light and using open architecture with clear sight lines. (Source: David Evans and Associates)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

EXECUTIVE SUMMARY



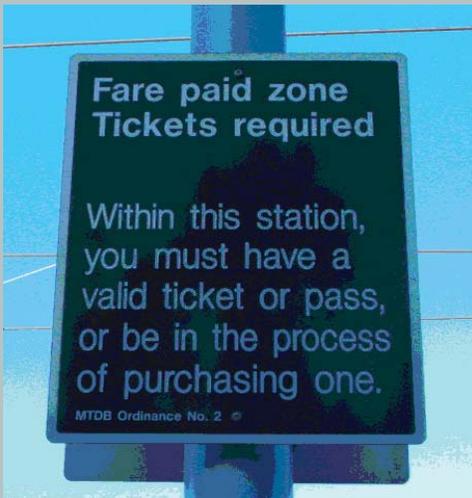
A light, bright station with clear sight lines, like this one in Denver, provides a more secure environment for patrons, even at night. (Source: David Evans and Associates)

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



In San Diego, the station platforms are “fare paid zones,” allowing MTS to control loitering and activity on the station platforms. (Source: David Evans and Associates)

## Best Practices

### A. Employ design techniques that deter crime.

Station security and crime reduction can be significantly affected by the design of the station platform, adjacent facilities, and pedestrian connections. The principles of Crime Prevention Through Environmental Design (CPTED) have proven effective in deterring criminal activity. Design objectives include preserving visibility of all areas, controlling access, and lighting station areas and connecting sidewalks.

### B. Foster a sense of ownership by users and neighbors of stations.

A well-designed station with high quality finishes, public art, and frequent maintenance practices can be a community asset and encourage people who use the station and live nearby to report inappropriate activity and maintenance problems. Enlisting the participation of citizens in the location and design of stations will enhance the community’s sense of ownership of the station.

### C. Establish a fare paid zone at stations and program an active presence of transit and law enforcement personnel on the train and on platforms.

The fare paid zone requires that people at the station be in the process of purchasing or already possess a valid ticket to ride the train or they will face removal. Enforcement of this provision with regular and frequent presence of personnel discourages loitering and vandalism at stations, increases the level of surveillance and security, and helps reduce fare evasion. The law enforcement presence should be supported by both Sound Transit and the City of Bellevue.



## D. Employ effective technologies to protect the safety of station users and neighbors.

Video surveillance at stations and on trains and buses is becoming standard practice for the systems researched. A common theme among the case study systems was that it was better to design the system for these technologies rather than try to retrofit them. By planning for the technology early in the design process, the equipment can be better integrated with the station to be less obtrusive without diminishing its effectiveness. This should include real-time train arrival information that can alert riders to whether there is sufficient time to leave the station and wait at a nearby shop or other location, as well as phones at each station that connect directly to security or emergency personnel. Practices related to the design and operation of high capacity transit systems are constantly evolving. As newer practices and technologies become available, the Committee recommends that the best practice for Bellevue and Sound Transit is to evaluate these early in the design and construction phases and periodically during operations and incorporate them as appropriate.



Elevated stations, like this one in San Diego, can be designed to feel safe and welcoming by using high quality materials, lighting, bright stairways, and open architecture. (Source: David Evans and Associates)



The presence of law enforcement or security personnel discourages loitering and vandalism at stations, increases the level of surveillance and security, and helps reduce fare evasion. (Source: David Evans and Associates)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY

*Cross reference:*

See existing **Comprehensive Plan Transportation Policy TR-8** for policy supporting pedestrian design features that improve safety including adequate lighting and paved, hazard-free surfaces; and **Policy TR-80** for policy supporting improved security and utility of park and ride lots and bus stops.

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

## Actions

### Comprehensive Plan Policies

1. Coordinate with the regional transit provider to employ crime prevention principles in the design of the stations and use available technologies to deter crime. Examples include:
  - Visibility of station platform from adjacent streets and parking;
  - Open and well-lighted pedestrian connections to parking and adjacent community; and
  - Video surveillance on station platforms and trains.
2. Develop agreements with the regional transit provider to ensure long-term safety and security, operation, and maintenance of stations.

### Codes and Standards

3. Review and update street design manual to ensure that all new pedestrian paths, sidewalks, and streets developed or renovated to serve a light rail station should include crime prevention design principles.
4. Review and update development standards related to safety and security (e.g., lighting, landscaping, signage, access, design) for high capacity transit facilities.

### Other City Policies/Procedures

5. Bellevue Police should work with Sound Transit to develop a security program for Bellevue's stations and to report back to City Council with recommendations on city actions required to protect neighborhoods from undesirable impacts and ensure the security of Bellevue citizens.



6. The City and Sound Transit should develop an interlocal agreement to address the City's and Sound Transit's joint and separate responsibility and authority for security, enforcement, and maintenance in and around stations.

## City Capital Investments

7. Add lighting to bring all sidewalks and streets within a ten-minute walk of light rail stations up to current city lighting standards.

## Expectations of Sound Transit

8. All stations and related facilities should incorporate CPTED design principles.
9. All trains should be monitored with video surveillance equipment during operating hours. All stations should be monitored with video surveillance equipment at all times.
10. All stations should be equipped with emergency phones connected directly to 911 or security personnel.
11. Sound Transit, in coordination with the City, should initiate a crime prevention program that includes public awareness campaigns and outreach to neighborhoods on crime prevention techniques in and around stations.
12. Sound Transit should establish a fare paid zone at stations and provide for the regular and frequent presence of enforcement and security personnel on the platforms and trains.
13. Sound Transit should ensure that all facilities are maintained in good condition. Damage to furnishings should be repaired promptly. Graffiti should be removed promptly.

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

**CATALOG**

NEXT STEPS

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# CONSTRUCTION IMPACTS AND MITIGATION

Construction impacts are one of the biggest concerns expressed about light rail. The construction of a light rail system will have considerable temporary negative effects on the citizens and businesses and the natural and built environments of Bellevue. The Committee explored how other cities have mitigated construction impacts to business and residences. The review included responses to limitations on access and disruptions caused by vibration, noise, dust, and traffic.

## Summary of Research and Findings

Impacts of light rail construction are similar to those of any major capital project and include noise, vibration, dust, property access limitations, and traffic disruptions. Construction of a light rail line and stations in a dense urban environment is a complex undertaking. The size and complexity of construction means that while certain impacts are unavoidable, thoughtful planning and design can minimize the scope and intensity of many impacts. In instances where impacts are unavoidable or where more than one approach to mitigation is possible, decisions may be framed as choices about trade-offs. For example, mitigation of construction noise may involve limiting hours of operation; however, this may prolong the duration of the construction and inconvenience. One option may be to allow for greater disruption and inconvenience with longer hours of operation if that will result in a shorter total duration of that construction phase. It is important that the people affected by these decisions be informed about the options and the trade-offs and be involved in the decision-making process.

The Committee found that successful transit agencies and cities acknowledge concerns about construction impacts and actively involve residents and business owners in working through the issues and giving them real tools to address challenges. Early and ongoing public engagement that builds relationships and trust with the people that are affected is critical. Resident concerns typically focus on noise, dust, vibration, neighborhood and property access, and increased traffic and parking in the neighborhood. Business concerns typically encompass many of the same issues with a much greater emphasis on visibility and access. Restaurants, retail stores, and personal



On Beacon Hill, Sound Transit installed noise absorbing materials on wall surrounding construction staging area to reduce impacts on surrounding community. (Source: David Evans and Associates)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

# CONSTRUCTION IMPACTS AND MITIGATION



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

service businesses rely heavily on customer traffic in their establishments. When visibility and access are disrupted for an extended period of time, profitability can be seriously impacted and some businesses are not able to survive.

Wherever the construction activity is located, involving the affected people in developing the plans to help them cope with the construction is an important element to developing successful plans and engendering understanding and collaboration throughout the difficult construction period. Another important lesson learned from other systems is the need for early and ongoing communication between the city and the transit agency. One aspect of this lesson was to have city staff dedicated to the light rail project to be able to respond to public and agency issues and help resolve them quickly.

Some transit agencies provide liaisons throughout the construction process that are available twenty-four hours a day, seven days a week, to answer concerns and address problems. Providing frequent, real-time communications through multiple media outlets helps manage expectations about traffic impacts and allows people to make adjustments to travel plans. Web updates, television, radio, pod-casts, variable message signs, street-level signs, and signs on buses all help to inform citizens. Communication messages may include project updates, traffic detours, and upcoming road closures.

In addition to the practices discussed above, agencies can provide other significant support to businesses during the construction phase. The Committee learned of agencies providing financial support in various forms, such as low- or no-interest loans, grants, financial advice, marketing assistance, and active marketing for construction areas. Visual and physical access to businesses for pedestrians, automobiles, and delivery vehicles was identified as a critical concern in the research and case studies.

Construction staging areas for light rail projects are primarily used for the storage of equipment, materials, and spoils, as well as activities such as employee parking, deliveries, and construction offices. These areas typically encompass several acres and remain in use for the



# CONSTRUCTION IMPACTS AND MITIGATION

duration of the project. Staging areas are one of the most difficult aspects of the construction phase because they are difficult to site and they raise a great deal of concern about displacement, impacts during construction, and subsequent use of the site after construction. Staging areas are also a necessary element of any major construction project, and siting requires consideration of proximity to construction activity, land availability, and access routes. Larger staging areas may allow for a shorter construction period if all materials and equipment are kept on-site, but require more land. Smaller staging areas may minimize land requirements and displacements, but require more complex construction plans to coordinate the timing of materials and equipment use and storage due to limited space. Once a staging area is selected, the design should include features to minimize noise and light pollution, maintain safety for the public traveling near the site, and minimize traffic impacts from site activities. Once active, the contractor should keep surrounding areas clean and safe, and reduce dust, vibration, and noise. Art can be incorporated into temporary structures to make the construction area more visually attractive, which is important in a dense urban area.

A formal construction plan is one of the most important tools an agency has for managing construction impacts. Plans may be developed between the contractor and transit agency or be imposed unilaterally by the transit agency. In either case, the purpose of the plan is to detail the process to achieve an efficient delivery of construction services. Plans typically address conduct of construction items such as phasing in segments to minimize impacts, hours and days of operation, employee parking, response to public complaints, and incentives for contractors.

As with any major construction project, light rail construction will need to address issues of noise, soil erosion, air quality, visual and aesthetic conditions, transportation, traffic, parking, ecological impacts, and hazardous materials and contamination, as well as social and economic concerns. The City should work with Sound Transit to develop a method to identify appropriate mitigation for all phases of project construction. Tools

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS

# CONSTRUCTION IMPACTS AND MITIGATION



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

such as interlocal agreements can allow the City and Sound Transit to formalize a process to identify mitigation measures, resolve issues, and develop a decision-making structure acceptable to all parties.

Project mitigation will vary depending on the environment and the characteristics of the impact. For example, a key noise mitigation technique is to have the most noise-intensive construction work occur when people are generally away from the area. Neighborhoods can usually accept more noise during the day but require quiet at night. Downtown environments typically require more quiet during the day, but can often accept more noise at night. However, as the residential population in downtown Bellevue continues to grow, this will not be so simple. In both neighborhoods and downtown, noise mitigation will require strategic consideration. In Seattle, Sound Transit conducted 24-hour construction in the Beacon Hill neighborhood, allowing Sound Transit to decrease the duration of construction. Noise was mitigated using temporary sound walls containing noise absorbing materials and innovative approaches, such as having trucks use flashers at night when moving in reverse, rather than standard beeping alerts.



# CONSTRUCTION IMPACTS AND MITIGATION

## Best Practices

### A. Develop a Construction Management Plan.

The plan, which must be a collaborative effort between Sound Transit and the City of Bellevue, should comprehensively address all construction-related issues including but not limited to access, parking, noise, vibrations, working hours, and phasing. It should clearly assign responsibility for oversight and provide accountability for results. Financial incentives for meeting plan standards should be incorporated into Sound Transit's agreement with the contractor. The plan should include a program for engaging both businesses and residents throughout the construction phase.

### B. Site and design construction staging areas to minimize disruption and inconvenience to adjacent land uses.

The size of construction staging areas should be minimized while balancing functionality and the duration of construction activity. The design of both physical and operational elements should seek to minimize impacts such as noise, light, dust, and traffic volumes. Details on site management should be specific and negotiated in advance, and be reflected in both the contractors agreement and any city-issued permits. If appropriate, the site should be considered for conversion to a community amenity once construction is complete. Construction staging areas should not be located in residential neighborhoods except where no practicable alternative exists.



To reduce traffic and noise impacts to businesses, a significant amount of demolition and major reconstruction work for the T-REX project occurred at night. (Source: T-REX Project).



Staggered construction in downtown Portland reduced duration of construction in front of any one group of businesses. (Source: City of Bellevue)

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY



Business access signage for Mall Extension light rail construction, Portland, OR. (Source: Damian Conrad Photography)

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

## C. Plan for and address the impacts of construction by providing adequate alternative access and mitigating negative impacts such as noise and vibration.

With adequate planning, major impacts can be avoided or minimized. Where impacts are unavoidable, they must be mitigated satisfactorily during the construction period. Alternative access should be well signed and adequate to the needs of the business or residence. Mitigation techniques such as sound walls need to be built before the impact occurs. Impacts and mitigation should be continuously monitored during construction, and adjustments made quickly if needed.

## D. Engage the business community in developing plans to provide support to businesses before, during, and after construction.

Support should be broad and include positive project messages, advertising, business impact mitigation (such as storefront maintenance), grant opportunities, low interest loans, and other creative solutions.

## E. Engage the residential community in developing approaches to minimize impacts and provide support during construction.

Solicit the input of residents, utilizing their knowledge of the local area, to develop construction approaches that minimize impacts through design of the system and construction techniques and phasing. Where impacts cannot be avoided, work with the community to develop mitigation techniques that respond to their concerns.



# CONSTRUCTION IMPACTS AND MITIGATION

## F. Develop a broad public engagement program and provide regular communications to the public about construction project activities and impacts.

Hold regular meetings with affected residents and businesses before and during construction and provide advance notification of changes to plans. Utilize a variety of familiar and new media and techniques to engage the public.



Access for pedestrians and businesses during light rail construction on the Transit Mall in Portland, OR. (Source: Damian Conrad Photography)

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY

*Discussion:*

“Construction staging areas” for light rail projects are primarily used for the storage of equipment, materials, and spoils, as well as activities such as employee parking, deliveries, and construction offices. These areas typically encompass several acres and remain in use for the duration of the project.

INTRODUCTION

*Cross reference:*

See existing **Comprehensive Plan Transportation Policy TR-112** for policy supporting physical treatments to reduce noise impacts on adjacent neighborhoods from transportation construction projects; and **Policy TR-118** for policy supporting mitigation of adverse impacts of proposed transportation projects on adjacent neighborhoods, including air quality, noise, light and glare; and **Environmental Policies EN-59–66** for guidance on protection of wetlands and habitat.

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

## Actions

### Comprehensive Plan Policies

1. Collaborate with regional transit providers to create a Construction Management Plan for all new major transit investments.
2. Develop an interlocal agreement with the regional transit provider to develop, monitor, and adapt mitigation measures for the design and construction phases of projects to ensure their continual effectiveness.
3. Minimize disruption and inconvenience of construction staging areas to adjacent land uses in collaboration with regional transit providers through actions such as site selection, design, and operational management plans. Construction staging areas should not be located in residential neighborhoods except where no practicable alternative exists.
4. Work with the regional transit provider to develop a construction phasing plan that minimizes the amount of area disrupted at one time and minimizes the time period of disruption.

### Codes and Standards

5. Develop a comprehensive approach to permitting for light rail construction, including consideration of use of city right-of-way, noise variances, light and signage requirements, detour routes, and timing of construction activities. Review codes and standards to consider any unique attributes of light rail construction and amend as necessary.



# CONSTRUCTION IMPACTS AND MITIGATION

## Other City Policies/Procedures

- 6. Develop a Construction Management Plan in collaboration with Sound Transit. At a minimum, the plan should address mitigation techniques, parking and access, public involvement, and contractor responsibilities. Formalize the Construction Management Plan through an interlocal agreement specifying action items and procedures included in the Construction Management Plan and detailing processes to address complaints and disputes that may arise during construction.
- 7. Dedicate city staff to coordinate with Sound Transit throughout the design and construction of the project.

## City Capital Investments

None proposed.

## Expectations of Sound Transit

- 8. In collaboration with the City, develop a Construction Management Plan. At a minimum, the plan should address mitigation techniques and timeline, parking and access, public involvement, and contractor responsibilities. The plan should establish a process for monitoring, reviewing, handling complaints, and adjusting techniques as necessary to ensure effectiveness of the mitigation techniques.
- 9. In collaboration with the City, develop a public involvement program that defines the type and extent of communications with the public. The goal should be to ensure extensive communication about construction schedules, impacts, responsiveness, and effectiveness of or changes to mitigation measures so that residents and businesses are provided with predictability about project events and have a regular and convenient means of conducting a dialogue with Sound Transit.

EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

# CONSTRUCTION IMPACTS AND MITIGATION



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

10. Minimize duration of construction in any given area through techniques such as:
  - Divide construction into “reaches” or shorter segments and limit activity in one segment until completion in another;
  - Break construction into phases, which could coincide with the “reaches” guideline above;
  - Detail and validate preplanning for sensitive areas; and
  - Allow a specified time for completion of work in each “reach.”
11. Minimize disruption and provide support to businesses by:
  - Establishing a construction mitigation fund;
  - Establishing a loan program;
  - Providing a local marketing campaign during construction;
  - Providing management and technical assistance;
  - Maintaining at least one vehicle and pedestrian access path during business hours;
  - Maintaining nearby parking;
  - Providing additional signage during construction.
12. When selecting and negotiating agreements with contractors:
  - Allow for selection of the contractor who is most capable of delivering the project in a timely, professional, expedient manner while minimizing impacts and being responsive to community interests (this may not be the lowest bidding contractor);
  - Provide opportunities for qualified businesses who may not typically be able to compete on large projects;
  - Structure contractor payment to provide incentives



# CONSTRUCTION IMPACTS AND MITIGATION

for mitigating negative temporary effects and to encourage responsiveness to complaints;

- Structure construction phases and contracting arrangements to provide for timely repair of individual owners' properties, for example, by using separate contractors to perform mitigation work.

### 13. Address impacts on Historic and Archaeological Resources by:

- Conducting preconstruction surveys to identify presence of resources;
- Coordinating mitigation measures with the State Historic Preservation Office and local agencies;
- Requiring the contractor to halt work if unidentified resources are encountered;
- Minimizing fugitive emissions by watering areas of exposed soil, covering open body trucks, and removing soil and other materials from paved streets;
- Restricting hours of construction and using sound dampening equipment;
- Establishing vibration limits and monitoring vibration and foundation conditions at nearby historic buildings;
- Working in phases for demolition, earth-moving, and other ground impacting operations; and
- Restoring sites to at least preconstruction condition.

### 14. Address impacts on Soil Erosion and Air Quality by:

- Watering exposed soil to control dust;
- Covering open body trucks traveling to and from construction sites;
- Using wheel baths or rock aprons to prevent dirt from being carried onto public streets;
- Promptly removing accumulated soil and other

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS

# CONSTRUCTION IMPACTS AND MITIGATION



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

materials from paved streets; and

- Temporarily paving, repaving, and/or revegetating exposed areas during specific phases.

## 15. Address Visual and Aesthetic impacts by:

- Constructing temporary fences and screens to shield staging and construction areas; and
- Integrating art (e.g., murals) on temporary fences or walls.

## 16. Address Noise impacts by:

- Completing detailed assessment during final design to identify sensitive noise receptors;
- Conducting construction activities according to state and local requirements;
- Providing an appropriate waiver process for unique circumstances;
- Employing design considerations such as constructing temporary noise barriers, routing trucks away from residential areas, and locating noisy equipment away from residential and environmentally sensitive areas;
- Using an operations sequence that avoids nighttime construction in residential areas or altering practices to reduce noise at night;
- Using alternative demolition and construction methods (for example, drilled piles instead of pile driving and noise suppressed equipment);
- Providing a 24-hour staffed hotline for noise complaints;
- Using temporary noise walls (for example, semi-trailer box cars) that can be moved; and
- Using hotel vouchers for residents living very close to nighttime work.



# CONSTRUCTION IMPACTS AND MITIGATION

## 17. Address Vibration impacts by:

- Inspecting and monitoring nearby foundation conditions;
- Establishing vibration limits during construction (historic structures may require special attention);
- Requiring contractors to monitor and report vibration levels at nearby buildings throughout excavation and construction while adhering to the City of Bellevue construction standards; and
- Working in phases so that demolition, earth-moving, and other ground impacting operations do not overlap.

## 18. Address Safety and Security issues by:

- Using temporary construction fencing and barricades around construction sites;
- Controlling access to construction sites; and
- Requiring the contractor to provide adequate traffic control.

## 19. Address Transportation, Traffic, and Parking impacts by:

- Conducting off-peak-hour construction;
- Relocating utilities simultaneously with or in advance of light rail construction;
- Placing mitigation measures in construction contract specifications and plans;
- Providing full and controlled pedestrian access to businesses;
- Limiting open excavation and trackway construction and coordinating phasing;
- Including limitations on construction (for example, during holidays, festivals, and special events) in specifications;
- Using dynamic message signs (DMS) to inform the public about upcoming work, road closures, and

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

detours; and

- Providing a project budget for transportation demand management activities (for example, transit and vanpool subsidies, and community outreach and education).

20. Address impacts to Ecological Resources in the following ways:

- Floodplains and floodways: Design bridge and culvert crossings to minimize backwater conditions and design rail/road profiles to minimize overtopping.
- Groundwater: Monitor groundwater table depth and contain and manage contaminants.
- Surface water: Restrict in-stream construction activities to periods of low-flow or based on needs of local fish populations and require contractors to install filter devices to prevent sediments from discharging directly into stormwater system.
- Wetlands: Install fabric filters along the periphery of the wetland (or construction zone), revegetate within temporary construction areas with native plantings, and require wetland replacement per local regulations.

21. Address Hazardous Materials and Contamination issues by:

- Requiring a hazardous material spill prevention plan and emergency response procedures prior to construction;
- Requiring specialty subcontractors to remove contaminants or hazardous materials, and requiring proper documentation of disposal at approved sites;
- Monitoring excavation and dewatering to identify changes in conditions, requiring work to stop with discovery of contaminated or potentially contaminated materials, and having technically qualified personnel available to determine proper



# CONSTRUCTION IMPACTS AND MITIGATION

course of action;

- Stockpiling excavated soils on heavy, waterproof plastic, and segregating and covering contaminated materials;
- Using innovative resource management techniques, and creating an environmental management plan with responsibilities for monitoring, maintaining, and managing mitigation efforts.

22. Address Staging Area needs by:

- Locating construction staging areas outside of residential neighborhoods except where no practicable alternative exists;
- Designing staging areas to minimize size and disruption to surrounding areas through early consideration of avoidance and mitigation techniques;
- Exploring opportunities to consolidate staging areas;
- Providing design of staging areas in advance to evaluate trade-offs before selecting staging areas;
- Requiring staging area access and parking plan prior to construction;
- Paving, applying water, or applying (nontoxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites;
- Sweeping daily (preferably using water sweepers) paved access roads, parking areas, staging areas at construction sites, and adjacent public streets; and
- Avoiding staging of construction equipment and idling of equipment within 200 feet of noise-sensitive land uses whenever feasible.

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT STEPS

# CONSTRUCTION IMPACTS AND MITIGATION



EXECUTIVE SUMMARY

INTRODUCTION

PROJECT METHODOLOGY

CATALOG

NEXT STEPS

- 23. Create a project tree farm using saplings that can mature during construction and provide larger trees for project landscaping.
- 24. Minimize the effects of hauling activities through measures such as:
  - Operating on routes and/or during hours that do not coincide with peak traffic;
  - Daily sweeping of haul routes; and
  - Prompt repair of street damage.



## IV. Next Steps

The Light Rail Best Practices Committee sunsets in June 2008 and will transmit the Final Report to the City Council for their consideration. The City Council will begin review of the full report in early July. The City Council has expressed a clear desire to adopt the Comprehensive Plan Amendments (CPAs) prior to Sound Transit's issuance of the East Link DEIS, anticipated in fall 2008. Therefore, the Council is expected to refer the Comprehensive Plan policy recommendations to the Planning Commission for their concurrent review in July. The Planning Commission is required to hold a public hearing on the proposed CPAs prior to finalizing their recommendation. The public hearing is tentatively scheduled for mid-July. The Commission is expected to complete its deliberations and issue a recommendation shortly thereafter. The City Council could take action on the CPAs in late July or early August, and take additional time as needed in the fall on the balance of the best practices recommendations.

It is the hope of the Committee that the findings and recommendations of the report will be supported by the City Council. The Committee has given careful thought to the crafting of the recommendations, particularly to the assignment of actions to each of the five categories. The proposed Comprehensive Plan policies reflect careful deliberation about the vision for light rail in Bellevue, the appropriate roles for the city and Sound Transit, and the priorities of the community. The Committee hopes these will be will be advanced by the Planning Commission and City Council and adopted into the Comprehensive Plan.

As specified in the Committee charge, the Committee hopes that the findings and recommendations of the report complement the information provided through Sound Transit's East Link environmental review and assist the community and Council in evaluating and determining Bellevue's light rail routing preferences. Ultimately, the Committee hopes the report is useful in communicating community expectations for Sound Transit's development of light rail in Bellevue. The Committee views the recommendations within the report as a complete body

EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT  
STEPS



EXECUTIVE  
SUMMARY

INTRODUCTION

PROJECT  
METHODOLOGY

CATALOG

NEXT  
STEPS

of work where each action is necessary to address community concerns and ensure the best outcome for all aspects of light rail development. The Committee hopes the action recommendations of the report will be pursued over the course of the East Link project to leverage this historic investment for the best outcome for Bellevue.



## Appendix A

### **Draft Research Findings**

David Evans and Associates prepared eight research memos on topic areas developed based on public input and confirmed by the Committee:

1. Connecting People to Light Rail
2. Community and Neighborhoods
3. Station Security
4. Property Values
5. Land Use
6. Construction Impacts and Mitigation
7. Street Design and Operations
8. Elevated, At-Grade, and Tunnel

These memos were not edited or approved by the Committee. Rather, they served as an initial foundation of information about light rail and an inventory of national best practices for Committee consideration. Committee members used these memos as tools to familiarize themselves with the current state of practice for light rail implementation, evaluate whether the proposed “best practices” were potential “best practices for Bellevue,” and identify issues for additional information gathering through case study tours. The information in the memos was supplemented by case study tours, presentations from Sound Transit, review of existing city policy, consideration of public input, and evaluation of Bellevue’s unique characteristics, priorities, and community values to develop the recommendations of the Light Rail Best Practices Final Report.



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# APPENDICES

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## Appendix B

### **Case Study Cities Memo**



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## Appendix C

### **Public Involvement Report**



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