

**Central Link Light Rail Transit Project  
Final Supplemental Environmental Impact Statement  
North Link**

**APPENDIX M  
*Mitigation Plan***



# Appendix M Mitigation Plan

## M.1 INTRODUCTION TO THE MITIGATION PLAN

The mitigation plan for North Link describes Sound Transit's preliminary mitigation commitments. These commitments include all the mitigation measures Sound Transit proposes to implement to avoid or minimize impacts from the Preferred Alternative identified in the SEIS. If the Sound Transit Board ultimately selects another alternative for implementation differing from the Preferred Alternative, the mitigation plan will be modified accordingly.

The mitigation measures described below are based on the potential mitigation measures identified in the Final SEIS. Mitigation measures associated with the operation of the light rail system (long-term impacts) are described first; mitigation measures associated with construction are described second.

## M.2 OPERATIONAL/LONG-TERM MITIGATION

### M.2.1 Transportation

#### M.2.1.1 Project-wide/Common to All Segments

##### ***Regional Travel***

No adverse impacts have been identified and no additional mitigation is proposed.

##### ***Transit***

No adverse impacts have been identified and no additional mitigation is proposed.

##### ***Freight movement***

No adverse impacts have been identified and no additional mitigation is proposed.

##### ***Navigable Waterways***

No adverse impacts have been identified and no additional mitigation is proposed.

##### ***Nonmotorized Access***

For the Roosevelt Station, Sound Transit would work with the City of Seattle, Seattle Public Schools, and the neighborhood to determine the most appropriate treatments to provide for safe and effective pedestrians access at 12th Avenue NE and NE 67th Street; options could include painted crosswalks or signals, street lighting, warning lights or signage. No project-wide adverse impacts have been identified. No additional mitigation is necessary beyond the design improvements that Sound Transit will provide immediately adjacent to North Link stations.

##### ***Parking***

- Hide-and-ride impacts may occur in station areas;
  - Sound Transit will work with the City of Seattle to pursue appropriate on-street parking measures to discourage hide-and-ride activity in station areas. To identify appropriate parking controls, Sound Transit will conduct on-street parking inventory surveys around each station up to one year prior to station opening to document existing on-street parking supply within a 1/4-mile radius of the station areas. Based on survey results, Sound Transit and City staff will work with affected stakeholders to identify and implement appropriate mitigation elements prior to station opening.

- Mitigation measures may include paid parking meters, time-limit signs, passenger drop-off/pick-up zones, truck and load/unload zones, and residential parking zones (RPZs) within a 1/4-mile radius of each station. For locations where the mitigation is accepted and approved by City staff and local community or neighborhood groups, Sound Transit would provide funding for implementing appropriate parking controls (e.g., meters or pay stations and signs), labor, and all other related installation costs.
- City staff will monitor all parking controls during the first 2 two years after the system opens and determine if RPZ boundaries or other on-street controls are insufficient. Sound Transit will fund any expansions of existing or newly-created RPZs or other parking controls during the first two years following station opening, when the expansion can be attributed to light rail hide-and-ride parking impacts. The City of Seattle will be responsible for the installation of any additional parking controls deemed necessary after this time. Parking enforcement in the North Link station areas will be provided by the City of Seattle Police Department.
- Compensate affected property owners or replace displaced off-street parking according to provisions specified in Sound Transit's Real Estate Property Acquisition and Relocation Policy, Procedures, and Guidelines.

### **M.2.1.2 Segment A**

#### **Arterials and Local Streets**

##### *Congestion*

- The NE Northgate Way/5th Avenue NE intersection would operate at LOS F under both of the No-Build and Build Alternatives in the year 2030. Sound Transit will contribute a fair share of costs to improve this intersection, based on the proportionate share of PM peak hour project trips to total trips traveling through the intersection.

##### *Parking*

- Signs will be placed at Northgate Mall to restrict use of mall parking by light rail patrons.
- Sound Transit will provide one-to-one replacement of displaced off-street park-and-ride spaces at the Northgate transit center.

##### *Nonmotorized Access*

- As part of the project, Sound Transit will provide sidewalks on station property and immediately adjacent to stations. The stations also include facilities for bicycle access, circulation and storage. For the Northgate Station, the improvements include sidewalks on the east side of 1st Avenue NE between NE 100th and NE 103rd Streets and on the north side of NE 100th Street and south side of NE 103rd Street between 1st Avenue NE and the transit center. For the Roosevelt Station, Sound Transit will work with the City of Seattle, Seattle Public Schools, and the neighborhood to determine the most appropriate treatments to provide for safe and effective pedestrian access at 12th Avenue NE and NE 67th Street; options could include painted crosswalks or signals, street lighting, warning lights or signage. No additional mitigation is necessary.

### **M.2.1.3 Segment B**

#### **Arterials and Local Streets**

##### **Congestion**

- The NE Pacific Place/Montlake Boulevard NE intersection would operate at LOS F in the years 2015 and 2030.
  - Adding a second westbound left-turn lane would improve operations to better than No-Build conditions, which would be at LOS F by 2030 and LOS E in 2015. Sound Transit will contribute a proportionate share of costs to improve this intersection.
- At the Broadway E/E Olive Way/E John Street intersection, the high pedestrian volumes occurring at this intersection often block vehicles making left turns, resulting in long vehicle queues.
  - Sound Transit will work with the City of Seattle to determine and implement appropriate traffic control measures, such as prohibiting eastbound and westbound left turns at this intersection during the PM peak hour period to reduce or eliminate queues.

##### **Nonmotorized Access**

At the University of Washington Station, Sound Transit will continue to work with local agencies (KCM, WSDOT, SDOT, and the University of Washington) to identify University of Washington Station design features to accommodate the increase in pedestrians associated with North Link. Design improvements such as reduced speed limit signs for bicycles, distinctive paving, or other improvements to enhance visibility and slow bicycle travel speeds along the Burke-Gilman trail in this area will be implemented as necessary to reduce the likelihood of bicycle/pedestrian collisions. An unsignalized or signalized midblock crossing of NE Pacific Place will be provided to help balance transportation needs. A station entrance or access point will be located to the north of NE Pacific Place and the Burke-Gilman Trail with an extended pedestrian passageway under or over NE Pacific Place and the Burke-Gilman Trail.

In the vicinity of the south station entrance, Sound Transit will provide sufficient facilities for pedestrian storage and capacity by improving and widening the crosswalks across Montlake Boulevard NE and NE Pacific Street, and providing sufficient pedestrian storage capacity on either the existing refuge/traffic island or south end of the Montlake Triangle.

##### **Parking**

- For permanent parking loss at the University of Washington Station, Sound Transit will provide replacement parking or compensation for the parking loss.

## **M.2.2 Acquisitions, Displacements, and Relocations**

### **M.2.2.1 Project-wide Mitigation**

Sound Transit will compensate and assist affected property owners according to the provisions specified in Sound Transit's adopted Real Estate Property Acquisition and Relocation Policy, Procedures, and Guidelines. Sound Transit will comply with appropriate provisions of the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and Uniform Relocation Act Amendments of 1987 and the State of Washington's relocation and property acquisition regulations (Washington Administrative Code [WAC] 468-100). Benefits will vary depending on the level of impact, available relocation options, and other factors.

Sound Transit will contact property owners whose property would be directly affected to answer questions and provide additional information about relocation assistance services, payments, and reimbursement eligibility. Sound Transit's relocation assistance advisory services will include, but not be limited to, measures,

facilities, or services that may be necessary or appropriate to determine the relocation needs and preferences of each household, business, and nonprofit organization to be displaced. Sound Transit will provide current information on the availability, purchase prices, and rental costs of comparable replacement dwellings.

Property owners whose entire or partial property would be acquired by Sound Transit will receive just compensation for their land and improvements. Just compensation is an amount paid to a property owner for property acquired for public purposes that is not less than the fair market value of the property acquired, including damages or benefits to the remaining property. Compensation would include any measurable loss in value to the remaining property as a result of partial acquisition. Permanent parking lost from partial acquisitions would be mitigated through compensation to the property owner or provision of replacement parking.

Sound Transit would pay for all normal expenses of sale, including escrow fees, title insurance, prepayment penalties, mortgage release fees, recording fees, and all typical costs incurred incident to conveying title. The sale, however, would be exempt from real estate excise tax and no real estate commissions are involved. All funds remaining at the end of sale closing would be released to the seller.

Sound Transit will also work cooperatively with WSDOT and the City of Seattle to avoid or minimize impacts to the highway and local roadway systems that might arise from the acquisition of public rights-of-way. Sound Transit will also seek to preserve the ability of the transportation agencies to construct future lanes or roadway improvements. Sound Transit will work cooperatively with other property owners to minimize property acquisitions and to allow for the redevelopment of property. Any use or acquisition of University of Washington property would have to be approved by the University.

## **M.2.3 Land Use and Economic Activity**

### ***M.2.3.1 Project-wide Mitigation***

Impacts related to acquisition and displacements are addressed above under acquisitions, displacements and relocations. No additional mitigation is proposed in Segments A or B.

## **M.2.4 Neighborhoods and Populations**

### ***M.2.4.1 Project-wide Mitigation***

Specific mitigation for impacts to neighborhood quality, social interaction, safety and security, and social equity are described in detail in the Transportation; Acquisitions, Displacements, and Relocations; Visual Resources and Aesthetics; Air Quality; and Noise and Vibration sections. With the implementation of mitigation measures described in these sections, no additional mitigation for neighborhood effects would be required.

No additional mitigation is proposed in Segments A or B.

## **M.2.5 Visual Resources and Aesthetics**

### ***M.2.5.1 Project-wide Mitigation***

- The design process will incorporate features and approaches that can reduce visual impacts of the light rail project.

### ***M.2.5.2 Segment A***

- Installation of retaining walls along I-5 and noise walls along the light rail facilities will incorporate aesthetic retaining wall design measures, such as steps, patterning, texture, and vegetative planting.

### **M.2.5.3 Segment B**

At the University of Washington Station, Sound Transit will replace removed trees and landscaping along Montlake Boulevard, in landscaped areas along the Lake Washington Ship Canal, in the Montlake Triangle, and near Rainier Vista. Sound Transit will preserve selected specimens as appropriate, or replace with new landscaping. Sound Transit will work in cooperation with the University of Washington to design station areas, above ground structures, pedestrian facilities, and re-landscape station areas after construction.

For the Montlake vent facility, Sound Transit will reduce visual impacts by designing structures and their associated landscaping to integrate with the scale and character of the surrounding neighborhood.

## **M.2.6 Air Quality**

### **M.2.6.1 Project-wide Mitigation**

No adverse impacts have been identified and no additional mitigation is proposed in Segments A or B.

## **M.2.7 Noise and Vibration**

### **M.2.7.1 Project-wide Mitigation**

Sound Transit will provide reasonable and feasible noise mitigation to reduce noise levels at properties identified with noise impacts attributed to North Link to below the FTA criteria. The primary form of noise mitigation is to install noise barriers along the guideway. In accordance with Sound Transit policy, if noise walls are not considered a reasonable and feasible form of noise mitigation, sound insulation of impacted structures may also be considered. The table below provides a list of measures that Sound Transit will perform on a regular basis and the benefit that each of the measures would provide. In addition to the measures listed, Sound Transit will use low-noise, current state-of-the-art vehicles.

**Summary of Link Light Rail Systemwide Operational Mitigation Measures**

<b>Operational Measure</b>	<b>System Benefit</b>
Rail Grinding and Replacement	As rails wear, noise and vibration levels from light rail vehicles can increase. By grinding down or replacing worn rail, noise and vibration levels can remain at the projected levels. Rail grinding or replacement is normally performed every 3 to 5 years.
Wheel Truing and Replacement	Wheel truing is a method of grinding down flat spots (commonly called “wheel flats”) on the light rail vehicle’s wheels. Flat spots occur primarily because of hard braking. When flat spots occur, they can cause increases in both the noise and vibration levels produced by the light rail vehicles.
Vehicle Maintenance	Vehicle maintenance includes performing scheduled and general maintenance on items such as air conditioning units, bearings, wheel skirts, and other mechanical units on the light rail vehicles. Keeping the mechanical system on the light rail vehicles in top condition will also help to maintain the projected levels of noise and vibration.
Operator Training	Operators will be trained to maintain light rail travel speeds at those speeds given in the operation plan that was used for the analysis and to avoid hard-braking when possible. Because light rail noise and vibration increase with speed, the operated speeds should be the same as those used in the analysis or additional impacts that were not projected could occur. Also, as stated, hard-braking can cause wheel flats and may also damage track. Furthermore, by training operators to identify potential wheel flats and other mechanical problems with the trains, proper maintenance can be performed in a timely manner.

### **M.2.7.2 Segment A**

- Residential structures north of NE 95th Street along 1st Avenue NE would exceed FTA noise criteria.
  - Noise walls will be installed along the east side of the light rail tracks north of NE 95th Street along 1st Avenue NE.
- Vibration and ground-borne noise impacts along Roosevelt Avenue near NE 64th Street, on 9th Avenue at NE 73rd Street, on the western end of NE Banner Place north of Lake City Way to I-5 ramps, between NE 79th at 2nd Avenue NE and NE 85th Street at 1st Avenue NE, along 1st Avenue NE, and near the crossover where the alignment is on structure crossing over NE 1st Avenue will be mitigated using one or more of the following:
  - Ballast mat, or similarly performing measure, on top of a concrete pad in ballast and tie track.
  - High-compliance direct-fixation ties or fasteners.
  - Resiliently supported ties in tunnels.

At three residential locations along Banner Place near I-5, there is the potential for residential ground-borne noise impacts with the proposed mitigation measures. A more detailed analysis will be performed during final design to determine if the ground-borne noise will exceed the FTA criteria and determine the final mitigation measures that would be used to reduce the levels in this area if the criteria are exceeded.

### **M.2.7.3 Segment B**

- Ground-borne noise and vibration impacts near Brooklyn Station.
  - Mitigation will apply the same methods given for Segment A vibration impacts.

#### *University of Washington Mitigation*

The project will generate vibration that is predicted to exceed the vibration levels requested by the University of Washington. Sound Transit will mitigate the potential vibration and ground-borne noise impacts at sensitive University of Washington buildings using the measures listed below. Sound Transit and the University of Washington will cooperatively determine an acceptable threshold for each sensitive building if vibration from the light rail system cannot reasonably be mitigated below the University requested threshold. Sound Transit and the University of Washington will coordinate to refine the mitigation measures and strategies through final design, construction and operation.

#### *Source-based mitigation*

- Floating slab trackwork – The track is directly fixed to a concrete slab which is supported by resilient natural rubber or other types of isolators. The floating slab will isolate the trackwork from the tunnel structure reducing the transmission of vibration to the ground. A floating slab will extend from north of the University of Washington station to the north or northwest boundary of the University campus, with the exact limits determined during final design.
- High compliance direct fixation track fasteners - The high compliance fasteners will extend at least from the University of Washington station to the south boundary of the University campus, with the exact limits determined during final design.
- Moveable point “frogs” – A crossover track uses a frog (a rail-crossing structure) to allow the train to either crossover to another track or continue moving on the same track. A gap is provided on top of the frog so that vehicle wheels can pass regardless of which track is in use. With typical frogs, impact vibration is generated when the wheels pass over the gap. In a moveable frog, the gap is eliminated



and one end of the frog moves in the direction of the train travel thereby reducing vibration associated with the wheel impact. These will be provided in the crossover south of the University of Washington station.

- Reducing train speeds – Train vibration levels are generally reduced at lower train speeds and operating speeds will be lowered as reasonable to meet agreed vibration levels.
- One train passby – Control trains traveling in opposite directions under campus to eliminate increased vibration levels from two train passbys. This operating restriction would only be implemented if absolutely necessary to mitigate impacts to the most sensitive research facilities.
- Rail straightness – Specify rail to minimize vertical undulation and vibration. The effectiveness of this measure and the appropriate rail vertical undulation specification will be determined during final design.
- Sound Transit will maintain the light rail system to minimize vibration levels and long term degradation of vibration levels over time (see table above).
- Sound Transit, in cooperation with the University, will develop a vibration monitoring system.

#### *Receiver-based mitigation options*

The University has requested that mitigation be applied at the source only and not the receiver, however some types of receiver mitigation are being considered and would only be implemented where reasonable.

- Active or pneumatic (passive) vibration isolation systems for individual equipment – These are benches, tables, or desks that are supported by air spring isolators. Pneumatic isolators are passive in design and their effectiveness is limited to their design natural frequency. Active isolators can vary their natural frequency in response to different vibration levels.
- Relocate sensitive research – Move the sensitive equipment to a new location farther away from the light rail vibration source. Relocating research facilities is an appropriate option when only a few research facilities are affected and they can be reasonably relocated to a new location.

## **M.2.8 Ecosystems**

### ***M.2.8.1 Segment A***

- Mitigation for the loss of a small area of wetland and wetland buffer will be based on a hierarchy of avoidance, minimization, and compensation; and in accordance with Seattle Municipal Code, which requires replacement at 2:1 ratio for wetlands and 1:1 for wetland buffer.

### ***M.2.8.2 Segment B***

No adverse impacts have been identified and no additional mitigation is proposed.

## **M.2.9 Water Resources**

### ***M.2.9.1 Project-wide mitigation***

- Water Quality Best Management Practices will be incorporated as required to meet applicable city, state and federal standards and requirements.

- Detention is not required according to the Department of Ecology manual but may be required to prevent downstream drainage capacity problems. Coordinate with the City of Seattle to determine if detention of runoff will be required before discharge to Lake Union or Portage Bay to prevent downstream drainage capacity problems. Downstream drainage capacity issues could occur if more than 2,000 square feet of impervious surface is created. Stormwater detention facilities, if required, will be designed according to the applicable standards to detain runoff from new and replaced impervious surfaces.

## **M.2.10 Energy**

### ***M.2.10.1 Project-wide Mitigation***

No adverse impacts have been identified and no additional mitigation is proposed in Segments A or B.

## **M.2.11 Geology and Soils**

### ***M.2.11.1 Project-wide Mitigation***

No adverse impacts have been identified and no additional mitigation is proposed in Segments A or B.

## **M.2.12 Hazardous Materials**

### ***M.2.12.1 Project-wide Mitigation***

Project-wide mitigation measures include avoiding contaminated sites or portions of sites as practical. By minimizing encounters with hazardous materials, the project will reduce exposure risk, as well as potential delays, construction costs, and liability associated with site clean-up. Clean-up efforts that could be implemented prior to or during construction would reduce potential long-term impacts).

Properties left with residual contamination in excess of standard or negotiated clean-up levels will be clearly identified in documentation provided to Ecology. Restrictive covenants may be required to be filed for certain properties to place limits on property transfer as well as allowable conditions for future invasive work.

No additional adverse impacts have been identified and no mitigation is proposed in Segments A or B.

## **M.2.13 Electromagnetic Fields**

### ***M.2.13.1 Project-wide Mitigation***

No adverse impacts for human health are anticipated due to Electromagnetic Fields (EMF).

### ***M.2.13.2 Segment B (University of Washington)***

The project will generate EMF that is predicted to exceed the EMF levels requested by the University of Washington. The primary mitigation for reducing B-fields caused by the light rail system is the quadrupole mitigation which involves replacement of the typical overhead catenary as the primary conductor of DC propulsion current to the train with a multiple-conductor current path. The quadrupole mitigation will extend to at least the boundaries of the University of Washington campus with the exact limits determined during final design. Light rail operating restrictions will only be implemented if absolutely necessary to mitigate impacts to the most sensitive research facilities. In some instances, it may also be practical to relocate some of the research facilities.

Sneak path impacts will be avoided by careful design and layout of the overall DC power system in a manner that avoids existence of conductor loops during normal operation or their creation during crossing maneuvers from track to track. The project will also mitigate leakage current by providing isolating insulation

between the rails and ground. Current imbalances will be minimized by maintaining good resistance contacts, such as by including a good wheel truing program in the maintenance program.

Sound Transit will maintain the light rail system to minimize EMF levels and long term degradation of EMF levels over time. Sound Transit, in cooperation with the University, will develop an EMF monitoring system. Sound Transit and the University will continue to refine the appropriate mitigation measures and strategies through final design, construction and operation.

## **M.2.14 Public Services**

### ***M.2.14.1 Project-wide Mitigation***

Sound Transit will implement its Safety and Security Management Plan (2001), which involves the continual development and reevaluation of safety and security procedures throughout project design, construction, and operation. Such evaluations will include an assessment of the need to provide security personnel at North Link stations and park-and-ride facilities and a determination of who will provide the service. Developing and implementing design criteria, training programs, and implementation procedures will be an ongoing process in concert with the Fire/Life Safety Committee, which includes representatives of the University of Washington, SPD, SFD, and Sound Transit safety and security specialists. The work of the committee will continue to address public service issues throughout design, construction, and operation. The Fire/Life Safety Committee's work will include an evaluation of the need for specialized equipment and training to respond to emergencies and security concerns within the system, including potential terrorist attacks. CPTED features and security measures, such as including CCTV, and providing alarm systems, will be incorporated into the project as necessary to minimize impacts. In Segment B, Sound Transit will also coordinate with the University of Washington regarding incident response and reporting, training, and liability responsibilities.

## **M.2.15 Utilities**

### ***M.2.15.1 Project-wide Mitigation***

Based on design measures and coordination with utility service providers, impacts to utilities during light rail operation will be minimal. Sound Transit will continue to work with utility providers and the University of Washington to minimize potential service interruptions, and conserve resources. Sound Transit will also coordinate with utility providers and the University of Washington to establish replacement procedures and standards of facilities as applicable. The light rail project will include the following measures to prevent or minimize potential operational impacts for any proposed alternative on utilities:

- Coordinate light rail design with local utility providers and the University of Washington, including relocation of manholes and other access points for ongoing utility maintenance once light rail is in operation.
- Design the system to control stray current to levels where significant damage to metallic utility infrastructure does not occur. Replace particularly susceptible metallic utility infrastructure with nonmetallic materials.
- Use industry-standard methods to reduce the impacts of soil settlement on underground utilities and special infrastructure concerns such as lead joint pipes. Coordinate with utility owners to determine the extent of, and negotiate the responsibility for, appropriate measures to protect existing utilities from damage due to settlement or other light rail related construction impacts.

## **M.2.16 Historic and Archaeological Resources**

### ***M.2.16.1 Project-wide Mitigation***

The Preferred Alternative has no adverse affects to historic properties on or eligible for the NRHP and no mitigation is necessary.

### ***M.2.16.2 Segment A***

No adverse impacts have been identified and no mitigation is proposed in Segment A.

### ***M.2.16.3 Segment B***

The Brooklyn Station would require the property occupied by the Felch House, which is eligible for Seattle Landmark listing. Sound Transit could make the property available for relocation or demolish the building.

## **M.2.17 Parklands**

### ***M.2.17.1 Segment A***

No adverse impacts have been identified and no mitigation is proposed in Segment A.

### ***M.2.17.2 Segment B***

- Potential conflicts between transit riders who use or cross the Burke-Gilman trail and recreational users on the trail will be mitigated with a station entrance or access point located to the north of the Burke-Gilman Trail with a pedestrian passageway under or over the trail and NE Pacific Place (see Segment B Transportation Mitigation Section M.2.1.3).

## **M.3 CONSTRUCTION/SHORT-TERM MITIGATION**

### **M.3.1 Transportation**

#### ***M.3.1.1 Project-wide Mitigation***

Mitigation measures will comply with local regulations governing construction traffic control and construction truck routing. Sound Transit will finalize detailed construction mitigation plans in coordination with local jurisdictions, WSDOT, King County Metro, the University of Washington, and other affected agencies and organizations.

- Mitigation for traffic and freight impacts due to construction of light rail include:
  - Coordinate with King County Metro Transit to minimize construction impacts and disruptions to bus facilities and service. Post informative signage before construction at existing transit stops that would be affected by construction activities. Coordinate with King Count Metro Transit to temporarily relocate trolley wires or use non-trolley replacement buses as necessary.
  - Follow standard construction safety measures, such as installation of advance warning signs, highly visible construction barriers, and the use of flaggers.
  - Post advance notice signs prior to construction in areas where surface construction activities would affect access to surrounding businesses.

- Provide regular, written updates to assist public school officials in providing advance and ongoing notice to students and parents concerning construction activity near schools.
- Coordinate street sweeping services in construction areas with construction activity, particularly areas with surrounding residential and retail development.
- Use lighted or reflective signage to direct drivers to truck haul routes to enhance visibility during nighttime work hours.
- Use temporary reflective truck prohibition signs on streets with a high likelihood of cut-through truck traffic.
- Schedule traffic lane closures and high volumes of construction truck traffic during off-peak hours to minimize delays during periods of higher traffic volumes as much as possible.
- Cover potholes and open trenches where practical, and use protective barriers to protect drivers from trenches remaining open.
- Provide public information tools (e.g., print, radio, posted signs, and electronic web page) to provide information regarding street closures, hours of construction, business access, and parking impacts.
- Provide construction workers designated parking on- or off-site as practical, to minimize neighborhood parking impacts. Contractor parking could also be accomplished through satellite parking with a shuttle bus and/or parking management systems.
- Provide temporary parking or compensation to property owners to mitigate parking loss due to construction staging or work activities, as appropriate.

#### **M.3.1.2 Segment A**

- Northgate Transit center parking will be displaced.
  - Sound Transit will continue to coordinate with King County Metro and others to develop measures to mitigate the loss of parking at the Northgate transit center park-and-ride during construction. Options could include additional transit service to reduce the need for patrons to drive to the transit center, or replacement parking.

#### **M.3.1.3 Segment B**

- Brooklyn Avenue would be closed between NE 45th and NE 43rd Streets.
  - For the Brooklyn Station, impacts to pedestrian access will be mitigated by providing a temporary sidewalk from the north, and Sound Transit will develop a temporary bridge over Brooklyn or alternate means to provide pedestrian and emergency access to the Safeco building. Other emergency access routes and pedestrian entrances to the Safeco building will likely remain unchanged. A replacement emergency egress for the Neptune Theater will also be provided, if the existing egress is removed.
- University of Washington Station
  - Sound Transit will provide temporary replacement parking for parking displaced during construction. Preliminary temporary parking replacement locations include new surface parking in the undeveloped area south of the existing Husky Stadium parking lots (E11 and E12) and on the surface of the Triangle Garage. In the event that these temporary parking replacement locations are not available or do not fully replace affected parking, Sound Transit will provide temporary parking replacement at alternate locations. Reducing the size or reconfiguring the construction

staging area at the University of Washington Station will also be considered to reduce temporary parking loss during construction.

- Construction parking replacement and/or contractor parking could also be accomplished through satellite parking on or off campus with a shuttle bus, parking management systems, or other measures as agreed by the University. The University of Washington's existing parking management systems, including expanded event management plans, could also be used to encourage parking users to utilize unused capacity in the University lot system or to reduce vehicle trips during construction.
- During major events at Husky Stadium and other nearby facilities, Sound Transit will coordinate with the University of Washington to revise event management plans and provide supporting traffic control measures. Construction activities will also be reduced during the limited number of days per year that the largest events occur.
- A through-lane will be maintained to allow traffic in each direction of Montlake Boulevard during construction of the underground or overhead pedestrian crossing to the north station entrance, and during construction of the north end of the station.
- A detour route for the Burke-Gilman Trail will be provided if construction of the optional station entrance north of the trail or pedestrian tunnel or overpass across the trail resulted in temporary closure of the trail.

### **M.3.2 Land Use and Economics**

#### **M.3.2.1 Project-wide Mitigation**

Mitigation measures to reduce impacts to affected communities during project construction will include:

- Development and implementation of a construction outreach plan that will assure impacted community members such as local residents, businesses, ethnic community members, institutions, and property owners are fully informed about potentially major disruptions such as temporary street closures; out of the ordinary construction noise, vibration, light, or glare; changes in transit service; and parking availability. The outreach plan will also contain the following elements:
  - Establish effective communication with residents and businesses through means such as holding public meetings with project team members and the contractor and producing materials such as construction updates, alerts, and construction schedules.
  - Work with impacted community members such as affected business owners, institutions, chambers of commerce, merchants' associations, ethnic community organizations and others on construction business mitigation that will provide measures to assist impacted businesses maintain their customer base during construction.
  - Provide business cleaning services on a case-by-case basis.
  - Provide clear signage to identify and make accessible paths to and from major transportation facilities, such as designated pedestrian routes, bicycle lanes, bus routes and stops, designated truck routes, and tunnel entrances.
  - Provide a 24-hour hotline service for the public to leave complaints and obtain timely resolution.
  - Maintain access to businesses and other properties during construction activities when possible and coordinate closely with businesses during times of limited access due to public safety or construction related issues.
  - Minimize construction-related noise, vibration, dust, and dirt impacts through appropriate construction methods during periods of increased sensitivity.

- Provide a community ombudsman.

No additional mitigation is proposed in Segments A or B.

### **M.3.3 Neighborhoods**

#### ***M.3.3.1 Project-wide Mitigation***

Potential construction impacts related to neighborhoods are addressed under construction mitigation for Transportation, Land Use and Economics, Visual Resources and Aesthetics, and Noise and Vibration. With the implementation of mitigation measures described in these sections, no additional mitigation for neighborhood effects is proposed. No additional mitigation is proposed in Segments A or B.

### **M.3.4 Visual and Aesthetics**

#### ***M.3.4.1 Project-wide Mitigation***

Temporary lighting impacts will be reduced by shielding light sources to block direct views from residential areas and/or by aiming and shielding light sources to reduce spillover lighting in such areas, as necessary. Some visual impacts from construction-related activities will be mitigated with simple screening measures like fencing or noise wall around construction sites and staging areas. Clearing will be minimized to the extent practical to reduce landscape removal. Trees, shrubs, and landscaping that are impacted by construction activities will be restored or replaced as appropriate.

No additional mitigation is proposed in Segments A or B.

### **M.3.5 Air Quality**

#### ***M.3.5.1 Project-wide Mitigation***

The Puget Sound Clean Air Agency enforces air quality regulations in King County, including those for controlling fugitive dust (Regulation 1, Section 9.15). Contractors engaged in construction activities must comply with this regulation, which requires the use of best available control technology to control fugitive dust emissions. Controls used to meet this standard may require the following actions as necessary and in accordance with standard practice to reduce potential impacts to air quality:

- Use water spray or other suppressants as necessary to prevent visible dust emissions and reduce emissions of PM<sub>10</sub> and deposition of particulate matter, particularly during demolition of brick or concrete buildings by mechanical or explosive methods.
- Promptly clean up spills of transported material on public roads by frequent use of a street sweeper machine.
- Cover loads of hot asphalt to minimize odors.
- Schedule work tasks to minimize disruption of the existing vehicle traffic on streets as practical.
- Keep all construction machinery engines in good mechanical condition to minimize exhaust emissions.
- Locate construction equipment and truck staging areas away from sensitive receptors as practical and in consideration of other impacts such as noise.
- Wet materials in trucks, or provide adequate freeboard (space from the top of the material to the top of the truck bed), or cover all trucks transporting materials, as practical, to reduce PM<sub>10</sub> and deposition of particulates during transportation.

- Provide wheel washes as needed to remove particulate matter that would otherwise be carried off-site by vehicles to decrease deposition of particulate matter on area roadways.
- Remove particulate matter deposited on paved public roads, sidewalks, and bicycle and pedestrian paths to reduce mud and dust.
- Cover dirt, gravel, and debris piles as needed to reduce dust and wind-blown debris.
- Route and schedule high volumes of construction trucks to reduce delays to traffic during peak travel times as practical to reduce air quality impacts caused by a reduction in traffic speeds.

These standard measures will avoid adverse construction-related dust impacts. Where businesses or other facilities such as University of Washington buildings with unusually high air quality requirements are located adjacent to high dust-generating construction activities, additional mitigation may be required. Potential measures include more frequent cleaning or replacement of the building's air conditioning system filters, or more frequent exterior dust and particulate matter control measures.

No additional mitigation is proposed in Segments A or B.

### **M.3.6 Noise and Vibration**

#### ***M.3.6.1 Project-wide Mitigation***

Sound Transit will, as practical, limit construction activities that produce the highest noise levels to daytime hours, or when disturbance to sensitive receivers will be minimized. For operation of construction equipment that could exceed allowable noise limits during nighttime hours (between 10:00 p.m. and 7 a.m.) or on Sundays or legal holidays, Sound Transit will obtain the appropriate noise variance from the City of Seattle. Sound Transit will control nighttime construction noise levels by applying noise level limits and noise control measures where necessary. Contractors will be given noise performance criteria that they will be required to meet during nighttime hours. These criteria give the contractor the flexibility of either prohibiting certain noise generating activities during nighttime hours or providing additional noise control measures to meet these noise limits. Nighttime noise control measures will include the following measures, as necessary, to meet required noise limits:

- Construction site noise barrier wall where practical
- Backup Alarms (switch off at night to use warning lights)
- Low-Noise Emission Equipment
- Noise deadening measures for truck loading and operations

#### **Optional Noise Mitigation Measures as Needed**

- Monitoring and maintenance of equipment to meet noise limits
- Lined or covered storage bins, conveyors, and chutes with sound deadening material.
- Acoustic shields or shrouds for equipment
- High-grade engine exhaust silencers and engine-casing sound insulation
- Prohibit above ground jack hammering and impact pile driving during nighttime hours.
- Enclose electrical generators, ventilation fans, pumps, concrete batch plants and air compressors.
- Minimize the use of generators to power equipment
- Limit use of public address systems
- Grade surface irregularities on construction sites



- Use of moveable noise barriers at the source of the construction activity.
- Limit or avoid certain noisy activities during nighttime hours.

These same measures are available for use to mitigate daytime construction noise where necessary.

For most areas vibration monitoring will be considered for all activities that may produce vibration levels at or above a PPV of 0.5 inches-per-second (500,000 micro-inches/sec) whenever there are structures located near the construction activity. This includes pile driving, vibratory sheet installation, and other construction activities that have the potential to cause high levels of vibration.

To mitigate vibration related to pile driving, the use of an auger to install the piles instead of a pile driver will greatly reduce the vibration as well as noise levels. If pile driving is necessary the only mitigation is to limit the time of day the activity can occur. Pile driving is not expected at most construction locations.

#### **M.3.6.2 Segment A**

- Nighttime construction and noise mitigation, including a noise wall around all or part of the site, is anticipated at the Roosevelt Station construction staging area and will be implemented as described above. Final noise wall requirements will be determined through the city noise variance process.

#### **M.3.6.3 Segment B**

- Nighttime construction and noise mitigation is anticipated at the Brooklyn, University of Washington, and Capitol Hill Stations, and possibly at the Montlake vent and Pine Street construction staging areas. Nighttime noise mitigation will be implemented as described above. A noise wall is anticipated on the west and south sides of the University of Washington site, around all or part of the Capitol Hill site, and as necessary at the Montlake vent site and at Brooklyn Station. Final nighttime noise wall requirements will be determined through the city noise variance process.
- University of Washington vibration sensitive research facilities could be affected.

For tunnel and station construction near the University of Washington sensitive research facilities, the extent of impacts and their duration will be minimized through a combination of approaches developed in coordination with the University. Potential mitigation measures include reducing the duration and extent of vibrations to University of Washington research facilities by staging construction and tunneling to shorten the duration of tunnel boring and mine train activities in the tunnel alignment near vibration-sensitive buildings. To the extent practical, tunneling or other high vibration activities will be scheduled in coordination with research schedules. Scheduling for station and crossover construction may be adjusted to add shifts to accelerate the work and shorten the overall duration or work one shift per day to allow research during off hours.

Mitigation measures to control the vibration from the TBM are not feasible, and limited measures are available to address vibration from the mine train. Sound Transit will measure vibration levels from the TBM and mine train used for Beacon Hill tunnel construction (2006) to obtain a better estimate of vibration levels in similar geology as North Link tunnel construction. The results of the measurements will help refine the expected vibration levels from tunneling under the University of Washington campus and determine what, if any, mitigation will be provided.

For tunneling under the main campus between the Brooklyn and University of Washington Stations, both the TBMs and mine trains will be operating simultaneously under campus. Implementing vibration mitigation for the mine train should not substantially reduce the overall tunnel construction vibration levels, because the vibration levels from the mine train are estimated to be similar to those from the TBM. In addition, TBM construction of the tunnel under campus would occur over the duration of about 5 to 7 months or less (depending on the alternative). Scheduling of University of Washington vibration sensitive activities to avoid the tunneling under campus and, to the extent practical, timing the tunneling to avoid higher research times of

year, are the most effective measures to minimize disruption during construction of the tunnel under this scenario, and no additional vibration mitigation is proposed for the mine train.

Without mitigation, vibration levels on campus from the mine train for the tunnel south of campus toward Capitol Hill are projected to be low but will extend over a long duration. If the mine train vibration levels measured at the Beacon Hill tunnel construction are determined to affect the existing research activities at the most sensitive buildings, mitigation will be provided as necessary for the Capitol Hill tunnel. The mitigation could include: (1) using ground rail for the mine train tracks; (2) wheel truing of the muck train cars and locomotives; (3) reducing the speed of the mine train when it is within 2000 feet of the most sensitive University of Washington buildings; and (4) isolating the mine train track using concrete ties supported by a neoprene elastomer.

Another mitigation option for tunnel or station construction is the relocation of limited highly sensitive research facilities that would be adversely affected by construction activities. Research already planned for relocation due to operational impacts could be relocated prior to the start of construction.

### **M.3.7 Ecosystems**

#### ***M.3.7.1 Project-wide Mitigation***

Mitigation for short-term ecosystem impacts will be based on a hierarchy of avoiding and minimizing impacts and compensating for unavoidable adverse impacts. Projects must comply with the City of Seattle's Critical Areas Ordinance. Sound Transit will implement BMPs such as silt fencing, stabilizing exposed soils, landscaping with native plants, marking the limits of clearing, and collecting runoff during construction to minimize impacts on wetlands, wildlife, and fish, including endangered species.

To the extent practical, and as required by permits, construction will be restricted in wetlands to the drier summer months to minimize the impact on those wetlands that flood only during winter and early spring months and reduce wetland impacts caused by stormwater runoff. Wetland areas disturbed by construction will be replanted with native species once construction is complete. Trees removed from street rights-of-way will be replaced in accordance with local city requirements.

Wetland fill impacts are addressed in long-term operational mitigation. No additional mitigation is proposed in Segments A or B.

### **M.3.8 Water Quality and Quantity**

#### ***M.3.8.1 Project-wide Mitigation***

Best Management Practices for construction area stormwater controls and dewatering or spoils controls will be provided as required to meet applicable city, state and federal permits and standards. Where storm drains may be temporarily cut or plugged, temporary mitigation may also include pumping stormwater around a site until the impacted pipe can be replaced, or it will be mitigated by providing detention.

No additional mitigation is proposed in Segments A or B.

### **M.3.9 Energy**

#### ***M.3.9.1 Project-wide Mitigation***

No adverse impacts have been identified and no mitigation is proposed.

### **M.3.10 Geology and Soils**

#### ***M.3.10.1 Project-wide Mitigation***

Based on final design, geotechnical investigations, and the results of field and laboratory tests, Sound Transit will apply design and construction measures, as appropriate, to minimize the potential for settlement, vibration-induced damage to structures, and other ground movement including:

- For cut and cover construction and areas with shallow tunnels, detailed pre-construction structural conditions surveys for existing structures located near the excavation.
- Construction monitoring of structures and surface areas for subsistence or excessive vibration levels.
- Use of temporary excavation support systems and/or flexible wall support systems that are designed to address requirements for groundwater control, soils movements and other geologic factors that could cause settlement.
- Soil treatments or ground modification, or structural supports.
- Post construction inspection and, as appropriate, repair.
- Measures to minimize vibration, as described in noise and vibration mitigation
- Require closed-face tunneling machines that minimize ground loss and resulting settlement, minimize dewatering of the soil, and provide immediate support of the ground.

### **M.3.11 Hazardous Materials**

#### ***M.3.11.1 Project-wide Mitigation***

Mitigation will consist of hazardous materials management plans, in compliance with applicable regulations. Sound Transit will also implement a Spill Control Management and Response Plan to address accidental discharges of fuel, chemicals or other hazardous materials that could occur during construction.

#### ***M.3.11.2 Segment A***

No additional adverse impacts have been identified and no mitigation is proposed in Segment A.

#### ***M.3.11.3 Segment B***

Preliminary geotechnical investigations have indicated that there is a low potential for methane gas migration from an old landfill at the University of Washington Station. If during final design methane is determined present or likely in the vicinity of station and tunnel construction, testing for lateral migration will be conducted and monitoring for gas during construction will be done if needed. If final design and testing indicates methane is present or likely in the vicinity of construction activity, tunneling equipment will be equipped to operate in potentially gassy environments in accordance with federal and state safety regulations.

### **M.3.12 Public Services**

#### ***M.3.12.1 Project-wide Mitigation***

Sound Transit will continue to work with the City of Seattle Police and Fire departments, University of Washington Police, transportation divisions, and others, through Sound Transit's Fire-Life Safety Committee during project construction to provide that reliable emergency access is maintained and alternate plans or routes are developed to avoid delays in response times. Sound Transit will coordinate with construction

contractors and, if necessary, with the Seattle Police Department to ensure adequate staffing during construction for traffic and pedestrian movement control and other necessary policing efforts. Additional staffing requirements and financial responsibilities for police services required during construction will be determined in collaboration with the local police departments. Sound Transit will coordinate with the Seattle Fire Department and local hospitals during water utility relocations to prevent water supply disruptions to these facilities, and it will notify school districts of major construction activities that may affect bus routing and walking routes during the school year. Sound Transit will work with local jurisdictions and solid waste haulers to minimize impacts to solid waste collecting operations during light rail construction.

No additional mitigation is proposed for Segments A and B.

### **M.3.13 Utilities**

#### ***M.3.13.1 Project-wide Mitigation***

The project will cross a number of storm drains, sanitary sewers, water mains, fiber optic/telephone, and natural gas lines. Mitigation measures for impacts to utilities would include these actions:

- Provide utility relocation benefits associated with relocation of existing City-owned utilities in accordance with City code or charter provisions. Incremental costs of upgrades will be funded by the utilities.
- Provide utility relocation benefits in accordance with the agency's Real Property Acquisition and Relocation Policy, Procedures, and Guidelines and applicable state and federal law if construction disrupts private utilities within the private utility's easement or on private property. Responsibility for the cost of relocation of private utilities in public rights-of-way will be based on existing franchise, license, and other utility agreements.
- Establish general utility relocation and protection methods for crossings and installations.
- Use utility company base maps as the primary source of the utility information and conduct a limited program of field surveys and reconnaissance to check accuracy of utility locations before final design and construction. Sound Transit will conduct potholing activities at key locations in coordination with the affected utility. The agency will request that utility companies review the accuracy of the base maps.
- Continue to meet, coordinate, and collaborate closely with both public and private utilities to minimize impacts to utilities during construction, including minimizing service disruptions and acceptable and safe relocation of manholes and other maintenance access points.
- Develop a program to conduct pre-construction inspections of underground utilities and to monitor underground utilities during construction where appropriate. Sound Transit will work with utility providers to develop the program.
- Collaborate with the City to create and implement a joint customer service plan to coordinate with private properties affected by utility relocation.
- Work with Seattle City Light to maintain energized electrical lines to provide continuous service to their customers during construction; maintain clearances of temporary and permanent overhead lines and poles according to the National Electric Safety Code and the Washington Administrative Code safety standards.
- Develop a contingency plan to address any potential utility service disruptions during construction, and notify utility customers of planned disruptions, if any.
- Comply with City and state requirements and procedures for utility construction, inspection, and operation; coordinate relocations and large service connections with Seattle's Utility Coordinating Committee and similar entities.

- Use pipe and conduit support systems, trench sheeting and shoring, and other precautionary measures during construction to minimize the potential for damage to exposed utilities.

Design review and permitting processes will provide further opportunities to address and minimize impacts to utilities.

No additional mitigation is proposed in Segments A or B.

### **M.3.14 Historic and Archaeological Resources**

#### ***M.3.14.1 Project-wide Mitigation***

Typical mitigation options for short-term impacts to historic resources will be provided and include protecting affected building facades from excessive dirt through the use of dust control measures. Additional mitigation measures listed above related to noise and vibration, traffic and parking, air quality, land use, and visual and aesthetic impacts are also applicable to historic resources and will be implemented as appropriate.

Sound Transit will either conduct subsurface testing before construction or monitor ground-disturbing operations located in archeological high probability areas. Sound Transit will prepare an Archaeological Resources Monitoring and Treatment Plan (ARMTP) to establish how monitoring of ground-disturbing operations located in archeological high probability areas will be conducted by qualified archaeologists during construction. The ARMTP will also include procedures that will govern actions to be taken if an eligible historic or pre-historic archaeological site is discovered during project implementation.

No additional mitigation is proposed for Segments A and B.

### **M.3.15 Parklands**

#### ***M.3.15.1 Project-wide Mitigation***

#### ***M.3.15.2 Segment A***

No adverse impacts to Segment A have been identified and no mitigation is proposed.

#### ***M.3.15.3 Segment B***

At the Burke-Gilman trail, trail use will be maintained, and trail detours will be developed during work on or across the trails. Dust will be mitigated through the use of dust control measures.

### **M.3.16 Cumulative Impacts**

#### ***M.3.16.1 Project-wide Mitigation***

Mitigation measures described above apply, and Sound Transit will coordinate with the other project proponents through alternative development, environmental review, mitigation planning, scheduling, design and construction to reduce adverse cumulative affects. No additional mitigation is proposed in Segments A or B.

### **M.3.17 Section 4(f) Impacts**

#### ***M.3.17.1 Segment A***

No adverse impacts to Segment A have been identified and no mitigation is proposed.

### **M.3.17.2 Segment B**

The University of Washington Station will increase the number of pedestrians crossing the Burke-Gilman Trail near Pacific Place. This increase may be considered a constructive use and the station design will include the optional entrance or access point north of the trail, or other type of grade separated crossing of the trail, to mitigate this impact and avoid the constructive use. The Burke-Gilman Trail may also experience short term impacts from construction of the station entrance north of the trail or other grade-separated pedestrian crossing of the trail. Trail detours will be created to allow for continued use of the trail during the construction period, thus maintaining its primary purpose and function, and the trail will be fully restored after construction.