CHAPTER 1: PROJECT HISTORY AND ALTERNATIVES

1.1 Project Background and History

Changes from the Draft EIS

Chapter 1 includes a description of the newly developed Preferred Alternative, which was not analyzed in the DEIS. It also includes a revised description of Roadway Design and Safety Considerations, and summarizes the comments received on the DEIS.

The Burke-Gilman Trail (BGT) is a regional trail that runs east from Golden Gardens Park in Seattle and connects to the Sammamish River Trail in Bothell, except for a missing segment through the Ballard neighborhood. Currently, the regional trail ends at 30th Ave NW by the Hiram M. Chittenden (Ballard) Locks on the west, and begins again at the intersection of 11th Ave NW and NW 45th St on the east. The Seattle Department of Transportation (SDOT) proposes to connect these two segments of the BGT with a marked, dedicated route that would serve all users of the multi-use trail. The proposed project to complete the regional facility is referred to as the Missing Link.

Completing this section of the BGT has been discussed and analyzed since the late 1980s. In the early 1990s, the City of Seattle (City) included the extension of the BGT in its comprehensive plan. By the late 1990s, the Seattle City Council passed a resolution outlining the guiding principles for extending the trail and developed an operating agreement between the Ballard Terminal Railroad (BTR) and the City to preserve the rail line in City ownership while continuing rail service to area businesses. The City Council adopted an ordinance, the Ballard Terminal Railroad Franchise Agreement, which granted BTR the right, privilege, and authority to construct and operate the railway in the railroad right-of-way. In the early 2000s, the City evaluated alternative routes for the trail. In 2003, the Seattle City Council adopted a resolution identifying Shilshole Ave NW as the preferred alignment for the Missing Link, with interim portions of the route to be located along Ballard Ave NW and NW Market St. In 2007, the City adopted the Bicycle Master Plan, which called for completing the trail. Environmental documentation was prepared for the Missing Link beginning in 2008 and was challenged multiple times. In 2012, after the third appeal to the City's Hearing Examiner over the project's environmental determination, the Hearing Examiner required SDOT to develop an environmental impact statement (EIS) related to traffic hazards on the Shilshole Ave NW segment of the project. As a result of the ruling, SDOT decided to prepare an EIS for the entire project and to include an evaluation of alternative routes. SDOT began preparation of an EIS in 2013. Figure 1-1 provides a general timeline of the Missing Link project history.

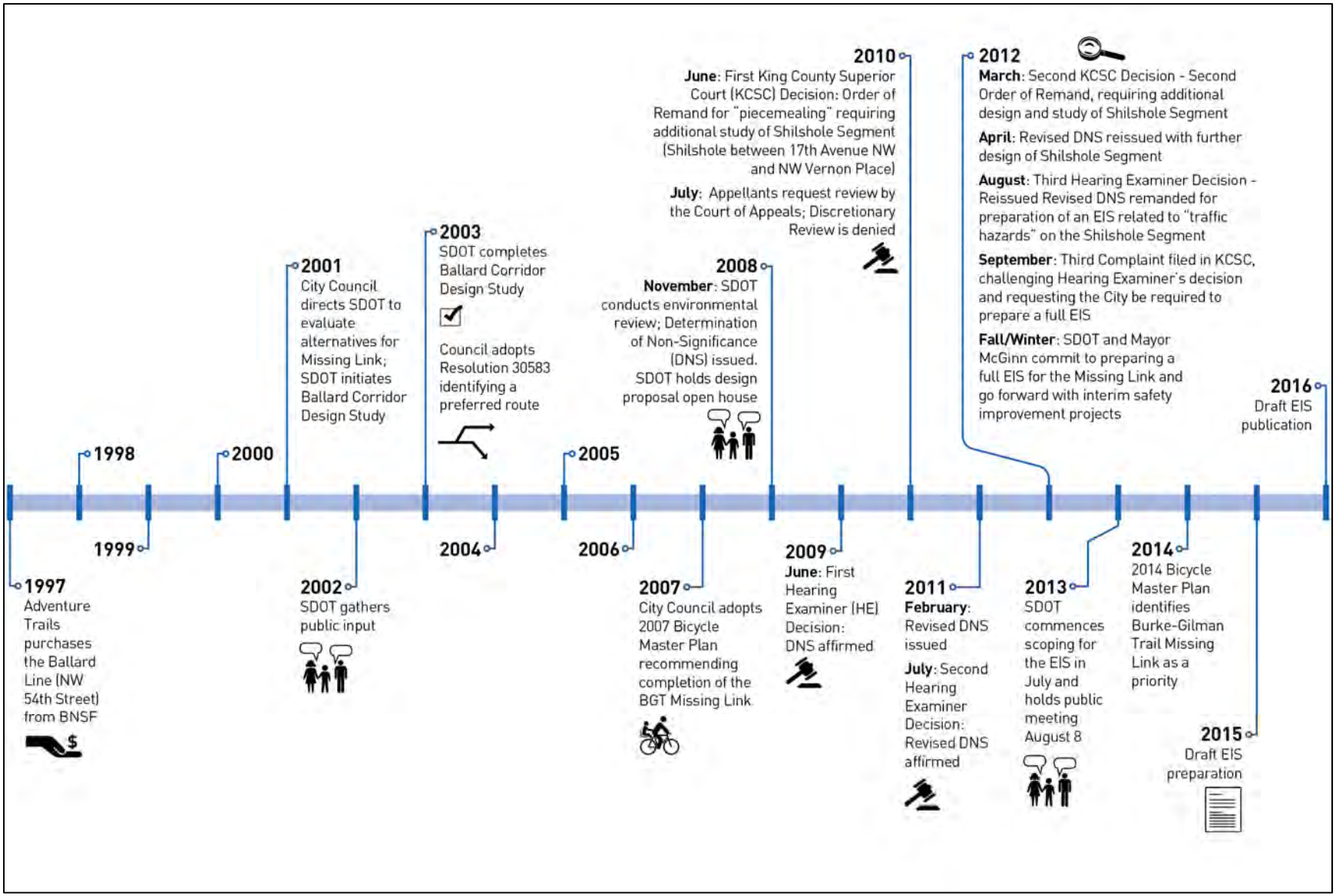

Figure 1-1. Missing Link Project History Timeline

1.2 Objectives

The BGT currently serves a large portion of Seattle and the region as a highly used nonmotorized transportation and recreational facility. The City has identified a need for recreational and commuter users of the Burke-Gilman Trail to have a safe, direct, and defined way to traverse through the Ballard neighborhood from either end of the existing trail (SDOT, 2007, 2009, 2015). There are a number of barriers between the existing trail ends for people walking and biking. Some streets lack sidewalks or other demarcated areas for pedestrians, and intersection and railroad crossings are substandard for bicycles. Many people have commented during public meetings and open houses that they do not feel comfortable riding bicycles or walking in the roadway, and some activities such as skateboarding are not allowed on city streets. Traffic surveys have shown that the lack of a direct and defined route between trail ends results in people dispersing along various streets through Ballard, which in turn increases the opportunity for conflicts between vehicles and nonmotorized activities (SDOT, 2014, 2015).

Therefore, the primary objective of the proposed project is to connect the roughly 1.4-mile gap between the existing segments of the BGT through the Ballard neighborhood. The project is intended to create a safe, direct, and defined multi-use trail for persons of all abilities, for a variety of transportation and recreational activities, and to improve predictability for motorized and nonmotorized users along the project alignment. Another objective of the project is to provide connections to the proposed nonmotorized networks shown in the Pedestrian Master Plan (SDOT, 2009) and Seattle Bicycle Master Plan (SDOT, 2014), while maintaining truck and freight facilities and access that support industrial and water-dependent land uses within the shoreline district and the Ballard-Interbay Northend Manufacturing and Industrial Center (BINMIC).

1.3 SEPA Process

This Final EIS (FEIS) has been prepared consistent with the State Environmental Policy Act (SEPA) (Washington Administrative Code [WAC] 197-11 and Seattle Municipal Code [SMC] 25.05). It is an analysis designed to help elected officials, community leaders, and the public understand the full range of environmental impacts that could result from the proposal. The City, as the SEPA lead agency, is responsible for fulfilling SEPA's procedural requirements. The FEIS describes potential adverse impacts of each alternative and describes proposed measures to reduce potential adverse impacts. SDOT received approximately 4,100 public comments on the Draft EIS (DEIS), which are included with their responses in Volume 2 of the FEIS. Since the issuance of the DEIS, the City has selected a Preferred Alternative that best meets the project's objective, which is fully analyzed in this FEIS.

The intent and purpose of this FEIS is to satisfy the procedural requirements of SEPA (Revised Code of Washington [RCW] 43.21c and City Ordinance 114057). This is a project-level EIS that encompasses all of the regulatory, transactional, and other actions necessary to complete the Missing Link. This document is not an authorization for an action, nor does it constitute a decision or a recommendation for an action.

1.3.1 **Scoping**

SDOT held its scoping process between July 17 and August 16, 2013, and held an open house on August 8, 2013 at Ballard High School. The focus of the open house was to receive comments related to alternative trail locations and the elements of the environment that should be evaluated in the EIS. Scoping is described in more detail in the *Burke-Gilman Trail Missing Link Environmental Impact Statement Public Scoping Meeting Comments Summary* available on the City website (SDOT, 2015).

All of the trail location information obtained as part of the scoping process was incorporated into the alternative development and screening process, as described in Section 1.4.1 of the DEIS.

1.4 Alternative Development

1.4.1 Screening

SDOT received a number of suggestions during scoping in 2013 for potential routes to complete the Missing Link. SDOT mapped all possible route segments identified in the public scoping period, along with several additional segments suggested by SDOT staff and consultants. Overall routes through the study area were broken into smaller segments for review, and included a street block or number of blocks that would likely remain intact as part of a larger route. Segments were added in addition to those suggested by the public, including street blocks that could be used to connect streets in a reasonable way.

Engineers and planners from SDOT, in conjunction with their consultants (engineers, transportation planners, environmental planners, trail designers, and scientists), evaluated 55 route segments using the screening criteria listed below in a charrette-style workshop held in March 2015.

Screening criteria were developed by SDOT and their consulting team to narrow down the possible alternative segments and remove unworkable or infeasible segments from further consideration. The criteria included factors critical to the development of a safe, multi-use trail that would be similar in design and feel to the remainder of the BGT system. The screening criteria included the following factors:

- Directness of route,
- Number and types of trail crossings (driveways and intersections),
- Street and arterial classification,
- Adjacent land uses, and
- Right-of-way width.

At the workshop, each route segment was evaluated to create reasonable alignments that best meet the project objective. Using the screening criteria, the number of route segments was reduced to 31 segments. Segments that were eliminated either did not meet the criteria or did not provide a reasonable connection where another segment better met the criteria and/or provided a more direct or safe connection. The remaining segments were combined by the team to create a range of trail alignments through the study area that incorporated a broad range of options. The route segments were connected into three feasible alternative routes and seven route segments that would allow potential links to “mix and match” route segments.

Once the general alignments were determined, the route was further refined. To reduce the number of intersection crossings, the trail was located on the side of the street that resulted in fewer intersection crossings. In general, this meant that the trail would be located on the south side of east-west trending streets and on the west side of north-south trending streets.

Several team workshops were held over the next 3 months as the routes were being developed to refine the trail details and crossings. The trail alignments were named for the general east-west trending street on which they are located: the Shilshole South Alternative, the Ballard Avenue Alternative, and the Leary Alternative.

Following review of the three alternatives in June 2015, SDOT decided to include a fourth alternative, along the north side of Shilshole Ave NW, called the Shilshole North Alternative, because this alignment meets the screening criteria and does not result in more intersection crossings than the Ballard Avenue or Leary Alternatives. Ultimately, after issuance and review of the DEIS, SDOT developed an additional Build Alternative, identified as the Preferred Alternative in this FEIS.

This FEIS evaluates the five Build Alternatives described above, along with the No Build Alternative. Refer to Section 1.6 and Figure 1-2 for descriptions and depictions of the alternative alignments and connector segments.

1.4.2 Development and Selection of the Preferred Alternative

As described in the DEIS, all four Build Alternatives that SDOT evaluated would meet the project objectives to provide a safe, direct, and defined multi-use trail for persons of all ages and ability, improve predictability for users along the project alignment, and maintain truck and freight facilities and access that support industrial and water-dependent uses in the area. However, several factors unique to each alternative could make some alternatives better suited to meeting the project objectives than others and could result in different potential adverse impacts to the natural and built environment. Upon further evaluation of the merits of each alternative, SDOT determined that the Shilshole South Alternative best meets the project objectives, but with some modifications to that route.

SDOT began the process of selecting a Preferred Alternative after review of the public comments on the DEIS. Approximately 80% of the public comments received on the DEIS expressed a preference for the Shilshole South Alternative. However, SDOT also received a substantial number of comments related to concerns over the project's potential conflicts with and impacts to adjacent commercial and industrial businesses. Based on those comments, SDOT made the decision to analyze motor vehicle volumes and movement at several additional driveways and roadway intersections and to conduct additional parking studies during night and weekend time periods.

After re-examining the driveway volumes and vehicle movements, SDOT determined that, starting from the Ballard Locks, it would be preferable for the trail to run along NW 54th St to NW Market St, rather than along the unimproved NW 54th St right-of-way all the way to Shilshole Ave NW. Locating the trail along the unimproved NW 54th St right-of-way would exacerbate a pinch point between vehicles needing to access properties south of the roadway, the Ballard Terminal Railroad tracks, and business access garages that open immediately into the public right-of-way. In addition, the trail would need barriers or fences on either side to prevent motor vehicles from driving along the trail due to the otherwise narrow roadway. In contrast, SDOT determined that an alignment along NW Market St, west of 24th Ave NW, would allow for a more pleasurable trail user experience with minimal diversion from the desired line of travel, without the need for physical barriers on either side of the trail. Further, the trail would take advantage of and help activate the new developments occurring along NW Market St, west of 24th Ave NW, and provide an easier access point to the Burke-Gilman Trail for people coming from the north.

Figure 1-2. Proposed Alternatives

From the intersection of 24th Ave NW and Shilshole Ave NW, SDOT determined that between the options of continuing on NW Market St to Leary Way or Ballard Ave NW, or turning onto Shilshole Ave NW, Shilshole Ave NW would be the most preferable alignment, as it would provide the most direct route to the trail's terminus at 11th Ave NW and NW 45th St. SDOT determined that the Leary Alternative was less preferable because of the number of high-volume roadway intersection crossings and transportation and transit impacts, and that the Ballard Avenue Alternative was less preferable because of similar concerns over the number of roadway intersection crossings in addition to the adverse impacts to the Ballard Farmers Market and Ballard Avenue Landmark District. SDOT then considered whether it would be best to locate the trail on the north or south side of Shilshole Ave NW. At this point in its deliberations, SDOT, in partnership with the City's Office of Economic Development, initiated discussions with transportation and trail experts, bicycle and trail advocacy groups, and representatives from Ballard maritime, industrial, and commercial businesses, about which alignments—either NW Market St or NW 54th St and either along the north or south side of Shilshole Ave NW—would work best for trail users and businesses along the route.

Ultimately SDOT decided that the Preferred Alternative is the NW Market St and Shilshole South alignment, as it best meets the project objectives. While an alignment along the north side of Shilshole Ave NW could provide more direct access into the Ballard Urban Hub neighborhood as trail users would not need to cross Shilshole Ave NW, there are far fewer roadway intersection crossings and fewer conflicts with business operations on the south side of roadway. In addition, there is a wider area of public right-of-way on the south side of Shilshole Ave NW that, combined with a general shift of the trail alignment toward the north, allows more room for business operations and for truck and freight movement in and out of driveways. For a comparison of the potential traffic hazards associated with each of the Build Alternatives, please see Section 1.8.

1.5 No Build Alternative

Under the No Build Alternative, no new multi-use trail would be constructed to connect the existing segments of the regional Burke-Gilman Trail. Trail users would continue to use the existing surface streets and sidewalks to travel between the existing trail segments, a distance of approximately 1.4 miles. Currently, trail users tend to use the most direct route, which is along Shilshole Ave NW. Pedestrians may opt for a street with sidewalks such as Ballard Ave NW or NW Leary Way. Shilshole Ave NW is used by passenger vehicles in addition to large commercial vehicles and trucks traveling to the adjacent industrial areas. There are no sidewalks on the south side of the street and sporadic sidewalks on the north side of the street. Unregulated parking occurs on both sides of the street. The No Build Alternative serves as the baseline condition against which the Build Alternatives are compared over time to their 2040 design year. The year 2040 was used as the timeline to analyze the impacts of the project. Over that time period, population and employment growth is expected to continue in the Ballard neighborhood, leading to an increase in traffic congestion, parking demand, and the number of people walking and biking.

1.6 Build Alternatives

1.6.1 Preferred Alternative

The Preferred Alternative (illustrated in Figure 1-3) is a combination of components of the previously analyzed Build Alternatives. Except for one minor route connection (as described below), the Preferred Alternative does not contain any route segments or components that were not analyzed in the DEIS. The

Preferred Alternative is most similar to the Shilshole South Alternative, but its westernmost portion contains elements of both the Leary and Shilshole North Alternatives. The Preferred Alternative does not share any segments or components of the Ballard Avenue Alternative.

There would be changes to parking areas, travel and motor vehicle lanes, as well as intersection configurations on both sides of the streets along the Preferred Alternative. The trail would accommodate users on a newly paved, grade-separated surface for most of its length. Route specifics are described below.

Beginning at the existing western trail end (at the Ballard Locks), the trail would continue east along the south side of NW 54th St until it turns into NW Market St. The trail would continue along the south side of NW Market St, until the intersection with 24th Ave NW. Up to this point, the Preferred Alternative follows the same route as both the Shilshole North and Leary Alternatives.

At the intersection of NW Market St and 24th Ave NW, the Preferred Alternative would head south on the west side of 24th Ave NW for approximately 125 feet before the intersection with the south side of Shilshole Ave NW.

The Preferred Alternative would then cross 24th Ave NW and proceed along the south side of Shilshole Ave NW, continuing onto the south side of NW 45th St to 11th Ave NW, and the eastern terminus of the trail. This section of the Preferred Alternative route is identical to the Shilshole South Alternative.

From the existing western trail end at the Ballard Locks, the trail would be north of the BTR tracks until just past 17th Ave NW, at which point the trail would cross to the south of the tracks. A signal would be installed at the intersection of Shilshole Ave NW and 17th Ave NW. The signal would facilitate nonmotorized user crossings of Shilshole Ave NW and allow for better traffic flow between Shilshole Ave NW and 17th Ave NW, which would provide a benefit to traffic mobility and trail users.

The trail width would vary somewhat throughout the corridor due to existing conditions and constraints, but would generally be between 10 and 12 feet wide. Based on the design concepts, the typical right-of-way on Shilshole Ave NW for this alternative would include a barrier or buffer zone adjacent to the railroad tracks, a multi-use trail, a barrier or buffer zone adjacent to the vehicle travel lanes, two vehicle travel lanes, and preservation or addition of parking areas where feasible (Figure 1-3). See Chapter 7, Transportation, for additional detail on this and all other Build Alternatives.

This route was addressed in the DEIS except for the approximately 125-foot section on the west side of 24th Ave NW. The west side of 24th Ave NW has better connectivity and directness of route than the east side of 24th Ave NW, which was evaluated as part of the Shilshole North Alternative.

1.6.2 **Shilshole South Alternative**

Under the Shilshole South Alternative, the multi-use trail would be primarily routed along the south side of Shilshole Ave NW (Figure 1-2). There would be changes to parking, lanes, and intersection configurations on both sides of the street along this alternative alignment. The trail would accommodate users on a newly paved surface for most of its length.

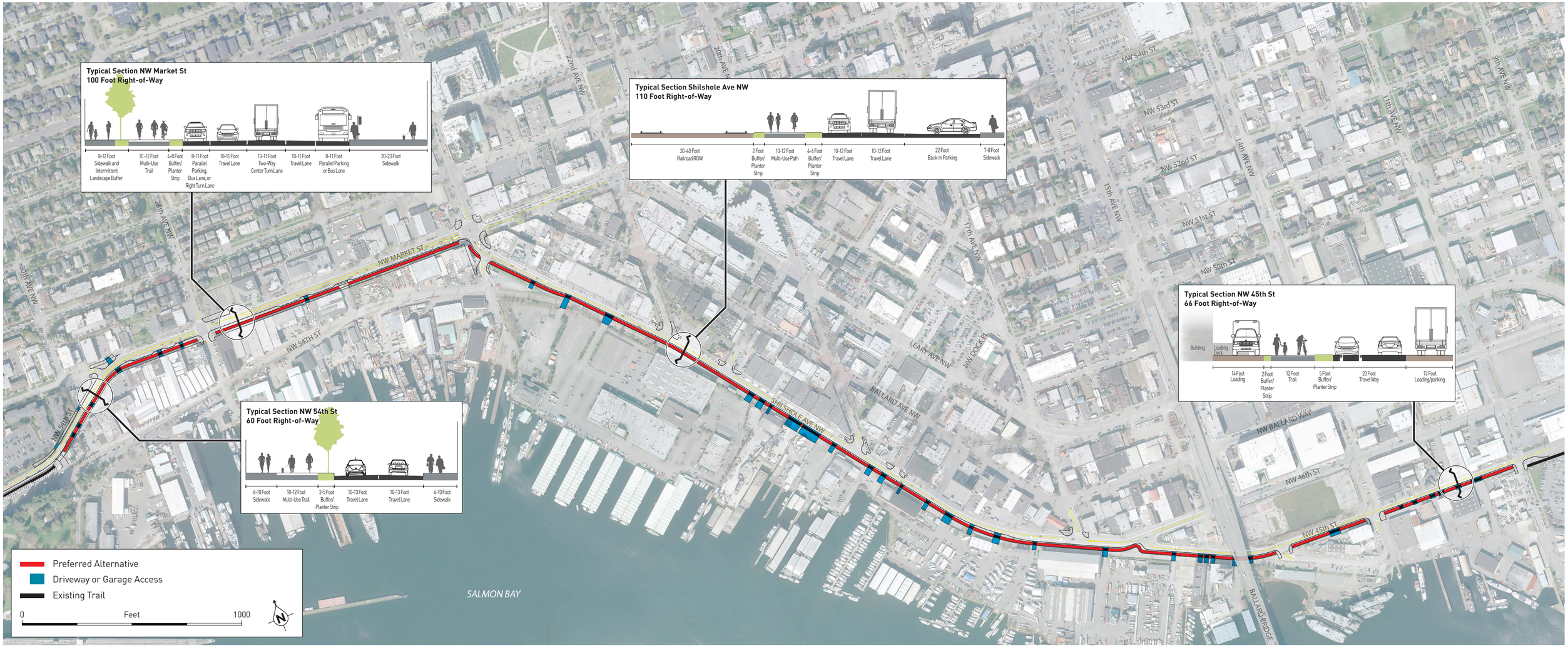

Figure 1-3. Preferred Alternative

Beginning at the existing western trail end at the Ballard Locks, the trail would continue east along the north side of the unimproved NW 54th St right-of-way until the intersection with Shilshole Ave NW, just east of 24th Ave NW. The trail would then proceed along the south side of Shilshole Ave NW, continuing onto the south side of NW 45th St to the eastern project end at 11th Ave NW. From the existing western trail end at the Ballard Locks, the trail would be north of the BTR tracks until just before 17th Ave NW, at which point the trail would cross to the south of the tracks. A signal would be installed at the intersection of Shilshole Ave NW and 17th Ave NW for trail users crossing Shilshole Ave NW to access 17th Ave NW.

The trail width would vary somewhat throughout the corridor due to existing conditions and constraints, but would generally be between 10 and 12 feet wide, with one short segment that narrows to 8 feet wide. Based on the design concepts, the typical right-of-way on Shilshole Ave NW for this alternative would include a barrier or buffer zone adjacent to the railroad tracks and vehicle travel lanes, a multi-use trail, two vehicle travel lanes, and preservation of parking areas where feasible. A detailed map showing this alternative was presented in the DEIS. See also Chapter 7, Transportation, for additional detail on this and for all other Build Alternatives.

1.6.3 **Shilshole North Alternative**

Under the Shilshole North Alternative, the multi-use trail would be primarily routed along the north side of Shilshole Ave NW (Figure 1-2). Beginning at the existing western trail end at the Ballard Locks, the trail would continue east along the south side of NW 54th St until it turns into NW Market St. The trail would continue along the south side of NW Market St, until it crosses 24th Ave NW and turns south on the east side of 24th Ave NW. The trail would then proceed east along the north side of Shilshole Ave NW to the intersection with NW 46th St. A signal would be installed at the intersection of Shilshole Ave NW and 17th Ave NW for trail users crossing 17th Ave NW. It would continue along the north side of NW 46th St underneath the Ballard Bridge to 11th Ave NW. At this point the trail would turn south along the east side of 11th Ave NW until it connects to the eastern end of the existing trail at NW 45th St.

There would be changes to parking, vehicle travel lanes, and intersection configurations on both sides of the streets in this alternative. The typical right-of-way on NW Market St would include sidewalks on both sides of the street, the multi-use trail, a buffer zone, parallel parking or bus zone on both sides of the street, two vehicle travel lanes, and center turn lane. The typical right-of-way on Shilshole Ave NW for this alternative would include a barrier or buffer zone and informal parking adjacent to the railroad tracks, two vehicle travel lanes, parallel parking area, buffer area, multi-use trail, and sidewalk. The existing gravel shoulder on the south side of Shilshole Ave NW would be maintained. These elements would vary along the trail due to the existing road configuration and structures. A detailed map showing this alternative was presented in the DEIS. See also Chapter 7, Transportation, for additional detail on this and for all other Build Alternatives.

1.6.4 **Ballard Avenue Alternative**

Under the Ballard Avenue Alternative, the multi-use trail would be primarily routed along the south side of Ballard Ave NW (Figure 1-2). Beginning at the existing western trail end at the Ballard Locks, the trail would continue east along the north side of the unimproved NW 54th St right-of-way until 28th Ave NW. At this point the trail would turn north along the east side of 28th Ave NW until it reaches NW 56th St. The trail would then turn east along the south side of NW 56th St to the intersection with 22nd Ave NW. At 24th Ave NW and NW 56th St, a new pedestrian-activated signal would be installed to facilitate the trail crossing of 24th Ave NW. The trail would turn south along the west side of 22nd Ave NW, cross NW Market St, and proceed south to Ballard Ave NW. At this point the trail would turn southeast along the south side of Ballard Ave NW and continue east on the south side of NW Ballard Way to the intersection with 15th Ave NW. The trail would then turn south onto the one-way road on the west side of 15th Ave

NW, which could potentially be converted to trail only use (no vehicles). The trail would cross to the south side of NW 46th St at a newly signalized intersection and proceed east across 11th Ave NW. It would then turn south along the east side of 11th Ave NW to the eastern trail end at NW 45th St.

There would be changes to parking and vehicle travel lane configurations on all streets traversed by this alternative. The typical right-of-way on Ballard Ave would include pedestrian sidewalks on both sides of the street, buffer zone, two vehicle travel lanes, and parallel parking area on the north side of the street. These elements would vary along the trail due to the existing road configurations and structures. A detailed map showing this alternative was presented in the DEIS. See also Chapter 7, Transportation, for additional detail on this and for all other Build Alternatives.

1.6.5 **Leary Alternative**

Under the Leary Alternative, the multi-use trail would be primarily routed along the south side of Leary Ave NW (Figure 1-2). Beginning at the existing western trail end at the Ballard Locks, the trail would continue east along the south side of NW 54th St until it turns into NW Market St. The trail would continue east along the south side of NW Market St, crossing 22nd Ave NW. At 22nd Ave NW, the trail would turn southeast on the south side of Leary Ave NW. The trail would continue east along the south side of Leary Ave NW, which becomes NW Leary Way, to 11th Ave NW. At this point, the trail would turn south along the east side of 11th Ave NW to the current trail end at NW 45th St.

There would be changes to parking, vehicle travel lanes, and intersection configurations on both sides of the street along this alternative. The typical right-of-way on Leary Ave NW would include buffer zones on both sides of the street, a multi-use trail, parking areas on both sides of the street, sidewalks on both sides of the street, two vehicle travel lanes, and one two-way center left turn lane. The typical right-of-way on NW Market St would include a sidewalk, the multi-use trail, a buffer zone, two vehicle travel lanes, center turn lane, and parking areas on both sides of the street. These elements would vary along the trail length due to the existing road configuration and structures. A detailed map showing this alternative was presented in the DEIS. See also Chapter 7, Transportation, for additional detail on this and for all other Build Alternatives.

1.6.6 **Connector Segments**

The alternatives above are conceptual routes designed to provide distinct alternatives for review in the DEIS. There are a number of possibilities to connect segments of the routes, and six segments were identified in the DEIS as the most likely connectors (Figure 1-2). These segments could be used as connections between portions of the previously identified alternative routes and could be on either side of the road; however, none of these connectors were selected as part of the Preferred Alternative.

- Ballard Avenue NW;
- NW Vernon Place;
- 20th Avenue NW;
- 17th Avenue NW;
- 15th Avenue NW; and
- 14th Avenue NW.

If NW Vernon Pl is used as a connector segment, then a signal at NW Vernon Pl and Shilshole Ave NW may also be warranted, depending on whether the trail would continue on the north or south side of Shilshole Ave NW.

1.7 Features Common to All Build Alternatives

1.7.1 Roadway Design and Safety Considerations

Although safety itself is not an element of the environment required to be analyzed under SEPA, a focus of this FEIS is the analysis of potential "traffic hazard" impacts, as well as design treatments and other measures that may be taken to mitigate those potential impacts. Regardless of any relation to SEPA, safety is a key component of this project (and all SDOT projects), and therefore is described throughout the FEIS.

The SDOT design process relies on City standards and guidelines, such as the City of Seattle's Standard Plans for Municipal Construction and Right-of-Way Improvements Manual (SDOT, 2012), which have been developed through research and adaptation of national publications. In addition to City standards, SDOT consistently follows national guidelines developed by the American Association of State Highway and Transportation Officials (AASHTO), National Association of City Transportation Officials (NACTO), and Federal Highway Administration (FHWA). The final construction documents rely on a milestone schedule that allows for a thorough quality control process where the design is vetted through several SDOT divisions and City of Seattle departments, whose expertise is applicable to the project. These reviews occur at multiple checkpoints during design.

Given the City's diverse mobility needs, which include motorized and nonmotorized users, it is common for multiple modes of transportation to interact with each other at roadway intersections, driveway crossings, and along shared roads. Designing to increase predictability between modes of travel is a priority of any project and standard practice. While these interactions may introduce potential conflicts, they are not inherently traffic hazards. In fact, pedestrian and bicycle facilities are typically considered categorically exempt under SEPA (WAC 197-11-800(2)(d)(ix); SMC 25.05.800.B.4.i), meaning that no environmental analysis of potential adverse impacts would be required. However, this EIS is being completed for the reasons explained above in Section 1.1.

Roadway designs would vary for each alternative based on factors such as intersection geometry, vehicle volumes, nonmotorized users, and types of vehicles. This section describes roadway modifications, intersection treatments, driveway design, and parking modifications that could be incorporated during the final design phase of the project to address safety, access, nonmotorized users, and vehicle types. Similar concepts can be found throughout the city and in design documents such as the Urban Bikeway Design Guide (NACTO, 2015) and Guide for Development of Bicycle Facilities (AASHTO, 2012). These features are common to all Build Alternatives, but the location and other specifics would vary by alternative. Chapter 7, Transportation, provides additional detail related to these design considerations.

Potential roadway design and safety modifications are shown on Figures 1-4 to 1-6. These figures show design treatments such as pavement markings, buffers, changes to curb radii, and perpendicular intersections that can be used at an intersection as well as a mixing zone (area where there is heavier nonmotorized traffic). The figures also show roadway design treatments that could be used at driveways, which include pavement markings, buffers, mountable curbing, and alternative pavements.

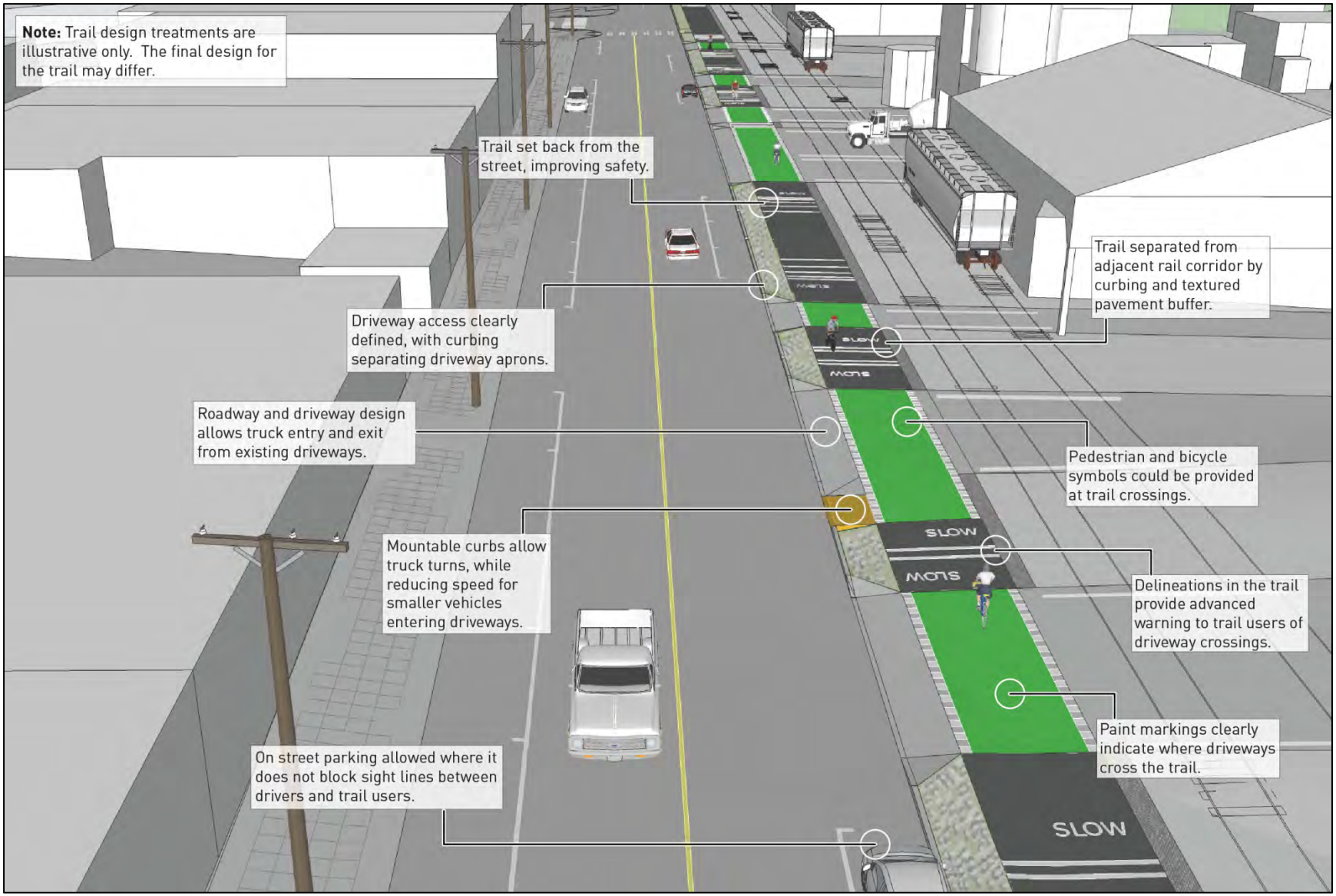

Figure 1-4. Potential Roadway Design and Safety Modifications (Shilshole Ave NW, at Salmon Bay Sand and Gravel)

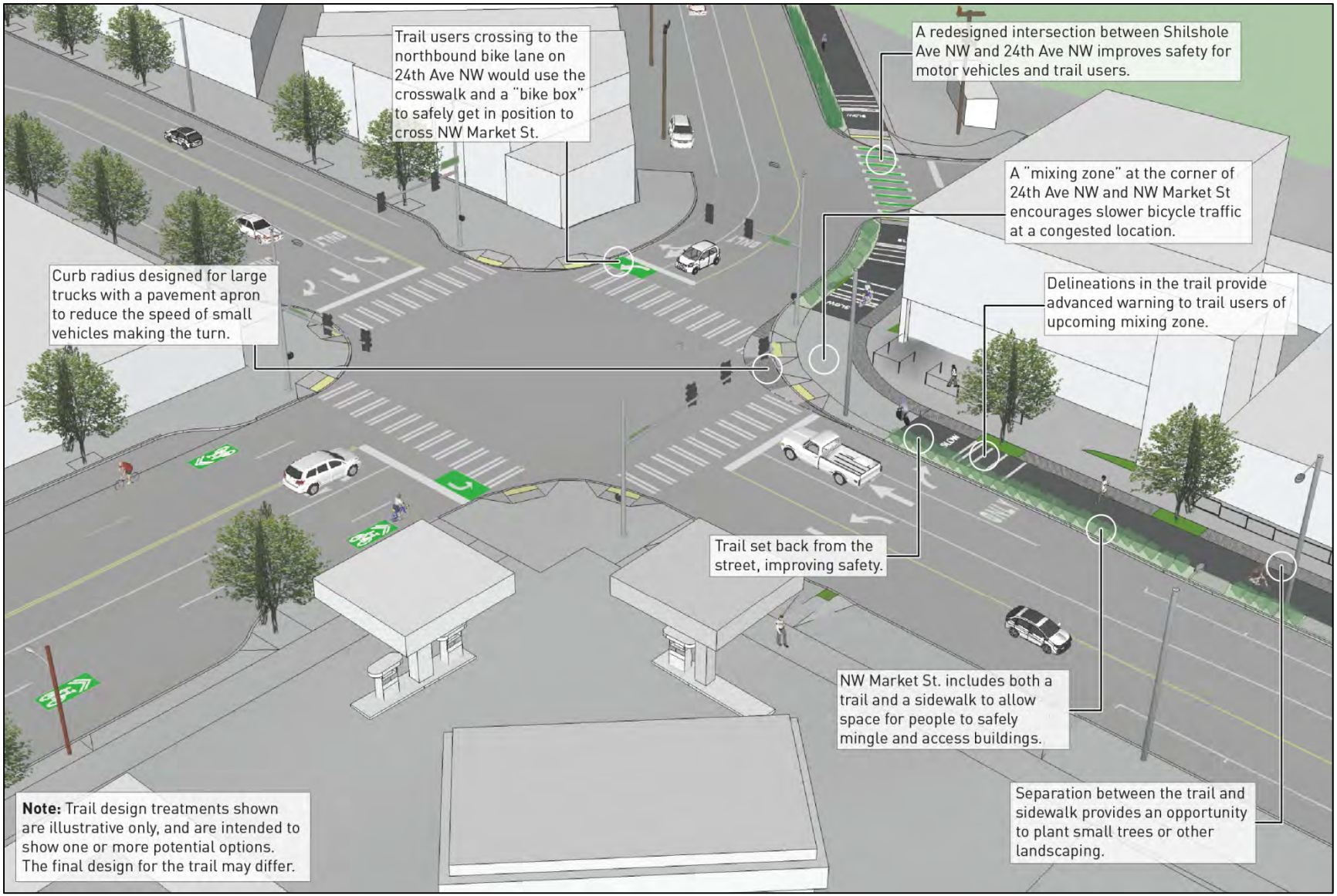

Figure 1-5. Potential Roadway Design and Safety Modifications (NW Market St and 24th Ave NW)

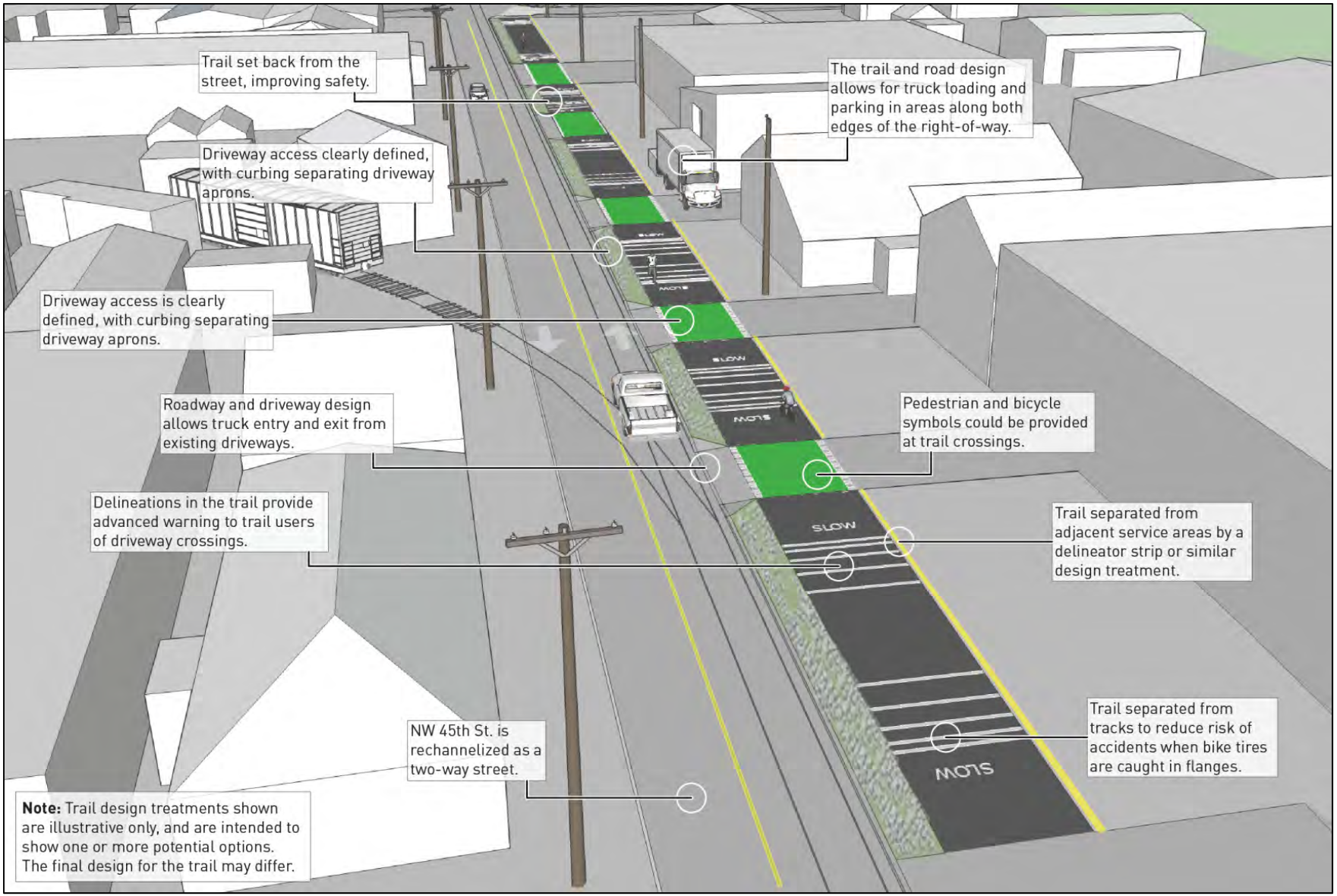

Figure 1-6. Potential Roadway Design and Safety Modifications (NW 45th Street)

Roadway Design

Adding a trail to the street system would require roadway modifications for vehicles to co-exist with nonmotorized users under any of the Build Alternatives. These changes could include geometric changes to create perpendicular intersections, changes to roadway lane configurations, alterations of curb radii, and design details that provide sight lines between vehicles and nonmotorized users:

- Perpendicular Intersections–Modification of diagonal streets to create perpendicular intersections would be included in the designs wherever feasible. Several streets along the alternative alignments intersect at diagonals rather than at a preferred perpendicular angle. Adjusting the geometry of the intersections would slow vehicles down as they are turning through the intersection, allow crosswalks to be shorter, and provide more consistent sight distance for all users. Figure 1-7 depicts a perpendicular intersection configuration.

- Lane Configurations–Lane configurations would be modified to create additional space within the roadway for the multi-use trail where necessary. These changes could include the removal of parking or vehicle lanes as well as the removal or addition of intersection or center turn lanes.

- Curb Radii–Curb radii would be modified to accommodate the turning requirements for different vehicles such as large freight trucks. Different intersections may have different types of vehicles that typically use the street, including passenger vehicles, single unit trucks (delivery-style trucks), buses, emergency vehicles, or semi-trucks. Appropriate curb radii would be chosen to accommodate the differing vehicles and roadway geometry at each location. In general, smaller radii are preferred to slow vehicles making turning movements while at the same time accommodating truck movements where needed. Figure 1-8 illustrates a variety of features, including curb radii.

- Sight Lines–Sight lines are important for safety and would be considered throughout the corridor. Trees, vegetation, and other obstructions would be cleared from intersections and from the back of sidewalks to avoid obstructing sight lines. Parking would also be restricted near driveways and intersections to preserve sight lines. Where possible, the trail would be shifted to allow greater sight distances around buildings adjacent to the property lines. However, because of the developed nature of the study area, sight lines may not meet industry standards in all locations, depending on the alternative.

- Driveways–In addition to pavement and painting elements, driveway locations, heights, and widths would also be considered for modifications. Driveways could be narrowed such that the current use is maintained. A narrower width would provide a more defined location for vehicles and would be matched with the turning movement

Refining the Analysis

To supplement the analysis presented in the DEIS and inform the development of the Preferred Alternative, additional ***intersection and driveway data*** were collected in the study area in November and December 2016; the new data were analyzed to provide more information on potential transportation and freight impacts. The traffic volume data included PM peak hour turning movements at driveways, as well as turning movements for the PM peak hour at additional study area intersections. Similarly, an ***AutoTURN analysis*** (a vehicle swept path software that analyzes the ability of large trucks to maneuver driveway and roadway configurations) was completed to determine if the design of the Build Alternatives would affect freight access to businesses in the study area. Results of this new analysis are presented in Appendix A of the FEIS.

requirements of each driveway. A narrower driveway would shorten and define trail user and vehicle crossing locations. In some cases, it might be appropriate to move a driveway to provide more separation between adjacent driveways. This would provide space between driveways for a refuge area for trail users. In some locations, it could be possible to close driveways where multiple driveways access one parking area. This consolidation would remove a conflict area. Last, where multiple access points are in close proximity to each other, it may make the most sense to merge driveways into one large driveway, rather than multiple, separate ones that could pose difficulties for large vehicles entering or exiting. Access would be maintained for all properties.

- Alternative Pavement – Another application of alternative pavement is for vehicles in the street. This could be the use of stamped concrete or concrete scoring to create rough patterns that are visual and tactile warnings for drivers. A typical application of this treatment is used to designate the different area for vehicle use where the pavement is smooth and rough pavement in areas where travel is undesirable. The rough pavement detracts vehicles from using that space, but would allow some truck turning movements. This treatment could be used on large radius intersections to slow vehicles through a smaller radius while also allowing large vehicles to turn and to provide the adequate sidewalk space outside of the turning roadway. The treatment could similarly be used for truck driveways at the trail crossings. It could also be used for raised crosswalks and driveway-style intersection treatments to provide additional clues to slow vehicles prior to crossing the trail.

Intersection Design

Intersections would be designed to more clearly identify crossings of the multi-use trail. These improvements could include the following:

- Curb Extensions or Curb Bulbs–Curb extensions or curb bulbs would be used at intersections, where feasible, where parallel parking and bus stops are located along the street. In these cases, the sidewalk is extended into the parking lane such that the curb is adjacent to the lane of travel. This design shortens the crossing length for pedestrians and provides additional space for curb ramps. Figure 1-9 provides an example of curb extensions.

- Pavement Markings–Pavement markings distinguish space for nonmotorized users. Pavement markings could include colored pavement such as white markings for crosswalks and bike symbols or green for bicycle lanes, similar to other locations in Seattle. These treatments would be used to demark where the BGT crosses streets or driveways, for “bike boxes” at intersections to provide safe zones for bicycles crossing paths with turning vehicles, and for other signed bicycle routes or greenways as they intersect the BGT. These enhanced pavement markings are a visual clue for both vehicle drivers and trail users that there is a potential conflict zone. Figures 1-7 and 1-8 illustrate varied pavement markings.

- Raised Crosswalks–Raised crosswalks would be used at roadway intersections and driveways, where feasible, as a traffic calming measure to slow vehicles down in the vicinity of the crossing and to have a significant visual clue of the trail crossing. The roadway pavement would be raised 3 to 6 inches within the crosswalk and, if warranted, would be coupled with a stop sign or signal-controlled intersection. The roadway would typically be enhanced with additional markings and signage for the raised crosswalk and could include alternative pavement treatments for the crossing. Figure 1-10 illustrates a raised crosswalk.

- Driveway-Style Entrances–Intersections could be converted to driveway-style entrances, where warranted. This design concept was recently completed on Bell St in downtown Seattle. This design feature would make the trail continuous across an intersection. Curbs and gutters would also be modified to be continuous across the intersection, with the curb lowered to create a driveway-style approach to enter the street. This design creates a condition for a vehicle driver that signifies they are crossing a pedestrian feature where the typical action would be to yield to nonmotorized users prior to crossing and entering the street. Figure 1-11 illustrates a driveway-style intersection.

- Signalized Intersections–Signalized intersections would be used to clearly direct both nonmotorized trail users and vehicles. Existing signalized intersections in the corridor would be maintained and additional signals may be added to congested intersections, as necessary, to address safety concerns and improve traffic flow. All signalized intersections would include pedestrian-activated signals. These signals could include leading-pedestrian walk or all-way walk phases where pedestrians could cross diagonally through intersections. They could also include bicycle signals that would allow bicycle movement through an intersection separate from motor vehicle travel. Signalized intersections in the corridor may include No-Right-On-Red restrictions to eliminate right turn conflicts with nonmotorized users.

- Trail Crossing Warning Devices–Several possible design features could be used to warn both trail users and drivers of upcoming trail crossings. Road or driveway crossings of the trail could include rapid flashing beacons or flashing amber lights at mid-block trail crossings to alert vehicle drivers to trail users crossing the road. In some cases, barrier arms could be employed at crossings. Signage will be placed to alert both drivers and trail users of impending crossings.

- Medians–Medians could be used either to improve the street crossing for pedestrians or to restrict left turns across the trail.

- Barriers, Fences, and Buffers–In some locations, barriers, fences, or buffers would be used to separate nonmotorized trail users from moving vehicular traffic or the railroad. Figures 1-7 through 1-11 illustrate various buffer possibilities, including non-vegetated and vegetated options.

- Alternative Pavement–Alternative pavement types would be used to warn pedestrians and bicyclists of upcoming driveways and intersections. An example of alternative pavement treatments is inserting concrete strips within the asphalt trail. The strips could be colored concrete or could have texture added to increase awareness. It could also include using concrete for crosswalks in addition to pavement striping. This treatment is used to alert trail users in advance of a crossing to raise their awareness of an upcoming conflict area.

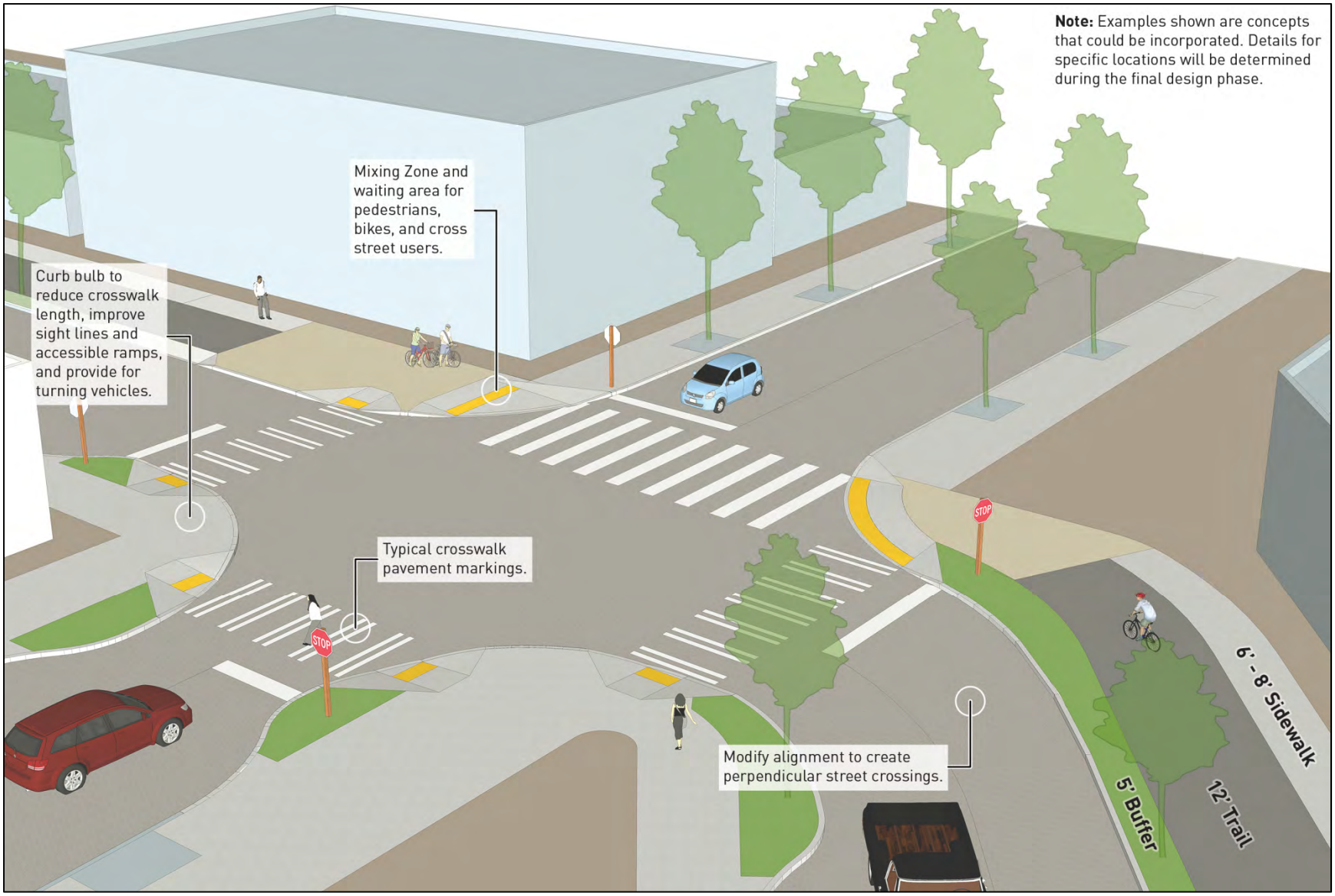

Figure 1-7. Intersection Design Options: Perpendicular Intersection

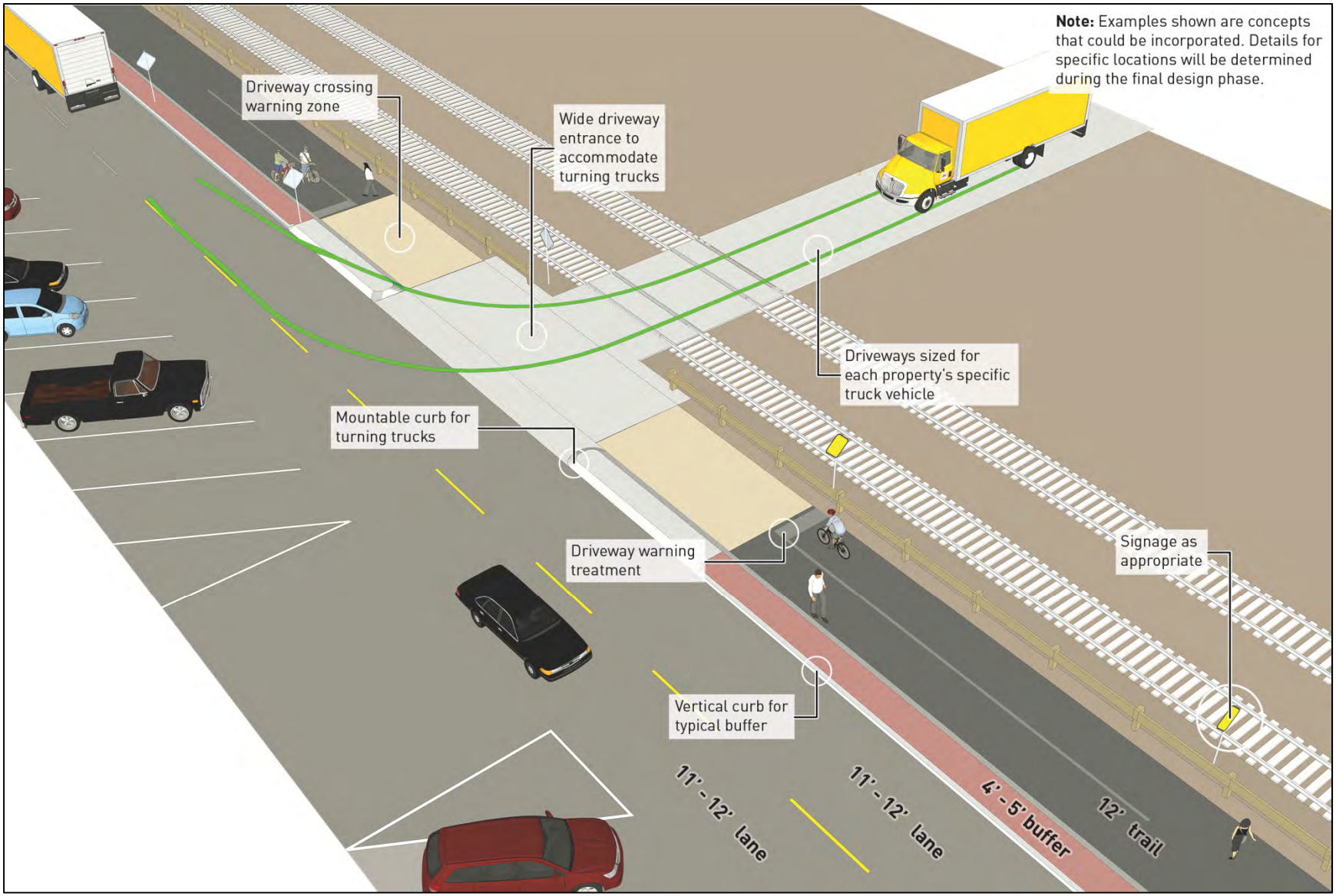

Figure 1-8. Intersection Design Options: Curb Radii Modification

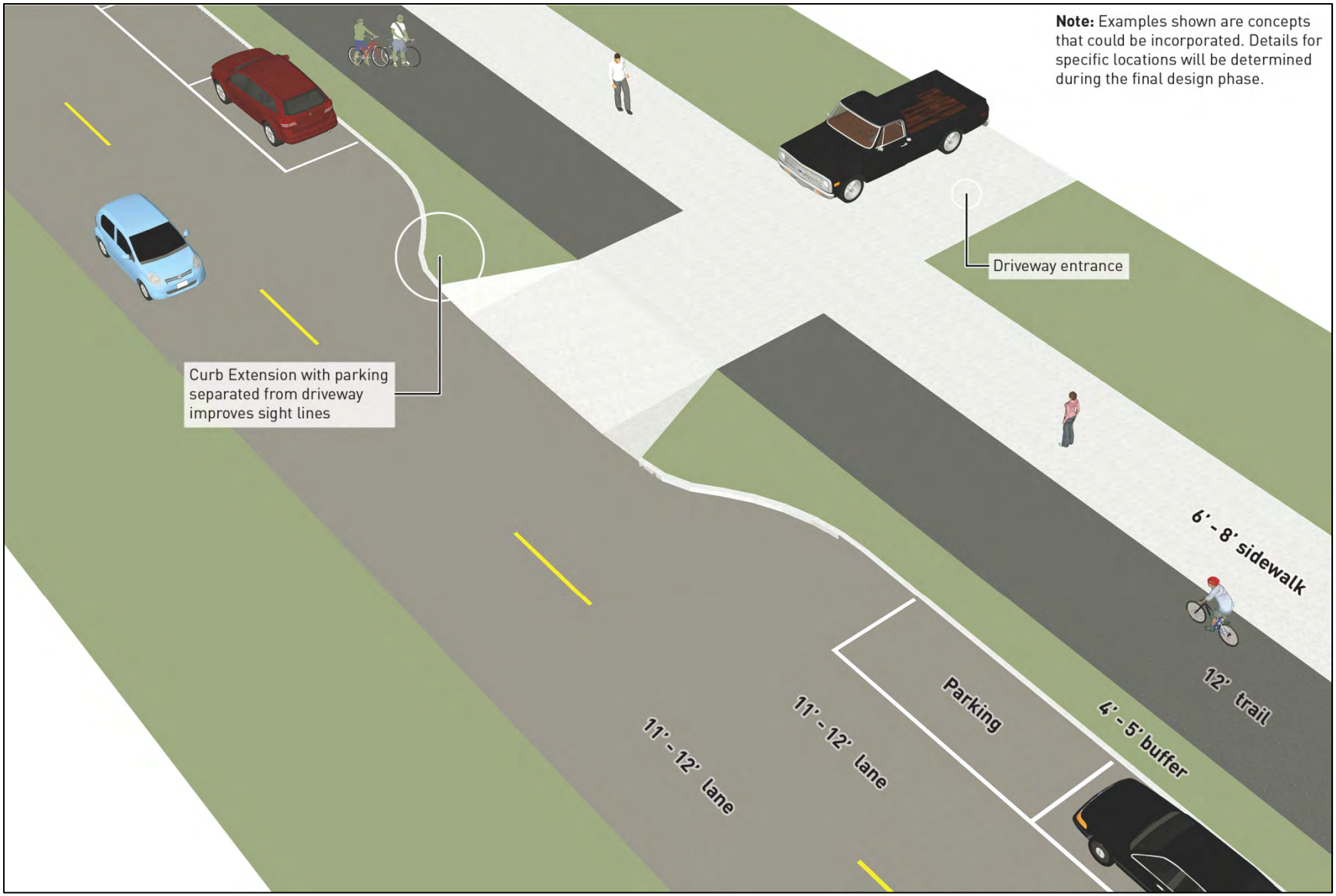

Figure 1-9. Intersection Design Options: Curb Extension

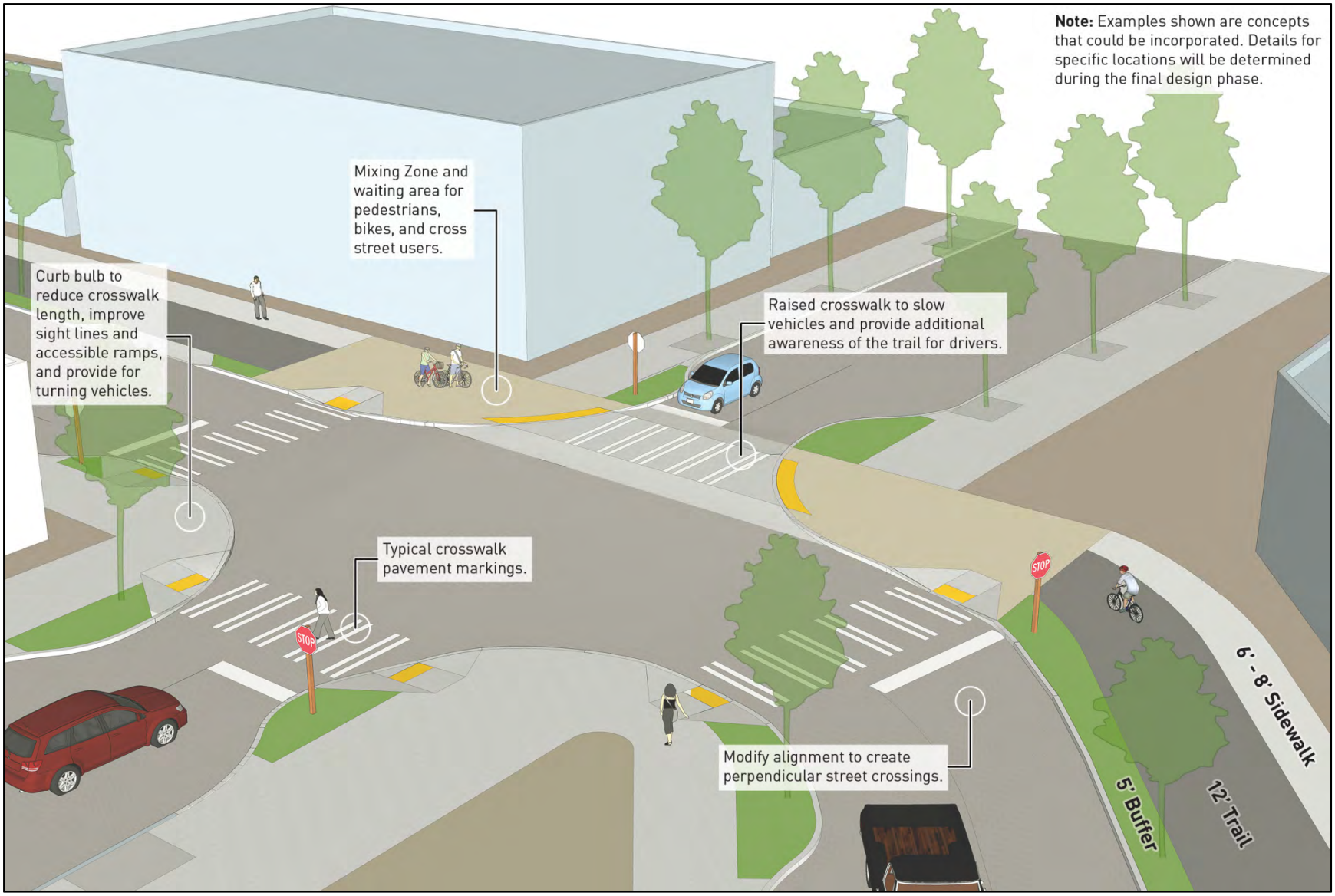

Figure 1-10. Intersection Design Options: Raised Crosswalk

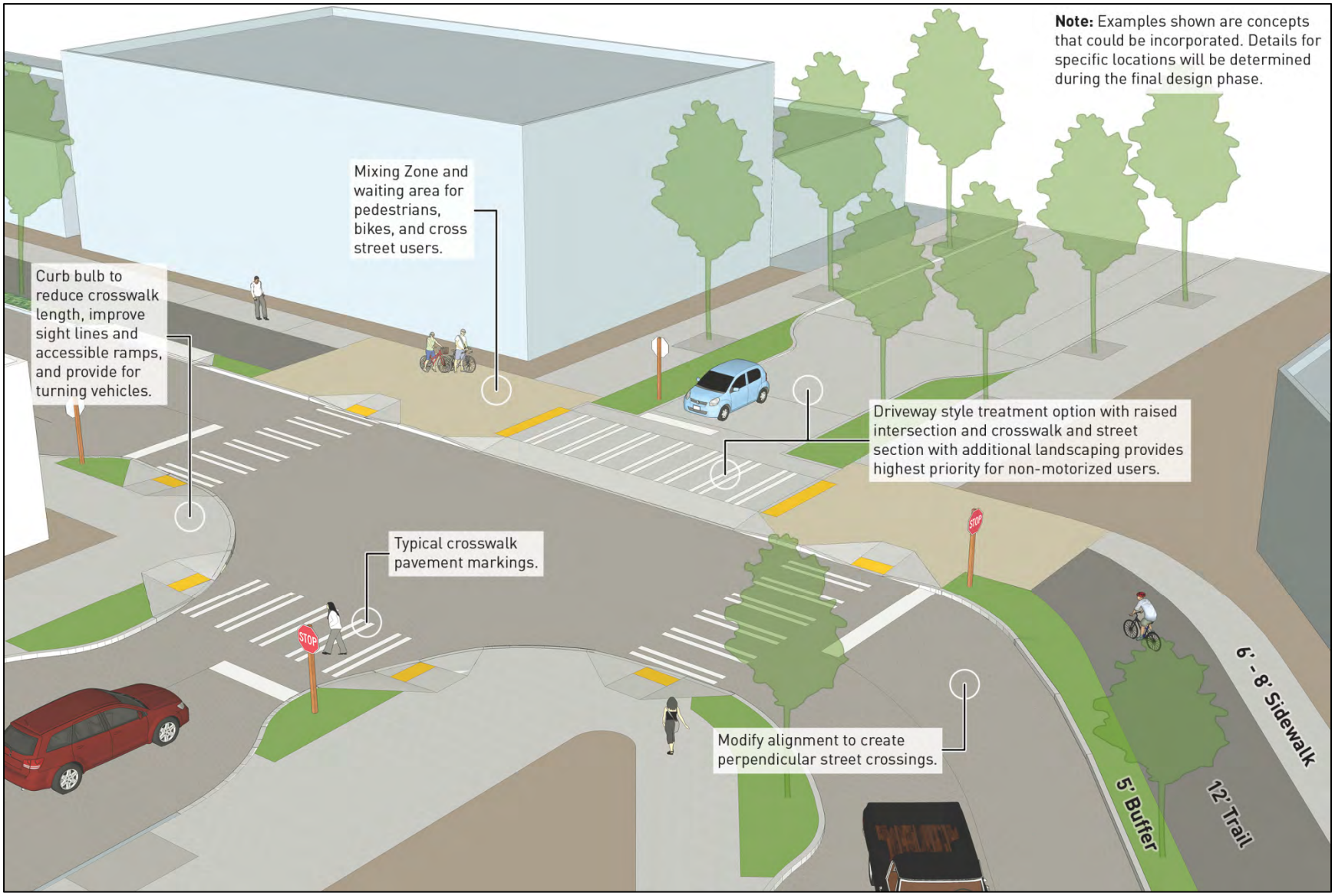

Figure 1-11. Intersection Design Options: Driveway Style Intersection

Driveway Design

Driveways that cross or intersect with the multi-use trail would also be evaluated for possible design changes. Design changes could include many of the intersection elements described above, including curb bulbs, pavement markings, and restricted parking. Driveways and loading zones could be reconfigured so that parked vehicles would not block the trail. Some driveways may be eliminated, relocated, or consolidated in the case of multiple driveways at a single property. Additional detail is provided in Chapter 7, Transportation, by Build Alternative related to possible driveway design changes.

Access Modifications

Parking in some private lots may be affected due to changes to property access from the multi-use trail. For example, striping in parking lots may need to be modified to prevent vehicles from blocking the trail when parked, which may reduce the number of parking spaces in some lots.

1.7.2 Stormwater Management

Stormwater management would conform with the City of Seattle Stormwater Manual (City of Seattle, 2016) and Seattle Municipal Code (SMC 22.800). Stormwater management varies widely by alternative alignment and would be part of the future design of the project. Additional description is provided in Chapter 6, Utilities.

1.7.3 Construction Methods

This section describes the construction methods that the City currently anticipates using for the Build Alternatives. Because of the dynamic nature of construction, the sequencing, extent, and timing of construction activities would vary to some degree from what are described here. However, this description represents a reasonable scenario that allows an understanding of the range of potential methods that could be used as the project is built.

Overall construction of any of the Build Alternatives would last 12 to 18 months. The duration would vary depending on the extent of utility relocations, storm drainage improvements, and existing roadway reconfigurations including bus stop relocations. Construction would likely occur in segments, and one segment would be completed before moving on to the next segment to minimize the construction duration at any given location.

Construction Activities

Construction of any of the Build Alternatives would consist of, but not be limited to, the following general activities:

- Demolition, including removal of pavement, curbs, sidewalks, driveways, trees, signs, bus shelters, fencing, or other features located in the new trail area.

- Construction of new roadway elements including pavement, curbs and gutters, sidewalks, driveways, trees, bus shelters, fencing, signs, and buffer elements. Buffer elements include such things as paving, landscaping, barriers, fencing, and signage.

- Utility relocations, ranging from moving fire hydrants, stormwater catch basins, and overhead utility and power poles to the installation of new drainage facilities.

- Rail relocation could occur in some of the alternatives.

Construction Staging

Construction staging and scheduling are typically determined by the contractor; however, the City would specify some restrictions that the contractor must adhere to. Demolition would likely be limited to a certain length of the trail; as such, the contractor would not be allowed to demolish the work space along the entire length of the trail at one time. Rather, the project would be constructed in multiple smaller segments.

The project would generally use areas within or near the project footprint for construction staging and storing materials and equipment, including vacant lots, parking lots, and unused rights-of-way. Temporary construction offices (such as trailers) could also use these areas. Alternatively, construction offices may be located in a rented office space. All staging areas would be restored to their pre-construction condition or better.

Construction Timing and Road Closures

As noted above, depending on the alternative and specific design features selected, construction would likely occur over a 12- to 18-month duration. Construction work would primarily occur during typical daylight weekday work hours. However, night and/or weekend work could be scheduled for construction at high-volume intersections and driveways and would comply with all applicable permit conditions for work during non-weekday timeframes.

Throughout construction, the City would maintain access to private property to the maximum extent feasible, and would notify property owners in advance of activities that might temporarily limit access. If properties have multiple access points, one driveway could be closed while the other remains open. Pedestrian access would also be maintained, such that commercial businesses remain open and residential and industrial properties are accessible. Temporary pedestrian access would be Americans with Disabilities Act (ADA) compliant. Options include temporary asphalt paths, steel plates, fabricated timber walkway with handrails, or a cordoned section of the roadway. Specific methods would be determined by the contractor, subject to review and approval by SDOT.

Construction activities could result in the temporary removal of on-street parking and restrictions in travel lanes, such as full lane closures or flagger-controlled travel through the construction zone. Clearly signed detour routes would be provided around construction areas.

Construction Sequencing

The sequence of construction activities is typically determined by the contractor in consultation with, and with concurrence from, the City.

Worker Access and Parking

The contractor would establish a job site office, which could be located in existing office space within the project vicinity or elsewhere along the route in a trailer. While a limited number of construction workers would park at the job site, other construction workers may be required to park away from the construction site to preserve parking for local businesses and customers to the greatest extent feasible.

Construction Traffic and Haul Routes

Construction would generate traffic to transport materials and equipment to the work site and to remove demolition debris and excess soil. The contractor would require access to the site for heavy vehicles (such as dump trucks and concrete trucks), light vehicles (such as pickup trucks), and heavy equipment (such as excavators and compactors). Construction materials would be transported by truck. The contractor would determine the best construction methods as permitted by the City and in conformance with the project

construction plans and specifications. The exact number of truck trips per day during construction cannot yet be determined because project design is not complete. However, preliminary estimates indicate that the highest number would be approximately 20 round-trip truck trips per work day during a paving operation, spread uniformly throughout the day. City streets that could be used as haul routes include Shilshole Ave NW, NW 46t^{h} St, NW Leary Way/Leary Ave NW, and 15th Ave NW.

Rail Relocation

Along Shilshole Ave NW and NW 45th St, existing tracks would be relocated to provide for the trail design under the Preferred and Shilshole South Alternatives. Where possible, the relocated tracks would be constructed prior to removing the existing tracks such that rail operations could be maintained during construction. Exceptions to this would be required where connecting the relocated tracks to the existing tracks. This transition work is anticipated to have a duration of a few days to two weeks. These closures would be coordinated in advance with the railroad operator.

1.8 Potential Traffic Hazards by Alternative Segment

To better compare and understand the differences among the alternatives as analyzed in the DEIS, and to inform the development of the Preferred Alternative presented in the FEIS, SDOT examined the key roadway design and safety considerations described in Section 1.7. In particular, SDOT examined driveways, intersections, sight line concerns, traffic/roadway changes, and nonmotorized considerations. For this new analysis, which was not presented in the DEIS, the alternative routes were grouped by broad geographical segment within the study area to reflect the broad land uses in these segments. The three segments examined are illustrated in Figure 1-12 and include the following:

- The west segment (between Ballard Locks and 24th Ave NW);
- The central segment (between 24th Ave NW and 15th Ave NW); and
- The east segment (between 15th Ave NW and 11th Ave NW).

The intent of this analysis by segment was to elucidate and differentiate impacts that were not clear when evaluating each of the alternative routes as a whole. This process allowed SDOT decision makers to make an informed decision when weighing options for selection of the Preferred Alternative. Results of the examination of potential traffic hazards by segment are summarized in Table 1-1.

Figure 1-12. West, Central, and East Segments of the Study Area

Table 1-1. Potential Traffic Hazards by Alternative Segment

Element	*Preferred Alternative*	*Shilshole South Alternative*	*Shilshole North Alternative*	*Ballard Avenue Alternative*	*Leary Alternative*
West Segment (between Ballard Locks and 24th Ave NW)					
Driveways	• Crosses about 8 driveways/loading zones along this segment • Driveways are primarily commercial/retail driveways • Driveways are organized and delineated	• Crosses about 7 driveways/loading zones along this segment • Driveways are primarily industrial driveways • Driveways are organized and delineated • Large trucks backing into industrial driveways at multiple locations	• Crosses about 8 driveways/loading zones along this segment • Driveways are primarily commercial/retail driveways • Driveways are organized and delineated	• Crosses about 7 driveways/loading zones along this segment • Driveway are primarily residential driveways with some commercial/ retail driveways • Driveways are organized and delineated	• Crosses about 8 driveways/loading zones along this segment • Driveways are primarily commercial/retail driveways • Driveways are organized and delineated
Intersections	• The Missing Link would cross 1 signalized intersection approach and 1 unsignalized intersection approach	• The Missing Link would cross 2 unsignalized intersection approaches	• The Missing Link would cross 2 signalized intersection approaches and 1 unsignalized intersection approach	• The Missing Link would cross 2 signalized intersection approaches and 2 unsignalized intersection approach	• The Missing Link would cross 2 signalized intersection approaches and 1 unsignalized intersection approach
Sight Line Concerns	• Buildings constructed up to property lines, but trail is buffered from property lines by sidewalk	• Buildings constructed up to property lines adjacent to portions of the trail • Storage of industrial materials encroaching on right-of-way on NW 54th St	• Buildings constructed up to property lines, but trail is buffered from property lines by sidewalk	• Buildings set back from property lines adjacent to portions of the trail	• Buildings constructed up to property lines, but trail is buffered from property lines by sidewalk
Traffic/Roadway Changes	• Left-turn pocket relocated from Ballard Locks driveway to signalized intersection at 32nd Ave NW • NW 54th St/NW Market St reduced by one lane in each direction	• Two-way traffic reoriented into one-way operations in narrow right-of-way along unimproved NW 54th St right-of-way • Railroad tracks along unimproved NW 54th St right-of-way may be removed or relocated to allow additional right-of-way space for the trail	• NW 54th St/NW Market Street reduced by one lane in each direction	• Intersection at 24th Ave NW and NW 56th St signalized	• NW 54th St/NW Market St reduced by one lane in each direction

Element	*Preferred Alternative*	*Shilshole South Alternative*	*Shilshole North Alternative*	*Ballard Avenue Alternative*	*Leary Alternative*
Nonmotorized	• Mixing zone of pedestrians, trail users, and business functions (sidewalk café) at 24th Ave NW/NW Market St intersection • Some trail design components could create obstacles for trail users	• Heavy industrial nature, building orientation, and special truck movements on unimproved NW 54th St right-of-way affect nonmotorized experience • Some trail design components could create obstacles for trail users	• Mixing zone of pedestrians, trail users, and business functions (sidewalk café) at 24th Ave NW/NW Market St intersection • Some trail design components could create obstacles for trail users	• Some trail design components could create obstacles for trail users	• Mixing zone of pedestrians, trail users, and business functions (sidewalk café) at 24th Ave NW/NW Market St intersection • Some trail design components could create obstacles for trail users
Central Segment (between 24th Ave NW and 15th Ave NW)					
Driveways	• Crosses about 23 driveways/loading zones along this segment • Driveways are primarily industrial • Driveways are organized and delineated • Areas with multiple driveways within close proximity, such as near Salmon Bay Sand and Gravel and Covich Williams	• Crosses about 23 driveways/loading zones along this segment • Driveways are primarily industrial • Driveways are organized and delineated • Areas with multiple and wide driveways within close proximity, such as near Salmon Bay Sand and Gravel and Covich Williams	• Crosses about 37 driveways/loading zones along this segment • Driveways are commercial/retail and industrial • Driveways are organized and delineated • Areas with multiple driveways within close proximity, such as Salmon Bay Sand and Gravel	• Crosses about 28 driveways/loading zones along this segment • Driveways are primarily commercial/retail and industrial. • Driveways are organized and delineated • Areas with multiple driveways within close proximity, such as Ballard Hardware and Ballard Sheet Metal Works	• Crosses about 14 driveways/loading zones along this segment • Driveways are primarily commercial/retail • Driveways are organized and delineated
Intersections	• There is 1 crossing of an unsignalized intersection approach	• There is 1 crossing of an unsignalized intersection approach	• There are 1 crossing of a signalized intersection approach and 5 crossings of an unsignalized intersection approach	• There are 1 crossing of a signalized intersection approach, 1 crossing of a rapid flashing beacon, and 6 crossings of an unsignalized intersection approach	• There are 2 crossings of a signalized intersection approach and 6 crossings of an unsignalized intersection approach

Element	*Preferred Alternative*	*Shilshole South Alternative*	*Shilshole North Alternative*	*Ballard Avenue Alternative*	*Leary Alternative*
Sight Line Concerns	• Buildings set back from property lines except near Ballard Mill Marina. Trail has been buffered in this area by relocating rail line adjacent to property lines.	• Buildings set back from property line except near Ballard Mill Marina. Trail placement is constricted by existing rail line and is adjacent to buildings in this area.	• Buildings constructed up to property lines, but trail is buffered from property lines by sidewalk	• Buildings constructed up to property lines, but trail is buffered from property lines by sidewalk	• Buildings constructed up to property lines, but trail is buffered from property lines by sidewalk
Traffic/Roadway Changes	• Intersection of 17th Ave NW and Shilshole Ave NW signalized • Railroad tracks removed or relocated closer to property frontages between Hatton Marine driveway (about 600 feet west of 17th Ave NW) to just east of Ballard Bridge to allow additional right-of-way space for the trail	• Intersection of 17th Ave NW and Shilshole Ave NW signalized • Railroad tracks may be removed or relocated to allow additional right-of-way space for the trail	• Intersection of 17th Ave NW and Shilshole Ave NW signalized	• Rapid flashing beacon installed at 15th Ave NW and NW 46th St	• NW Leary Way/ Leary Ave NW reduced by one lane in each direction
Nonmotorized	• Trail crossing with active rail line • Some trail design components could create obstacles for trail users	• Trail crossing with active rail line • Some trail design components could create obstacles for trail users	• Some trail design components could create obstacles for trail users	• Potential user conflicts with Ballard Farmers Market • Some trail design components could create obstacles for trail users	• Sidewalk reduced by about 12 feet on NW Market (between 24th Ave NW and 22nd Ave NW) to add the BGT Missing Link in heavy pedestrian, transit, and commercial/retail corridor • Some trail design components could create obstacles for trail users

Element	*Preferred Alternative*	*Shilshole South Alternative*	*Shilshole North Alternative*	*Ballard Avenue Alternative*	*Leary Alternative*
East Segment (Between 15th Ave NW and 11th Ave NW)					
Driveways	• Crosses about 8 driveways/loading zones along this segment • Driveways are primarily industrial • Driveways are organized and delineated	• Crosses about 7 driveways/loading zones along this segment • Driveways are primarily industrial • Driveways are organized and delineated	• Crosses about 9 driveways/loading zones along this segment • Driveways are commercial/retail and industrial • Driveways are organized and delineated • Crossing with heavy traffic volume driveway (Ballard Blocks)	• Crosses about 6 driveways/loading zones along this segment • Driveways are primarily industrial • Driveways are organized and delineated	• Crosses about 7 driveways/loading zones along this segment • Driveways are commercial/retail • Driveways are organized and delineated
Intersections	• There are 3 crossings of an unsignalized intersection approach	• There are 3 crossings of an unsignalized intersection approach	• There are 2 crossings of a signalized intersection approach and 3 crossings of an unsignalized intersection approach	• There is 1 crossing of a signalized intersection approach and 2 crossings of an unsignalized intersection approach	• There are 4 crossings of a signalized intersection approach, and 2 crossings of an unsignalized intersection approach
Sight Line Concerns	• Buildings constructed up to property lines, but trail is buffered from property lines by parking	• Buildings constructed up to property lines, but trail is buffered from property lines by parking	• Buildings constructed up to property lines, but trail is buffered from property lines by sidewalk	• Buildings constructed up to property lines, but trail is buffered from property lines by sidewalk	• Buildings set back from property lines, but trail is buffered from property lines by sidewalk
Traffic/Roadway Changes	• NW 45th St restored to two-way traffic • Railroad tracks along NW 45th St would be removed or relocated to allow additional right-of-way space for the trail	• NW 45th St restored to two-way traffic • Railroad tracks along NW 45th St would be removed or relocated to allow additional right-of-way space for the trail	• NW 45th St restored to two-way traffic	• NW 45th St restored to two-way traffic	• NW 45th St restored to two-way traffic
Nonmotorized	• Some trail design components could create obstacles for trail users	• Some trail design components could create obstacles for trail users	• Some trail design components could create obstacles for trail users • Trail crossing with inactive rail line	• Some trail design components could create obstacles for trail users • Trail crossing with inactive rail line	• Some trail design components could create obstacles for trail users • Trail crossing with inactive rail line

1.9 Alternatives Considered but Not Included

1.9.1 Facility Types

The project would create a safe, direct, and defined multi-use trail for persons of all abilities, improve predictability for both motorized and nonmotorized users, and maintain truck and freight facilities and access along the project alignment. A number of different facility types were initially considered by SDOT, but were removed from further consideration because they did not fully meet the project objectives. The facility types described below would not maintain the same look and feel as the remainder of the BGT, nor would they provide an adequate level of comfort for users of varying abilities and activities. The facilities considered, along with the reasons for no further consideration, are described below. These alternatives did not meet the project objective of a multi-use trail through the study area.

Protected Bicycle Lanes

A protected bicycle lane may have different forms, including cycle tracks, but they are designed exclusively to keep bicycles separated from motor vehicle travel lanes, parking lanes, and sidewalks. A protected bicycle lane does not provide accommodations for pedestrians or other nonmotorized users of all abilities. Pedestrians and other nonmotorized users would have to use an adjacent sidewalk. This type of facility does not meet the project objective of completing the multi-use trail through the study area. It would not maintain the feel of the existing trail on either side of the Missing Link, and would put people running or skating onto a sidewalk, which introduces potential conflicts with people gathering or milling about on sidewalks, or entering or exiting buildings.

Elevated Trail

During public scoping, it was suggested that the trail be elevated such that vehicles can pass underneath, thereby reducing any potential conflict with industrial uses and truck traffic (particularly along Shilshole Ave NW). This alternative was eliminated from further consideration as there is insufficient space to construct a facility that would meet fire code and ADA requirements due to existing development. Additionally, the ramps (at a 5% maximum grade) needed to access an elevated trail would be a minimum of 75 feet long and would require additional right-of-way, greatly reducing the advantages of elevating the trail in proportion to making it accessible to users. Furthermore, the cost estimate to construct an elevated structure of sufficient length to avoid potential conflicts along Shilshole Ave NW or other segments would be 400 to 500% higher than an at-grade structure.

Sharrow

Shared lane markings or “sharrows” guide bicyclists to the safest place on the street to ride and help motorists expect to see and share the lane with bicyclists. Sharrows do not fulfill the objective of the project to develop a multi-use trail for persons of all abilities. Similar to protected bicycle lanes, it meets the needs of some people bicycling, but does not provide accommodations for people walking or jogging, or people not comfortable riding in streets, unprotected from adjacent motor vehicle traffic.

Woonerf

A woonerf is a street where pedestrians and bicyclists have priority over motorists. Originally a Dutch concept, woonerfs are gaining popularity in the United States. Traffic volumes and speeds are low, approximately 5 miles per hour (mph), a minimal amount of public right–of–way is dedicated to vehicles,

and curbs may be eliminated. Traffic volumes and speeds within the study area are too high for this type of facility to be appropriate within the Missing Link corridor, and it was removed from further consideration.

1.10 Comments and Reponses on the DEIS

SDOT published the DEIS on June 16, 2016. A 45-day comments period was open until August 1, 2016 and included public meetings on July 14, 2016 and July 16, 2016. In response to public comment and meetings with area businesses and interest groups, SDOT developed the Preferred Alternative, which combines components previously analyzed in the Build Alternatives. This FEIS contains the responses to the comments in Volume 2.

1.10.1 Public Comment Summary

Comments received on the DEIS included oral testimonies received at the July public meetings, emails, and mailed comment letters. Approximately 270 people attended the public meetings. A total of approximately 4,400 comments (including oral comments) were received during the 45-day public comment period, excluding duplicates. In addition to unique letters or emails, survey form letters were used by the Olympic Athletic Club/Farmers Market group and Cascade Bicycle Club soliciting preference of alternative from approximately 3,400 people. In addition, an email form letter was received by approximately 360 people; these comments were identical or substantively similar, as some commenters customized the template with personal experiences or unique concerns. Figure 1-13 lists the types of comment letters received.

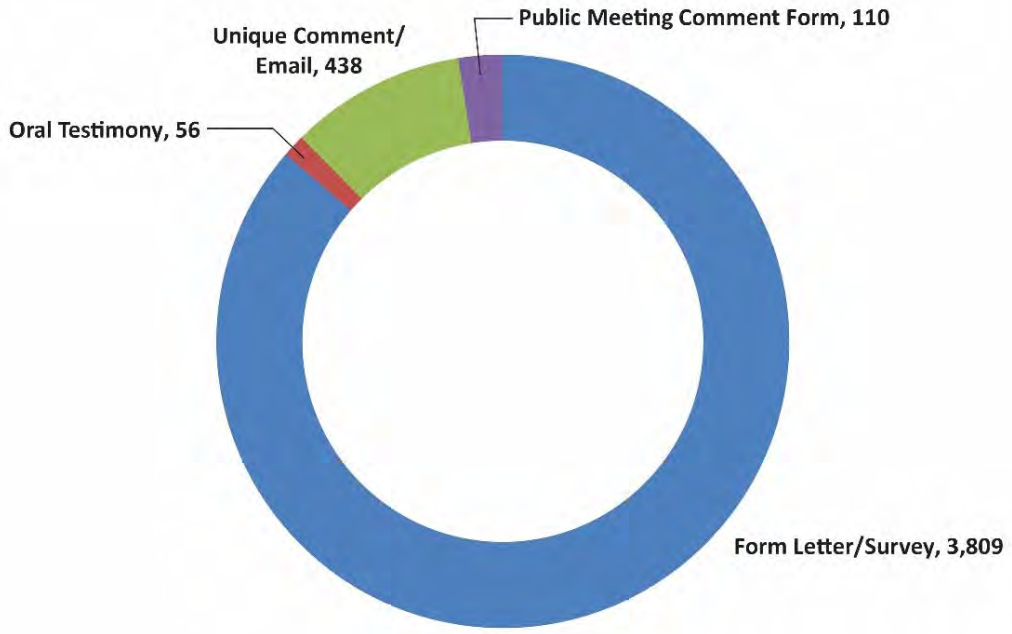

Figure 1-13. Number and Type of Comment Letters Received

1.10.2 **Preferred Route**

The majority of commenters expressed a preference for route. Of all the comments received, 77% preferred the Shilshole South Alternative; 2% each for either the Shilshole North or either Shilshole Alternative; 5% for the Leary Alternative; and 1% for the Ballard Avenue Alternative (as shown in Figure 1-14). A total of 4% expressed a preference for a hybrid alternative, the No Build Alternative, or something other. Approximately 9% of the commenters expressed no preference.

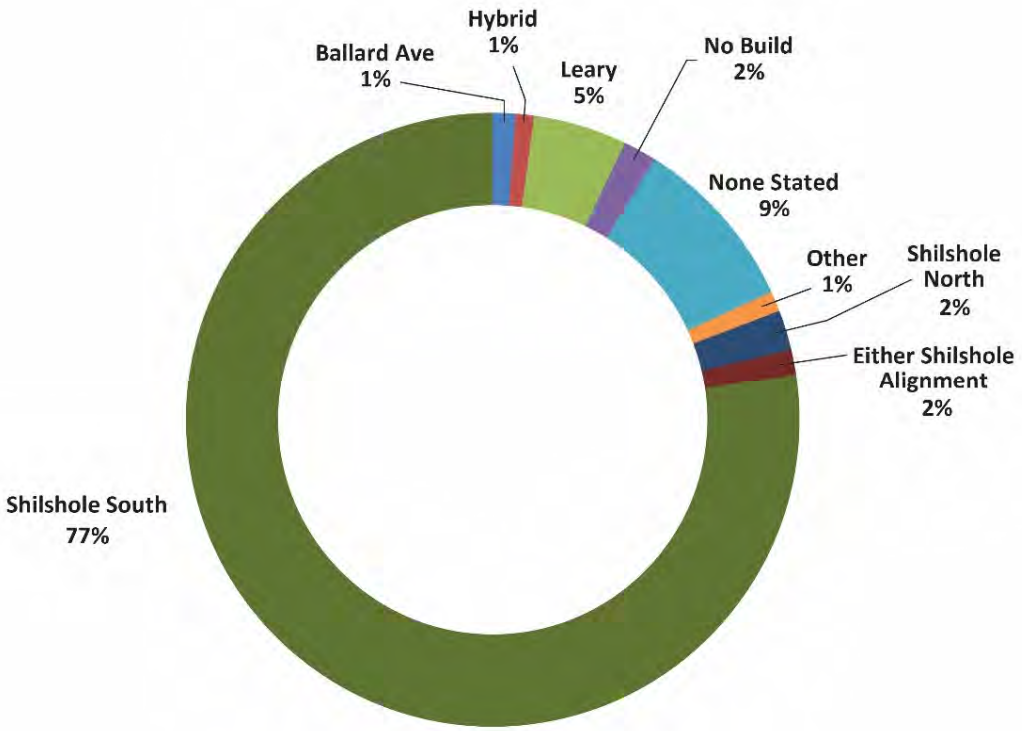

Figure 1-14. Route Preference

1.10.3 **Project Concerns**

Regardless of support or opposition to the project, the most common concerns expressed were related to maintaining the Farmers Market, followed by safety. Trail design, maintaining the industrial corridor, and directness of route were also common concerns noted. Figure 1-15 shows the most common comment topics made in the comment letters. (Note: Many comment letters addressed multiple topics.)

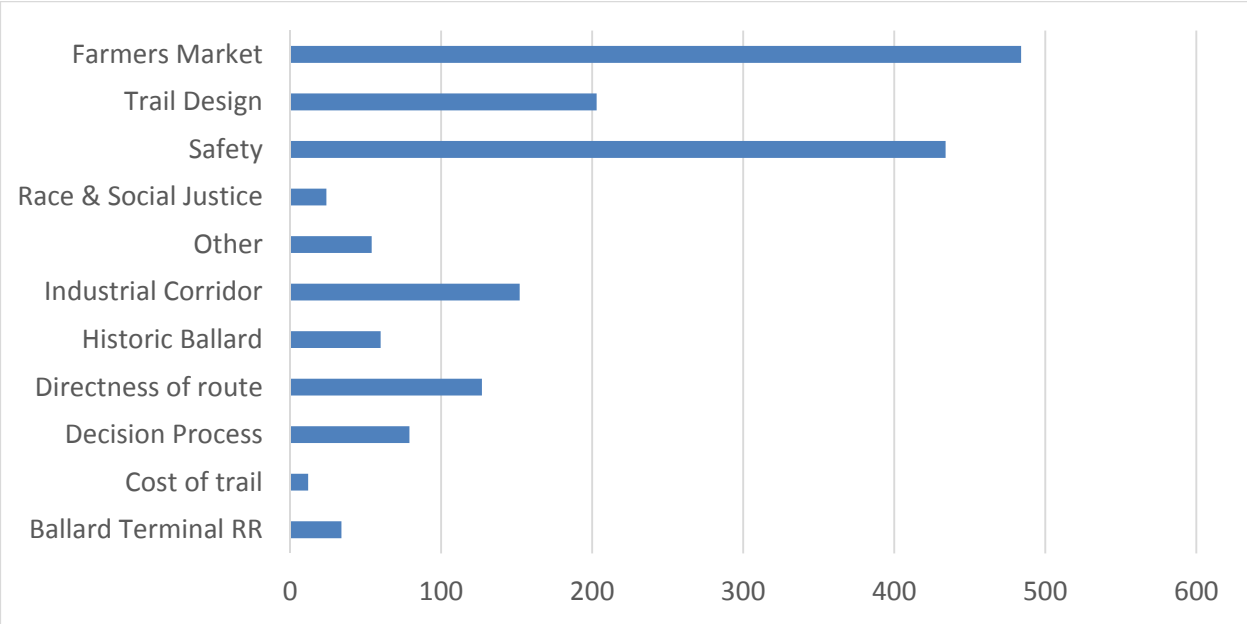

Figure 1-15. Counts of Leading Concerns Raised in the Comment Letters

1.11 Next Steps

SDOT will continue working with property owners, businesses, residents, and other interested parties throughout the design phase of the project and through construction. It is anticipated that the design will be complete by early 2018, and construction of the trail would begin in spring 2018.