# 3.7 Visual and Aesthetic Resources

This section documents the visual environment surrounding the OMF South project alternatives and assesses the extent to which the viewer experience of visual and aesthetic resources may be affected by the project. Visual resources that can contribute to the public's appreciative enjoyment of the environment include natural features and landmarks, like mountain peaks and hills, bodies of water, or stands of trees; constructed features, such as individual buildings or an urban skyline; or entire landscapes, such as a valley ringed by hills.

The visual analysis assesses the existing visual quality and character of the landscape and then considers how typical viewers may respond to what they see around them. Sound Transit adapted FHWA and WSDOT guidelines for this analysis. The FHWA guidelines provide a generally accepted methodology for preparing visual assessments for transportation projects and are appropriate for use on this project. Generally, assessment methods include defining viewsheds from where a build alternative can potentially be seen, characterizing the visual quality in landscape units within the viewshed, and selecting key observation points of the affected areas.

Visual and aesthetic impacts are defined by the extent to which the proposed project would change the environment in terms of visual quality and viewer sensitivity. According to guidance found in the Visual Impact Assessment for Highway Projects (FHWA 1988), the key terms for a visual impact analysis are defined as follows:

**Visual quality** refers to the evaluation of the visual experience of the public and is described in terms of vividness, intactness, and unity. *Vividness* refers to the way landscape components combine in distinctive and memorable visual patterns. *Intactness* refers to whether the natural and human-built visual patterns form a consistent landscape or whether highly contrasting features intrude into the view. *Unity* refers to the visual coherence and compositional harmony of the landscape considered as a whole. Visual character also informs visual quality; it refers to identifiable visual information, including visual elements and major environmental features.

Based on the considerations listed above, different levels of visual quality have been assigned to describe the viewsheds surrounding the project alternatives:

- **High Visual Quality** describes views with vivid, memorable, distinctive features in a landscape with compositional harmony, or where elements of the landscape fit together in a visual pattern that is free from encroaching visual elements that look out of place.
- **Medium Visual Quality** describes views with some unity or compositional harmony between elements of the landscape in which out-of-place visual elements do not substantially alter the perception of the landscape as a unit. These views lack vivid, memorable features and are generally characterized as common or ordinary.
- **Low Visual Quality** describes views that lack a dominant visual character in which views appear disorganized with features that seem out of place or views with some compositional harmony but include eyesore elements that can dominate one's perception.

**Viewer sensitivity** refers to how viewers perceive the environment and what they find important. Viewer sensitivity can be affected by what the viewer is doing; the visual context; and the values, expectations, and interests of the viewer. Viewer exposure, which considers the number of viewers, where viewers are, and how long they are typically in a place, is also important to viewer sensitivity. For example, highway users driving by a site would have less exposure than surrounding neighbors.

For each potential viewer group within the study areas, viewer sensitivity is rated as high, average, or low. High-sensitivity groups include viewers who highly value a particular view, and low-sensitivity groups include viewers who do not regard the visual setting as important to their activities. For example, residential viewers are typically in high-sensitivity groups, as well as persons driving for pleasure, tourists visiting an area to enjoy scenic features, and individuals engaged in recreation activities in parks or on trails. These viewers have a high awareness and sensitivity to their surroundings.

An average sensitivity rating reflects the experience of people who view the visual context as a secondary feature of other activities. These could be persons at work or shopping who may value a pleasant environment but are not at a location for the specific purpose of enjoying the scenery. Low viewer sensitivity generally describes the experience of persons engaged in activities that render the quality of their surroundings as irrelevant or incidental. For example, drivers and vehicle occupants passing through an area are less sensitive to the visual context because they are focusing on features other than the surrounding landscape and generally have an average to low sensitivity.

**Landscape units** are geographic units in which visual quality impacts to viewers are assessed. Landscape units are defined both by viewshed area and landscape type and are generally visually homogenous (i.e. one viewshed and one landscape type). The landscape units encompassing the three OMF South build alternatives are defined by changes in topography, neighborhoods, streets, building types, and tree cover. The viewsheds within the landscape units range in width from half a block to 0.5 mile from the build alternatives.

**Key observation points** were selected within each landscape unit to illustrate views that are typical of the build alternatives, locations from which project features are particularly prominent, or views from sensitive viewpoints that would have views of the operating build alternative. At each key observation point, views of existing conditions are compared with simulated views of the build alternatives.

In addition, potential impacts to Resource Conservation Areas (formerly called “Beautification Areas”) along the I-5 right-of-way were reviewed. These areas were originally acquired under the Highway Beautification Act of 1965 by FHWA and WSDOT for the “restoration, preservation and enhancement of scenic beauty adjacent to the highway.”

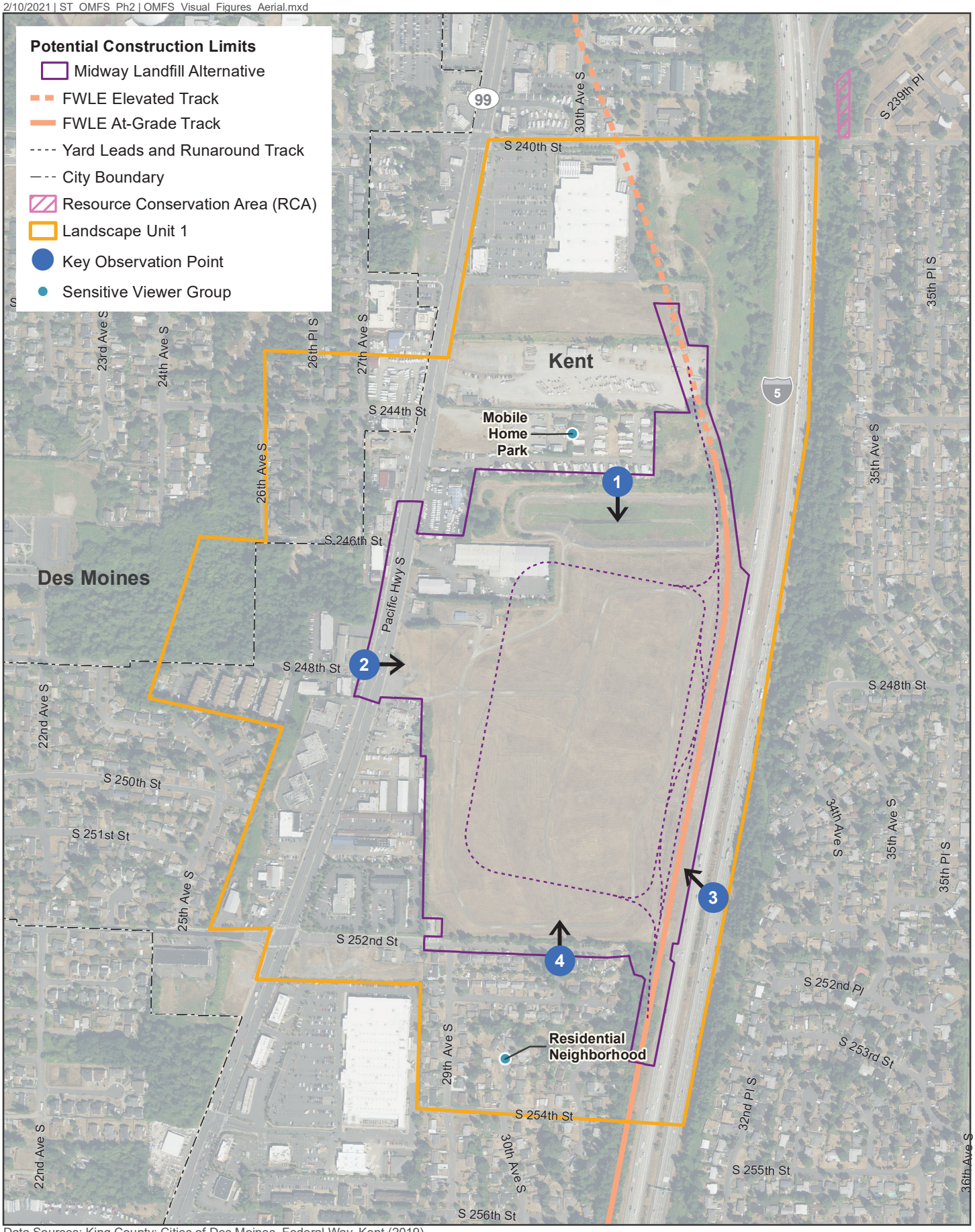
### 3.7.1 Affected Environment

This section describes the affected environment for visual and aesthetic resources by landscape unit and by build alternative. There are three landscape units. One encompasses the Midway Landfill Alternative. The second is the section of the I-5 corridor and adjacent areas where the mainline track serving the South 336th Street and South 344th Street alternatives, including the mainline tail tracks, would be built. The third landscape unit encompasses the OMF sites of the South 336th Street and South 344th Street alternatives. Table 3.7-1 below lists the landscape units and describes the visual quality rating and viewer groups for each.

Most views of the build alternatives are foreground views from vantages immediately adjacent to the sites and are typically within 400 to 500 feet. Views of the sites from beyond 500 feet and from middle-ground and background vantages are mostly blocked by either vegetation, terrain, buildings, or infrastructure. Figures 3.7-1 through 3.7-4 show each build alternative, the associated landscape unit, and the location of the key observation points.

## Table 3.7-1 Existing Visual Quality for the OMF South Alternatives

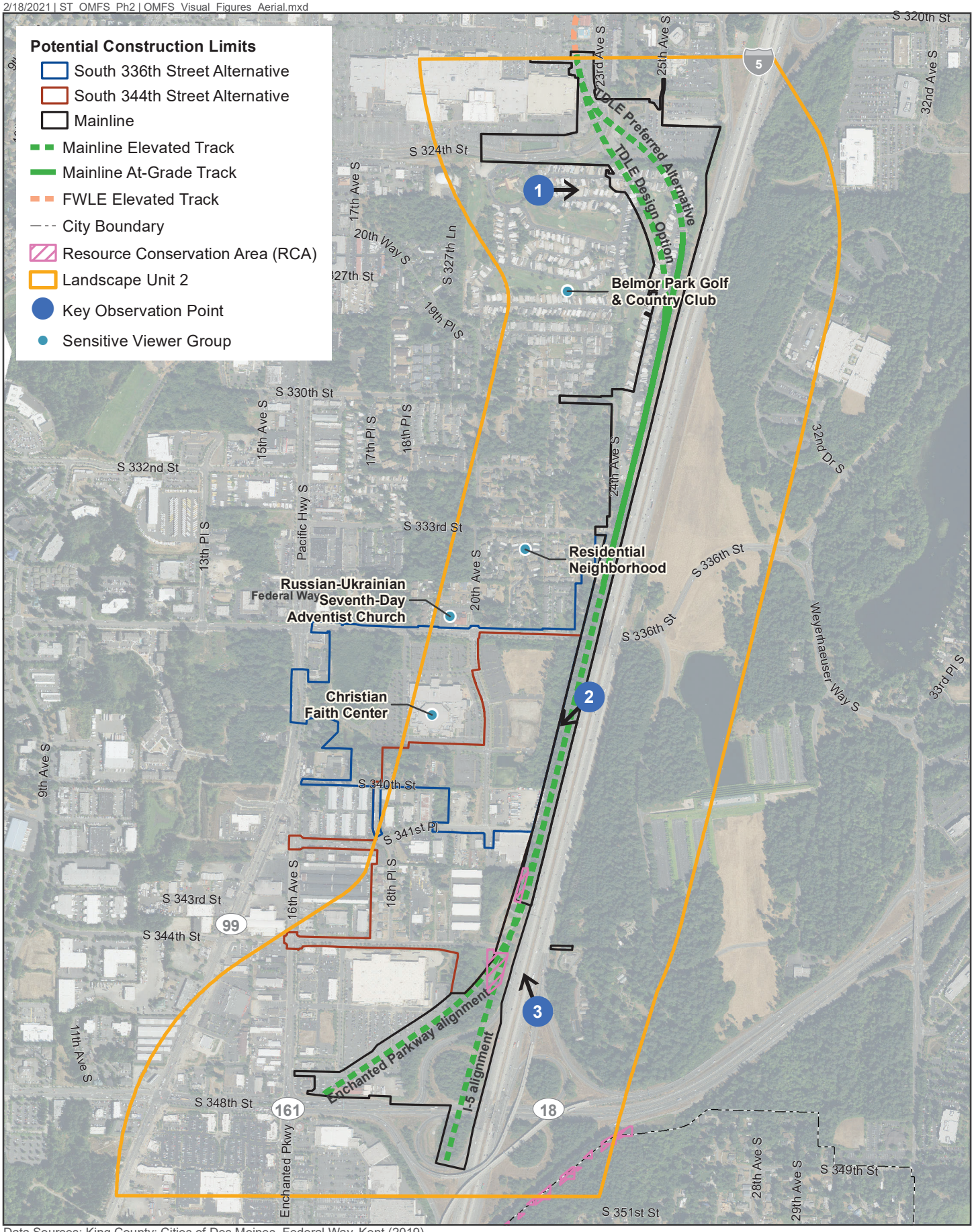
| Alternative | Landscape Unit | Vividness | Intactness | Unity | Existing Visual Quality | Predominant Viewer Groups (Sensitivity) |
|---|---|---|---|---|---|---|
| Midway Landfill | Site: Landscape Unit 1 | Medium | Low to Medium | Low to Medium | Medium | Residential (High)<br>I-5 and SR 99 Drivers (Low)<br>Business Patrons and Workers (Low to Medium)<br>Pedestrians and Cyclists (Medium) |
| South 336th Street | Mainline: Landscape Unit 2 | Medium | Low to Medium | Medium | Medium | Residential (High)<br>I-5 Drivers (Low) |
| | Site: Landscape Unit 3 | Low to Medium | Medium | Medium | Medium | Residential (High)<br>I-5 and SR 99 Drivers (Low)<br>Business Patrons and Workers (Medium)<br>Pedestrians and Cyclists (Medium) |
| South 344th Street | Mainline: Landscape Unit 2 | Medium | Low to Medium | Medium | Medium | Residential (High)<br>I-5 Drivers (Low) |
| | Site: Landscape Unit 3 | Low to Medium | Low to Medium | Low to Medium | Low to Medium | Residential (High)<br>I-5 and SR 99 Drivers (Low)<br>Business Patrons and Workers (Medium)<br>Pedestrians and Cyclists (Medium) |




Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

**FIGURE 3.7-1**
Visual Conditions and Key Observation Points
Midway Landfill Alternative

*OMF South*



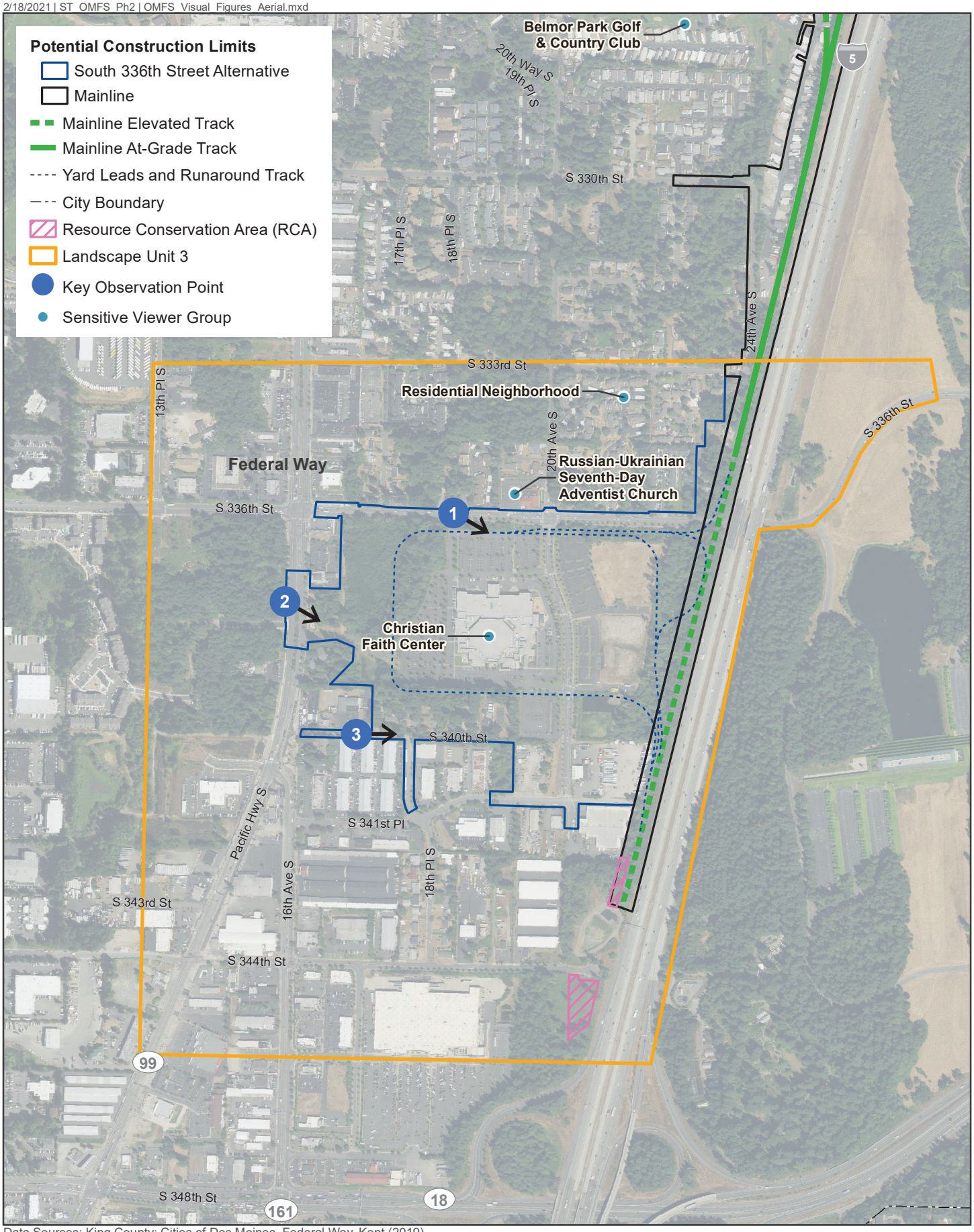

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

**FIGURE 3.7-2**
Visual Conditions and Key Observation Points
Mainline Track Options

*OMF South*



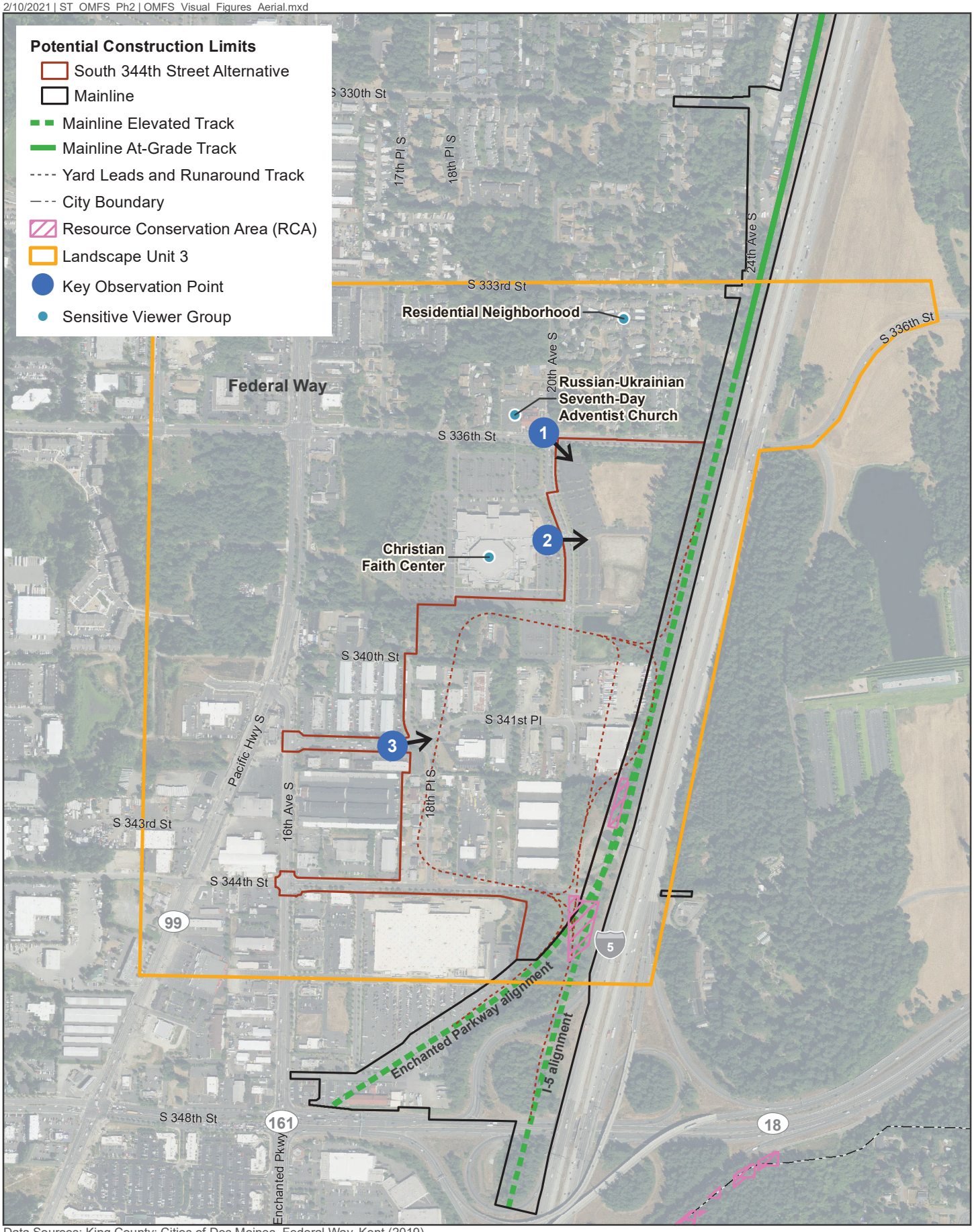

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

**FIGURE 3.7-3**
Visual Conditions and Key Observation Points
South 336th Street Alternative

*OMF South*




Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

**FIGURE 3.7-4**
Visual Conditions and Key Observation Points
South 344th Street Alternative

*OMF South*

#### 3.7.1.1 Midway Landfill Alternative

Landscape Unit 1 centers on the Midway Landfill. It is defined by the following limits: S 240th Street to the north, S 254th Street to the south, 26th Avenue S to the west, and the I-5 roadside side vegetation buffer to the east (Figure 3.7-1).

Within Landscape Unit 1, the Midway Landfill Alternative OMF site is bordered to the north by S 244th Street and the Midway RV and Mobile Home Park. I-5 borders the site on the east, with a continuous vegetative buffer east of the interstate screening views of the project site from residential neighborhoods to the east of I-5. To the south, the site is bordered by S 252nd Street, a residential neighborhood, and a Fred Meyer superstore to the southwest. SR 99 and automobile-dependent businesses with parking areas, including hotels, restaurants, auto mechanics, and other small commercial uses in strip mall developments, border the site to the west. Residential neighborhoods lie further west beyond the SR 99 commercial zone.

The site itself is a closed landfill and stands out as distinct from surrounding areas with an open, gently rolling landscape covered in tall grass. Gravel access roads and landfill gas collection piping crisscross the site, and a stormwater detention pond is located on the northern part of the property. Observed on its own, the site would be rated a higher visual quality with uniform fields providing higher vividness, intactness, and unity, and a different visual character from its surroundings, which are mainly developed. But as seen by most viewers, including the more sensitive residential viewers to the north and south, views include a mix of onsite and offsite built and natural elements that give the broader landscape unit medium vividness and low to medium visual intactness and unity.

Lighting within the study area consists of limited exterior lighting for the landfill operations area in the northwest corner of the site, lighting for businesses adjacent to and roadway lighting on SR 99, interior and exterior lighting and street lighting associated with residential areas to the north and south of the site, and high-mast lighting on I-5 to the east.

Elevation change across the site and mature vegetation bordering the site and lining local roadways limits views from the north and south. The landfill is very open to and visible from I-5. Longer views of the site from neighborhoods to the east of I-5 are blocked by vegetative buffer and a noise wall. The uncluttered openness of the site contrasts with the visual character of the surrounding landscape and is likely considered to be a distinctive and dominant visual feature by viewers. The rolling hills and open vistas would be considered a positive visual element to many viewers.

I-5 is a busy interstate, with many motorists passing through each day. Typical of major interstate highways, I-5 in this area is a divided highway with four north and south travel lanes each way, along with shoulders, cleared areas adjacent to the shoulder, and vegetated areas beyond. The view on both sides of the interstate is of mature, mainly native mixed forest dominated by conifer trees with some open, tall grass areas.

For motorists and passengers traveling through the corridor, the vegetation and open grass areas provide for a pleasant backdrop with higher visual intactness and unity. The mature vegetation along the edge of I-5 serves as a backdrop for many adjacent neighborhoods that, along with noise walls in some locations, provides a visual barrier to the freeway. Where I-5 can be seen from adjacent areas, its presence influences the character of adjacent land uses and the visual quality of surrounding areas.

### 3.7.1.2 Mainline Tracks

Landscape Unit 2 encompasses the mainline tracks that would connect the South 336th Street and South 344th Street alternatives to the terminus of FWLE. It includes two mainline design options to the north, the TDLE Preferred Alternative and TDLE Design Option, and two tail track options for the South 344th Street Alternative to the south, the Enchanted Parkway alignment and the I-5 alignment (Figure 3.7-2). This area is well south of and separate from the Midway Landfill Alternative and shares adjacency with the South 336th Street and the South 344th Street alternatives. However, the visual character of the mainline study area is unique and distinct from that of the OMF sites, and therefore it is discussed as a separate landscape unit.

The northern portion of Landscape Unit 2 is near the future Federal Way Transit Center Station and includes the Federal Way downtown area, the Federal Way Performing Arts Center, The Commons at Federal Way shopping center, and the Federal Way/S 320th Street Park-and-Ride. The central portion includes residential areas, including the private Belmor mobile home park and golf course south of S 324th Street and the visually prominent BPA transmission line towers. The southern portion of this area extends south of S 348th Street and includes the I-5/SR 18 interchange and a shopping center with big-box and medium-scale retail shops.

Belmor residents are high-sensitivity viewers. Relatively unobstructed views of Mount Rainier can be seen from locations in Belmor. The residents between Belmor and S 336th Street would have high visual sensitivity as well, with views of mature trees within and surrounding the neighborhood. The vividness, intactness, and unity ratings of Belmor and the residential areas north of S 336th Street are medium, but due to a lower rating for the southern portion of the Landscape Unit 2, the entire landscape unit is rated medium-low in vividness, intactness, and unity.

I-5 runs adjacent to the mainline and is included in Landscape Unit 2. Its visual character is similar to that described above for the Midway Landfill Alternative. The mature vegetation along the edge of I-5 serves as a backdrop for many adjacent neighborhoods that, along with noise walls in some locations, provides a visual barrier to the freeway. Where I-5 can be seen from adjacent areas, its presence influences the character of adjacent land uses and the visual quality of surrounding areas.

The southern tail track alignments extend south past S 348th Street to just south of the I-5/SR 18 interchange. This area includes two WSDOT-designated Resource Conservation Areas and is bordered by the I-5/SR 18 interchange on the east and south and a retail store parking lot on the west (Figure 3.7-2). The northernmost of the two Resource Conservation Area is approximately 0.3 acre and is covered in mature native trees. The second area, 500 feet to the south, is approximately 1 acre and is primarily covered in Himalayan blackberry, with just a few trees. Both are seen as a green background by travelers on I-5 and visitors to the stores on the west.

Lighting within the landscape unit varies from the higher levels of commercial and streetscape lighting in the Federal Way Downtown area, to more subdued neighborhood lighting in Belmor, to the I-5 corridor, which is continuously illuminated from high-mast overhead lighting.

### 3.7.1.3 South 336th Street Alternative

The South 336th Street Alternative is located within Landscape Unit 3, which encompasses the combined areas of the South 336th Street and South 344th Street alternative OMF sites and their surroundings. Landscape Unit 3 is defined by the following limits: S 333rd Street to the

north; S 344th Street and a commercial business district to the south; retail businesses and residential and light industrial land uses to the west; and I-5 to the east (Figure 3.7-3).

The South 336th Street OMF site itself is bounded on the north by S 336th Street, with residential areas beyond, and to the east by the I-5 corridor, which is lined with mature conifer trees. The site is bounded on the west by SR 99 and commercial properties. To the south, the site borders S 340th Street and S 341st Place and a mix of warehouses, light industrial land uses, and five residential properties.

The site is primarily occupied by the approximately 55-foot tall building for the Christian Faith Center church and school, with surrounding surface-level parking west of 20th Avenue S and overflow parking lots, a soccer field, and open areas east of 20th Avenue S. Given the mix of visual character elements of parking areas, landscaping, and more natural perimeter vegetation along with the building scale, the Christian Faith Center campus has medium visual intactness and unity. The southern portion of the site, with a mix of building forms, scales, and uses, has a lower level of unity and intactness. Overall views in the area lack vividness, and the overall visual quality is medium.

Lighting visible within the study area consists of exterior lighting for the Christian Faith Center parking areas; limited interior lighting and street lighting associated with residential areas to the north and commercial areas to the south of the site; and high-mast lighting on I-5 to the east of the site that is somewhat obscured by mature vegetation next to the interstate.

Viewers of the OMF site include nearby residents in surrounding neighborhoods; patrons and workers at nearby commercial and industrial establishments; motorists, pedestrians, and cyclists using nearby streets; and motorists driving on I-5.

As described previously, the South 336th Street Alternative mainline would connect the OMF site to the terminus of FWLE at S 320th Street. The mainline tail tracks would continue past the southern boundary of the OMF site and would terminate between S 341st Place and S 344th Street (Figure 3.7-3). The affected environment for the mainline and tail tracks is defined and discussed above as Landscape Unit 2. The northern lead tracks connecting the OMF site to the mainline would be located near S 336th Street between the proposed OMF site and I-5 to connect the OMF site to the mainline. This area is primarily vegetated and is visible by I-5 motorists and residents of surrounding neighborhoods between S 333rd Street and S 336th Street. Similarly, the southern lead tracks would connect to the mainline between S 340th Street and S 341st Place through a vegetated area between the OMF site and I-5.

#### 3.7.1.4 South 344th Street Alternative

The South 344th Street Alternative partially overlaps with the South 336th Street Alternative within Landscape Unit 3 (Figure 3.7-4). A portion of the OMF site extends north to S 336th Street, with residential areas beyond, and to 20th Avenue S on the west, with the Christian Faith Center building and parking areas beyond. The entire site is bordered on the east by the I-5 corridor, which is lined on both sides with mature conifer trees, and the southern boundary of the site is defined by S 344th Street. The lower central portion of the site is bounded on the west by warehouse and light industrial properties and by the Christian Faith Center to the north.

The northern portion of the site, which covers the Christian Faith Center campus property east of 20th Avenue S, is visually open and uncluttered and so has medium levels of intactness and unity. The main southern portion of the site contains a mix of building forms and uses and has a lower level of unity and intactness. Overall views in the area lack vividness, and the overall visual quality is medium to low.

Viewers of the OMF South site include nearby residents in surrounding neighborhoods; patrons and workers at nearby commercial and industrial establishments; motorists, pedestrians, and cyclists using nearby streets; and motorists driving on I-5.

The South 344th Street Alternative includes lead tracks connecting to the mainline to the north and south of the site. The lead tracks would be constructed primarily through vegetated areas adjacent to I-5, which are visible from the interstate and from adjacent business and industrial properties. The South 344th Street Alternative would have the same mainline connection as the South 336th Street Alternative, with tail tracks extending south past the OMF site to S 348th Street (Figure 3.7-4). The affected environment for the mainline and tail tracks is defined and discussed above as Landscape Unit 2.

As with the South 336th Street Alternative, lighting visible within the study area consists of exterior lighting for the Christian Faith Center parking areas and high-mast lighting on I-5 to the east. The high-mast lighting along I-5 is somewhat obscured by the mature vegetation adjacent to the interstate. Due to its proximity to the commercial areas to the south, the South 344th Street Alternative is subject to higher lighting levels as compared to the South 336th Street Alternative, which is next to residential areas to the north with lower lighting levels.

## 3.7.2 Environmental Impacts

### 3.7.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to visual and aesthetic resources from construction or operation of OMF South would not occur. FWLE will impact visual resources in the Midway Landfill Alternative study area by constructing the elevated mainline to the east of the landfill next to I-5 and by removing some mature vegetation that screens views of I-5 south of the landfill. Other planned projects could also change views in the area. Because TDLE would open after OMF South, impacts associated with TDLE that would overlap with OMF South, such as the mainline tracks that would connect to the South 336th Street and South 344th Street alternatives, are addressed within the build alternative impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Impact Analysis.

### 3.7.2.2 Long-Term Impacts

This section describes the potential visual changes that could occur as a result of the OMF South build alternatives and qualitatively assesses the level of visual change and visual quality for each landscape unit. Simulations were prepared as part of the visual assessment. The simulations use photographs of existing views from key locations from around each build alternative. The simulations are conceptual; the building, wall and landscaping details would be determined in the final design phase.

Visual impacts are defined as a change from a higher visual quality to a lower visual quality where sensitive viewers have exposure to the view. The following criteria are used to characterize the degree of visual quality change from existing conditions in terms of changes in the elements of vividness, intactness, and unity.

- **High change and impact to visual quality** would remove existing features and/or introduce visually prominent features that alter the visual character of the area for sensitive viewers with exposure to the change. High changes include removing dense mature vegetation that contributes to high or moderately high visual quality or vegetation that provides effective screening of less attractive views. High changes may also include prominent structures that are larger in scale or higher than surrounding visual features,

including views of trains passing by. High visual change could have high, medium, or low visual impact, depending on the level of sensitivity and exposure of viewers effected.

- **Medium change and impact to visual quality** would alter visual features but not in a way that would be perceived as intrusive or incompatible by most viewers, and it would not substantially change intactness and visual unity. A medium change can result from the removal of vegetation that would not affect the extent to which highway or light rail features are screened or buffered and would not render features more visible or prominent. Medium visual change would have medium or low visual impact, depending on the level of sensitivity and exposure of viewers effected.
- **Low change and impact to visual quality** generally includes relatively minor new features or relatively minor alteration of existing features, such as vegetation cover. Replacing noise walls with similar-scale walls and/or the inclusion of light rail facilities would result in minor changes in intactness and visual unity. In some cases, physically prominent new features might result in a low change in visual quality if the existing visual context already has low visual quality. Low visual change would generally have low visual impact, depending on effected viewers.

### Impacts Common to All Build Alternatives

All the build alternatives would add new at-grade buildings, elevated light rail track, overhead catenary wires, at-grade parking lots and access roads, as well as tree and shrub landscape plantings and fences around the perimeter with limited-access gates. On-site lighting would be as prominent or more prominent than existing lighting at the alternative sites; however, light sources would be shielded to control glare and light escaping from the site.

### Midway Landfill Alternative

The primary viewers of the Midway Landfill Alternative OMF site include the residents in the neighborhood south of the site and residents of the Midway RV and Mobile Home Park north of the site (high-sensitivity viewers) and drivers on I-5 and SR 99 (lower-sensitivity viewers). Other viewers include patrons and employees of businesses along SR 99, pedestrians, and cyclists — all of whom are considered to have medium or low viewer sensitivity.

The current site consists of a large closed and capped landfill with rolling grass terrain and a stormwater detention pond. The proposed facility would introduce prominent buildings and retaining wall structures. Retaining walls are needed to create the level areas required for operations on this sloping site. This would constitute a high degree of change when compared with existing conditions; however, the resulting development would not be drastically out of character with the visual character of the broader landscape unit east and west of the site.

Lead tracks would be seen by residential neighbors in the mobile home park to the north as well as by nearby residents in the neighborhood to the south. The lead tracks would appear somewhat closer to viewers than the mainline. However, they would be at essentially the same elevations and, therefore, should not appear distinct or prominent separate from the mainline track.

Figures 3.7-5 through 3.7-8 show visual simulations of the proposed facility from four key observation points around the site.


*Existing Condition* *Simulation of Proposed Conditions*

**Figure 3.7-5 Midway Landfill Alternative Key Observation Point 1**

Figure 3.7-5 provides an approximation of the residential view looking south from the Midway RV and Mobile Home Park across the stormwater detention pond to the OMF site. The photographer was unable to access the mobile home park, so this picture was taken from the northern edge of the landfill property. An existing fence and tree line that separate the landfill and the mobile home park are not visible because they are located directly behind the photographer in this view.

The residential viewers to the north of the site would have a high sensitivity to changes, and the proposed retaining walls for the site development would result in a medium to high degree of change to visual intactness, vividness, and unity in this view. However, the retention of the existing fence and vegetation along the property boundary would provide foreground visual screening. New landscaping near the proposed on-site structures would further screen and mitigate impacts to these views. Viewers would be over 300 feet from the wall, which would lower the wall's visual prominence. Together this would result in a low to medium visual impact for views from this location.

*Existing Condition* *Simulation of Proposed Conditions*

**Figure 3.7-6 Midway Landfill Alternative Key Observation Point 2**

Figure 3.7-6 presents the pedestrian and driver views of the facility and wall from the corner of S 248th Street and SR 99, looking east. Views of the site from SR 99 by low- to medium-sensitivity viewers are the most prominent due to the lack of vegetation. The proposed retaining walls and visible elements beyond would result in a medium to high degree of change to visual intactness and unity in this view. Views of the wall seen in the simulation would be enhanced

with aesthetic treatments to the wall surface as well as with tree and shrub plantings to screen the view of the wall. This would result in a low to medium level of impact.

*Existing Condition*

*Simulation of Proposed Conditions*

**Figure 3.7-7 Midway Landfill Alternative Key Observation Point 3**

Figure 3.7-7 represents the facility building and wall that a driver would see looking northwest as they drive northbound on I-5. Travelers on I-5, who are considered to have low viewer sensitivity, would experience a low level of visual change or impact because the future FWLE elevated mainline track in the foreground will obstruct views of development on the site. The FWLE mainline will be constructed before OMF South and would therefore be part of the existing conditions.

*Existing Condition*

*Simulation of Proposed Conditions*

**Figure 3.7-8 Midway Landfill Alternative Key Observation Point 4**

Figure 3.7-8 shows the view from the closest houses in the residential neighborhood just south of the Midway Landfill. This photo was taken in the middle of S 252nd Street, at the intersection of 30th Avenue S, looking north. Residential viewers to the south of the site would have a high sensitivity to changes. But retention of some existing screening vegetation and planting of new screening vegetation would mitigate impacts to these views and would result in a low to medium visual impact to visual intactness and unity for these areas. Shielding of light sources would be used to control glare and light escaping from the site.

*Summary of Midway Landfill Alternative Impacts*

Overall, the Midway Landfill Alternative would result in a medium impact to visual quality. Visual features would be altered in a way that could be perceived as intrusive or incompatible by higher-sensitivity residential viewers to the north and south but would be would not substantially change intactness and visual unity with surroundings as seen by the lower-sensitivity viewers to the east from I-5 or the west along SR 99. Preservation of existing vegetative screening, in combination with planting of new trees and shrubs, would cause the residents to the north and south of the site (as sensitive viewers) to have similar views of the Midway Landfill Alternative as before the project. The FWLE mainline will be constructed before OMF South and would therefore be part of the existing conditions. Therefore, the views from I-5 would not change much with the Midway Landfill Alternative because views of the site will include and be somewhat obscured by the FWLE mainline in the foreground.

**Mainline Tracks**

Viewers of the mainline tracks include residents at Belmor and residential neighborhoods to the south of Belmor (high-sensitivity viewers), drivers on I-5 (low-sensitivity viewers), and patrons and employees of businesses (low-sensitivity viewers). The area currently consists of residential areas north of S 336th Street and mostly vacant or industrial land uses to the south. The vegetation is mostly mature and includes large trees and various other mature shrubs, as well as some landscaped areas on the east side of the Christian Faith Center campus. Figures 3.7-9 through 3.7-11 show visual simulations of the proposed facility from three key observation points along the mainline.

*Existing Condition*

*Simulation of Mainline with TDLE Preferred Alternative*

*Existing Condition*

*Simulation of Mainline with TDLE Design Option*

**Figure 3.7-9 Mainline Tracks Key Observation Point 1**

Figure 3.7-9 represents the view Belmor residents have of the TDLE Preferred Alternative and TDLE Design Option for the mainline. The mainline tracks would connect to the South 336th Street and South 344th Street alternative OMF sites roughly 0.75 mile south of this location. The elevated mainline tracks would have a high impact on the visual intactness, unity, and vividness of this view for the high-sensitivity viewers at Belmor. While the project would retain vegetation beyond the elevated mainline in this view and plant new trees, the retained and new vegetation would not fully block views of the elevated mainline tracks due to their height and the clearances required around the tracks.

*Existing Condition* *Simulation of Proposed Conditions*

**Figure 3.7-10 Mainline Tracks Key Observation Point 2**

Figure 3.7-10 presents the driver viewpoint looking southwest on southbound I-5. The South 336th Street and South 344th Street alternative OMF sites would be just out of sight to the right of this view, where the grade drops down west of the interstate. The mainline would have a high impact on the visual intactness, unity, and vividness of this view for low-sensitivity viewers traveling I-5. Potential exists to retain vegetation west of the elevated mainline in this view and to plant new trees, but retained and new vegetation would not be very visible in this view because it would be on the opposite side and downslope from the mainline.

*Existing Condition* *Simulation of Proposed Conditions*

**Figure 3.7-11 Mainline Tracks Key Observation Point 3**

Figure 3.7-11 captures the driver viewpoint looking northwest at the rendering of the mainline and facility from the entrance ramp, merging onto northbound I-5. The South 344th Street Alternative OMF site is behind the trees on the other side of I-5. Building detail will be

determined during the final design phase. The project would have a low impact on the visual intactness, unity, and vividness of this view for low-sensitivity viewers traveling I-5.

*Summary of Mainline Tracks Impacts*

Overall, the mainline tracks would result in a medium-high impact to visual quality. The elevated mainline track would impact a portion of the Belmor community, and mobile homes would be displaced as a result of acquisitions required for construction and maintenance of track facilities. The mainline would impact residents' views from both their homes and when using the private golf course. To a lesser extent, the mainline would also be visible to some in the residential communities between Belmor and the existing Christian Faith Center (which would be displaced by the South 336th Street Alternative).

Additionally, vegetation near I-5 and along the South 344th Street Alternative tail track alignments would be removed, although some native vegetation could be expected to remain, depending on final design clearing requirements. Mitigation measures focused on Hylebos Creek could include planting vegetation in the creek buffer area (see Section 3.10, Ecosystem Resources). This would also add to a vegetative screen from I-5. These changes would have a high impact to visual intactness and unity to the sensitive viewers in the Belmor community and an overall medium impact to visual unity to low-sensitive viewers in other areas along the mainline track, including adjacent to the southern tail tracks.

Please note that the mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

**South 336th Street Alternative**

Viewers of the South 336th Street Alternative site include residents to the north of the site (high-sensitivity viewers), visitors to and employees at the Russian-Ukrainian Seventh-Day Adventist Church (medium-sensitivity viewers), travelers on I-5 (low-sensitivity viewers), and patrons and employees of nearby businesses to the south and southwest of the site (low-sensitivity viewers).

The site is presently occupied by the Christian Faith Center campus, with surface-level parking for the centrally located main building and overflow parking and a soccer field across 20th Avenue S in the eastern portion of the site. The landscaping in the parking areas and streetscape trees along 20th Avenue S, as well as mature trees and much of the vegetation on the perimeter of the site, would be cleared. The north side of the site would have two existing driveways removed and replaced with vegetation and fencing. The current drive entry on SR 99 would be widened to install a guard house and gate.

Lead tracks would mostly be contained within the South 336th Street Alternative OMF site boundary, with the exception of a small segment of track that would pass over S 336th Street to connect with mainline track near I-5. Lead tracks on the southern end of the site would also be mostly contained within the site boundary, with a small segment passing over vacant and industrial parcels. These changes would not lead to additional visual impacts beyond those listed above under Impacts Common to All Build Alternatives.

Figures 3.7-12 through 3.7-14 show visual simulations of the proposed facility from three key observation points around the site.

*Existing Condition* *Simulation of Proposed Conditions*

**Figure 3.7-12 South 336th Street Alternative Key Observation Point 1**

Figure 3.7-12 captures the view of the facility along S 336th Street, looking southeast from across the street. This represents the site as it would be seen by viewers in residences north of the site who would have a high sensitivity to change to this view. While existing trees and shrubs would be removed, new street trees and vegetation planted nearer to the proposed on-site structures would reduce impacts. The result would be a medium impact to visual intactness and unity for views from this location.

*Existing Condition* *Simulation of Proposed Conditions*

**Figure 3.7-13 South 336th Street Alternative Key Observation Point 2**

Figure 3.7-13 shows a shared pedestrian and driver viewpoint looking east from the far side of the sidewalk on the west side of SR 99. The majority of the OMF site would be hidden by existing trees that would remain north and south of the proposed drive entry. Changes to the site entrance, including driveway realignment, removal of church signs, and addition of a new guard station, would result in a low visual change as seen by low- to medium-sensitivity viewers who are mainly drivers and nonmotorized users along SR 99.

*Existing Condition* *Simulation of Proposed Conditions*

**Figure 3.7-14 South 336th Street Alternative Key Observation Point 3**

Figure 3.7-14 represents the driver viewpoint looking east on S 340th Street. The proposed retaining walls for the site development would result in a medium to high degree of change to visual intactness, vividness, and unity in this view. However, new vegetation planted nearer to the proposed on-site structures would screen and mitigate impacts resulting in a low to medium visual impact for views from this location.

*Summary of South 336th Street Alternative Impacts*

Overall, the South 336th Street Alternative would result in a medium impact to visual quality. Visual features would be altered in a way that could be perceived as intrusive or incompatible by higher-sensitivity residential viewers to the north. However, alterations to visual features would not substantially change intactness and visual unity with surroundings to the south and west and would maintain consistency with existing conditions.

**South 344th Street Alternative**

Viewers of the South 344th Street Alternative include residents to the north (high-sensitivity viewers), visitors and employees of the Christian Faith Center and the Russian-Ukrainian Seventh-Day Adventist Church (medium-sensitivity viewers), and travelers on I-5 (low-sensitivity viewers). Other viewers include residents of two properties directly west of the site (high-sensitivity viewers) and patrons and employees of businesses to the south and west of the proposed alternative site (low-sensitivity viewers).

The visual impacts from the mainline would be the same as those of the South 336th Street Alternative at the north end of the site. Additionally, the two Resource Conservation Areas in the study area would be impacted by either of the alignments for the mainline tail track in the area northwest of the I-5/SR 18 interchange (see Figure 3.7-4). The tail tracks would be built adjacent the eastern boundary of the northernmost Resource Conservation Area, which could impact some vegetation, and pass directly through and partially impact the southernmost area.

The majority of the proposed OMF site is south of the Christian Faith Center and consists of two residential streets with approximately 20 residences. The remainder of the southern area is occupied with various office and warehouse light industrial buildings and associated surface-level parking. Site development would result in a low degree of visual quality change compared with the existing commercial area, which has built elements and buildings of similar scale to those that surround the site to the south and southwest. Site development in the northern portion of the site would replace parking and open areas with new structures in proximity to

residential viewers north of S 336th Street and to visitors and employees of the Christian Faith Center and the Russian-Ukrainian Seventh-Day Adventist Church. The increased scale of development in this area would result in a medium degree of change.

Lead tracks would be contained within the South 344th Street Alternative OMF site and would require clearing of some mature vegetation along I-5. Therefore, the OMF site would have visual impacts for low-sensitivity viewers from I-5 beyond those listed above under Impacts Common to All Build Alternatives.

Figures 3.7-15 through 3.7-17 show visual simulations of the proposed facility from three key observation points around the OMF site.

*Existing Condition* *Simulation of Proposed Conditions*

**Figure 3.7-15 South 344th Street Alternative Key Observation Point 1**

Figure 3.7-15 represents the driver viewpoint looking southeast from S 336th Street and 20th Avenue S from the opposite side of the street from the facility. This view represents the site as would be seen by viewers in residences north of the site who would have a high sensitivity to change to this view. Architectural design and façade treatments on the buildings would reduce visual massing of those structures, and retention of existing or new vegetation planted nearer to the proposed on-site structures would screen and mitigate impacts to these views. Together this would result in a low impact to visual intactness and unity for views from this location.

*Existing Condition* *Simulation of Proposed Conditions*

**Figure 3.7-16 South 344th Street Alternative Key Observation Point 2**

Figure 3.7-16 shows the pedestrian viewpoint of OMF South looking east from the east entrance to the Christian Faith Center. Views for congregants and employees of the Christian Faith Center would include new buildings and fencing. The presence of the proposed OMF buildings and fencing would result in a medium to high degree of change in visual intactness, vividness, and unity for this view. However, new vegetation planted nearer to the proposed on-site structures would screen and mitigate impacts resulting in a medium visual impact for views from this location.

*Existing Condition* *Simulation of Proposed Conditions*

**Figure 3.7-17 South 344th Street Alternative Key Observation Point 3**

Figure 3.7-17 presents a rendering of OMF South looking east on S 341st Place from the driver viewpoint. Changes to the site entrance would result in low visual changes as seen by low- to medium-sensitivity viewers, who are mainly drivers and nonmotorized users along on S 341st Place.

*Summary of South 344th Street Alternative Impacts*

Overall, the South 344th Street Alternative would result in a medium impact to visual quality because of the increased scale of constructed features. The customers and employees (medium-sensitivity viewers) and residents (high-sensitivity viewers) next to the southern portion of the site would experience a low degree of change. The residents and church visitors to the north of the site would have views similar to what they have now, given that existing vegetation would be retained and new trees and shrubs would be planted to provide a vegetative screen along S 336th Street. Views from the Christian Faith Center would include new buildings and fencing. Impacts to these views would be reduced with vegetative screening, such as the planting of trees and shrubs. Like the South 336th Street Alternative, views from I-5 could be affected by vegetation removal.

### 3.7.2.3 Construction Impacts

There would be temporary visual impacts due to construction for the viewer groups identified for each build alternative. Construction would last approximately 3.5 years for the South 336th Street and South 344th Street alternatives and up to approximately 8.5 years for the Midway Landfill Alternative. While visual impacts from construction of the Midway Landfill Alternative would potentially be longer in duration, the nature of the impacts would be the same as for the other sites. The existing visual character and form of the site would be altered due to the removal of existing structures; vegetation, including trees and shrubs; and roads.

The construction site would include staging areas; reserves of building materials; fencing; lighting; large vehicles or pieces of equipment, such as cranes, dump trucks, scaffolding, bulldozers, or excavators; and detours or temporary roads. Other large vehicles could move to and from the site. The visual impact of construction would be a temporary decrease in visual quality, typical for a large construction project. Where practical, Sound Transit would place construction screens or barriers to limit the visibility of work areas from sensitive viewers, such as nearby residents. If necessary, Sound Transit would reduce the glare during any nighttime construction by shielding light sources.

#### 3.7.2.4 Avoidance and Minimization of Impacts

When developing the OMF South build alternatives during conceptual design, Sound Transit worked to minimize the elevation or height of structures to avoid and minimize potential visual impacts. This included incorporating at-grade track profiles to reduce visual and aesthetic impacts where practical. Early conceptual design also considered where mainline alignments could avoid or reduce acquisitions and clearing of right-of-way where the project would be near or in existing arterial and highway rights-of-way or utility corridors.

Each alternative site's context varies with the surrounding community, with the influence of comprehensive plans and overlay zones, and with development standards that govern building setbacks, heights and massing, landscaping, facade treatment, and urban design character. The project designers would consider site context and adhere to the landscape guidelines in Sound Transit's Design Criteria Manual. Context-sensitive design measures would be developed and refined during final design with input from the affected communities and cities and could include the following items:

- Preservation of existing vegetation, where possible.
- Adherence to required design standards, guidelines, and design review processes for the cities of Kent and Federal Way and WSDOT, as applicable, to promote visual unity in treatments at the site and along corridors. Landscaping treatments would be used to enhance the visual character of the build alternative at the perimeter of the site. Streetscape elements, such as sidewalks, street trees, and other aesthetic features, would be added along adjacent frontage streets. These measures would help maintain the local character, improve aesthetics, and reduce the visual scale of proposed project.
- Architectural treatment of buildings, including varying materials and articulation of the building façade to minimize visual massing.
- Design treatment of retaining walls, such as texture, pattern, color, and screening vegetation, where practical.
- Preparation of a Roadside Master Plan in accordance with WSDOT guidelines for the portion of the route within I-5 right-of-way.
- Design of exterior lighting at the OMF site to minimize height and use of source shielding to avoid direct visibility of luminaries (bulbs) from residential areas, streets, and highways. Shielding would also limit spillover light and glare in residential areas.
- Replacement of trees removed for the project in accordance with tree-replacement formulas for Kent, Federal Way, and WSDOT to meet minimum replacement ratios. Some of these requirements encourage native species for the ecosystem benefit and the planting of younger trees because of the higher likelihood for survival as compared with transplanting more mature, larger trees.

It is important to note that, even when using larger or faster-growing trees or plants, it can take 15 to 20 years for the plants to grow large enough to screen large facilities such as elevated structures and tall building or retaining walls. As a result, some visual impacts may not be able to be immediately avoided or minimized.

#### 3.7.2.5 Indirect Impacts

No indirect impacts related to visual and aesthetic resources would result from construction and operation of the proposed project.

### 3.7.3 Potential Mitigation Measures

In addition to the avoidance and minimization measures considered during the development of the design and in place during construction, mitigation measures would be implemented in areas near residences and other areas with sensitive viewers to reduce impacts, where appropriate. Sound Transit would refine the mitigation measures as the project design is further developed and feedback from reviewing agencies and the public is received. Most of the potential mitigation measures for visual impacts are related to the use of landscaping, aesthetic treatments, or other features to help screen views of the mainline or other project components. Mitigation measures would be compatible with Sound Transit's maintenance and operations requirements, which include long-term maintenance, safety, and security considerations.

During final design, Sound Transit would incorporate specific measures to mitigate impacts to WSDOT's Resource Conservation Areas, which were originally acquired under the Highway Beautification Act of 1965. Sound Transit would consult with WSDOT staff to develop appropriate site-specific measures and mitigate the conversion of Resource Conservation Areas to right-of-way with replacement property or with other measures agreed to by WSDOT and FHWA, consistent with the WSDOT Roadside Policy Manual (WSDOT 2015). The manual describes the extent of mitigation that would be required for lost vegetation, vegetation types, and replacement ratios. Replacement parcels would meet the intended function of the original Resource Conservation Area.

# 3.8 Air Quality and Greenhouse Gas Emissions

This section discusses the potential air quality and greenhouse gas (GHG)-related impacts associated with the construction and operation of the OMF South project alternatives.

Regional impacts on air quality were analyzed by calculating criteria air pollutants that would be emitted directly or indirectly as a result of the proposed project. “Criteria air pollutants” are six common air pollutants that can harm health and the environment, cause property damage, and are subject to certain federal air quality standards. Three agencies have jurisdiction over the ambient air quality in the OMF South study area: EPA, the Washington State Department of Ecology (Ecology), and the Puget Sound Clean Air Agency.

The impacts of the OMF South project’s air quality and GHG emissions are not limited to the build alternative sites. Therefore, the study area for this analysis is the Puget Sound Clean Air Agency’s jurisdiction, which includes King, Pierce, Snohomish, and Kitsap counties.

## 3.8.1 Affected Environment

### 3.8.1.1 Regulatory Setting

#### Federal Clean Air Act

The Federal Clean Air Act, as amended, is the primary federal law that governs air quality. These laws, and related regulations by EPA, set standards for the concentration of pollutants in the air, known as the National Ambient Air Quality Standards. National Ambient Air Quality Standards have been established for the six criteria pollutants, which include carbon monoxide; nitrogen dioxide; ozone; particulate matter (PM), which is broken down for regulatory purposes into particles of 10 micrometers and smaller ($PM_{10}$) and particles of 2.5 micrometers and smaller ($PM_{2.5}$); and sulfur dioxide. In addition, national standards exist for lead and air toxics.

The National Ambient Air Quality Standards are set at levels that protect public health with a margin of safety and are subject to periodic review and revision. Washington State adopts current federal National Ambient Air Quality Standards in state regulations, administered by Ecology. Applicable state and federal ambient air quality standards are shown in Table 3.8-1.

Based on monitoring information for criteria air pollutants collected over a period of years, Ecology and EPA designate regions as being attainment or nonattainment areas for the criteria pollutants. Once a nonattainment area achieves compliance with the National Ambient Air Quality Standards, the area is considered an air quality maintenance area. Although portions of the Puget Sound region are in maintenance areas for $PM_{2.5}$ and $PM_{10}$, none of the build alternative sites are located within the $PM_{2.5}$ or $PM_{10}$ maintenance areas.

## Table 3.8-1 Ambient Air Quality Standards

| Pollutant[1] | National (Primary) | National (Secondary) | Washington State |
|---|---|---|---|
| **Carbon Monoxide** | | | |
| 8-Hour Average | 9 ppm | NS | 9 ppm |
| 1-Hour Average | 35 ppm | NS | 35 ppm |
| **Ozone** | | | |
| 8-Hour Average | 0.07 ppm | 0.07 ppm | 0.07 ppm |
| **Lead** | | | |
| Rolling 3-Month Average | 0.15 µg/$m^3$ | 0.15 µg/$m^3$ | 0.15 µg/$m^3$ |
| **Nitrogen Dioxide** | | | |
| Annual Arithmetic Mean | 0.053 ppm | 0.053 ppm | 53 ppb |
| 1-Hour Average[2] | 100 ppb | NS | 100 ppb |
| **Particulate Matter ($PM_{10}$)** | | | |
| 24-Hour Average[3] | 150 µg/$m^3$ | 150 µg/$m^3$ | 150 µg/$m^3$ |
| **Particulate Matter ($PM_{2.5}$)** | | | |
| Annual Arithmetic Mean | 12 µg/$m^3$ | 15 µg/$m^3$ | 12 µg/$m^3$ |
| 24-Hour Average | 35 µg/$m^3$ | 35 µg/$m^3$ | 35 µg/$m^3$ |
| **Sulfur Dioxide ($SO_2$)** | | | |
| Annual Arithmetic Mean | NS | NS | 0.02 ppm |
| 24-hour | NS | NS | 0.14 ppm |
| 3-hour | NS | 0.5 ppm | 0.5 ppm |
| 1-hour[4] | 75 ppb | NS | 75 ppb |

Notes:
NS = No standard established
µg/$m^3$ = micrograms per cubic meter
ppm = parts per million
ppb = parts per billion
(1) Annual standards never to be exceeded; short-term standards not to be exceeded more than once a year unless noted.
(2) The 3-year average of the annual 98th percentile of daily maximum 1-hour averages is not to be above this level.
(3) Not to be above this level on more than 3 days over 3 years with daily sampling.
(4) The 3-year average of the annual 99th percentile of daily maximum 1-hour averages is not to be above this level.

### Washington Clean Air Act

The Washington Clean Air Act, RCW 70.94, sets forth the state law regarding outdoor air pollution and establishes a system of regional air pollution control authorities to implement federal and state air pollution control regulations. Air pollution control regulations cover the emission of air contaminants that are injurious to health or that unreasonably interfere with the enjoyment of life and property. In general, cities and towns cannot develop their own air pollution regulations. However, they can enact local nuisance provisions and performance standards so long as they are not less stringent than those of the regional authority. Many local governments have enacted general nuisance ordinances, which typically contain provisions aimed at such problems as illegal burning, dust, and noxious odors.

**Climate Change**

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to GHG emissions, particularly those generated from the production and use of fossil fuels, such as carbon dioxide.

While climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change by the United Nations and World Meteorological Organization in 1988 has led to increased efforts devoted to GHG emissions reduction and climate change research and policy. These efforts are primarily concerned with the emissions of GHGs generated by human activity.

In the U.S., the main source of GHG emissions is electricity generation, followed by transportation. The dominant GHG emitted is carbon dioxide, mostly from fossil fuel combustion.

There are four primary strategies for reducing GHG emissions from transportation sources: 1) improving the transportation system and operational efficiencies, 2) reducing passenger vehicle travel activity, 3) transitioning to lower GHG-emitting fuels, and 4) improving vehicle technologies/efficiency. To be most effective, all four strategies should be pursued cooperatively.

**Washington State Greenhouse Gas Reduction Goals**

In 2020, Washington State adopted House Bill 2331 (HB 2331), which revised the state's GHG reduction goals. Under HB 2331, Washington must limit emission of greenhouse gases to achieve the following reductions for the state:

- By 2020, reduce overall emissions of greenhouse gases in the state to 1990 levels.
- By 2030, reduce greenhouse gas emissions to 45 percent below 1990 levels.
- By 2040, reduce overall emissions of greenhouse gases in the state to 70 percent below 1990 levels.
- By 2050, reduce overall emissions of greenhouse gases in the state to 95 percent below 1990 levels, and achieve net zero greenhouse gas emissions.

In addition, Sound Transit's Sustainability Plan, most recently updated in 2019, commits Sound Transit to integrating efficient operating practices at existing and new facilities, using energy-saving equipment to reduce energy demand, and maximizing intermodal transit connections to reduce automobile travel (Sound Transit 2019). The 2019 update includes goals focused on sustainable building and infrastructure and opportunities for transit oriented development.

### 3.8.1.2 Climate Conditions and Local Air Quality

Washington is located on a windward coast in the mid-latitudes, producing a predominantly marine-type climate west of the Cascade Mountains. East of the Cascades, the climate possesses both continental and marine characteristics. The Puget Sound region's climate is mild, with wet and cloudy winters and cool and comparatively dry summers. In the interior valleys, measurable rainfall is recorded on 150 days each year; in the mountains and along the coast, there is rain 190 days each year.

Prevailing winds are typically from the south or southwest during the winter and from the north or northeast during the summer. Wind speeds are generally sufficient to disperse air pollutants released into the atmosphere. Air pollution is most noticeable in the late fall and winter under conditions of clear skies and light winds.

Typical air pollution sources near the study area include vehicular traffic, commercial and retail businesses, light industry, and residential wood-burning devices. While many types of pollutant sources are present, the largest contributors of criteria pollutant emissions are on-road vehicles, which contribute the majority of the carbon monoxide and ozone precursors. Secondary sources of emissions are commercial and industrial land uses.

## 3.8.2 Environmental Impacts

### 3.8.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to air quality and GHGs from construction or operation of OMF South would not occur. FWLE will have a minor benefit to air quality from reduced traffic volumes and congestion to the extent that it leads to a reduction in vehicle miles traveled, which would lower GHG emissions. Other planned projects in the area could have air quality impacts, depending on their nature. Because TDLE would open after OMF South, impacts associated with TDLE that would overlap with OMF South, such as the mainline tracks that would connect to the South 336th Street and South 344th Street alternatives, are addressed within the build alternative impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Impact Analysis.

### 3.8.2.2 Long-Term Impacts

**Impacts Common to All Build Alternatives**

Because all the build alternatives would have the same programming and function, there are no discernable differences between them in terms of potential long-term air quality impacts. As such, the description of impacts below applies to all OMF South build alternatives.

*Air Quality*

Operational air quality emissions include emissions from mobile sources associated with the facility, natural gas usage, electricity usage, architectural coatings, consumer products, and landscaping equipment. Due to the fact that the electrical utilities in the project area primarily rely on hydropower and thus have very low emissions, the primary sources of long-term air quality emissions would be associated with employee commutes, material deliveries, and on-site vehicle maintenance, which includes the use of a paint booth. Spray painting is anticipated to occur infrequently and would be limited in quantity. The potential impacts from painting are minor and would be addressed by implementing standard minimization measures. The on-road emissions associated with project operations would be distributed throughout the OMF South study area. In addition, none of the build alternatives are located within nonattainment or maintenance areas for the National Ambient Air Quality Standards.

As the OMF South project is not seeking federal approvals, it is not subject to a conformity determination. In addition, the build alternatives are located within attainment areas for the $PM_{2.5}$, $PM_{10}$, and carbon monoxide standards. Therefore, carbon monoxide and PM hot-spot analyses are not required, and thus a conformity determination under federal regulations would not be needed.

*Climate Change*

The maintenance and operational GHG emissions for OMF South were calculated using FTA's Greenhouse Gas Emissions from Transit Projects: Programmatic Assessment (FTA 2017a). Each phase of operation was considered separately and included both upstream and downstream sources of emissions. Upstream emissions are the emissions associated with the extraction, transportation, and production of the fuels and materials used in the operation of the facilities (e.g., natural gas for heating, paint and solvents, fuel for maintenance equipment, etc.). Downstream emissions are generated within the facility during daily operations (e.g., the burning of natural gas for heating, the use of paint and solvents, the burning of fuel for maintenance equipment, etc.).

In total, the OMF South facility would generate between 336 and 345 metric tons of carbon dioxide equivalent ($MTCO_2e$) per year. Sound Transit and Puget Sound Energy (PSE) have entered into an agreement that all electricity accounts related to the operations of Link light rail be sourced solely from renewable wind power via PSE's Green Direct program. Therefore, there would be no upstream emissions associated with the project's electricity use. Table 3.8-2 summarizes the project's annual GHG emissions from operation and maintenance. Maintenance activities include routine transit way, pavement, and vehicle maintenance. The annual operational emissions are far below the 10,000 $MTCO_2e$ per year mandatory reporting threshold for facilities in Washington State (Ecology 2020).

**Table 3.8-2 Annual Operational Greenhouse Gas Emissions ($MTCO_2e$)**

| Emission Source | Midway Landfill Alternative | South 336th Street Alternative | South 344th Street Alternative |
|---|---|---|---|
| Operations – Upstream | 0 | 0 | 0 |
| Operations – Downstream | 297 | 297 | 297 |
| Maintenance | 39 | 46 | 48 |
| **Total Annual GHG Emissions** | **336** | **343** | **345** |

### 3.8.2.3 Construction Impacts

#### Impacts Common to All Build Alternatives

Because all the build alternatives would have a similar footprint and, as a result, similar on-site construction activities, the description of impacts below applies to all OMF South build alternatives. However, the large number of truck trips required for two of the Midway Landfill subsurface construction design options — Hybrid and Full Excavation — would result in additional off-site emissions. The emissions associated with those additional haul truck trips are reflected in Table 3.8-3 below.

*Air Quality*

During construction, short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other activities. Emissions from construction equipment would include carbon monoxide, nitrogen oxides, sulfur dioxide, volatile organic compounds, and directly emitted particulate matter ($PM_{2.5}$ and $PM_{10}$).

Site preparation and project construction would involve clearing, cut-and-fill activities, grading, and building activities. Construction-related effects on air quality from the proposed project would be greatest during the site preparation phase because most engine emissions are associated with the excavation, handling, and transport of soil to and from the site.

Sources of fugitive dust (primarily consisting of $PM_{10}$) could include disturbed soil at the construction sites and trucks carrying uncovered loads of soil. Unless properly controlled, vehicles leaving the site could deposit dirt and mud on local streets, which could be an additional source of airborne dust after it dries. $PM_{10}$ emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. $PM_{10}$ emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of operating equipment. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction sites.

Water or other soil stabilizers can be used to control dust, resulting in emission reductions of 50 percent or more. With the implementation of standard construction measures, such as frequent watering (e.g., two times per day at a minimum), fugitive dust emissions from construction activities would not result in adverse air quality impacts.

In addition to dust-related $PM_{10}$ emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate carbon monoxide, sulfur dioxide, nitrogen oxides, volatile organic compounds, and some soot particulate ($PM_{2.5}$ and $PM_{10}$) in exhaust emissions. If construction activities were to increase traffic congestion in the area, carbon monoxide and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction sites.

*Climate Change*

The construction GHG emissions for OMF South were calculated using the FTA's Greenhouse Gas Emissions from Transit Projects: Programmatic Assessment (FTA 2017a). These emission estimates are based on the size of the proposed facilities and the number of truck trips required to complete the excavation of each alternative and design option. Each phase of construction was considered separately and included both upstream and downstream sources of emissions. In the construction phase of a transit project, upstream emissions are the emissions associated with the extraction, transportation, and production of the materials used in the construction of the facilities (e.g., asphalt, concrete, base stone, and steel). Downstream construction emissions are tailpipe emissions resulting from the operation of construction vehicles and equipment. In total, construction of the project would generate up to 1,792 $MTCO_2e$ per year. This total reflects an amortization of construction emissions over a 50-year period, which corresponds to the minimum useful life span of facilities (FTA 2017b).

As shown in Table 3.8-2, operation and maintenance of OMF South would generate up to 345 $MTCO_2e$ per year. Although construction emissions are not included in the Washington State Agency Greenhouse Gas Calculator, the amortized emissions from construction have been added to the operational emissions to determine the total annual impact of the OMF South build alternatives. Table 3.8-3 summarizes the annual GHG emissions from construction, operation, and maintenance for each of the build alternatives. The largest impact would be from the Midway Landfill Alternative using the Full Excavation subsurface construction design option, which would generate up to 2,128 $MTCO_2e$ per year. This amount is less than the 10,000 $MTCO_2e$ per year mandatory reporting threshold for facilities in Washington State (Ecology 2020). Therefore, no additional analysis is required.

**Table 3.8-3 Total Annual Greenhouse Gas Emissions ($MTCO_2e$)**

| Build Alternative | Mainline Track Construction[1] | | OMF Construction | | Haul Truck Emissions | Operation and Maintenance | Annual GHG Emissions |
|---|---|---|---|---|---|---|---|
| | Upstream | Downstream | Upstream | Downstream | | | |
| Midway Landfill – Platform | N/A | N/A | 946 | 90 | 284 | 336 | 1,656 |
| Midway Landfill – Hybrid | N/A | N/A | 946 | 90 | 684 | 336 | 2,056 |
| Midway Landfill – Full Excavation | N/A | N/A | 946 | 90 | 756 | 336 | 2,128 |
| South 336th Street | 97 | 3 | 946 | 90 | 70 | 343 | 1,549 |
| South 344th Street | 125 | 4 | 946 | 90 | 75 | 345 | 1,585 |

Notes: Construction emissions, including truck haul trips, have been amortized over a 50-year period prior to being added to the annual operations and maintenance emissions.

(1) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

### 3.8.2.4 Avoidance and Minimization of Impacts

Sound Transit would implement construction BMPs to minimize the impact on existing residential and recreational uses from construction-related emissions and nuisance dust. BMPs to reduce construction impacts could include the following:

- Complying with the BMPs required in WAC 173-400-040 (general standards for maximum emissions)
- Complying with applicable dust control policies and plans
- Spraying dry soil with water to reduce dust
- Using temporary ground covers
- Minimizing idling of equipment when not in use
- Planning construction areas to minimize soil exposure for extended periods
- Covering dirt and gravel piles
- Establishing wheel wash stations at exits from spoils handling and truck-loading sites
- Sweeping paved roadways to reduce mud and dust
- Replanting exposed areas as soon as practical after construction

Sound Transit would implement the following measures to minimize, reduce, or control air emissions from the on-site paint booth:

- Install exhaust ventilation to remove particulates
- Dispose of paint materials appropriately
- Provide personal protective equipment to staff

#### 3.8.2.5 Indirect Impacts

Indirect impacts are changes to air quality that may occur for reasons related to the project but are not part of it and that may occur separated by distance or time. The air quality analysis includes the indirect effects of the project and other traffic growth that would be associated with the project. Indirect construction GHG emissions are also known as embodied and life-cycle emissions. Both embodied and life-cycle emissions were included in the direct construction GHG methodology. No additional indirect impacts related to air quality are anticipated.

### 3.8.3 Potential Mitigation Measures

Overall, existing air quality in the project area meets the national standards for criteria pollutants. With implementation of the controls required for the various aspects of construction activities and consistent use of BMPs to minimize on-site emissions, construction and operation of the proposed project would not be expected to substantially affect air quality. No additional mitigation is required.

# 3.9 Noise and Vibration

This section contains the noise and vibration impact assessment for the OMF South project alternatives. The assessment follows FTA and Sound Transit policies and practices in evaluating impacts and potential mitigation measures. Sound Transit uses FTA noise and vibration guidance in its environmental methodology to assess impacts from transit projects.

For the purposes of the noise analysis, sound is defined as small changes in air pressure above and below the standard atmospheric pressure, and noise is usually considered to be unwanted sound. The three parameters that define noise include:

- **Level:** The level of sound is the magnitude of air pressure change above and below atmospheric pressure and is expressed in decibels (dB). Typical sounds fall within a range between 0 dB (the approximate lower limit of human hearing) and 120 dB (the highest sound level generally experienced in the environment).
- **Frequency:** The frequency (pitch or tone) of sound is the rate of air pressure change and is expressed in cycles per second, or hertz (Hz). Human ears can detect a wide range of frequencies from around 20 to 20,000 Hz. The A weighting system, which reduces the sound levels of higher- and lower-frequency sounds, is used to provide a measure (A-weighted decibels, or dBA) that correlates with human response to noise.
- **Time Pattern:** Because environmental noise is constantly changing, it is common to condense all this information into a single number, called the “equivalent” sound level (Leq). The Leq represents the changing sound level over a period of time, typically 1 hour or 24 hours in transit noise assessments. For assessing the noise impact of rail projects at residential land uses, the day-night sound level (Ldn) is used, which is a 24-hour cumulative noise exposure metric that accounts for increased noise sensitivity at night.

This noise assessment uses FTA operational noise impact criteria to evaluate impacts from operation of the OMF for each build alternative and the mainline track, where applicable. FTA criteria are based on both the existing level of noise and the change in noise exposure due to a project and depend on the land use category of the sensitive receptor.

In addition, the noise assessment evaluates the noise impacts of the OMF at each build alternative under WAC 173-60, Maximum Environmental Noise Levels, which is used by Kent and Federal Way. WAC 173-60 defines the maximum allowable noise level (expressed as Leq) for each noise abatement designation, or land use zone, which can also be defined as residential, commercial, or industrial. As the WAC regulations only apply to stationary noise sources, the mainline transit operations were not evaluated under these criteria. Appendix G2, the Noise and Vibration Technical Report, contains information regarding the WAC limits and applicability to the project.

For the purposes of the vibration analysis, ground-borne vibration from trains refers to the fluctuating or oscillatory motion experienced by persons on the ground and in buildings near railroad tracks. The response of humans, buildings, and equipment to vibration is most accurately described using velocity or acceleration. Because the human body tends to respond to an average of the vibration impulses, the root mean square (RMS) velocity is used to describe the "smoothed" vibration amplitude. RMS velocities are normally described in inches per second (in/sec) in the U.S., which can be expressed in decibel notation using a reference value. Consistent with FTA guidance, this analysis uses decibel notation with a reference value of $1 \times 10^{-6}$ in/sec.

Typical vibration levels can range from below 50 vibration decibels (VdB) to 100 VdB, and the human threshold of perception is approximately 65 VdB. The operational vibration impact criteria used for the project are based on the information contained in Section 6 of the FTA Transit Noise and Vibration Impact Assessment Manual (FTA 2018). The criteria for a general vibration assessment are based on land use and train frequency.

For more information regarding the noise and vibration assessment, refer to Appendix G2, Noise and Vibration Technical Report.

## 3.9.1 Affected Environment

A summary of noise- and vibration-sensitive land uses adjacent to the OMF South build alternatives is provided below, followed by a summary of the existing noise and vibration conditions in the study area. Sensitive receptors located near the proposed alternative sites include single-family and multi-family residences, hotels, and religious facilities. There are no commercial or industrial land uses nor any special buildings, such as recording studios or buildings with specialized equipment highly sensitive to vibration, known to be near any of the proposed OMF South sites or mainline.

### 3.9.1.1 Noise- and Vibration-Sensitive Land Use

**Midway Landfill Alternative**

The land use around the Midway Landfill Alternative includes primarily commercial land uses to the west on both sides of SR 99, along with three religious facilities that are noise sensitive: the Great Commission Presbyterian Church, the New Jerusalem Haitian Baptist Church, and the Seattle Full Gospel Church. Noise-sensitive uses also include a small mobile home park to the north and hotels and a single-family residential community to the south. To the east of the site is I-5.

**South 336th Street Alternative**

The noise-sensitive land uses adjacent to the mainline track options between the Federal Way Transit Center and the South 336th Street Alternative are a mix of single- and multi-family residences, including Belmor.

The study area around the South 336th Street Alternative OMF site and lead tracks includes a mix of commercial and noise-sensitive residential land uses. To the north of the OMF site is a noise-sensitive residential community with a mix of single- and multi-family residences and the Russian-Ukrainian Seventh-Day Adventist Church. To the south is a mix of commercial uses with a few scattered noise-sensitive residences and the Restoration Life Church. To the west are commercial uses on both sides of SR 99, along with the KAC Baptist Church, and I-5 is to the east.

**South 344th Street Alternative**

The land uses around the mainline track options between the Federal Way Transit Center and the South 344th Street Alternative are the same as described above for the South 336th Street Alternative. The land uses around the mainline tail track alignments to the south of the South 344th Street Alternative are commercial, with no noise-sensitive land uses.

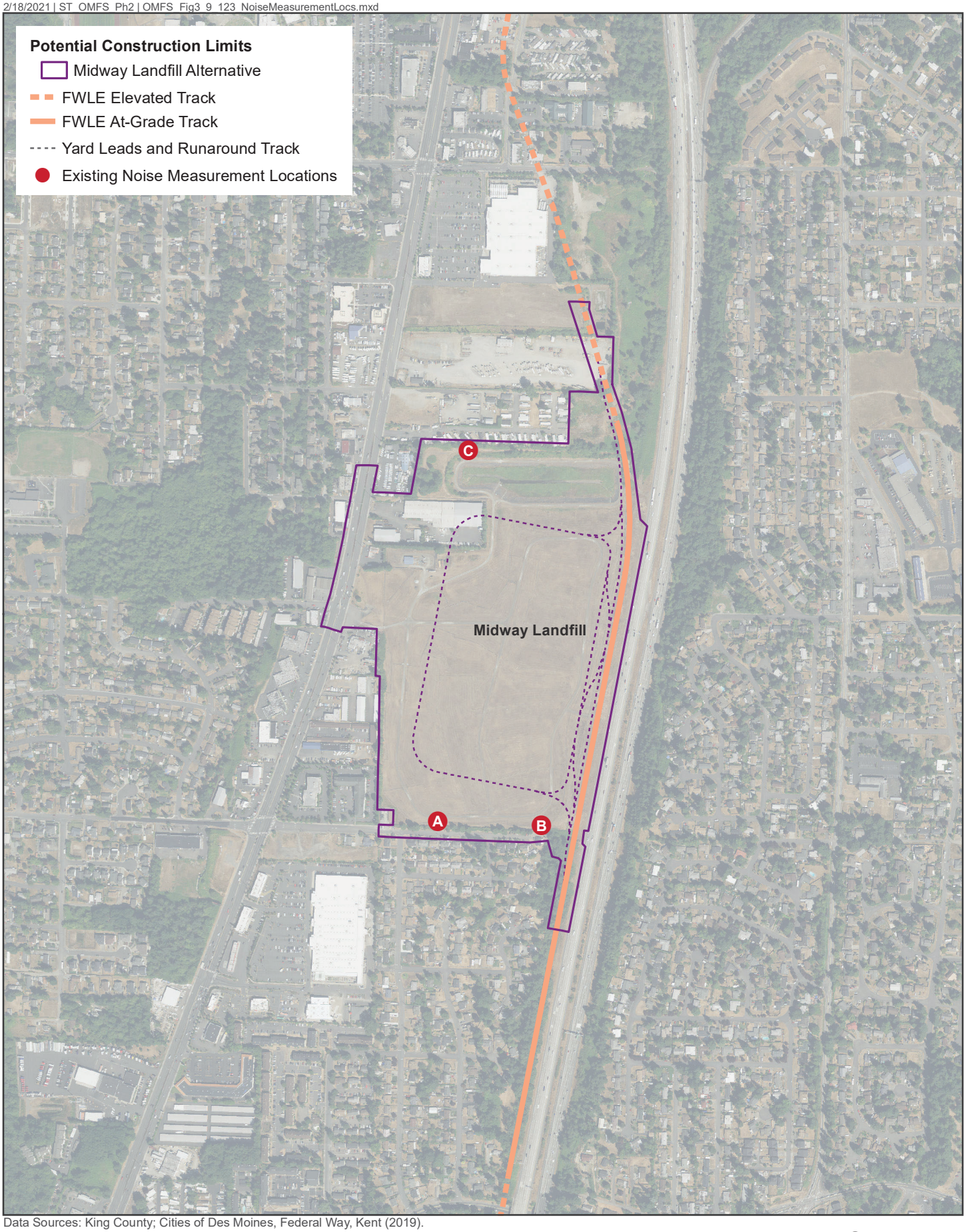
The study area around the South 344th Street Alternative includes a mix of commercial, institutional, and noise-sensitive residential land uses. To the north of the OMF site is a noise-sensitive residential community with a mix of single- and multi-family residences, the Christian Faith Center and associated school, the Russian-Ukrainian Seventh-Day Adventist Church, and the KAC Baptist Church. To the south are commercial uses. To the west are commercial uses on both sides of SR 99, and I-5 is to the east.

### 3.9.1.2 Existing Noise Conditions

Existing ambient noise levels were characterized through 24-hour direct measurements at selected sites in the areas near the OMF South alternatives and mainline design options during November 2019. Noise sources in the project area include traffic on I-5, local roadway traffic, aircraft overflights, and local community activities. The existing ambient sound levels vary by location, depending on the proximity to I-5, and are generally typical of a suburban environment near a busy interstate highway. The results of the existing noise measurements are shown in Table 3.9-1, and the locations of the measurements are shown in Figures 3.9-1 through 3.9-3.

**Table 3.9-1 Summary of Existing Ambient Noise Measurement Results**

| Site | Measurement Location Description | Start Date | Meas. Duration (hours) | Noise Exposure (dBA) Ldn | Noise Exposure (dBA) 1 Hour Leq |
|---|---|---|---|---|---|
| A | Midway Landfill – Southwest Corner | 11/18/19 | 24 | 65 | 62 |
| B | Midway Landfill – Southeast Corner | 11/18/19 | 24 | 71 | 66 |
| C | Midway Landfill – North Side | 11/18/19 | 24 | 67 | 62 |
| D | Mainline Track – 11 The Dunes Court, Belmor | 11/19/19 | 24 | 65 | 59 |
| E | Mainline Track – 326 Oakland Hills Boulevard, Belmor | 11/19/19 | 24 | 70 | 65 |
| F | S 336th/S 344th – Christian Faith Center West | 11/19/19 | 24 | 67 | 62 |
| G | S 336th/S 344th – Christian Faith Center East | 11/19/19 | 24 | 72 | 66 |
| H | S 336th – 20th Avenue S and S 31st Place | 11/19/19 | 24 | 73 | 67 |



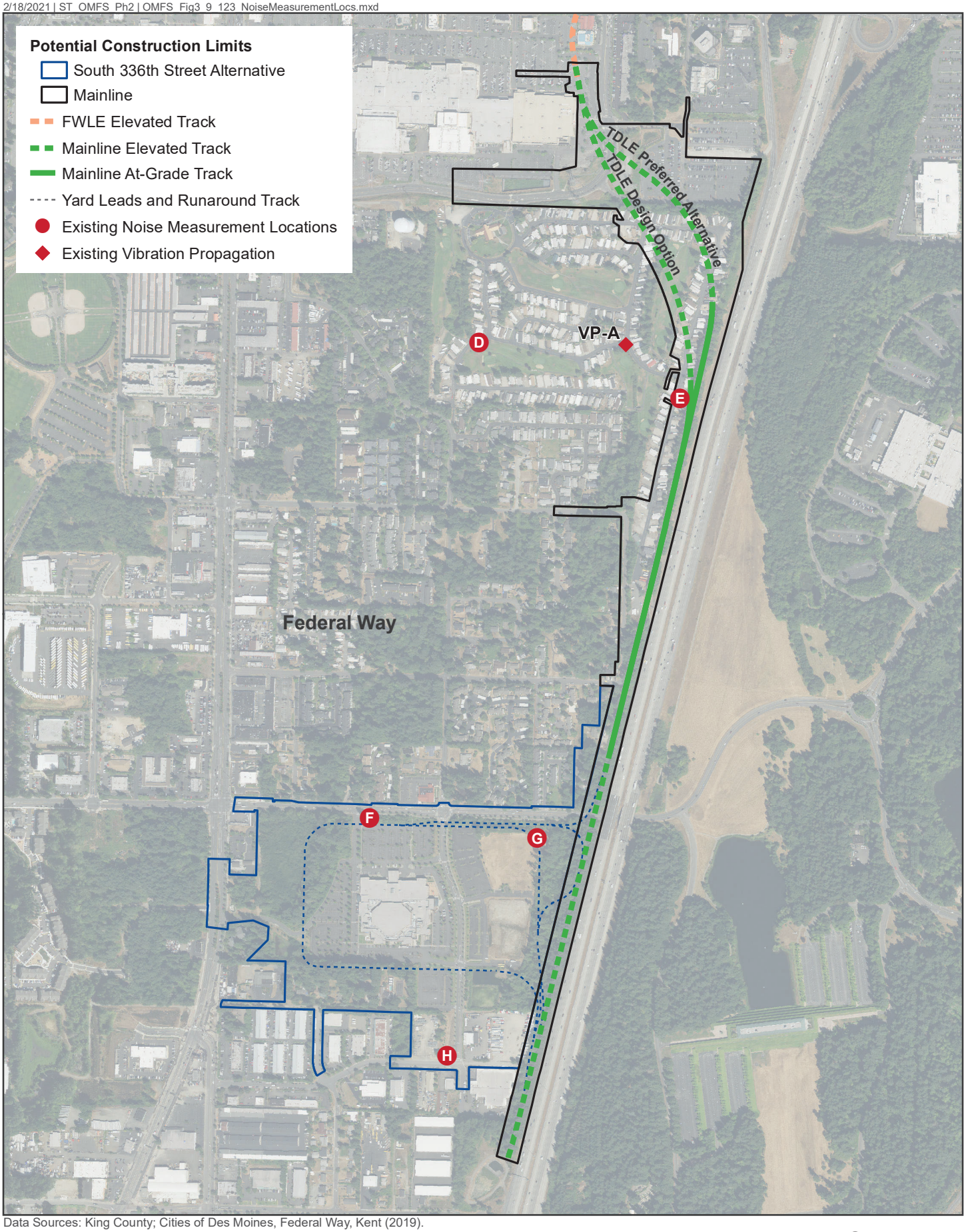

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

**FIGURE 3.9-1**
Existing Noise Measurement Locations
Midway Landfill Alternative

*OMF South*

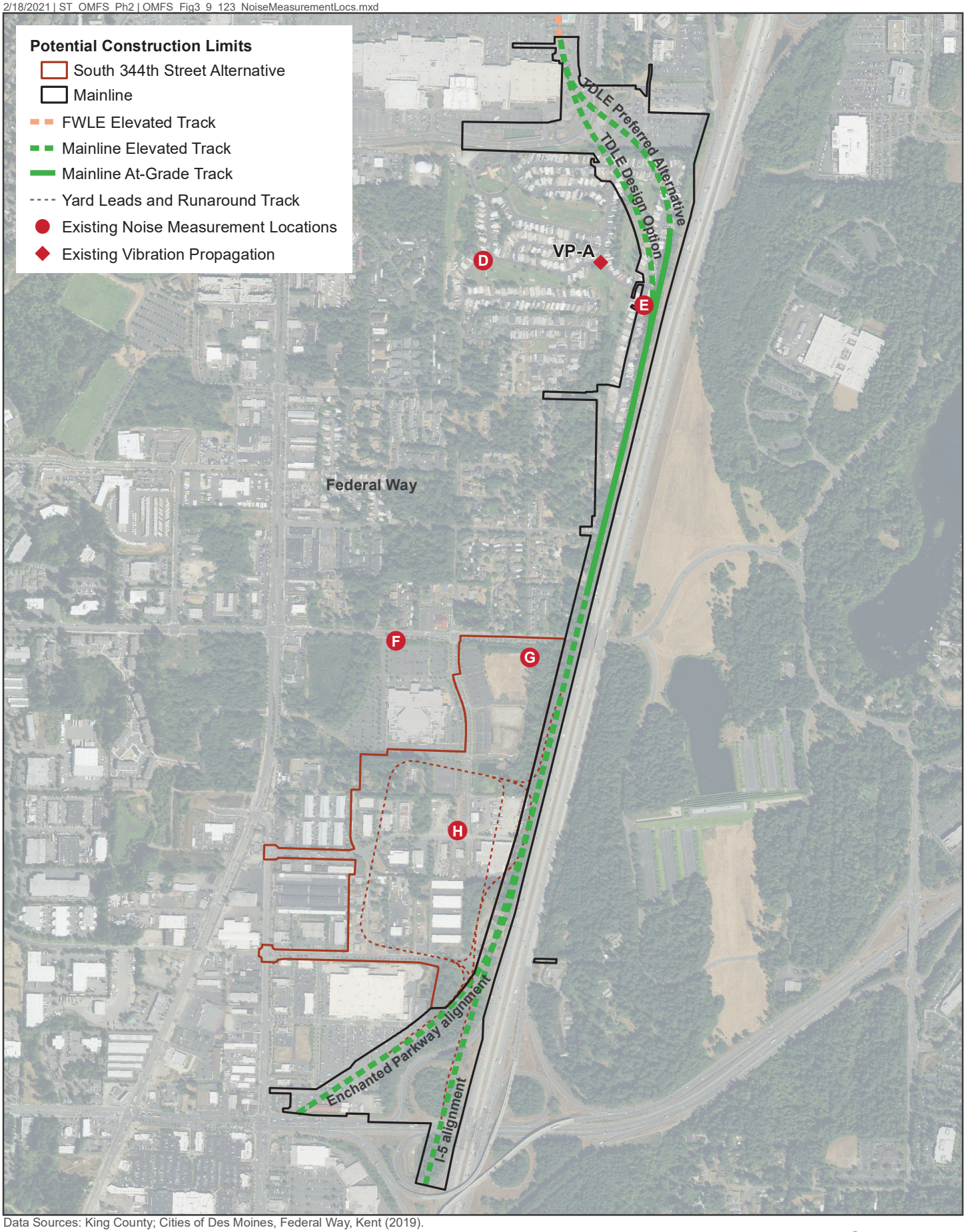



Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

**FIGURE 3.9-2**
Existing Noise and Vibration Propagation Measurement Locations
South 336th Street Alternative
*OMF South*




Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

**FIGURE 3.9-3**
Existing Noise and Vibration Propagation Measurement Locations
South 344th Street Alternative
*OMF South*

#### 3.9.1.3 Existing Vibration Conditions

Vibration-sensitive land uses for the project alternatives are the same as the noise-sensitive land uses described above. Existing vibration sources include auto, bus, and truck traffic on local streets. However, vibrations from street traffic are not generally perceptible at receivers in the study area unless streets have substantial bumps, potholes, or other uneven surfaces. Furthermore, the FTA vibration impact criteria are not ambient based; that is, future project vibrations are not compared with existing vibrations to assess impact. Therefore, the vibration measurements for the project focused on characterizing the vibration propagation properties of the soil along the mainline design options rather than characterizing the existing vibration levels. One vibration propagation test site, Site VP-A in Belmor, was selected for the 2019 measurements. The location of the site is shown on Figures 3.9-2 and 3.9-3.

### 3.9.2 Environmental Impacts

Noise-generating activities at OMF South would include vehicles moving within the OMF site, vehicle washing and drying, limited testing of train bells and horns, a traction power substation, and vehicles moving on the mainline (for the South 336th Street and the South 344th Street alternatives) into service in the morning and back to the OMF in the late evening.

Wheel squeal is possible on curves with a radius of less than 600 to 1,000 feet, depending on the speed and type of trackway. Wheel squeal is not included in the noise model because Sound Transit has committed to reducing any potential wheel squeal by installing wayside lubricators on all curves with a radius of less than 600 feet in noise-sensitive areas and by preparing all curves for wayside lubricators that have a radius of between 600 and 1,000 feet.

For the TDLE Preferred Alternative mainline option, the curves north of S 324th Street and from S 324th Street to Oakland Hills Boulevard would have a radius between 600 and 1,000 feet and would be prepared for wayside lubricators. There are numerous tight radius curves within the OMF sites for all three build alternatives that would also be prepared for wayside lubricators.

The slow speeds within the OMF South alternatives would reduce any impact noise associated with crossover connections between tracks within the facility. Crossover tracks connecting to the mainline would have higher speed operations and the potential for additional noise from vehicles traveling over them.

The only activity that would generate vibration would be vehicles moving on the mainline for the South 336th Street and the South 344th Street alternatives. Details regarding the model and assumptions used for the noise and vibration impact assessment are included in Appendix G2, Noise and Vibration Technical Report.

#### 3.9.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to noise and vibration from construction or operation of OMF South would not occur. However, for the purposes of this Draft Environmental Impact Statement, the No-Build Alternative assumes that, by the design year 2042, all planned Sound Transit 3 projects, including FWLE and TDLE, are built along with the other public and private projects planned within the study area.

The noise and vibration effects of FWLE on sensitive receptors near the Midway Landfill Alternative were addressed in the 2016 Federal Way Link Extension Final Environmental Impact Statement. FWLE was predicted to have moderate impacts to three residential areas near the

Midway Landfill, which would be mitigated with noise walls. No vibration impacts are anticipated in the area. The noise and vibration effects of TDLE on sensitive receptors near the mainline and the South 336th Street or South 344th Street alternatives are discussed in Chapter 4, Cumulative Impact Analysis, and will be further detailed in the Tacoma Dome Link Extension Draft Environmental Impact Statement, which is expected to be published in 2022.

#### 3.9.2.2 Long-Term Impacts

**Impacts Common to All Build Alternatives**

There are no FTA noise impacts or WAC exceedances associated with the OMF sites or lead tracks for any of the build alternatives. Noise impacts for the mainline tracks are discussed below. There are no vibration impacts associated with any of the build alternatives for all project elements including the mainline tracks.

The noise and vibration effects of TDLE on sensitive receptors near the mainline and the South 336th Street or South 344th Street alternatives are discussed in Chapter 4, Cumulative Impact Analysis, and will be further detailed in the Tacoma Dome Link Extension Draft Environmental Impact Statement, which is expected to be published in 2022.

**Midway Landfill Alternative**

There are no FTA noise impacts, WAC exceedances, or vibration impacts for the Midway Landfill Alternative.

**South 336th Street Alternative**

There are FTA noise impacts at three single-family residences for the TDLE Preferred Alternative and at four single-family residences for the TDLE Design Option, all due to their proximity to the proposed mainline tracks. The noise impact locations are described in Table 3.9-2 and shown in Figure 3.9-4 for the TDLE Preferred Alternative and are described in Table 3.9-3 and shown in Figure 3.9-5 for the TDLE Design Option.

There are no noise or vibration sensitive receptors near the mainline tail tracks and no FTA noise impacts, WAC exceedances or vibration impacts. There are no FTA noise impacts, WAC exceedances, or vibration impacts for the South 336th Street Alternative OMF site, including the lead tracks.

**Table 3.9-2 Summary of FTA Category 2 Noise Impacts: TDLE Preferred Alternative Mainline Track**

| Location | Side of Track | Dist to Near Track (feet) | Existing Noise Level (Ldn, dBA) | Project Noise Level (Ldn, dBA) | Mod Noise Criteria | Sev Noise Criteria | # of Mod Impacts | # of Sev Impacts |
|---|---|---|---|---|---|---|---|---|
| S 324th Street to Burning Tree Boulevard | SB | 40 | 70 | 65 | 64 | 69 | 3 | 0 |
| Burning Tree Boulevard to S 330th Street | SB | 32 | 70 | 62 | 64 | 69 | 0 | 0 |
| S 330th Street to S 333rd Street | SB | 90 | 72 | 55 | 64 | 69 | 0 | 0 |
| S 333rd Street to S 336th Street | SB | 208 | 72 | 55 | 65 | 71 | 0 | 0 |
| **Total:** | | | | | | | **3** | **0** |

Note: The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

**Table 3.9-3 Summary of FTA Category 2 Noise Impacts: TDLE Design Option Mainline Track**

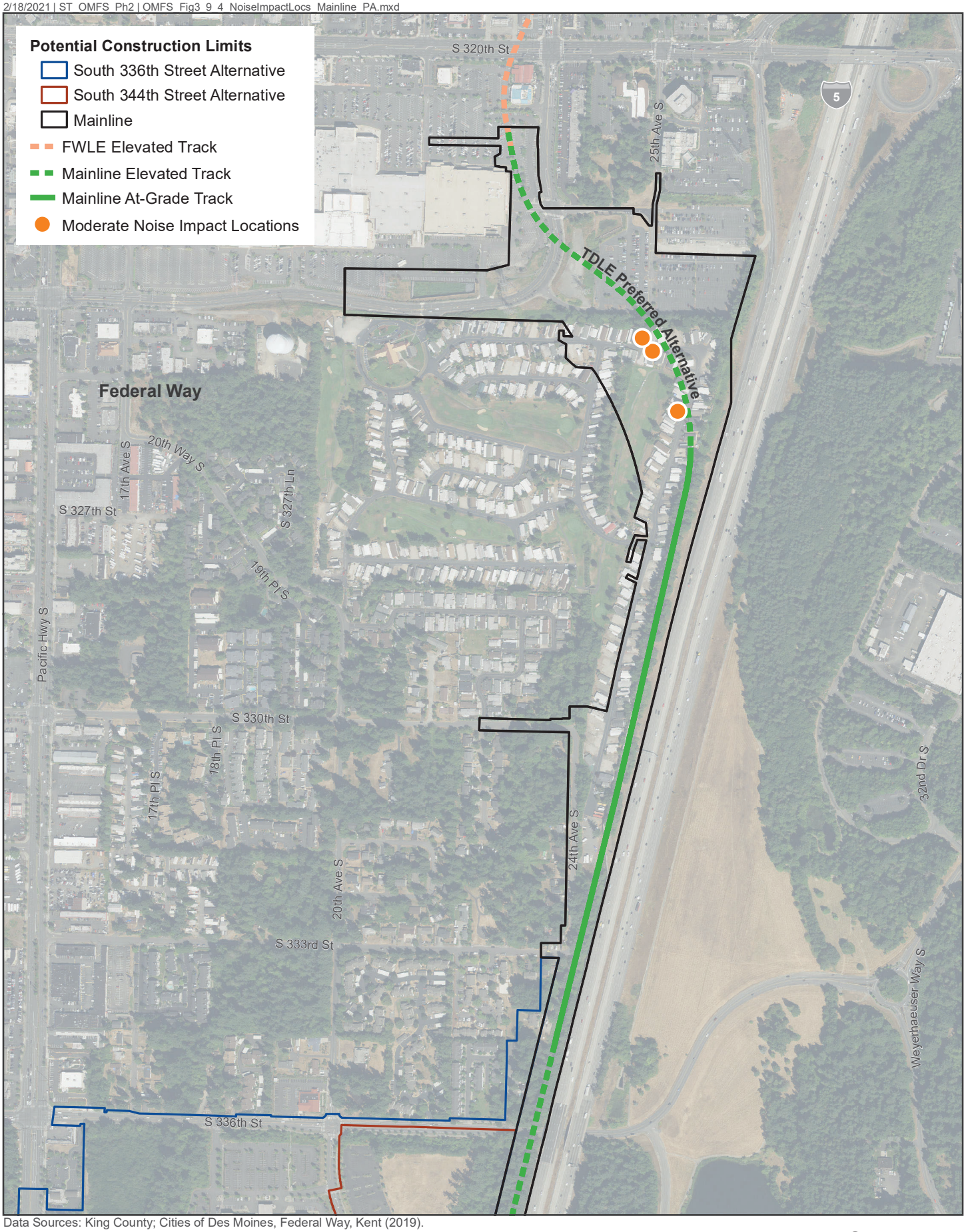
| Location | Side of Track | Dist to Near Track (feet) | Existing Noise Level (Ldn, dBA) | Project Noise Level (Ldn, dBA) | Mod Noise Criteria | Sev Noise Criteria | # of Mod Impacts | # of Sev Impacts |
|---|---|---|---|---|---|---|---|---|
| S 324th Street to Burning Tree Boulevard | NB | 50 | 70 | 63 | 64 | 69 | 0 | 0 |
| S 324th Street to Burning Tree Boulevard | SB | 43 | 65 | 64 | 61 | 66 | 4 | 0 |
| Burning Tree Boulevard to S 330th Street | SB | 54 | 70 | 59 | 64 | 69 | 0 | 0 |
| S 330th Street to S 333rd Street | SB | 93 | 72 | 55 | 65 | 71 | 0 | 0 |
| S 333rd Street to S 336th Street | SB | 209 | 72 | 55 | 65 | 71 | 0 | 0 |
| **Total:** | | | | | | | **4** | **0** |

Note: The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

### South 344th Street Alternative

Impacts due to the mainline tracks would be the same as those discussed above for the South 336th Street Alternative, described in Tables 3.9-2 and 3.9-3 and shown in Figures 3.9-4 and 3.9-5.

There are no noise or vibration sensitive receptors near either of the mainline tail track options and no FTA noise impacts, WAC exceedances, or vibration impacts. There are no FTA noise impacts, WAC exceedances, or vibration impacts for the South 344th Street Alternative OMF site and lead tracks.

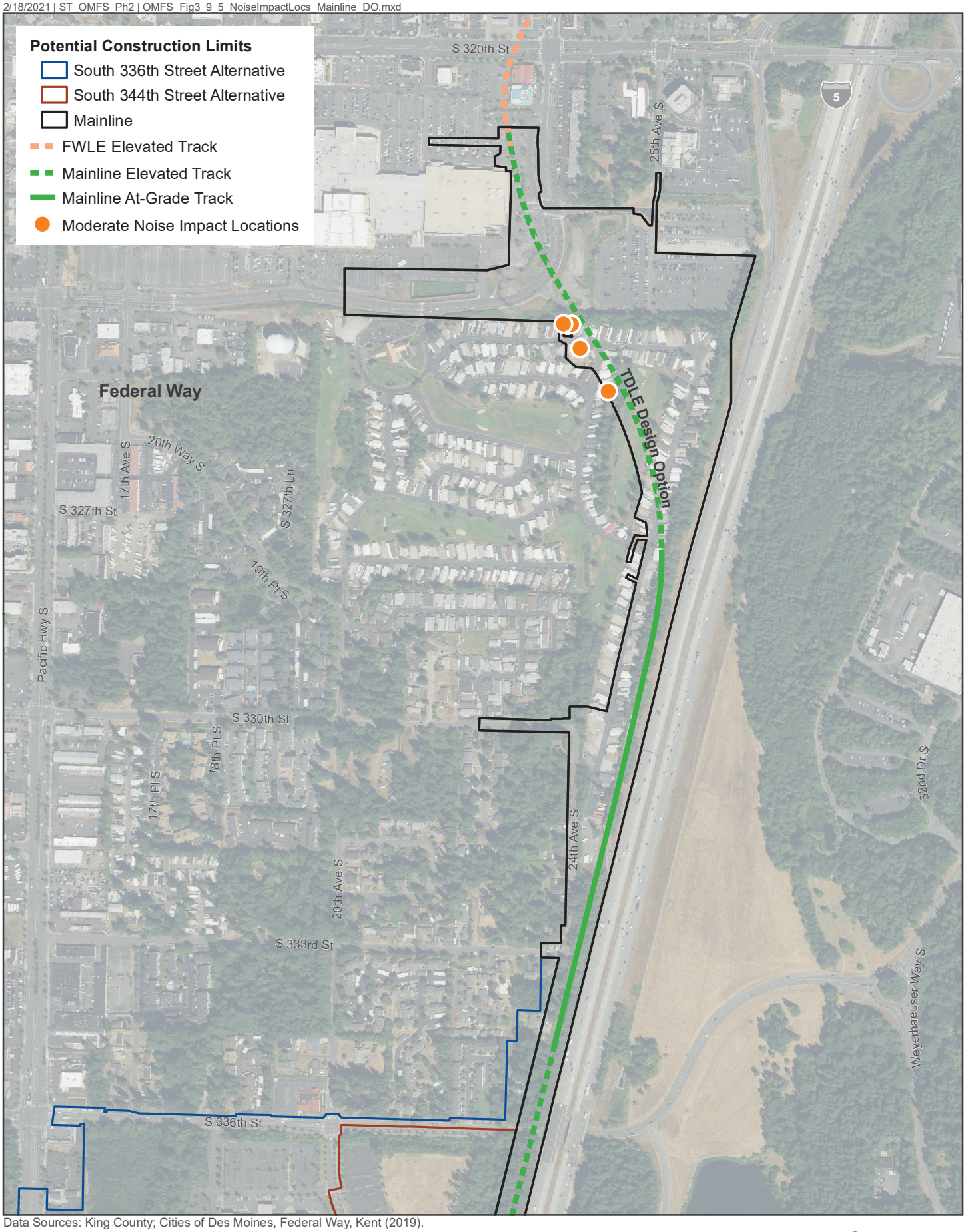



Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

**FIGURE 3.9-4**
Noise Impact Locations
TDLE Preferred Alternative
*OMF South*




Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

**FIGURE 3.9-5**
Noise Impact Locations
TDLE Design Option
*OMF South*

### 3.9.2.3 Construction Impacts

#### Impacts Common to All Build Alternatives

*Noise*

Elevated noise levels from construction activities are, to a degree, unavoidable for this type of project. For most construction equipment, diesel engines are typically the dominant noise source. For other activities, such as impact pile driving and jackhammering, noise generated by the actual process dominates. Noise during construction of the project can be intrusive to residents near the construction sites. Most of the construction would consist of site preparation and laying new tracks and should occur primarily during daytime hours, except when required and within city noise ordinance procedures for a variance. At some locations, more extensive work would occur, such as pile driving for elevated structures and retaining walls.

Construction noise predictions at noise-sensitive locations depend on the amount of noise during each construction phase, the duration of the noise, and the distance from the construction activities to the sensitive receptor. Conducting a construction noise impact assessment requires knowledge of the equipment likely to be used, the duration of its use, and the way it would be used by a contractor. Table 3.9-4 provides an example of a construction noise projection for typical at-grade track construction. Construction for other project features, such as buildings, would have similar results. Specific construction scenarios would be developed when more information on methods, equipment, and durations is available. Using these assumptions, an 8-hour Leq of 88 dBA would be projected at a distance of 50 feet from the construction site.

Within residential land uses, the potential noise impacts from short-term, at-grade track construction could extend to approximately 120 feet from the corridor; however, if nighttime construction is conducted (when sensitivity to noise is higher and the criteria for impacts are lower), the potential for short-term noise impacts from at-grade track construction could extend to approximately 380 feet from the corridor. The distances of noise impacts would likely be similar for OMF site construction. For elevated structure construction, the distance for noise impacts during the daytime could be up to 250 feet for impact pile driving, assuming a usage factor of 20 percent during the day. If alternative methods of piling are used, the impact distance could be less. A noise impact screening distance could be calculated once a specific pile installation method is determined.

Based on the distances above, there would be sensitive receptors within the screening distances for all three OMF South build alternatives and both mainline track design options. Noise impacts perceived by residents and other sensitive receptors would vary, depending on the proximity of the construction activity, the type of equipment being used, the time of day, and the overall duration of construction. While the noise levels would be similar for construction of any of the build alternatives, the Midway Landfill Alternative may be perceived to have the greatest impact due to the extended period of time and number of daily truck trips needed for site preparation work.

**Table 3.9-4 Typical Construction Scenario, At-Grade Track**

| Equipment Type | Typical Noise Level at 50 Feet (dBA) | Equipment Utilization Factor | Leq (dBA) |
|---|---|---|---|
| Grader | 85 | 50% | 82 |
| Backhoe | 80 | 40% | 76 |
| Compactor | 82 | 20% | 75 |
| Loader | 85 | 20% | 78 |
| Roller | 74 | 20% | 67 |
| Truck | 88 | 40% | 84 |
| Crane, mobile | 83 | 20% | 76 |
| **Total 8-hour workday Leq at 50 feet:** | | | **88** |

*Vibration*

Unlike typical light rail transit operations, there is the potential for damage to nearby structures at close distances due to vibration from construction activities, such as pile driving, hoe rams, vibratory compaction, and loaded trucks. Most limits on construction vibration are based on reducing the potential for damage to nearby structures. Although construction vibrations are only temporary, it is still reasonable to assess the potential for human annoyance and damage.

As a conservative approach, the potential for construction vibration impacts was assessed based on the vibration damage criteria for the non-engineered timber and masonry building category (Category III) in the FTA guidance manual (FTA 2018). A vibration criterion of 94 VdB has been used to assess potential damage impact, and the operational vibration criterion of 72 VdB has been used to assess potential vibration annoyance from construction activities. With the exception of impact pile driving, the potential for vibration damage is limited to within 25 feet of construction activities. For impact pile driving, the screening distance for potential vibration damage is 55 feet. There are no sensitive receptors within 25 feet of the project alternatives, but there are several within 55 feet of the mainline design options in Belmor. However, any potential for impacts would depend on the method of pile installation.

Because the exact location of construction equipment is important in projecting vibration levels, a more detailed assessment of potential vibration damage will be performed during final design when more accurate equipment locations are known.

### 3.9.2.4 Avoidance and Minimization of Impacts

The following measures would be applied as needed to minimize temporary construction noise and vibration impacts:

- Avoiding nighttime construction in residential neighborhoods
- Locating stationary construction equipment as far as possible from noise-sensitive sites
- Constructing noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers
- Routing construction-related truck traffic to roadways that would cause the least disturbance to residents
- Using alternative construction methods to minimize the use of impact and vibratory equipment (e.g., pile-drivers and compactors). If pile driving is necessary, it would be limited to daytime hours.

#### 3.9.2.5 Indirect Impacts

No indirect impacts related to noise and vibration would result from construction and operation of the proposed project. Most vehicle traffic and other sources of environmental vibration are below the levels of human perception and would not cause an indirect impact.

### 3.9.3 Potential Mitigation Measures

#### 3.9.3.1 Long-Term Measures

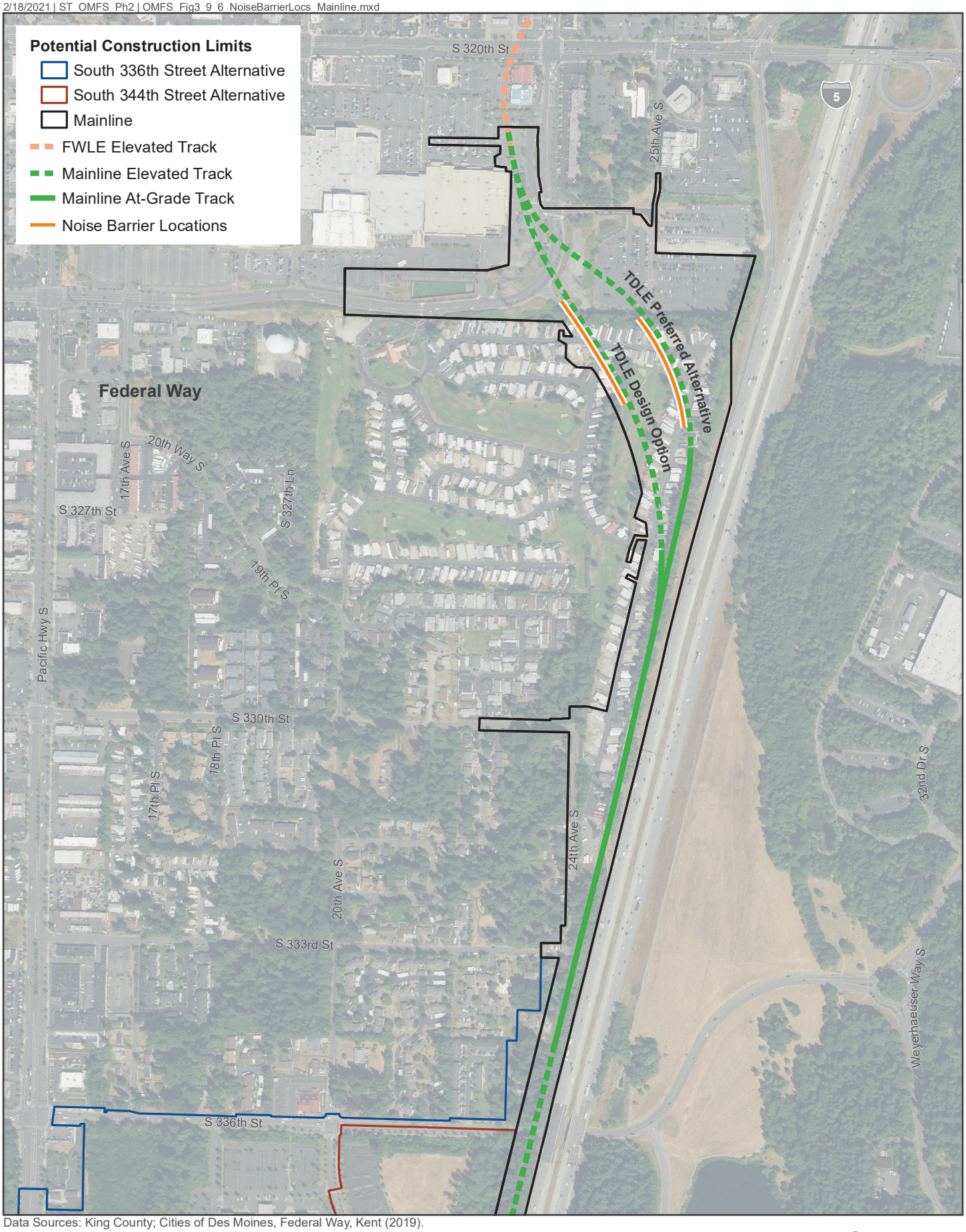
The Sound Transit Link Noise Mitigation Policy (Board Motion M2004-08) sets source mitigation as the preferred method, followed by path mitigation, such as noise barriers, and then receiver mitigation, which would include sound insulation of properties.

No mitigation would be necessary for the Midway Landfill Alternative. For the South 336th Street and South 344th Street alternatives, noise barriers are proposed for mitigation along the elevated mainline track for both design options. The approximate locations and lengths of the noise barriers would depend on which mainline design option is chosen and are shown in Table 3.9-5 and Figure 3.9-6. The final height and length of the barriers would be determined during final design. However, typical noise barriers are 4 feet in height on elevated structures. Assuming 4-foot barriers on the elevated structure at the locations described below, the barriers would provide approximately 8 dB of noise reduction, and there would be no residual impacts after mitigation.

The noise mitigation for the cumulative effects of TDLE on sensitive receptors for the South 336th Street and South 344th Street alternatives, including the mainline, are discussed in Chapter 4, Cumulative Impact Analysis, and will be further detailed in the Tacoma Dome Link Extension Draft Environmental Impact Statement, which is expected to be published in 2022.

**Table 3.9-5 Summary of Potential Noise Barrier Locations**

| Mainline Track Options | Approximate Location | Noise Barrier Length (ft) |
|---|---|---|
| TDLE Preferred Alternative (40 mph curve) | Southbound side from south of park-and-ride to Oakland Hills Boulevard | 600 |
| TDLE Design Option (55 mph curve) | Southbound side from south of park-and-ride to south of Seminole Lane | 600 |




Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

**FIGURE 3.9-6**
Noise Barrier Locations
Mainline Track Options
*OMF South*

#### 3.9.3.2 Construction Measures

Construction activities would be carried out in compliance with Sound Transit specifications and applicable local noise regulations. Construction noise is exempt from the WAC noise limits, except at residential land uses during nighttime hours (10 p.m. to 7 a.m.). If construction is performed during nighttime hours, the contractor must meet the WAC noise level requirements or obtain a noise variance from the governing jurisdiction. Specific construction noise and vibration mitigation measures would be developed during the design phase of the project when more detailed construction information is available.

In addition to the measures listed above in Avoidance and Minimization of Impacts, a detailed Noise and Vibration Control Plan would be required from the contractor as part of construction. Key elements of a plan would include:

- Contractor's specific equipment types
- Schedule (dates and times of day) and methods of construction
- Maximum noise limits for each piece of equipment with certification testing
- Prohibitions on certain types of equipment and processes during the night or daytime hours per local agency coordination and approved variances
- Identification of specific sensitive receptors near construction sites
- Methods for predicting construction noise levels
- Implementation of noise and vibration control measures where appropriate
- Methods for responding to community complaints in compliance with Sound Transit outreach requirements.