Figure PA 3.10-20 Phase I Avalon Barrier

- Recommended Noise Barrier
- Impacted > 10 dBA Increase
- Impacted > NAAC
- Impacted > NAAC and > 10 dBA Increase
- Not Impacted
- Phase 1
**Construction Mitigation**

ODOT will comply with all standard specifications to reduce construction-related noise for Phase 1 (discussed in more detail for the Preferred Alternative).

**Coordination With Local Government Officials**

A TNM analysis was performed to determine the distance from roadway centerlines to the Activity Category B and E NAACs of 65 dBA and 70 dBA, respectively for Springbrook Road and Oregon 219 in Newberg. Distances to impact were not determined for the Phase 1 loop in Dundee because it is located on lands zoned for agricultural use.

Using the projected 2016 traffic volumes on Springbrook Road with the Phase 1 improvements, residential development within approximately 90 feet of the centerline will be noise impacted at 65 dBA, and Activity Category E developed lands within approximately 30 feet of the Bypass will be noise impacted at 70 dBA. Using the projected 2016 traffic volumes on Oregon 219, residential development within approximately 145 feet of the centerline will be noise impacted at 65 dBA, and Activity Category E developed lands within approximately 55 feet of the Bypass will be noise impacted at 70 dBA.

As there are still parcels of empty land adjacent to Springbrook Road and Oregon 219, the local government officials should consider these sound levels in approving residential land use development in these locations. Provision of noise abatement measures for new developments becomes the responsibility of local governments, developers, and landowners, after the date of public knowledge of the project. The date of public knowledge is the date of approval of the CE, FONSI, or ROD.

**Conclusions and Findings**

Total numbers of estimated traffic noise impacts are summarized in Table PA 3.10-21 for the Phase 1 noise analysis areas. No other activity category impacts are predicted in the Phase 1 project terminus analysis areas.

**Table PA 3.10-21. Summary of Total Estimated Noise Impacts for the Phase 1 Analysis Areas**

<table>
<thead>
<tr>
<th>Segment</th>
<th>Estimated Numbers of Activity Category B Residences With SL ≥ NAAC</th>
<th>Estimated Numbers of Activity Category B Residences With SL ≥ NAAC</th>
<th>Estimated Numbers of Activity Category B (Residential) Noise Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/3 - Dundee</td>
<td>5</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>6 - Newberg</td>
<td>18</td>
<td>23</td>
<td>35</td>
</tr>
<tr>
<td><strong>Total Impacts</strong></td>
<td><strong>23</strong></td>
<td><strong>28</strong></td>
<td><strong>48</strong></td>
</tr>
</tbody>
</table>

Source: Newberg Dundee Bypass Tier 2 Final Noise and Vibration Analysis Technical Memorandum with Phase 1 Addendum, ODOT 2012.

NAAC = noise abatement approach criteria, SL = sound levels.

With inclusion of the noise barriers recommended for the Phase 1 alignment terminus areas (not including the Mill Barrier recommended for the Mill neighborhood), sound levels at 23 residences would be benefitted by a 5 dBA reduction (or greater) in sound levels under Phase 1. Twenty-five unavoidable noise impacts would result from construction of the project where barriers were not feasible or reasonable and were not recommended.
Table PA 3.10-22. Summary of Total Estimated Noise Impacts, Total Abated Noise Impacts and Total Unavoidable Impacts\textsuperscript{a} for Phase 1

<table>
<thead>
<tr>
<th>Total Estimated Noise Impacts\textsuperscript{a}</th>
<th>Total Impacts with Recommended Noise Abatement\textsuperscript{b}</th>
<th>Total Unavoidable Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>23</td>
<td>25</td>
</tr>
</tbody>
</table>

Source: Newberg Dundee Bypass Tier 2 Final Noise and Vibration Analysis Technical Memorandum with Phase 1 Addendum, ODOT 2012.

\textsuperscript{a} All impacts shown are Activity Category B impacts (residences).

\textsuperscript{b} This total includes all receptors located behind the three recommended noise barriers, even if they do not receive a reduction in noise levels of 5 dBA or more.
3.10.6 Tier 2 DEIS Build Alternative

The following is an exact copy of the Tier 2 DEIS Build Alternative section for noise and vibration. In-text references cite information in the Tier 2 DEIS.

The Tier 2 DEIS Build Alternative, which includes all of the design and local circulation options no longer under consideration, is included here as a comparison to the Tier 2 FEIS Preferred Alternative and for informational purposes only.

Copies of the complete Tier 2 DEIS are available from:

Kelly Amador, Senior Project Leader, Region 2
Oregon Department of Transportation
Mid-Willamette Valley Area
885 Airport Road SE, Building P
Salem, OR 97301-4788
kelly.l.amador@odot.state.or.us

3.10.2.1 Level of Analysis Detail

Future noise levels (2030) were predicted at 82 receptor sites for the No Build Alternative and the Build Alternative. The noise analysis performed for this Tier 2 DEIS is less detailed than the standard EIS-level analysis. Typically, noise-impacted properties are identified for each proposed alternative within the limits of construction using the three-dimensional Traffic Noise Model (TNM). ODOT determined that this less detailed methodology would be able to provide sufficient information on noise impacts for this Tier 2 DEIS without the standard approach or level of detail. In addition, no traffic data were available for several of the local circulation options, so a detailed analysis of noise impacts for all roadways to be constructed or modified as part of the Build Alternative was not feasible. The standard detailed noise analysis will be performed after the selection of a Preferred Alternative, and the results will be presented in the Tier 2 FEIS.

Traffic data for local streets in the vicinity of the Build Alternative, and specifically the Bypass, must be analyzed in more detail for the Preferred Alternative. This analysis is important because the data will have a large influence on the proposal and design of potential mitigation for noise-impacted neighborhoods. In many locations, local circulation on existing streets is the largest contributor to existing sound levels, and modeling of existing sound levels will not be accurate without inclusion of these roadways in the model network. Traffic data must be provided for all local circulation streets to be constructed (including overcrossings), even if projected volumes are very low, so the data can be included in the modeling analysis for the Preferred Alternative.

The noise analysis presented in this Tier 2 DEIS uses a methodology appropriate for the current level of roadway design. All modeling conducted was three-dimensional, and sound levels were predicted at discrete noise prediction sites (receptors). The selection of receptor locations, however, was limited, with the goal of determining the extent of noise impacts while minimizing the numbers of receptors for the project area. Not enough receptors were used to determine exactly which residences would be impacted by any given part of the Bypass. Instead, this noise analysis identified zones of noise impact, along with an estimate of the numbers of impacted residences, to provide a quantitative comparison between design options. This approach allows property owners to determine if their property falls within the noise-impacted zone. Where traffic data were available, local circulation options were analyzed in the modeling. All other local circulation options were analyzed qualitatively.

Noise barriers are being considered that would abate many of the noise impacts described below. The specific noise barriers under consideration are discussed in Section 3.10.4, Mitigation. A new noise study will be completed for the Tier 2 FEIS after a
Preferred Alternative is identified. The Tier 2 FEIS noise study will include a detailed analysis of the noise impacts resulting from the Preferred Alternative alignment, including the preferred local circulation options, and will identify noise barriers considered for construction. ODOT will consider abatement of noise impacts for developments with plan approval issued by local jurisdictions prior to the Record of Decision (ROD) on the Tier 2 FEIS. ODOT will make final decisions for provision of noise abatement measures during final design. In final design, ODOT will evaluate whether additional study might be appropriate due to changes within the project area and to reconfirm that the planned mitigation measures are appropriate, as well as to reconsider if abatement is now reasonable and feasible for areas previously dismissed from consideration for abatement.

3.10.2.3 Build Alternative

Direct Impacts

Operational traffic noise impacts (those from vehicles on the roadways) typically occur within approximately 500 feet of the roadway. Because most of the proposed project is a new roadway (the Bypass) that would be located away from existing highways and local roads, operational traffic noise would impact areas currently not affected by highway noise.

Operational noise levels produced under the Build Alternative (all segments and design options) were analyzed quantitatively (using modeling) except for Design Options 4.2, 5.2D, and 7.5C. These options were analyzed qualitatively through comparison with the results of the quantitative analysis of very similar design options. Segment 4 noise impacts were covered in the same model run as the East Dundee Interchange area, and are included under Segment 3 noise impacts. Design Option 5.2D was not modeled, but was estimated qualitatively, and is estimated to result in the same number of noise impacts as Design Option 5.1D.2.

Total numbers of estimated traffic noise impacts are summarized in Table 3.10-5 for each of the segments and design options. It is estimated that approximately 241 to 315 residences and one commercial property would be impacted by traffic noise under the Build Alternative. The majority of the affected properties are located in Segments 3, 5, 6 and 8.1 and 8.1A).

Table 3.10-5. Summary of Total Estimated Noise Impacts by Segment and Design Option

<table>
<thead>
<tr>
<th>Segment</th>
<th>Design Option</th>
<th>Estimated Number of Residential Impacts</th>
<th>Estimated Number of Commercial Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segment 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Segment 2</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Segment 3</td>
<td>3.A</td>
<td>33 to 35</td>
<td>0</td>
</tr>
<tr>
<td>Segment 3</td>
<td>3.A2</td>
<td>33 to 35</td>
<td>0</td>
</tr>
<tr>
<td>Segment 3</td>
<td>3.B</td>
<td>40 to 45</td>
<td>0</td>
</tr>
<tr>
<td>Segment 3</td>
<td>3.B2</td>
<td>39 to 42</td>
<td>0</td>
</tr>
<tr>
<td>Segment 4</td>
<td>4.1 and 4.2</td>
<td>Included in Segment 3</td>
<td>Not modeled – no effect on number of impacts</td>
</tr>
<tr>
<td>Segment 5</td>
<td>5.1C.2</td>
<td>78 to 84, Ewing Young Park and Scott Leavitt Park</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 3.10-5. Summary of Total Estimated Noise Impacts by Segment and Design Option

<table>
<thead>
<tr>
<th>Segment</th>
<th>Design Option</th>
<th>Estimated Number of Residential Impacts</th>
<th>Estimated Number of Commercial Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1D.2</td>
<td>137 to 138, Ewing Young Park and Scott Leavitt Park</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5.2D</td>
<td>137 to 138, Ewing Young Park and Scott Leavitt Park</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Segment 6</td>
<td></td>
<td>77</td>
<td>0</td>
</tr>
<tr>
<td>Segment 7</td>
<td>7.4C</td>
<td>14, CPRD Golf Course, Providence Newberg Medical Center</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>7.5C</td>
<td>12, CPRD Golf Course, Providence Newberg Medical Center</td>
<td>0</td>
</tr>
<tr>
<td>Segments 8.1 and 8.1A (combined)</td>
<td></td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td>Total Impacts</td>
<td></td>
<td>241 to 315b</td>
<td>1</td>
</tr>
</tbody>
</table>


a Residential impacts also include hospital and parks.
b Parks, the golf course, and the hospital are added to these totals because they have the same impact criteria as residences.

In the quantitative analysis, noise impacts occur when either the noise impact levels are reached or exceeded (65 or 70 dBA) or when predicted future levels for a design option increase by 10 dBA or more over existing conditions. The results of the analysis are summarized in Table 3.10-5 and are discussed below by segment and design option.

Table 3.10-6 shows a comparison of existing and Build Alternative (future) noise levels for impacted receptors. All sound levels cited in the following discussion are from the tables in Appendix B. In addition, the locations of areas that approach or exceed the impact criteria change between the No Build Alternative and the Build Alternative.

Table 3.10-6. Estimated 2030 Build Alternative Noise Impacts by Geographic Area Within Each Segment and for Each Design Option

<table>
<thead>
<tr>
<th>Location</th>
<th>Existing 2010 Sound Levels (Leq – dBA)</th>
<th>Predicted Build Sound Levels (Leq – dBA)</th>
<th>Estimated Number of Residential Impacts</th>
<th>Estimated Number of Commercial Impacts</th>
<th>Comment</th>
<th>Impacted Receptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segment 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Properties in closest proximity to Bypass Interchange</td>
<td>51 to 56</td>
<td>54 to 57</td>
<td>0</td>
<td>0</td>
<td>No impacts</td>
<td></td>
</tr>
</tbody>
</table>
### Table 3.10-6. Estimated 2030 Build Alternative Noise Impacts by Geographic Area Within Each Segment and for Each Design Option

<table>
<thead>
<tr>
<th>Location</th>
<th>Existing 2010 Sound Levels (Leq – dBA)</th>
<th>Predicted Build Sound Levels (Leq – dBA)</th>
<th>Estimated Number of Residential Impacts</th>
<th>Estimated Number of Commercial Impacts</th>
<th>Comment</th>
<th>Impacted Receptors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Segment 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Properties east of Bypass</td>
<td>43</td>
<td>53</td>
<td>4</td>
<td>0</td>
<td>Substantial increase impacts of 10 dBA</td>
<td>R78</td>
</tr>
<tr>
<td><strong>Design Option 3.A and 3.A2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residences southeast of Bypass</td>
<td>41 to 47</td>
<td>57 to 65</td>
<td>7</td>
<td>0</td>
<td>Residential impact criteria and substantial increase impacts of 10 to 24 dBA</td>
<td>R52, R73, R74</td>
</tr>
<tr>
<td>Residences west of connector road and northwest of Bypass</td>
<td>43 to 53</td>
<td>56 to 63</td>
<td>6 to 8</td>
<td>0</td>
<td>Substantial increase impacts of 10 to 13 dBA</td>
<td>R61, R72</td>
</tr>
<tr>
<td>Residences east of connector road and northwest of Bypass</td>
<td>42 to 44</td>
<td>53 to 63</td>
<td>20</td>
<td>0</td>
<td>Substantial increase impacts of 11 to 20 dBA</td>
<td>R51, R53, R55, R57, R60</td>
</tr>
<tr>
<td><strong>Design Option 3.B</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residences west of connector road and northwest of Bypass</td>
<td>43 to 53</td>
<td>54 to 64</td>
<td>13 to 18a</td>
<td>0</td>
<td>Substantial increase impacts of 10 to 13 dBA</td>
<td>R61, R70, R72</td>
</tr>
<tr>
<td>Residences southeast of Bypass</td>
<td>41 to 47</td>
<td>57 to 65</td>
<td>7</td>
<td>0</td>
<td>Residential impact criteria and substantial increase impacts of 10 to 24 dBA</td>
<td>R52, R73, R74</td>
</tr>
</tbody>
</table>
### Table 3.10-6. Estimated 2030 Build Alternative Noise Impacts by Geographic Area Within Each Segment and for Each Design Option

<table>
<thead>
<tr>
<th>Location</th>
<th>Existing 2010 Sound Levels (Leq – dBA)</th>
<th>Predicted Build Sound Levels (Leq – dBA)</th>
<th>Estimated Number of Residential Impacts</th>
<th>Estimated Number of Commercial Impacts</th>
<th>Comment</th>
<th>Impacted Receptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residences east of connector road and northwest of Bypass</td>
<td>42 to 44</td>
<td>53 to 63</td>
<td>20</td>
<td>0</td>
<td>Substantial increase impacts of 11 to 20 dBA</td>
<td>R51, R53, R55, R57, R60</td>
</tr>
<tr>
<td><strong>Design Option 4.1</strong></td>
<td>Included in Segment 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Design Option 4.2</strong></td>
<td>Not modeled – no effect on number of impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Design Option 5.1C.2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Properties south of Bypass</td>
<td>42 to 50</td>
<td>63 to 65</td>
<td>5</td>
<td>1</td>
<td>Substantial increase impacts of 13 to 23 dBA</td>
<td>R34, R46</td>
</tr>
<tr>
<td>Properties north of Bypass</td>
<td>44 to 50</td>
<td>58 to 68</td>
<td>73 to 79</td>
<td>0</td>
<td>Scott Leavitt Park and Ewing Young Park</td>
<td>R35, R36, R37, R38, R39, R40, R42, R43, R44</td>
</tr>
<tr>
<td><strong>Design Options 5.1D.2 and 5.2D</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Properties south of Bypass</td>
<td>42 to 50</td>
<td>64 to 63</td>
<td>5</td>
<td>1</td>
<td>Substantial increase impacts of 13 to 19 dBA</td>
<td>R34, R46</td>
</tr>
<tr>
<td>Properties north of Bypass</td>
<td>41 to 50</td>
<td>59 to 68</td>
<td>132 to 133c Scott Leavitt Park and Ewing Young Park</td>
<td>0</td>
<td>Substantial increase impacts of 11 to 18 dBA</td>
<td>R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45</td>
</tr>
<tr>
<td><strong>Segment 6</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Properties south of Bypass</td>
<td>46 to 69</td>
<td>63 to 69</td>
<td>15</td>
<td>0</td>
<td>Residential criteria impacts and substantial increase impacts of 17 dBA</td>
<td>R24, R31, R32, R33</td>
</tr>
</tbody>
</table>
Table 3.10-6. Estimated 2030 Build Alternative Noise Impacts by Geographic Area Within Each Segment and for Each Design Option

<table>
<thead>
<tr>
<th>Location</th>
<th>Existing 2010 Sound Levels (Leq – dBA)</th>
<th>Predicted Build Sound Levels (Leq – dBA)</th>
<th>Estimated Number of Residential Impacts</th>
<th>Estimated Number of Commercial Impacts</th>
<th>Comment</th>
<th>Impacted Receptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Properties north of Bypass</td>
<td>49 to 50</td>
<td>62 to 67</td>
<td>62</td>
<td>0</td>
<td>Residential criteria impacts and substantial increase impacts of 12 to 18 dBA</td>
<td>R23, R27</td>
</tr>
<tr>
<td>Segment 7.4C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Properties southeast of Bypass</td>
<td>43 to 51</td>
<td>61 to 68</td>
<td>0</td>
<td>Residential criteria impact and substantial increase impacts of 17 to 18 dBA</td>
<td>R12, R14</td>
<td></td>
</tr>
<tr>
<td>Properties northwest of Bypass</td>
<td>46 to 52</td>
<td>58 to 67</td>
<td>12, Newberg Providence Hospital</td>
<td>0</td>
<td>Residential criteria impact and substantial increase impacts of 11 to 21 dBA</td>
<td>R11, R15, R16, R22</td>
</tr>
<tr>
<td>Segment 7.5C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Properties southeast of Bypass</td>
<td>43 to 51</td>
<td>61 to 68</td>
<td>0</td>
<td>Residential criteria impact and substantial increase impacts of 17 to 18 dBA</td>
<td>R12, R14</td>
<td></td>
</tr>
<tr>
<td>Properties northwest of Bypass</td>
<td>46 to 52</td>
<td>58 to 67</td>
<td>12, Newberg Providence Hospital</td>
<td>0</td>
<td>Residential criteria impact and substantial increase impacts of 11 to 21 dBA</td>
<td>R11, R15, R16, R22</td>
</tr>
</tbody>
</table>
Table 3.10-6. Estimated 2030 Build Alternative Noise Impacts by Geographic Area Within Each Segment and for Each Design Option

<table>
<thead>
<tr>
<th>Location</th>
<th>Existing 2010 Sound Levels (Leq – dBA)</th>
<th>Predicted Build Sound Levels (Leq – dBA)</th>
<th>Estimated Number of Residential Impacts</th>
<th>Estimated Number of Commercial Impacts</th>
<th>Comment</th>
<th>Impacted Receptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segments 8.1 and 8.1A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Properties between Oregon 99W and Interchange</td>
<td>55 to 60</td>
<td>65</td>
<td>10</td>
<td>0</td>
<td>Residential criteria impacts and substantial increase impact of 10 dBA</td>
<td>R9, R10</td>
</tr>
<tr>
<td>Properties southeast of Interchange and Oregon 99W</td>
<td>67 to 72</td>
<td>69 to 74</td>
<td>12</td>
<td>0</td>
<td>Residential criteria impacts</td>
<td>R1, R2, R3</td>
</tr>
<tr>
<td>Properties north of Interchange and Oregon 99W</td>
<td>69 to 72</td>
<td>67 to 74</td>
<td>11</td>
<td>0</td>
<td>Residential criteria impacts</td>
<td>R3, R6</td>
</tr>
<tr>
<td><strong>Total Impacts</strong></td>
<td><strong>241 to 315°</strong></td>
<td></td>
<td><strong>1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


- a The berm reduces predicted sound levels by 2 to 3 dBA and the number of impacts for Design Option 3.B2 to 12 to 15 homes in this area.
- b Parks, the golf course, and the hospital are added to these totals since they have the same impact criteria as residences.
- c A large number of these impacts are apartment units represented by receptors R44 and R45. The apartment complex is represented by one dot on the graphics.
- d R3 is not located north of Oregon 99W, but is more representative of sound levels for properties located closer to Oregon 99W than R6.

Segment 1

Figure 3.10-4 shows the residential noise impact zones for Segment 1. No residences near the Dayton Interchange would be noise-impacted. The RV park would not be impacted by the Bypass. No direct noise impacts associated with the Dayton Interchange would occur. Local circulation options for this segment were not modeled because data for local circulation have not been developed. The area in Segment 1 will be analyzed further for noise impacts once the final Preferred Alternative is selected. The detailed Tier 2 FEIS noise analysis will include the data for local circulation.

Segment 2

Residential noise impact zones for Segment 2 are shown on Figure 3.10-5. Residential receptors located in the vicinity of Segment 2 are scattered farmhouses and rural residences. Under the Build Alternative, residences on the southeast side and within about 950 feet of the Bypass are predicted to have substantial increase noise impacts, with a predicted sound level of 53 dBA. Existing and No Build Alternative sound levels are 43 and 45 dBA, respectively, southeast of the proposed project.
All other residences near the Bypass alignment are on the northwest side of the Bypass between Oregon 99W and the Bypass. Sound levels at these residences would not change notably because major contributors to ambient sound levels are Oregon 99W and the railroad tracks. In addition, the Bypass alignment would be close enough to Oregon 99W in this area so that ambient sound levels already include traffic noise. Sound levels at many of the residences are predicted to decrease by up to 6 dBA because of reduced traffic volumes on Oregon 99W. None of the six properties identified in Table 3.10-3 and represented by receptor R77 in Figure 3.10-2 as residences (located on Oregon 99W between Trunk Road and NE Archery Summit Road) where existing sound levels approach or exceed the noise abatement criteria are predicted to be noise-impacted by the Build Alternative. Future sound levels under the Build Alternative would be lower than existing sound levels. Local circulation options would not have an impact.

**Segment 3**

In Segment 3, residential development includes a mix of neighborhood and rural residential development in proximity to the Bypass. The East Dundee connector road from the Bypass to Oregon 99W would pass through an area of residential development. Residential noise impact zones for this segment are shown on Figure 3.10-6 through Figure 3.10-9.

Design Options 3.A2 and 3.B2 include berms as visual elements. These berms were not included for the purpose of noise mitigation, but the design options were analyzed to determine whether the berms provided any reduction in noise for nearby residences. Design Option 3.A2 did not result in differences in noise impacts from Design Option 3.A. Design Option 3.B2 resulted in a small reduction in sound levels in the area west of the interchange and northwest of the Bypass, and reduced the number of impacted residences from 13 to 18 homes to 12 to 15 homes. Local circulation options of the 6th, 8th, or 10th Street overcrossing are not expected to change sound levels for the properties analyzed. The selected design option will be included in detailed noise impact modeling for the Preferred Alternative in the Tier 2 FEIS.

**Design Option 3.A**

Residences within about 1,000 feet of the southeast side of the Bypass are predicted to experience a substantial noise increase of 10 to 24 dBA. The predicted sound levels for residences in this area range from 57 to 65 dBA compared to existing sound levels of 41 to 47 dBA and predicted No Build Alternative sound levels of 42 to 50 dBA. Residential noise impact zones for this design option are shown on Figure 3.10-6 and Figure 3.10-7. All other residences close to the Bypass are located on the northwest side, between Oregon 99W and the Bypass. Impacts predicted for residences in proximity to the East Dundee connector road and the Bypass are considered substantial increase noise impacts; the predicted increases range from 10 to 13 dBA.

On the east side of the East Dundee connector road, several “substantial noise” increase impacts are predicted. Predicted sound levels would range from 53 to 63 dBA for impacted residences. Existing sound levels in this area for those residences are 42 to 44 dBA, and predicted No Build Alternative sound levels in this area are 43 to 48 dBA.

**Design Option 3.A2**

The addition of the 6-foot berm in this design option would not change predicted sound levels. Residential noise impact zones for this design option are shown on Figure 3.10-6 and Figure 3.10-7.
Local Circulation Common to Local Circulation Options A & B for Segment 1

Segment 1: Dayton Interchange

Estimated Noise Impact Zones

- Urban Growth Boundary (UGB)
- Segment 1 Local Circulation Options
- City Limits
- Segment 1 Right-of-Way
- Bypass Approved Corridor
- Segment 2 Local Circulation
- Railroad
- Bridges, Overcrossings, or Undercrossings
- Houses within Noise Impact Zone
- Estimated Residential Noise Impact Zone

Figure 3.10-4 Estimated Noise Impact Zones

Map ID: DEIS_Base_8x11_NoiseImpactZones.mxd Print Date: March 2010
Figure 3.10-5 Estimated Noise Impact Zones
Segment 2: Dayton Interchange to Dundee UGB

- Urban Growth Boundary (UGB)
- City Limits
- Bypass Approved Corridor
- Railroad
- Bridges, Overcrossings, or Undercrossings
- Houses within Noise Impact Zone
- Estimated Residential Noise Impact Zones

Legend:
- Segment 1 Right-of-Way
- Segment 2 Local Circulation
- Segment 2 Right-of-Way
- Design Option 3.A Right-of-Way

Map ID: DEIS_Base_8x11_NoiseImpactZones.mxd  Print Date: March 2010
Figure 3.10-6 Estimated Noise Impact Zones
Segment 3 and 4: Dundee UGB to East Dundee Interchange
Design Options: 3.A, 3.A2, and 4.1

- Urban Growth Boundary (UGB)
- City Limits
- Bypass Approved Corridor
- Railroad
- Bridges, Overcrossings, or Undercrossings
- Houses within Noise Impact Zone
- Estimated Residential Noise Impact Zone
- At-Grade Bridge Footprint
- Semi-Depressed Bridge Footprint

* Of the three overcrossing options, only one will be chosen.
Figure 3.10-7  Estimated Noise Impact Zones
Segments 3 and 4: Dundee UGB to East Dundee Interchange
Design Options: 3.A, 3.A2, and 4.2

* Of the three overcrossing options, only one will be chosen.

Semi-Depressed Bridge Footprint*
At-Grade Bridge Footprint*
**Design Option 3.B**

Impacts for Design Option 3.B are similar to those in Design Option 3.A, but this design option would result in a few more substantial increases in noise impacts to properties located northwest of the Bypass and west of the connector road. The majority of the additional impacts would occur to residences at the intersection of SE 8th Street and SE Boysen Lane. Residential noise impact zones for this design option are shown on Figure 3.10-8 and Figure 3.10-9.

**Design Option 3.B2**

The 6-foot berm in this design option would reduce predicted sound levels for the residences at SE 8th Street and SE Boysen Lane by 2 to 3 dBA. This reduction, although barely perceptible to the human ear, would prevent substantial increase noise impacts to those residences. This result would reduce the number of estimated impacts by one to three residences, bringing the total for the area west of the connector road and northwest of the Bypass to 12 to 15 estimated noise impacts. No other sound levels are predicted to change because of the berms (see Figure 3.10-8 and Figure 3.10-9).

**Segment 4**

**Design Option 4.1**

Design Option 4.1 (interchange) was included in the modeling for Segment 3, including the East Dundee connector road. As shown in Table 3.10-4, impacted residences are included in the Segment 3 design option totals. Residential noise impact zones for Design Option 4.1 are shown on Figure 3.10-6 and Figure 3.10-8.

**Design Option 4.2**

Design Option 4.2 (interchange) was not modeled. The ramp configuration is identical to the configuration for Design Option 4.1, except that in Design Option 4.2, the Bypass eastbound on-ramp is a loop ramp in the southwest quadrant of the interchange. Residential noise impact zones for Design Option 4.2 are expected to be identical to the impacts for Design Option 4.1 (see Figure 3.10-7 and Figure 3.10-9). Noise impacts for the Preferred Alternative will be modeled in detail for the Tier 2 FEIS. If Design Option 4.2 is the selected design option in Segment 4, it would be included in the modeling.

**Segment 5**

In Segment 5, the Bypass alignment passes between SP Newsprint and a neighborhood. Predicted sound levels at some first row residential receptors are expected to exceed the absolute noise impact criteria. The differences between the design options in Segment 5 are discussed below. The number of noise-impacted properties is a conservative maximum based on the size of the predicted zone of impact. Residential noise impact zones are shown in Figure 3.10-10.

**Design Option 5.1C.2**

In Design Option 5.1C.2, the Bypass would be semi-depressed. This semi-depressed stretch of Bypass is short, but would reduce sound levels at nearby residences. The 2030 traffic noise levels are predicted to range from 58 to 68 dBA in this area. The existing monitored sound levels ranged from 49 to 54 dBA, and predicted No Build Alternative sound levels range from 44 to 58 dBA.

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37 Local traffic data in this area were not well developed, and modeled results did not align with measurements in this area. For this area, measured rather than modeled results are presented.

38 Modeled results from the tables in Appendix B.
**Design Option 5.1D.2**

In Design Option 5.1D.2 (the overpass at College Street), the Bypass is elevated on an overpass rather than semi-depressed, as with Design Option 5.1C.2. The overpass changes the distribution of sound levels and noise impacts for residences in its vicinity. Some shielding of noise may exist for residences close to the Bypass, but the reduction is only a few decibels and is not enough to prevent properties from being impacted. The extent and number of estimated impacts is greater than with Design Option 5.1C.2.

**Design Option 5.2D**

In Design Option 5.2D, the Bypass is shifted closer to SP Newsprint than with Design Options 5.1C.2 and 5.1D.2, removing the need to acquire residential properties on 11th Street for right-of-way. The vertical profile of this design option is similar to the profile for Design Option 5.1D.2. The horizontal shift in Bypass alignment would likely produce no net change in the number and magnitude of noise impacts for Design Option 5.1D.2. The number of houses avoided by the shift southward in the Bypass would be directly offset by the number of houses impacted in the new location.

**Segment 6**

Two residential neighborhoods exist in the vicinity of the Oregon 219 interchange. The Avalon neighborhood is located south of the Bypass, and Springwood Estates is located north of the Bypass. Residential noise impact zones for Segment 6 are shown in Figure 3.10-10.

In the Avalon neighborhood, residences that back onto Oregon 219 currently have sound levels that exceed the ODOT absolute noise impact criteria of 65 dBA. Existing sound levels are predicted to range from 60 to 69 dBA, and predicted No Build Alternative sound levels are estimated to be 62 to 71 dBA. The predicted Build Alternative sound levels for the Avalon neighborhood range from 66 to 67 dBA, exceeding the noise impact criterion of L eq 65 dBA. The magnitude of the noise impact to residences adjacent to Oregon 219 would be reduced slightly in comparison to existing sound levels because the elevated highway shields the residences from the line of sight to the Bypass traffic and the traffic on Oregon 219 north of the Bypass. However, the addition of the interchange ramps and Bypass would cause additional residences to be impacted at which sound levels do not currently approach or exceed the impact criteria.

Springwood Estates is located at the intersection of Springbrook Street and Wilsonville Road. Currently, sound levels range from 45 to 50 dBA, depending on proximity to Wilsonville Road (based upon monitoring results). The No Build Alternative 2030 sound levels are predicted to be 50 to 51 dBA (based upon modeled results). Under the Build Alternative, predicted sound levels for the neighborhood are predicted to be 62 to 67 dBA. Thus, the noise impact criterion of 65 dBA would be exceeded at some properties. Substantial increases in noise impacts are predicted for approximately the eastern half of the neighborhood.

Shielding analyses for building rows were not performed for the neighborhoods in this section, and the estimated numbers of impacts are conservative maximums.
Figure 3.10-8 Estimated Noise Impact Zones

Segment 3 and 4: Dundee UGB to East Dundee Interchange

- Urban Growth Boundary (UGB)
- City Limits
- Bypass Approved Corridor
- Railroad
- Bridges, Overcrossings, or Undercrossings
- Houses within Noise Impact Zone
- Estimated Residential Noise Impact Zone
- At-Grade Bridge Footprint*

* Of the three overcrossings options, only one will be chosen.
Figure 3.10-9  Estimated Noise Impact Zones
Segment 3 and 4: Dundee UGB to East Dundee Interchange

- Urban Growth Boundary (UGB)
- City Limits
- Bypass Approved Corridor
- Railroad
- Bridges, Overcrossings, or Undercrossings
- Houses within Noise Impact Zone
- Estimated Residential Noise Impact Zone
- At-Grade Bridge Footprint*

* Of the three overcrossings options, only one will be chosen.
Segment 7

Design Option 7.4C

In Design Option 7.4C, the Bypass would pass through open space and past the Chehalem Glenn Golf Course, the Oaks at Springbrook Estates neighborhood, and the Oak Meadows neighborhood. A few single residences also exist near the Bypass in this area. The Newberg Providence Hospital is located northwest of this section of the alignment, just before the Rex Hill Interchange. Residential noise impact zones for this design option are shown on Figure 3.10-11.

Monitored existing ambient noise conditions ranged from 43 to 54 dBA. Measurements on the golf course ranged from 43 to 51 dBA. Noise levels for this design option were modeled. The predicted No Build Alternative sound levels for this area range from 46 to 68 dBA. The predicted Build Alternative sound levels for impacted receptors under this design option range from 58 to 68 dBA, with substantial noise increase impacts of 11 to 21 dBA. Impacts in this area include a residence south of Fernwood Road, the eastern-most residences in the Oak Meadows neighborhood, the western side of the golf course, and Newberg Providence Hospital.

Impacts to the hospital and associated medical offices (located within one large “U-shaped” building) are evaluated under the residential land use criterion. The hospital has an outdoor use area (the Healing Garden) on the east side of the building. The building does not have any windows that open, so it is unlikely that any operations within the building would be impacted by traffic noise. The predicted future exterior sound level at the hospital at a receptor site located southeast of the building on hospital property is 63 dBA. This 11 dBA increase over the existing sound level would be a substantial increase noise impact to the Healing Garden.

Houses in the Oaks at Springbrook Estates neighborhood are not predicted to be noise-impacted. In this area, the Bypass is semi-depressed to pass under Fernwood Road, which is elevated slightly over the Bypass, and this design shields those residences closest to the Bypass.
Earthborne Vibration at the Hospital With Design Option 7.4C

Through discussions with the hospital Facilities Manager, a determination was made that operations sensitive to vibration (the operating rooms) are located in the part of the building closest to the proposed Bypass alignment (the southeast side of the “U”-shaped building). Potentially sensitive imaging equipment is located in the center of the building.

No state or federal standards exist for the assessment of vibration impacts, but a reasonable amount of care should be taken to prevent the construction of new highway facilities too close to vibration-sensitive areas. Operations such as sensitive electronic equipment or surgical operations may require consideration of vibration criteria that are much lower than the threshold of perception level. In the absence of site-specific data, information from the technical advisory “Transportation Related Earthborne Vibrations (Caltrans Experiences)” prepared by the California Department of Transportation (Caltrans 2002) can be used to assess the potential for vibration impacts. The document contains information on established typical relationships between sources of earthborne vibrations versus distance to vibration-sensitive operations. Construction vibrations can vary much more than traffic vibrations and pile driving can be of particular concern. Heavy truck traffic on freeways within 100 feet, major construction within 200 feet, and pile driving within 600 feet may be potentially disruptive to sensitive operations, based on studies performed by Caltrans (Caltrans 2002).

Under Design Option 7.4C, the Bypass travel lanes would be located approximately 365 feet from the edge of the existing hospital building. This is beyond the 100-foot distance of concern for heavy truck traffic on freeways. The Caltrans data indicate that beyond 150 feet from the alignment centerline, maximum truck vibration levels drop below the threshold of perception. People staying in the hospital are unlikely to be annoyed by vibration from Bypass traffic, based on these data. Some vibration-sensitive equipment within the hospital may be affected by levels below the threshold of perception, but the distance between the hospital and Bypass is large and is greater than the 200-foot distance for major construction indicated by the Caltrans document.

Figure 3.10-12 shows the Bypass right-of-way in relation to the hospital location. The distance from the existing hospital building to the edge of the Design Option 7.4C right-of-way is approximately 310 feet. It can be assumed the right-of-way would contain the limits of construction activity. Construction within a distance of 200 feet may be potentially disruptive to sensitive operations. Construction of the Bypass would occur outside this distance from the hospital. In addition, pile driving within 600 feet may potentially be disruptive. The closest portion of the Bypass that will require pile driving during construction is the bridge expanse over Springbrook Creek, located approximately 1,500 feet from the hospital building. The location of pile driving will be outside the distance of concern for the hospital. If a noise barrier were to be constructed near the hospital, alternate methods could be used to sink the posts to avoid pile driving nearby.

The alignment of Design Option 7.4C is closer to the hospital and would not be the Preferred Alternative for the minimization of vibration; greater distances allow greater attenuation. In general, manmade earthborne vibrations attenuate rapidly with distance from the source.

The Newberg Providence Hospital has plans for expansion, which include construction of additional medical buildings on the empty parcel of land on the east side of Providence Drive and an expansion of the hospital building to accommodate additional operating rooms and patient rooms. The hospital expansion would be on the east and south sides of the current building, moving these potentially vibration-sensitive operations closer to the proposed Bypass alignment. Figure 3.10-12 also shows the proposed hospital expansion and new medical buildings. One potential new medical building located on the east side of Providence Drive is located within the Design Option 7.4C right-of-way. The land would be acquired if Design Option 7.4C were selected for the final Preferred...
Alternative. The figure shows that the distance between the expanded hospital and the right-of-way is 197 feet. If the hospital expansion were completed prior to construction of the Bypass, construction activities within the right-of-way would encroach on the 200-foot distance considered to be the distance of concern for construction activities. Pile driving for the Springbrook Creek Bridge would occur at a distance of 1,340 feet, which is outside the distance of concern. The travel lanes would be located beyond the 100-foot distance that Caltrans states may be the limit of potential vibration concerns from heavy truck traffic. If Design Option 7.4C were selected as the final Preferred Alternative and the hospital building expansion had been completed prior to the Bypass construction, ODOT would revisit the analysis of the minimum distance to construction. Mitigation for vibration due to construction activities would be established if necessary where construction would be closest to the hospital.

**Design Option 7.5C**

Design Option 7.5C was not modeled, but was assessed qualitatively. With this design option, the Bypass is shifted to the east, onto the golf course property and away from the Newberg Providence Hospital property. At Fernwood Road, the alignment is shifted slightly east as well. It was assumed that the noise impact zone would shift accordingly. The impacts to the Oak Meadows neighborhood would be reduced slightly as a result of this shift. A larger area of the golf course would be impacted as the road moves eastward. The zone of substantial increase noise impacts would still be likely to reach the Newberg Providence Hospital property, but would probably no longer include the eastern side of the building as with Design Option 7.4C. It is assumed the outdoor use area (Healing Garden) would still be impacted by a substantial noise increase of 10 dBA or greater. The hospital is still considered noise-impacted for this design option as with Design Option 7.4C. Residential noise impact zones for this design option are shown on Figure 3.10-13.

The anticipated construction of additional medical offices and the expansion of the hospital building in this area could also change the noise impact, because substantial increase noise impact may then include the buildings and not just the outdoor area. The existing building does not have any windows that open, however. The right-of-way would not include all of the parcel of land to the east of Providence Drive, and the proposed future medical building could potentially still be constructed just adjacent to the Bypass under Design Option 7.5C.

**Earthborne Vibration at the Hospital With Design Option 7.5C**

The Bypass alignment under Design Option 7.5C is located further away from the potentially vibration-sensitive operating rooms located within the east side of the existing hospital building (approximately 590 feet). The 590-foot setback is beyond the 100-foot distance established by Caltrans to be the minimum providing protection from traffic vibration impacts to sensitive operations. This alignment may reduce potential vibration at the hospital because it is further away than Design Option 7.4C. The existing hospital building is approximately 525 feet from the Design Option 7.5C right-of-way. Construction would occur beyond the distance of concern. Pile driving would occur at approximately the same distance as for Design Option 7.4C for the Springbrook Creek bridge, which is outside the 600-foot distance of concern. If a noise barrier were constructed for Design Option 7.5C, alternate methods could be used to sink the wall posts than pile driving in the vicinity of the hospital.

Figure 3.10-12 shows the location of the Design Options 7.4C and 7.5C right-of-way in relation to the proposed hospital expansion and new medical buildings. The shortest distance between the Bypass right-of-way and the expanded hospital building would be 420 feet. This distance is beyond the 200-foot limit of potential construction vibration impacts to sensitive operations and the 100-foot limit for traffic impacts. Pile driving would occur at approximately 1,340 feet from the expanded hospital building and 1,090 feet...
from the proposed southerly medical office building. Both distances are adequate to protect the hospital from earthborne vibration impacts. If the southerly medical office building were built prior to the construction of the Bypass, construction activities would occur within the 200-foot zone of concern. It is not known whether the medical office building would house any vibration-sensitive equipment, such as imaging equipment. Temporary construction vibration levels might exceed the threshold of perception for the building inhabitants. The building corner is located approximately 55 feet from the edge of the travel lanes. This distance is within the 100-foot distance of concern for heavy truck traffic, and the 150-foot distance stated for the threshold of perception.

If Design Option 7.5C were selected as the Preferred Alternative and the medical building had been completed prior to the Bypass construction, ODOT would revisit the analysis of the minimum distances to construction and freeway traffic. Mitigation for vibration impacts would be established if necessary. Despite the proximity of the Bypass alignment to the southern proposed medical office building, Design Option 7.5C is the preferable alignment for minimizing the potential for earthborne vibrations from Bypass operations to have an effect on sensitive operations occurring within the hospital building.

**Segments 8.1 and 8.1A**

Noise levels for Segments 8.1 and 8.1A, along with the associated local circulation option, were modeled. Land uses adjacent to Oregon 99W are a mix of residential and commercial properties. No substantial noise increase impacts are predicted for this area because Oregon 99W already contributes to elevated sound levels in the area. Residential noise impact zones for these segments are shown on Figure 3.10-11 and Figure 3.10-13.

Residences just east of the Newberg Providence Hospital would be located between the Bypass interchange ramps and the interchange ramps with Oregon 99W. Existing sound levels in this area are 55 to 60 dBA, depending on the proximity to Oregon 99W. Predicted No Build Alternative sound levels for this area are 57 to 61 dBA. The predicted Build Alternative sound level for these residences is 65 dBA, which meets the residential noise impact criteria. The residences further away from Oregon 99W will also experience a substantial noise increase impact.

The Rex Hill Winery and a few residences are located north of the Bypass, near the Bypass interchange. Existing sound levels are predicted as 69 to 72 dBA. No Build Alternative sound levels are predicted as 71 to 73 dBA. Future Build Alternative sound levels are predicted to be 67 to 74 dBA. The residences are predicted to be noise-impacted under these segments for the Build Alternative; sound levels at those residences also exceed the noise impact criteria of 65 dBA under existing and No Build conditions. East of the Rex Hill interchange are residences and commercial properties located adjacent to Oregon 99W. All residences and some commercial properties that are first row receptors are predicted to have sound levels exceeding the noise abatement criteria under existing conditions and the No Build Alternative. These locations would be noise-impacted under the Build Alternative, although no commercial noise-impacted properties would remain in this area after construction due to the acquisition of commercial property for right-of-way.
Newberg-Dundee Bypass
The Bypass alignments are superimposed on the Campus Masterplan concept map to show the relationship of the Bypass to the proposed plan.

- Bypass Approved Corridor
- Design Option 7.4C Right-of-way
- Design Option 7.5C Right-of-way
- Existing Hospital
- Future Hospital Expansion

Figure 3.10-12
Distances from Providence Newberg Hospital to Bypass, Segment 7 Design Options
Figure 3.10-13 Estimated Noise Impact Zones
Segment 7: East Newberg to East Newberg Interchange
Segment 8.1: East Newberg Interchange
Segment 8.1A: Rex Hill
Design Option: 7.5C

- Urban Growth Boundary (UGB)
- City Limits
- Bypass Approved Corridor
- Railroad
- Bridges, Overcrossings, or Undercrossings
- Houses within Noise Impact Zone
- Estimated Residential Noise Impact Zone
- Segment 6 Right-of-Way
- Design Option 7.5C Right-of-Way
- Segment 8.1 Local Circulation
- Segment 8.1 Right-of-Way
- Segment 8.1A Local Circulation
- Segment 8.1A Right-of-Way

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Oregon 99W

Under the Build Alternative, sound levels on Oregon 99W would improve over the No Build Alternative due to reduced traffic volumes. The reduction of traffic volumes would result in a benefit to residences and commercial properties on Oregon 99W, because sound levels at many properties which currently approach or exceed the abatement criteria would no longer approach the criteria.

Construction Impacts

During construction of the Build Alternative, construction equipment will generate noise on a temporary basis for the duration of project construction. There is the potential for a temporary but major increase in sound levels due to the construction in areas which do not currently have high levels of ambient traffic noise.

Construction equipment associated with pile driving, pavement breaking, blasting and demolition of structures can generate among the highest construction vibrations (Caltrans 2002). These activities may be a concern for construction of the Bypass in the vicinity of Newberg Providence Hospital. The right-of-way for the Bypass east of the hospital is currently mostly open space. Pile driving will not be required adjacent to the hospital. The closest location of pile driving will be for a bridge expanse over Springbrook Creek, at the interchange of 99W and the Bypass, 1,500 feet to the northeast. In addition, because the area adjacent to the hospital is currently mostly open space, very little (if any) pavement breaking, blasting or structure demolition might be required. Those sources of earthborne vibration are potentially damaging to buildings at distances of less than 25 feet from the source. The hospital and the proposed hospital expansion are beyond 25 feet from the proposed alignments.

Indirect Impacts

No indirect noise impacts are expected.