# *JEFFERSON ROAD IMPROVEMENTS*
# *(SR 601)*

## *SOUTH CHARLESTON, KANAWHA COUNTY, WV*

**NOISE ANALYSIS**

## West Virginia Department of Transportation
## Division of Highways

## STATE PROJECT U220-601-0.00 00
## FEDERAL PROJECT STP-0601 (009) D
## US 119 TO US 60

**SEPTEMBER, 2015**
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## *1.0 INTRODUCTION*

A noise analysis was undertaken to evaluate the possible impacts from the Jefferson Road Improvement Project, US 119 (Corridor G) to US 60 (McCorkle Avenue) in Kanawha County. Figure 1 shows the regional project location.

Jefferson Road (WV 601) provides an important connection between Interstate 64 and US 119 in South Charleston, Kanawha County, West Virginia. Interstate 64 and US 119 are heavily traveled major routes that connect the Charleston area with Kentucky to the west. Additionally, US 119 has become a major retail corridor, placing an additional demand for connectivity with Interstate 64.

Jefferson Road is functionally classified as an Urban Minor Arterial and currently is identified as a Congested Corridor in the Regional Intergovernmental Council's 2040 Long Range Transportation Plan. Without improvement, congestion will become increasingly worse, particularly with anticipated future growth in the US 119 corridor.

The project purpose is to increase capacity and alleviate the congestion near the Kanawha Turnpike in the vicinity of the at-grade active CSX railroad crossing. There are two (2) alternatives studied for highway traffic noise impacts: Alternative 1 (through Phase III) and Alternative 5 (including a roundabout option), as described below.

Alternative 1: Phase I includes widening Jefferson Road from Sta. 153+00 to the north end of the project near the I-64 overpass ramp. This point is just south of the new bridge crossing Davis Creek where the proposed alignment would tie back into existing Jefferson Road. In this phase, the four-leg at-grade intersection at Kanawha Turnpike would replace the existing offset intersection. Phase II includes completing the widening of Jefferson Road from Corridor G (US 119) to Sta. 53+00 (end of Phase I). Phase III includes the addition of single-lane Northbound and Southbound overpass bridges to convey Jefferson Road thru traffic over Kanawha Turnpike and CSX Railroad tracks. A four-leg at-grade intersection would still exist for traffic traveling between Jefferson Road and Kanawha Turnpike.

Alternative 5: This alternative includes widening existing Jefferson Road from two to five lanes. This alternate would generally follow the existing alignment of Jefferson Road from Corridor G (US 119) to approximately 1400' south of Kanawha Turnpike. At this point the alignment would deviate from existing Jefferson Road to the east on a new alignment then back to the west bridging over Kanawha Turnpike, CSX Railroad tracks and Davis Creek to tie back into the existing road near the I-64 overpass ramp. The widening of Jefferson Road, where the alignment follows the existing road, would be to the east of the existing travel lanes.

Alternative 5a (with roundabout): Same as Alternative 5 with the exception of replacing the Jefferson Road/Kanawha Boulevard "plus" intersection with a roundabout.

The noise analysis was performed following the WVDOH 2011 Noise Policy guidelines. The report identifies basic noise fundamentals, noise sensitive locations, impact criteria and analysis procedures. It also contains the modeling results of the existing and design year no-build and build alternatives, a comparison of the design year build sound levels to the existing and design year no-action levels and to the impact criteria.

Additionally, the analysis includes discussions of noise abatement measures which have been considered (as applicable), noise impacts for which no prudent solutions are reasonably available, construction impact discussion, FHWA Policy regarding land use development, local official coordination and a summary.

## *2.0 SUMMARY OF RESULTS*

The analysis was performed following the WVDOH 2011 Noise Policy guidelines. The land use immediately near the proposed project consists primarily of residential land use mixed with several commercial retail businesses, community services and open land.

### *Alternative 1*

There are two (2) predicted NAC criteria impacts and zero (0) substantial increase impacts under the Build Condition. There is a decrease in the number of receptors approaching or exceeding the NAC over both the existing and design year no-build conditions as a result of the proposed roadway shifts and/or property acquisitions. The predicted NAC impact is Receptor 3, a receptor that represents the two (2) single family residential dwellings that are in separate buildings shared with office spaces south of Ghareeb Dental. The greatest increase over the existing condition for all receptors is 10 dBA. The greatest increase over the design year no-build condition is 9 dBA.

### *Alternative 5*

There are three (3) predicted NAC criteria impacts and zero (0) substantial increase impacts. There is a decrease in the number of receptors approaching or exceeding the NAC over both the existing and design year no-build conditions as a result of the proposed roadway shifts and/or property acquisitions. The predicted NAC impacts are Receptor 3, a receptor that represents the two (2) single family residential dwellings that are in separate buildings shared with office spaces south of Ghareeb Dental; and, Receptor 4, a single family residence shared with a law firm office north of Ghareeb Dental at the corner of Jefferson Road and Schenley Road. The greatest increase over the existing condition for all receptors is 9 dBA. The greatest increase over the design year no-build condition is 8 dBA.

### *Alternative 5a (with roundabout)*

The predicted number of noise impacts will be the same as Alternative 5.
The proposed roundabout at the Kanawha Turnpike intersection includes a new approach lanes design to the former “plus” intersection to accommodate the roundabout. As a result, it is estimated that an additional nearby (non-noise impacted) residence will be acquired by the newly proposed right-of-way line. This residence is one of the houses represented by R22.

The southern approach lanes to this roundabout move some of the traffic closer to houses represented by R22 at the end of McCune Hollow, and closer to R34, which include the recreation area/cemetery land uses. As a result of the modifications, it is estimated that the predicted sound levels at R22 will increase by approximately 4 dBA over the Alt 5 result and R34 will not increase (0 dBA change). Neither receptor is predicted to be impacted by the 66 dBA impact criteria nor the WVDOH substantial increase criteria.

The north-south mainline of the ramp and bridge in Alt 5a is proposed to be shifted slightly to the east. An analysis of the residences north of Kanawha Turnpike was performed to determine if additional impacts would be predicted. As a result of the modifications, it is estimated that the predicted sound levels at R30 will increase by approximately 3 dBA over the Alt 5 result, R42 will increase by 2 dBA and R70 will increase by 1 dBA. Neither receptor is predicted to be impacted by the 66 dBA impact criteria nor the WVDOH substantial increase criteria. Therefore, no additional impacts are predicted if the roundabout design is proposed.

***Mitigation***

As a result of direct access and commercial business visibility, none of the preliminary proposed barrier analysis locations are considered to be both feasible and reasonable for impacted receptors 3 and/or 4, depending on the chosen alternative. Therefore, no sound wall barriers are proposed to be carried forward into final design.

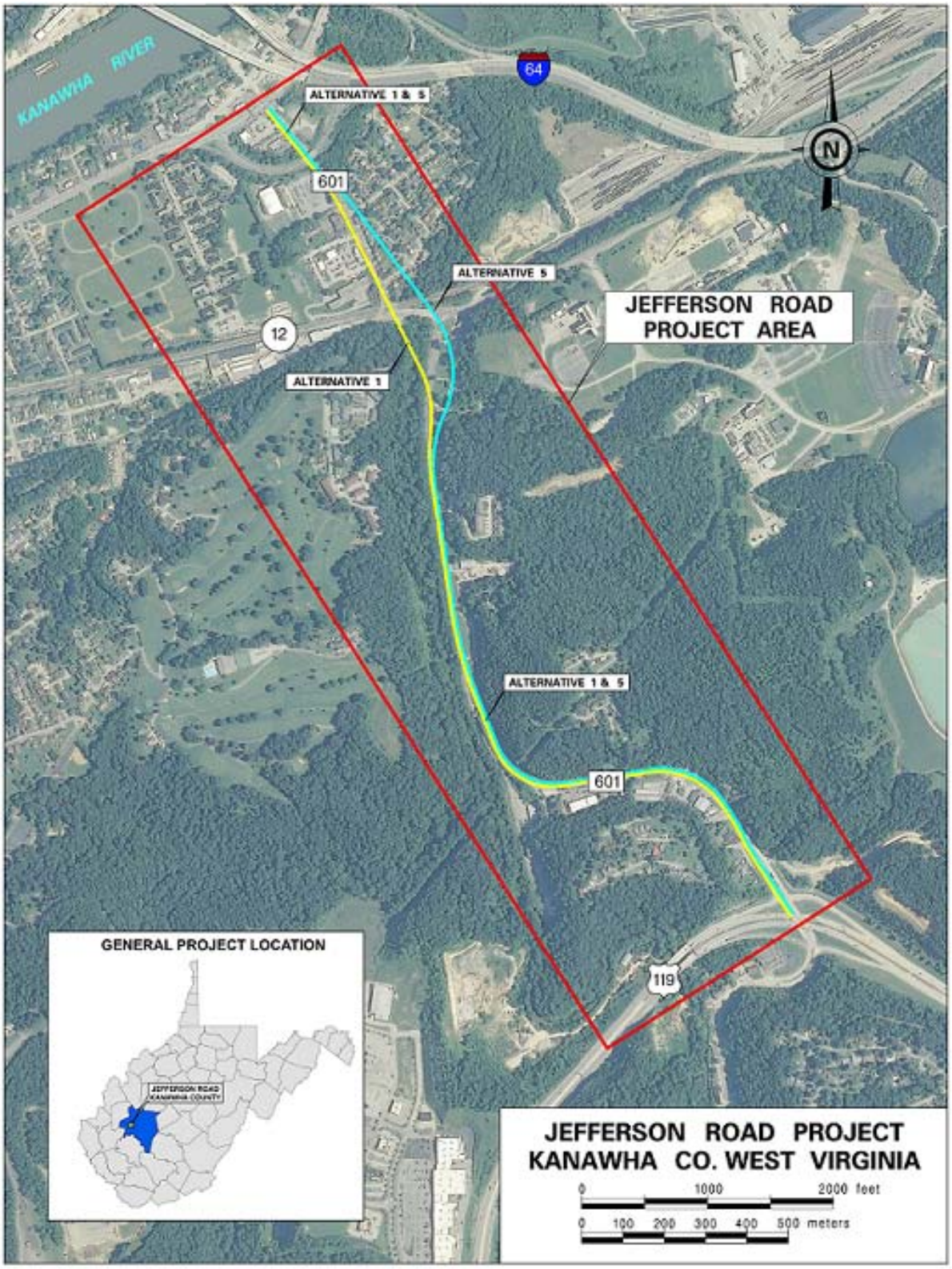



***Figure 1: Project Location Map***

## *3.0 FUNDAMENTALS OF SOUND AND NOISE*

Sound is the vibration of air molecules in waves similar to ripples on water. When these vibrations (or sound waves) reach our ears, we hear what we call sound. These sound waves are produced by objects which move back and forth very rapidly, such as vocal chords when we speak. The rate at which these objects move is called their frequency. Noise is defined as unwanted sound.

The intensity or loudness of sound is measured in units called decibels (dB). However, since the human ear does not hear sound waves of different frequencies at the same subjective loudness, an adjustment or weighting of the high-pitched and low-pitched sounds is often made to approximate average human perception. When such adjustments to the sound levels are made, they are called "A-weighted levels" and are labeled "dBA". Figure 2 illustrates some common A-weighted noise levels.

The dBA scale for measuring sound intensity is based on logarithmic or sound level pressure relative to a reference pressure. Logarithmic scales are based on powers of ten and are not linear (like a ruler). As a result, sound level additions are hard to define. For example, if a 60 dBA sound is added to another 60 dBA sound, the resulting sound is 63 dBA and not 120 dBA. Also, a 10 dBA sound level increase is equivalent to a person hearing a doubling of the sound level. This means that 60 dBA sounds twice as loud as 50 dBA. Figure 3 illustrates a typical person's sensitivity to sound level differences.

Additionally, the level of highway traffic noise is never constant; therefore, it is necessary to use a statistical descriptor to describe the varying traffic noise levels. The equivalent continuous sound level ($L_{eq}$) (h) dBA is the statistical descriptor used in this report. The $L_{eq}$ sound level is the steady A-weighted sound energy which would produce the same A-weighted sound energy over a stated period of time (1-hour (h), in this case) as a specified time-varying sound.

## *4.0 NOISE IMPACT CRITERIA*

A traffic noise impact occurs when the predicted levels approach the Noise Abatement Category criteria (NAC) or when predicted traffic noise levels substantially exceed the existing noise level, even though the predicted levels may not exceed the NAC. "Approach" shall mean within 1 dBA (Leq) of the NAC. Table 1 shows the noise abatement criteria. The term "substantially exceed the existing noise levels" is defined as an increase of 15 dBA or greater over the existing condition.

***Table 1: Noise Abatement Criteria***

| ACTIVITY CATEGORY | $L_{eq}$ (h) dBA | DESCRIPTION OF LAND USE CATEGORY |
|---|---|---|
| A | 57 (exterior) | Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. |
| B | 67 (exterior) | Residential. |
| C | 67 (exterior) | Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings. |
| D | 52 (interior) | Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios. |
| E | 72 (exterior) | Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A, B or C. |
| F | -- | Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing. |
| G | -- | Undeveloped lands that are not permitted. |

Source: 23 CFR 772.

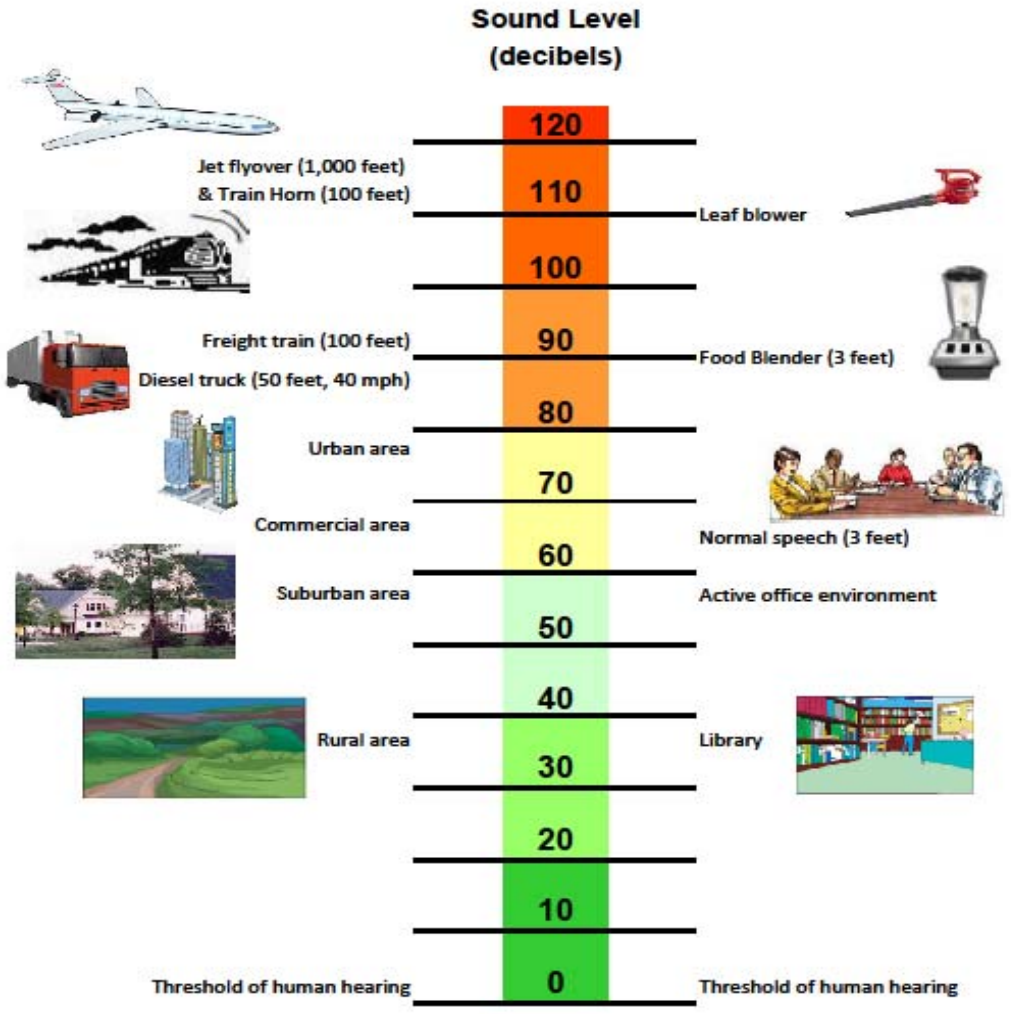



***Figure 2: Common Outdoor and Indoor Sound Levels***

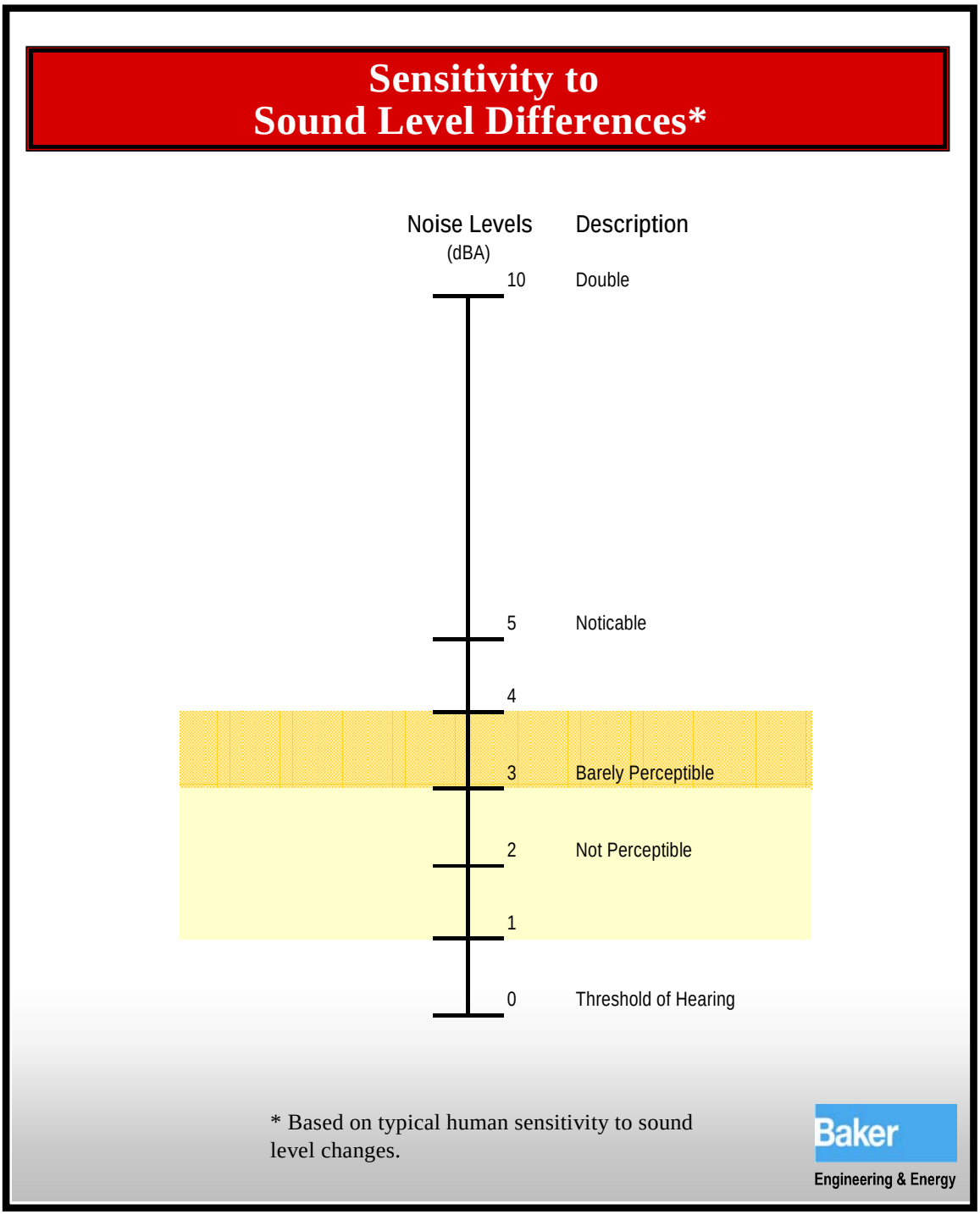



***Figure 3: Typical Sensitivity to Sound Level Differences***

## *5.0 NOISE LEVEL MEASUREMENTS*

Nine (9) field measurements were taken to validate the sound levels in the study area. The monitoring sites were chosen to be representative of the noise sensitive land uses adjacent to the project alternative and are characteristic of the existing background sound levels within the study area. The results of the field measurement program are shown in Table 2. The measured and monitored levels are within 3.0 dBA of each other. Therefore, the model is considered to be valid.

***Table 2: Measured Ambient Sound Levels (dBA)***

| Site | Location | Receptor Number | Land Use (NAC) | Field Measured Sound Levels | | Difference (dBA) | Primary Noise Sources |
|---|---|---|---|---|---|---|---|
| | | | | Measured | Modeled | | |
| M-1 | South Charleston Community Center - Tennis Courts | 75 | C | 55.0 | 52.4 | +2.6 | Jefferson Road |
| M-2 | Single Family Residences- Washington Street | 68 | B | 53.0 | 55.6 | -2.6 | Jefferson Road, Neighborhood Activities |
| M-3 | Single Family Residences- Park Street | 53/55/58 | B | 53.9 | N/A | N/A | Neighborhood Activities |
| M-4 | Single Family Residences- Jefferson Road | 18/19 | B | 69.1 | 67.6 | +1.5 | Jefferson Road |
| M-5 | Multifamily Residences-Mathias Lane | 13D | B | 54.5 | N/A | N/A | Country Club Village Activities, Distant Jefferson Road Traffic |
| M-6 | Single Family Residences- Forest Edge Drive | 9/10 | B | 69.2 | 66.3 | +2.9 | Jefferson Road |
| M-7 | Wesleyan Chapel | 6 | C/D | 71.2 | 69.2 | +2.0 | Jefferson Road |
| M-8 | Single Family Residences- Elmer Lane | 8 | B | 57.3 | N/A | N/A | Neighborhood Activities, Distant Jefferson Road and US 119 Traffic |
| M-9 | Recreation Area-Union Carbide | 34 | C | 59.6 | N/A | N/A | Neighborhood Activities, Local Traffic, Distant Jefferson Road Traffic |

Notes:

- N/A = Not Applicable as a result of the site being too far away from visible traffic. These sites were selected because the proposed alignment(s) will be on new location where there are no appreciable traffic volumes. As a result, these field measurements were used to define the existing sound level environment in lieu of highway traffic

## *6.0 NOISE LEVEL ESTIMATES*

Estimates of the exterior noise levels at sensitive receptors in the vicinity of the proposed project were based on the FHWA TNM2.5 computer model. Sound levels were modeled for the existing year, design year no-build, and design year build alternative. In making these estimates, the traffic volume, speed, fleet mix and elevation/terrain differences were considered.

## *7.0 TRAFFIC*

Paragraph b, Section 772.17 of 23 CFR 772 says that, "in predicting noise levels and assessing noise impacts, traffic characteristics which will yield the worst hourly traffic noise impact on a regular basis for the design year shall be used." Since the level of highway traffic noise is normally related to the traffic volume, the traffic characteristics which will yield the worst hourly traffic noise impact on a regular basis for the design year will be the average daily peak hour traffic volumes.

The traffic data used in the analysis was developed by Stantec Consulting Services Inc. for TRC Engineers, Inc. and was approved by WVDOH. The auto, medium truck and heavy truck percentages were 94, 4 and 2 percent, respectively, as provided by TRC and approved by WVDOH.

## *8.0 EXISTING (2014) NOISE ENVIRONMENT*

One-hundred (100) representative receptor sites were analyzed in the immediate vicinity of the project. The receptor sites included one place of worship, one fire station, one recreation facility (on Union Carbide property) and the South Charleston Community Center tennis courts. The rest of the receptors were residential dwelling units, mostly single family residences and a few multifamily sites. Some receptors represented multiple structures. There were 15 receptors, representing 16 residences, with existing noise levels approaching or exceeding the WVDOT criteria. Table 3 shows the predicted decibel levels and Figure 4 shows the receptor locations. Please note that the decibel levels are rounded.

## *9.0 DESIGN YEAR (2030) NO-BUILD ALTERNATIVE ENVIRONMENT*

The year 2030 no-build alternative $L_{eq}$ sound levels are predicted to generally increase by approximately 1 dBA over the existing sound level environment. There were twenty-two (22) receptors, representing 23 residences, with predicted design year noise levels approaching or exceeding the criteria. Table 3 shows the predicted decibel levels and Figure 4 shows the receptor locations.

## *10.0 DESIGN YEAR (2030) BUILD ALTERNATIVE ENVIRONMENT*

Table 3 shows the predicted decibel levels and Figure 4 shows the receptor locations. For Figure 4, Alternative 5A is represented in order to show the bigger footprint with the roundabout option. Table 4 shows a comparison of the predicted noise impacts by alternative. The impacted receptors are single family residential units.

### *Alternative 1*

There are two (2) predicted NAC criteria impacts and zero (0) substantial increase impacts. The decrease in the number of receptors approaching or exceeding the NAC over the existing or design year no-build conditions is a result of the proposed horizontal roadway shifts, property acquisitions (displacements) and/or notable elevation (vertical) changes in the relationships between the roadway and the receptor. The predicted NAC impact is Receptor 3, a receptor that represents the two (2) single family residential dwellings that are in separate buildings shared with office spaces south of Ghareeb Dental. The greatest increase over the existing condition for all receptors is 10 dBA. The greatest increase over the design year

no-build condition is 9 dBA.

***Alternative 5***

There are three (3) predicted NAC criteria impact and zero (0) substantial increase impacts. There is a decrease in the number of receptors approaching or exceeding the NAC over both the existing and design year no-build conditions as a result of the proposed roadway shifts and/or property acquisitions. The predicted NAC impacts are Receptor 3, a receptor that represents the two (2) single family residential dwellings that are in separate buildings shared with office spaces south of Ghareeb Dental; and, Receptor 4, a single family residence shared with a law firm office north of Ghareeb Dental at the corner of Jefferson Road and Schenley Road. The greatest increase over the existing condition for all receptors is 9 dBA. The greatest increase over the design year no-build condition is 8 dBA.

***Alternative 5a (with roundabout)***

The predicted number of noise impacts will be the same as Alternative 5. The proposed roundabout at the Kanawha Turnpike intersection includes a new approach lanes design to the former "plus" intersection to accommodate the roundabout. As a result, it is estimated that an additional nearby (non-noise impacted) residence will be acquired by the newly proposed right-of-way line. This residence is one of the houses represented by R22.

The southern approach lanes to this roundabout move some of the traffic closer to houses represented by R22 at the end of McCune Hollow, and closer to R34, which include the recreation area/cemetery land uses. As a result of the modifications, it is estimated that the predicted sound levels at R22 will increase by approximately 4 dBA over the Alt 5 result and R34 will not increase (0 dBA change). Neither receptor is predicted to be impacted by the 66 dBA impact criteria nor the WVDOH substantial increase criteria.

The north-south mainline of the ramp and bridge in Alt 5a is proposed to be shifted slightly to the east. An analysis of the residences north of Kanawha Turnpike was performed to determine if additional impacts would be predicted. As a result of the modifications, it is estimated that the predicted sound levels at R30 will increase by approximately 3 dBA over the Alt 5 result, R42 will increase by 2 dBA and R70 will increase by 1 dBA. Neither receptor is predicted to be impacted by the 66 dBA impact criteria nor the WVDOH substantial increase criteria. Therefore, no additional impacts are predicted if the roundabout design is proposed.

***Table 3: Predicted Sound Levels (dBA)***

| Receptor Number | Land Use & Location | NAC | Impact Criteria (dBA) | Existing Year | Design Year 2030 No-Build | Design Year Build 2030 | | Increase Over Existing | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Alt 1 | Alt 5 | Alt 1 | Alt 5 |
| 1 | Residence-Jefferson Road | B | 66 | 63 | 64 | 63 | 63 | 0 | 0 |
| 2 | Residence-Jefferson Road | B | 66 | 63 | 63 | 63 | 63 | 0 | 0 |
| 3 | Residences/Offices-Jefferson Road (2) | B | 66 | **66** | **66** | **66** | **66** | 0 | 0 |
| 4 | Residence/Office-Jefferson Road | B | 66 | **66** | **67** | 65 | **66** | -1 | 0 |
| 5 | Residence-Jefferson Road | B | 66 | **67** | **68** | X | X | X | X |
| 6 | Wesleyan Chapel (interior) | D | 51 | 45 | 46 | 43 | 43 | -2 | -2 |
| 7 | South Charleston Fire Station (interior) | D | 51 | 39 | 40 | 38 | 38 | -1 | -1 |
| 8 | Residence-Cliff View Drive | B | 66 | 59 | 59 | 59 | 59 | 0 | 0 |
| 8A | Residence-Elmer Lane | B | 66 | 59 | 59 | 59 | 59 | 0 | 0 |
| 8B | Residence-Elmer Lane | B | 66 | 58 | 59 | 59 | 59 | 1 | 1 |
| 8C | Residence-Elmer Lane | B | 66 | 56 | 57 | 56 | 57 | 0 | 1 |
| 8D | Residence-Elmer Lane | B | 66 | 56 | 57 | 56 | 56 | 0 | 0 |
| 8E | Residence-Schenley Park Drive | B | 66 | 58 | 59 | 58 | 59 | 0 | 1 |
| 8F | Residence-Addison Drive | B | 66 | 57 | 58 | 57 | 57 | 0 | 0 |
| 8G | Residence-Addison Drive | B | 66 | 57 | 58 | 57 | 57 | 0 | 0 |
| 8H | Residence-Schenley Park Drive | B | 66 | 48 | 49 | 48 | 48 | 0 | 0 |
| 9 | Residence-Forest Edge Drive | B | 66 | **67** | **68** | X | X | X | X |
| 10 | Residence-Forest Edge Drive | B | 66 | **66** | **67** | X | X | X | X |
| 11 | Residence-Forest Edge Drive | B | 66 | 60 | 61 | X | X | X | X |
| 11A | Residence-Forest Edge Drive | B | 66 | 55 | 56 | 54 | 55 | -1 | 0 |
| 12 | Residence-Forest Edge Drive | B | 66 | 47 | 47 | X | X | X | X |
| 13 | Residence-Jefferson Road | B | 66 | **68** | **69** | X | X | X | X |
| 13A | Multifamily Residences-Country Club Village-Mathias Lane | B | 66 | 59 | 60 | 60 | 60 | 1 | 1 |
| 13B | Multifamily Residences-Country Club Village-Pope Lane | B | 66 | 58 | 59 | 58 | 59 | 0 | 1 |
| 13C | Multifamily Residences-Country Club Village-Mathias Lane | B | 66 | 59 | 60 | 59 | 60 | 0 | 1 |
| 13D | Multifamily Residences-Country Club Village-Mathias Lane | B | 66 | 60 | 61 | 60 | 60 | 0 | 0 |

Notes:

- Values in **BOLD RED** indicate a Build Alternative NAC impact, a substantial increase impact, or both. Please note that Existing and No-Build values are not considered to be "impacts" and subject to mitigation, but are highlighted for informational purposes.
- X = Receptors located within the proposed right-of-way, subject to change during the environmental and design process.
- Some receptors were removed from the analysis as a result of field verification. The table was not renumbered to maintain continuity with the other modeled receptor numbers. Additional receptors were also added as a result of field identification.

| Receptor Number | Land Use & Location | NAC | Impact Criteria (dBA) | Existing Year | Design Year 2030 No-Build | Design Year Build 2030 | | Increase Over Existing | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Alt 1 | Alt 5 | Alt 1 | Alt 5 |
| 14 | Multifamily Patio Homes-Dapplewood Road | B | 66 | 59 | 60 | 60 | 60 | 1 | 1 |
| 15 | Multifamily Patio Homes-Dapplewood Road | B | 66 | 58 | 59 | 59 | 59 | 1 | 1 |
| 16 | Residence-Jefferson Road | B | 66 | **68** | **69** | X | X | X | X |
| 17 | Residence-Jefferson Road | B | 66 | **68** | **69** | X | X | X | X |
| 18 | Residence-Jefferson Road | B | 66 | **67** | **68** | X | X | X | X |
| 19 | Residence-Jefferson Road | B | 66 | **67** | **69** | X | X | X | X |
| 20 | Residence-Jefferson Road | B | 66 | **66** | **67** | X | X | X | X |
| 21 | Residences-McCune Hollow (2) | B | 66 | 49 | 50 | 53 | X | 4 | X |
| 22 | Residences-McCune Hollow (3) | B | 66 | 53 | 54 | 55 | 57 | 2 | 4 |
| 23 | Residence-Jefferson Road | B | 66 | 64 | 65 | X | X | X | X |
| 25 | Residence-Jefferson Road | B | 66 | 65 | **66** | 58 | X | -7 | X |
| 26 | Residence-Jefferson Road | B | 66 | 64 | 65 | 63 | X | -1 | X |
| 27 | Residence-Jefferson Road | B | 66 | **68** | **69** | X | 60 | X | -8 |
| 28 | Residence-Pennsylvania Avenue | B | 66 | **68** | **69** | X | 56 | X | -12 |
| 29 | Residence-Pennsylvania Avenue | B | 66 | 48 | 49 | X | 54 | X | 6 |
| 30 | Residence-Pennsylvania Avenue | B | 66 | 46 | 47 | 55 | 52 | 9 | 6 |
| 31 | Residence-Pennsylvania Avenue | B | 66 | 48 | 49 | 53 | X | 5 | X |
| 32 | Residence-Pennsylvania Avenue | B | 66 | 47 | 48 | 51 | X | 4 | X |
| 33 | Residence-Pennsylvania Avenue | B | 66 | 47 | 48 | 50 | X | 3 | X |
| 34 | Recreation Area and Cemetery | C | 66 | 50 | 51 | 52 | 52 | 2 | 2 |
| 35 | Residence-Jefferson Road | B | 66 | 64 | 65 | X | 57 | X | -7 |
| 36 | Residence-Jefferson Road | B | 66 | 65 | **66** | X | 57 | X | -8 |
| 37 | Residence-Park Street | B | 66 | 47 | 48 | 55 | X | 8 | X |
| 38 | Residence-Jefferson Road | B | 66 | **66** | **67** | X | 58 | X | -8 |
| 39 | Residence-Park Street | B | 66 | 47 | 48 | 55 | X | 8 | X |
| 40 | Residence-Jefferson Road | B | 66 | 65 | **66** | X | 59 | X | -6 |
| 41 | Residence-Park Street | B | 66 | 46 | 47 | 56 | X | 10 | X |
| 42 | Residence-Park Street | B | 66 | 49 | 50 | 51 | 51 | 2 | 2 |
| 44 | Residence-Jefferson Road | B | 66 | **66** | **66** | X | 59 | X | -7 |
| 45 | Residence-Park Street | B | 66 | 48 | 49 | 52 | 54 | 4 | 6 |
| 47 | Residence-Jefferson Road | B | 66 | 65 | **66** | X | X | X | X |

Notes:

- Values in **BOLD RED** indicate a Build Alternative NAC impact, a substantial increase impact, or both. Please note that Existing and No-Build values are not considered to be "impacts" and subject to mitigation, but are highlighted for informational purposes.
- X = Receptors located within the proposed right-of-way, subject to change during the environmental and design process.
- Some receptors were removed from the analysis as a result of field verification. The table was not renumbered to maintain continuity with the other modeled receptor numbers. Additional receptors were also added as a result of field identification.

| Receptor Number | Land Use & Location | NAC | Impact Criteria (dBA) | Existing Year | Design Year 2030 No-Build | Design Year Build 2030 | | Increase Over Existing | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Alt 1 | Alt 5 | Alt 1 | Alt 5 |
| 48 | Residence-Park Street | B | 66 | 43 | 44 | 51 | X | 8 | X |
| 49 | Residence-Park Street | B | 66 | 48 | 49 | 52 | 54 | 4 | 6 |
| 51 | Residence-Jefferson Road | B | 66 | 65 | **66** | X | X | X | X |
| 52 | Residence-Park Street | B | 66 | 45 | 46 | 54 | X | 9 | X |
| 53 | Residence-Park Street | B | 66 | 49 | 50 | 52 | 55 | 3 | 6 |
| 54 | Residence-Jefferson Road | B | 66 | 65 | **66** | X | X | X | X |
| 55 | Residence-Park Street | B | 66 | 49 | 50 | 51 | 52 | 2 | 3 |
| 56 | Residence-Jefferson Road | B | 66 | 65 | **66** | X | X | X | X |
| 57 | Residence-Park Street | B | 66 | 51 | 52 | 59 | X | 8 | X |
| 58 | Residence-Park Street | B | 66 | 50 | 51 | 54 | 57 | 4 | 7 |
| 60 | Residence-Jefferson Road | B | 66 | 64 | 65 | X | X | X | X |
| 61 | Residence-Park Street | B | 66 | 50 | 51 | 60 | X | 10 | X |
| 62 | Residence-Park Street | B | 66 | 50 | 51 | 55 | 58 | 5 | 8 |
| 63 | Residence-Park Street | B | 66 | 50 | 51 | 55 | 58 | 5 | 8 |
| 64 | Residence-Washington Street | B | 66 | 55 | 55 | 62 | X | 7 | X |
| 65 | Residence-Washington Street | B | 66 | 51 | 52 | 56 | 59 | 5 | 8 |
| 66 | Residence-Washington Street | B | 66 | 49 | 50 | 52 | 56 | 3 | 7 |
| 67 | Residence-Washington Street | B | 66 | 50 | 51 | 52 | 54 | 2 | 4 |
| 68 | Residence-Washington Street | B | 66 | 56 | 57 | 59 | X | 3 | X |
| 69 | Residence-Washington Street | B | 66 | 52 | 53 | 56 | 61 | 4 | 9 |
| 70 | Residence-Washington Street | B | 66 | 50 | 51 | 53 | 53 | 3 | 3 |
| 71 | Residence-Park Street | B | 66 | 56 | 57 | 60 | X | 4 | X |
| 72 | Residence-Park Street | B | 66 | 57 | 58 | 60 | X | 3 | X |
| 73 | Residence-Jefferson Street | B | 66 | 53 | 53 | 54 | 56 | 1 | 3 |
| 74 | Residence-Jefferson Street | B | 66 | 53 | 53 | 54 | 56 | 1 | 3 |
| 75 | South Charleston Community Center -Tennis Courts | C | 66 | 49 | 49 | 51 | 50 | 2 | 1 |
| 76 | Residence-Jefferson Street | B | 66 | 54 | 55 | 55 | 56 | 1 | 2 |
| 77 | Residence-Liberty Street | B | 66 | 55 | 56 | 57 | 57 | 2 | 2 |
| 78 | Residence-Pennsylvania Avenue | B | 66 | 49 | 50 | 52 | 54 | 3 | 5 |
| 79 | Residence-Pennsylvania Avenue | B | 66 | 50 | 51 | 52 | 54 | 2 | 4 |
| 80 | Residence-Pennsylvania Avenue | B | 66 | 52 | 53 | 53 | 51 | 1 | -1 |

Notes:

- Values in **BOLD RED** indicate a Build Alternative NAC impact, a substantial increase impact, or both. Please note that Existing and No-Build values are not considered to be "impacts" and subject to mitigation, but are highlighted for informational purposes.
- X = Receptors located within the proposed right-of-way, subject to change during the environmental and design process.
- Some receptors were removed from the analysis as a result of field verification. The table was not renumbered to maintain continuity with the other modeled receptor numbers. Additional receptors were also added as a result of field identification.

| Receptor Number | Land Use & Location | NAC | Impact Criteria (dBA) | Existing Year | Design Year 2030 No-Build | Design Year Build 2030 | | Increase Over Existing | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Alt 1 | Alt 5 | Alt 1 | Alt 5 |
| 81 | Residence-Pennsylvania Avenue | B | 66 | 52 | 53 | 53 | 54 | 1 | 2 |
| 82 | Residence-Pennsylvania Avenue | B | 66 | 51 | 52 | 53 | 54 | 2 | 3 |
| 83 | Residence-Jefferson Street | B | 66 | 50 | 51 | 53 | 54 | 3 | 4 |
| 84 | Residence-Jefferson Street | B | 66 | 50 | 51 | 53 | 53 | 3 | 3 |
| 85 | Residence-Jefferson Street | B | 66 | 50 | 51 | 53 | 53 | 3 | 3 |
| 86 | Residence-Jefferson Street | B | 66 | 49 | 50 | 53 | 53 | 4 | 4 |
| 87 | Residence-Jefferson Street | B | 66 | 49 | 50 | 53 | 53 | 4 | 4 |
| 88 | Residence-Jefferson Street | B | 66 | 50 | 51 | 53 | 53 | 3 | 3 |
| 89 | Residence-Jefferson Street | B | 66 | 50 | 51 | 54 | 53 | 4 | 3 |
| 90 | Residence-Jefferson Street | B | 66 | 51 | 52 | 54 | 54 | 3 | 3 |
| 91 | Residence-Washington Street | B | 66 | 51 | 52 | 53 | 54 | 2 | 3 |
| 92 | Residence-Washington Street | B | 66 | 51 | 52 | 53 | 54 | 2 | 3 |

Notes:

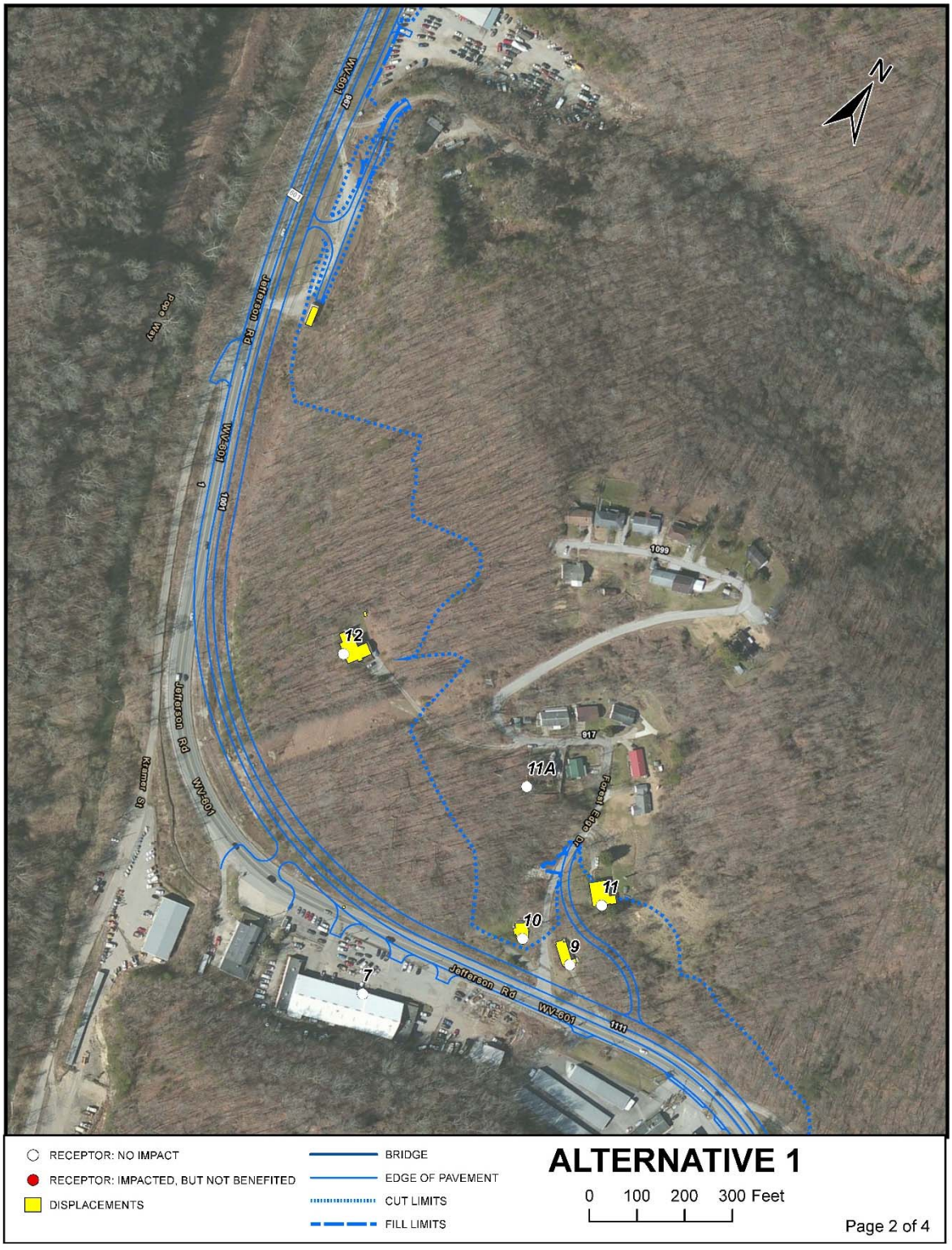
- Values in **BOLD RED** indicate a Build Alternative NAC impact, a substantial increase impact, or both. Please note that Existing and No-Build values are not considered to be "impacts" and subject to mitigation, but are highlighted for informational purposes.
- X = Receptors located within the proposed right-of-way, subject to change during the environmental and design process.
- Some receptors were removed from the analysis as a result of field verification. The table was not renumbered to maintain continuity with the other modeled receptor numbers. Additional receptors were also added as a result of field identification.

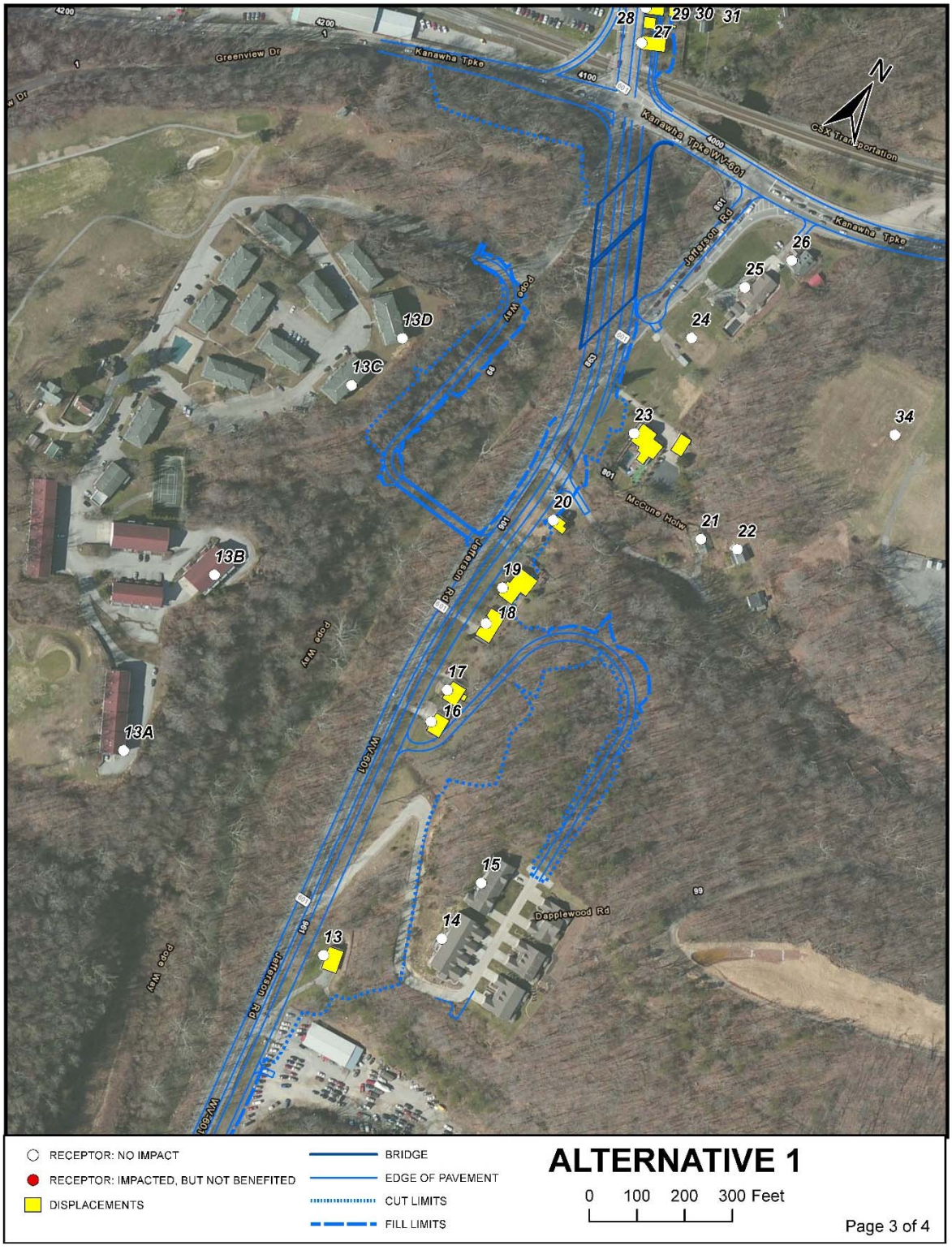
### *Table 4: Comparison of Predicted Impacts by Alternative*

| Receptor (Land Use ) Type | Existing | 2030 Design Year Noise Impacts | | |
|---|---|---|---|---|
| | | No-Build | Build Alternatives | |
| | | | 1 | 5, 5A |
| Residences (Single and Multi-Family) | 15 | 23 | 2 | 3 |
| Churches (Places of Worship) | 0 | 0 | 0 | 0 |
| Parks or Recreation Facilities | 0 | 0 | 0 | 0 |
| **Totals:** | **15** | **23** | **2** | **3** |

Note: Although Table 3 does not provide details on the impacts by Alternative 5A, no new noise impacts will occur with the addition of the roundabout option.


***Figure 4: Noise Receptor Impacts and Locations***
(Alternatives 1 and 5A, Sheets 1-4 for Each Alternative)


WV-601
Jefferson Rd
Pete Way
WV-601
1001
1099
12
Jefferson Rd
WV-601
Ramm St
11A
617
Forest Edge Dr
11
10
9
7
Jefferson Rd
WV-601
1111
RECEPTOR: NO IMPACT
RECEPTOR: IMPACTED, BUT NOT BENEFITED
DISPLACEMENTS
BRIDGE
EDGE OF PAVEMENT
CUT LIMITS
FILL LIMITS
ALTERNATIVE 1
0 100 200 300 Feet
Page 2 of 4

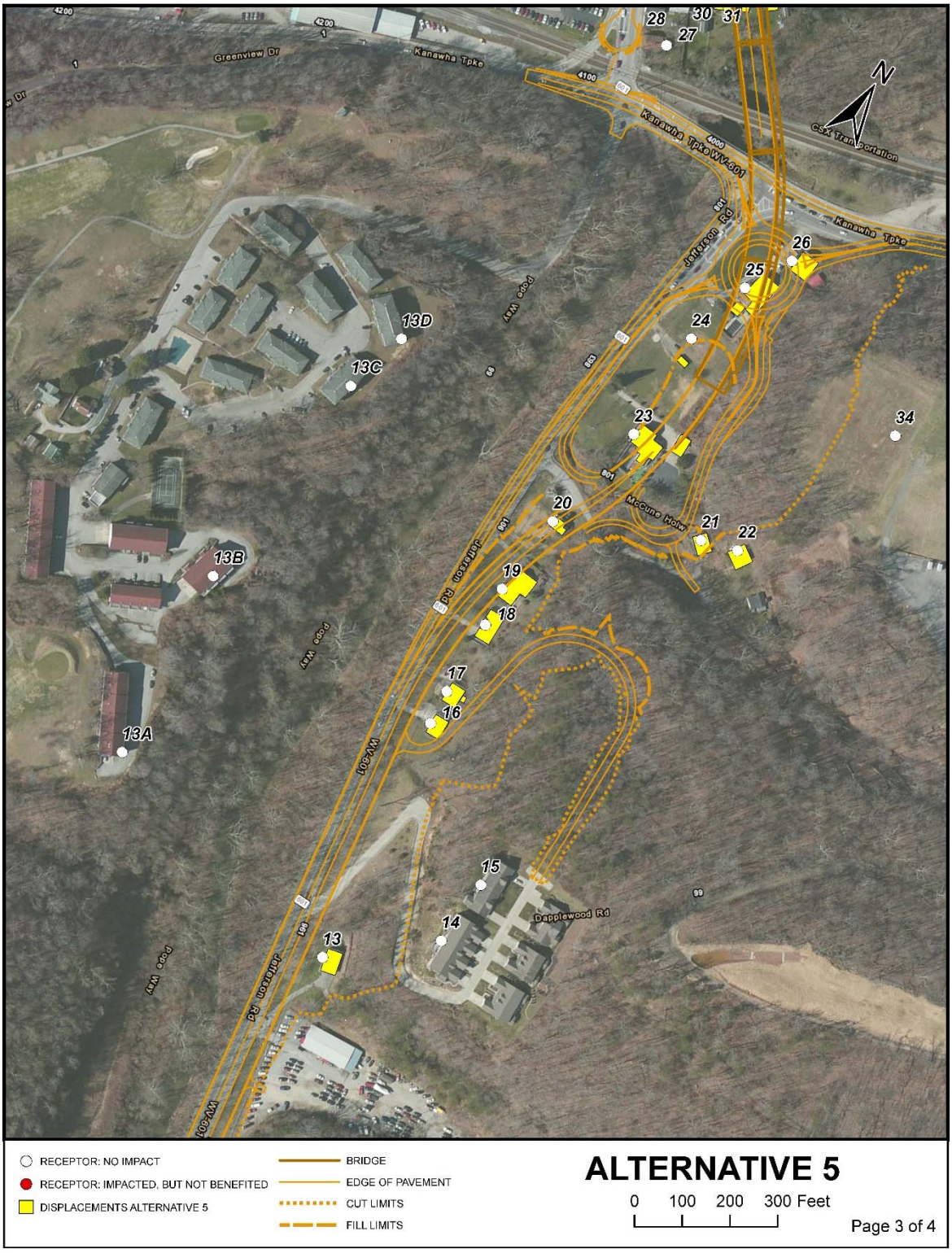

28
29
30
31
27
Greenview Dr
Kanawha Tpke
4100
Kanawha Tpke WV-601
CSX Transportation
N
Jefferson Rd
26
25
24
13D
13C
23
34
McCune Holw
20
21
22
13B
19
18
17
16
13A
WV-601
15
14
13
Dapplewood Rd
Jefferson Rd
Pope Way
RECEPTOR: NO IMPACT
RECEPTOR: IMPACTED, BUT NOT BENEFITED
DISPLACEMENTS
BRIDGE
EDGE OF PAVEMENT
CUT LIMITS
FILL LIMITS
ALTERNATIVE 1
0 100 200 300 Feet
Page 3 of 4


South Charleston Community Center
Jefferson Park
Riverside Dr
Maccorkle Ave SW
US-60
WV-601
Jefferson Rd
I-64 E
I-64 W
Kanawha Tpke
Pennsylvania Ave
Washington St SW
Virginia St SW
Liberty St
Park St
RECEPTOR: NO IMPACT
RECEPTOR: IMPACTED, BUT NOT BENEFITED
DISPLACEMENTS
BRIDGE
EDGE OF PAVEMENT
CUT LIMITS
FILL LIMITS
ALTERNATIVE 1
0 100 200 300 Feet
Page 4 of 4


8H
8G
8F
8E
8D
8C
8B
8A
8
1
2
3
4
5
6
Schenley Dr
Addison Dr
Elmer Ln
Club View Dr
Jefferson Rd
WV-501
WV-501 Jefferson Rd
WV-214
US-119 S
US-119 N
Oakhurst Dr
1111
1131
1374
1380
RECEPTOR: NO IMPACT
RECEPTOR: IMPACTED, BUT NOT BENEFITED
DISPLACEMENTS ALTERNATIVE 5
BRIDGE
EDGE OF PAVEMENT
CUT LIMITS
FILL LIMITS
ALTERNATIVE 5
0 100 200 300 Feet
Page 1 of 4


Jefferson Rd
WV-601
Pepe Way
Kanawha St
Forest Edge Dr
1099
917
1111
12
11A
11
10
9
7
RECEPTOR: NO IMPACT
RECEPTOR: IMPACTED, BUT NOT BENEFITED
DISPLACEMENTS ALTERNATIVE 5
BRIDGE
EDGE OF PAVEMENT
CUT LIMITS
FILL LIMITS
ALTERNATIVE 5
0 100 200 300 Feet

Page 2 of 4


28
30
31
27
Greenview Dr
Kanawha Tpke
Kanawha Tpke/WV-601
CSX Transportation
Jefferson Rd
Kanawha Tpke
26
25
24
13D
13C
Pope Way
23
34
McCune Holw
20
21
22
13B
19
18
Jackson Rd
17
16
13A
WV-601
15
14
13
Dapplewood Rd
RECEPTOR: NO IMPACT
RECEPTOR: IMPACTED, BUT NOT BENEFITED
DISPLACEMENTS ALTERNATIVE 5
BRIDGE
EDGE OF PAVEMENT
CUT LIMITS
FILL LIMITS
ALTERNATIVE 5
0 100 200 300 Feet
Page 3 of 4


South Charleston Community Center
Jefferson Park
Jefferson Rd
Riverside Dr
Maccorkle Ave SW
US-60
WV-601
I-64 E
I-64 W
Maccorkle Ave SW US-60
Harris St
Liberty St
Washington St SW
Virginia St SW
Pennsylvania Ave
Park St
Columbia St
Greenview Dr
Kanawha Tpke
RECEPTOR: NO IMPACT
RECEPTOR: IMPACTED, BUT NOT BENEFITED
DISPLACEMENTS ALTERNATIVE 5
BRIDGE
EDGE OF PAVEMENT
CUT LIMITS
FILL LIMITS
ALTERNATIVE 5
0 100 200 300 Feet
Page 4 of 4

## *11.0 TRAFFIC NOISE ABATEMENT*

The FHWA and WVDOH specifies several types of mitigation to be studied for areas warranting noise abatement consideration such as traffic management measures, changes in horizontal and vertical alignment, sound insulation for public institutions, additional acquisition for abatement features, and noise barriers. Each of these measures was investigated as described in the following sections.

### *Traffic Management Measures*

Traffic management measures that have been considered for this project are reductions in speed and truck restrictions on the proposed Build Alternatives. Neither would be considered an effective mitigation measure. A substantial decrease in speed would be needed to provide a noticeable sound level reduction because a 10 mph speed reduction would result in only a 2 dBA decrease in sound levels. Furthermore, the enforcement of lower speeds in this corridor is not a practical or effective solution for noise control. Truck restrictions would not accomplish the goal of moving people and goods effectively in the area.

### *Horizontal/Vertical Realignment*

The build alternative is bound by the required engineering limitations with the roadway design as well as incorporating abutting property lines. It was also developed to minimize and/or avoid impacts to potentially sensitive areas and to reduce/eliminate right-of-way acquisition. Any significant sound level reductions at impacted locations as a result of horizontal modifications would require large shifts in the alignment and might also require realigning the interchange ramp alignments for proper turning radii. Additionally, the proposed centerline in the vicinity of the impacted receptors has already been moved farther away to the northeast.

Vertical alignment alteration is also typically not considered to be a feasible noise abatement measure. As mentioned, the build alternative was developed to minimize impacts. The complexity of the direct access driveways, interchanges and cross-streets with the proposed road design would preclude any possible notable sound level reductions, if any could be achieved at all.

### *Sound Insulation for Public Institutions*

There were no interior sound levels at public institution receptors (Category D) that were impacted as a result of the proposed alternatives.

### *Acquisition for Abatement Features / Buffers*

Generally, WVDOH (or the responsible agency for the project) would build reasonable and feasible mitigation within the acquired right-of-way. The acquisition of property to serve as future buffer zones is practical in the sparsely developed sections of the proposed project since land would be available. It is also not practical in the more densely developed areas since the acquisition of property would expose shielded residences to additional noise with the removal of the first row of homes, offices and/or commercial business. Section 13 of this report will discuss FHWA policy regarding land use development, future noise abatement and proposing a buffer zone for potential subdivision development and/or other potentially sensitive noise receptors.

***Noise Barriers***

Feasibility

Feasibility deals with engineering considerations - that is, can a substantial noise reduction be achieved given the conditions of a specific location. Is the ability to achieve noise reduction limited by: (1) topography; (2) animal migratory paths; (3) cultural resources such as historic places; (4) access requirements for driveways, ramps, etc.; (5) maintenance issues and utility encumberments; (6) the presence of local cross streets; or (7) other noise sources in the area, such as aircraft, trains, or industry? All these considerations affect the ability of noise barriers to achieve an actual noise reduction.

It is state policy that construction of a noise barrier is NOT FEASIBLE if a noise reduction of at least 5 dBA cannot be achieved for at least one impacted receptor.

Reasonableness

Reasonableness is a more subjective criterion than feasibility. It implies that common sense and good judgment have been applied in arriving at a decision. Reasonableness should be based on a number of factors, with regard for all of the individual, specific circumstances of a particular project.

It is state policy that the final determination of reasonableness will be made only after a careful and thorough consideration of a wide range of criteria. However, noise barriers will definitely not be built if a majority of benefited receptors do not want them. During the environmental phase of a project it will be assumed that the benefited receptors will want a noise barrier. During the design phase of the project after the exact location and design of the project have been determined a public meeting will be held to provide detailed information on the design of the project and possible noise barriers. After the public meeting a survey will be conducted of the benefited receptors to determine if they want a noise barrier.

23 CFR 772.13(d)(2)(iv) requires that reasonableness factors 1, 2, and 3 listed below must collectively be achieved in order for a noise abatement measure to be deemed reasonable. Failure to achieve any of the three required reasonableness factors will result in the noise abatement measures being deemed not reasonable. In addition to the required reasonableness factors optional reasonableness factors 4 through 8 listed below may be considered. However, no single optional reasonableness factor can be used to determine reasonableness.

1. The construction of a noise barrier is not reasonable unless a majority of residents and property owners of the benefited receptors (receptors that receive a noise reduction of 5 dBA or more from the noise barrier) want a noise barrier even if all other criteria indicate that a noise barrier is reasonable. During the environmental phase of a project it will be assumed that the benefited receptors want a noise barrier. During the design phase of the project a public meeting will be held for residents and owners of benefited receptors. Local officials will also be invited and encouraged to attend this public meeting. After the public meeting a survey will be conducted to determine if the residents and owners of the benefited receptors want a noise barrier. Local officials will be encouraged to consider highway traffic noise in the land use planning process.

2. The construction of a noise barrier is not reasonable if the cost is more than $30,000 per benefited receptor. The barrier cost will include the cost of construction (material and labor), the cost of additional right-of-way, the additional cost of relocating utilities and any other costs associated with the barrier. The estimated

cost of construction (material and labor) will be $25 per square foot. The allowable cost per benefited receptor and the cost for construction shall be re-analyzed every 5 years. All receptors with noise reductions of 5 dBA or more will be counted. Each house or apartment unit will be counted as one receptor. Every 100 linear feet of frontage will be counted as one receptor when considering parks, active sports areas, campgrounds, cemeteries, and other similar outdoor noise sensitive land uses. For non-residential uses such as schools, places of worship, community centers and auditoriums the following equation will be used to determine the equivalent number of receptors:

Equivalent No. of Receptors = (no. of occupants/3) X (usage)
usage = (no. of hours used per day/ 24) X (no. of days used per year /365)

3. Each barrier must reduce the noise level by at least 7 dBA at ten percent or more of the benefited receptors.

4. The construction of a noise barrier is not reasonable if the impacted receptors were not constructed or the building permits were not issued before the date of public knowledge of the project. The date of public knowledge is the date the public is officially notified of the adoption of the location of a proposed highway project. This date is considered to be the date of approval of CEs, FONSIs, or RODs when considering highway traffic noise and highway traffic noise abatement.

5. The date of development of impacted receptors should be an important part of the determination of reasonableness. More consideration will be given to impacted receptors that predated initial highway construction.

6. More consideration will be given to impacted receptors with larger increases over existing noise levels. If the future build noise levels are at least 5 dBA greater than the existing noise levels more consideration will be given.

7. More consideration will be given to areas where larger changes in traffic noise levels are expected to occur if the project is constructed than if it is not. If the future build noise levels are at least 3 dBA greater than the future no-build noise levels additional consideration will be given.

8. More consideration will be given to benefited receptors with future build noise levels at or above the 23 CFR 772 Noise Abatement Criteria.

Preliminary Analysis

*Build Alternative 1*

For Build Alternatives that identify noise-impacted sites that clearly will not be eligible for mitigation (e.g., an area where driveway or local street access precludes barrier construction), the following location was analyzed and summarily dismissed from further mitigation consideration:

Receptor 3 represents the two single family residences that share buildings with office spaces. Both of the shared residential/office buildings will maintain direct access to Jefferson Road. A continuous noise barrier near these locations would restrict access to the shared residential/office buildings as well as the other residences and commercial businesses located to the south that share the same entrance. Gaps in a noise barrier would satisfy access requirements but the resulting non-continuous barrier segments would not be sufficient to achieve the minimum reduction of 5 dBA. Additionally, it is highly unlikely that the businesses would want to have their commercial visibility blocked by a sound wall.

*Build Alternative 5 and 5a*
For Build Alternatives that identify noise-impacted sites that clearly will not be eligible for mitigation (e.g., an area where driveway or local street access precludes barrier construction), the following locations were analyzed and summarily dismissed from further mitigation consideration:

Receptor 3 represents the two single family residences that share buildings with office spaces. Both of the shared residential/office buildings will maintain direct access to Jefferson Road. A continuous noise barrier near these locations would restrict access to the shared residential/office buildings as well as the other residences and commercial businesses located to the south that share the same entrance. Gaps in a noise barrier would satisfy access requirements but the resulting non-continuous barrier segments would not be sufficient to achieve the minimum reduction of 5 dBA. Additionally, it is highly unlikely that the businesses would want to have their commercial visibility blocked by a sound wall.

Receptor 4 is a single family residence that shares space with an office at the southwest corner of the Jefferson Road intersection with Schenley Road. At a minimum, a continuous barrier across Schenley Road, the Wesleyan Church parking lot entrance and in front of the adjacent Dental Group office would be required to meet the 5 dBA minimum sound level reduction for this impacted residence. This barrier would restrict access to the impacted residence, the church parking lot and approximately 20+ additional homes whose residents use this road exclusively to access their homes to the west of (behind) the impacted receptor. Gaps in the noise barriers would satisfy access and business visibility requirements but the resulting non-continuous barrier segments would not be sufficient to achieve the minimum, feasible reduction of 5 dBA. Additionally, a barrier in the location would likely impede the safety line-of sight at the intersection.

Conclusion

As a result of direct access and commercial business visibility, none of the preliminary proposed barrier analysis locations are considered to be both feasible and reasonable. Therefore, no barriers are proposed to be carried forward into final design. The WVDOH Noise Barrier Evaluation Forms detailing the preliminary barrier analyses are included at the end of this report.

## *12.0 CONSTRUCTION NOISE*

The following general steps are "suggested" for addressing construction noise for this project:

- Identify land uses or activities that may be affected by noise from construction of the project.
- Determine the measures recommended for inclusion in the contract plans and specifications to minimize or eliminate adverse construction noise impacts on the community. This determination shall include a weighing of the benefits to be achieved and the overall adverse social, economic, and environmental effects and the costs of the abatement measures.
- Incorporate the recommended abatement measures into the contract plans and specifications.

Generally, the potential for temporary increases in the sound level environment as a result of construction

activities may occur at any of the studied receptor sites. Therefore, control of construction noise will be governed by the Standard Specifications for Road and Bridge Construction and any additional abatement measures developed specifically for the action.

## *13.0 FHWA POLICY REGARDING LAND USE DEVELOPMENT AND FUTURE NOISE ABATEMENT*

The Federal Highway Administration will not normally participate in noise abatement measures unless there is construction or reconstruction of a highway section (or portion thereof). However, the Federal Highway Administration may participate in noise abatement measures on an existing highway where land development or substantial construction predated the existence of any highway. The granting of a building permit, filing of a plat plan, or a similar action must have occurred prior to the right-of-way acquisition or construction approval for the original highway.

Typically, a rough straight-line estimate of the design year build scenario 66 and 71 dBA contours is provided for future planning purposes. The values shown below do not represent predicted levels at every location at a particular distance back from the roadway. Sound levels may vary with changes in terrain, other road noise sources, tree zones, buildings, any other shielding and/or any other noise generating sources. This information is being included to make local officials and planners aware of anticipated highway noise levels so that future development will be compatible with these levels. Roughly:

- The 66 dBA contour is approximately 100 feet from the edge of the nearest lane.
- The 71 dBA contour is approximately 40 feet from the edge of the nearest lane.

## *14.0 COORDINATION WITH LOCAL OFFICIALS*

The results of traffic noise analyses are available in environmental documents such as Environmental Impact Statements or Environmental Assessments, copies of which are routinely furnished to local government offices. The WVDOH encourages, but cannot mandate, local communities and developers to practice noise compatible development.

Highway traffic noise should be reduced through a program of shared responsibility. Local governments should use their power to regulate land development in such a way that noise sensitive land uses are either prohibited from being located adjacent to a highway or that the developments are planned, designed and constructed in such a way that noise impacts are minimized.

# WVDOH NOISE BARRIER EVALUATION FORMS

| **WVDOH NOISE BARRIER EVALUATION FORM** | | | | |
|---|---|---|---|---|
| | | | | |
| Proposed Project: | Jefferson Road, Kanawah County | | | |
| Location: | Receptor 3, Alt 1 | | | |
| | | | | |
| **FEASIBILITY** | | | | |
| Can a 5 dBA noise reduction be achieved at any impacted receptors? | | | | No |
| If yes, complete the reasonableness section. | | | | **X** |
| If no, a noise barrier should not be constructed. No additional analysis is required. | | | | **X** |
| | | | | |
| **REASONABLENESS** | | | | |
| | Not | Marginally | Fully | Highly |
| | Reasonable | Reasonable | Reasonable | Reasonable |
| REQUIRED FACTORS: * | | | | |
| 1. % of benefited receptors | <50% | 50-60% | 61-75% | >75% |
| wanting barrier | | | | |
| 2. cost/receptor | >$30K | $26K-$30K | $20K-$25K | <$20K |
| 3. % of benefited receptors | <10% | 10%-20% | 21%-40% | >40% |
| with 7 dBA noise reduction | | | | |
| OPTIONAL FACTORS: ** | | | | |
| 4. % developed before public | <20% | 20%-30% | 31%-40% | >40% |
| knowledge of proposed project | | | | |
| 5. % developed before | <20% | 20%-30% | 31%-40% | >40% |
| highway constructed | | | | |
| 6. Build level 1-2 dBA | <3dBA | 3-4 dBA | 5-10 dBA | >10 dBA |
| greater than existing | | | | |
| 7. Build level 0 dBA | <2dBA | 2 dBA | 3-5 dBA | >5 dBA |
| greater than no-build | | | | |
| 8. Build level above | Not | Not | 0-3 dBA | > 3 dBA |
| Noise abatement criteria | Applicable | Applicable | Above | Above |
| | | | | |
| 9. ADDITIONAL CONSIDERATIONS: | | None. | | |
| DECISION AND REASONS: A barrier is not feasible. Receptor 3 represents two single family residences that share buildings with Nationwide and State Farm Insurance Office buildings, respectively. Both the shared residential/office buildings will maintain direct access to Jefferson Road. A continuous noise barrier near these locations would restrict access to shared residential/office buildings as well as the other residences and commercial businesses located to the south that share the same entrance. Mitigation features are not recommended. | | | | |
| * 23 CFR 772.13(d)(2)(iv) requires that reasonableness factors 1-3 must each be achieved for a noise abatement measure to be considered reasonable. | | | | |
| ** 23 CFR 772.13(d)(2)(iv) allows consideration of these optional abatement factors, which cannot singly eliminate an abatement measure that meets the requirements of 1-3 above. | | | | |

| **WVDOH NOISE BARRIER EVALUATION FORM** | | | | |
|---|---|---|---|---|
| | | | | |
| Proposed Project: | Jefferson Road, Kanawah County | | | |
| Location: | Receptors 3 and 4, Alt 5 | | | |
| | | | | |
| **FEASIBILITY** | | | | |
| Can a 5 dBA noise reduction be achieved at any impacted receptors? | | | | No |
| If yes, complete the reasonableness section. | | | | **X** |
| If no, a noise barrier should not be constructed. No additional analysis is required. | | | | **X** |
| | | | | |
| **REASONABLENESS** | | | | |
| | Not | Marginally | Fully | Highly |
| | Reasonable | Reasonable | Reasonable | Reasonable |
| REQUIRED FACTORS: * | | | | |
| 1. % of benefited receptors | <50% | 50-60% | 61-75% | >75% |
| wanting barrier | | | | |
| 2. cost/receptor | >$30K | $26K-$30K | $20K-$25K | <$20K |
| | | | | |
| 3. % of benefited receptors | <10% | 10%-20% | 21%-40% | >40% |
| with 7 dBA noise reduction | | | | |
| OPTIONAL FACTORS: ** | | | | |
| 4. % developed before public | <20% | 20%-30% | 31%-40% | >40% |
| knowledge of proposed project | | | | |
| 5. % developed before | <20% | 20%-30% | 31%-40% | >40% |
| highway constructed | | | | |
| 6. Build level 1-2 dBA | <3dBA | 3-4 dBA | 5-10 dBA | >10 dBA |
| greater than existing | | | | |
| 7. Build level 0 dBA | <2dBA | 2 dBA | 3-5 dBA | >5 dBA |
| greater than no-build | | | | |
| 8. Build level above | Not | Not | 0-3 dBA | > 3 dBA |
| Noise abatement criteria | Applicable | Applicable | Above | Above |
| | | | | |
| 9. ADDITIONAL CONSIDERATIONS: | | None. | | |
| DECISION AND REASONS: A barrier is not feasible. Receptor 3 represents two single family residences that share buildings with Nationwide and State Farm Insurance Office buildings, respectively. Both the shared residential/office buildings will maintain direct access to Jefferson Road. A continuous noise barrier near these locations would restrict access to shared residential/office buildings as well as the other residences and commercial businesses located to the south that share the same entrance. Receptor 4, located near Receptor 3, is single family residence located at the southwest corner of the Jefferson Road intersection with Schenley Road. At a minimum, a continuous barrier across Schenley Road, the Wesleyan Church parking lot entrance and in front of the adjacent Dental Group Office would be required to meet the 5 dBA minimum sound level reduction for this impacted residence. This barrier would restrict access to the impacted residence, the church parking lot and approximately 20+ additional homes whose residents use this road exclusively to access their homes to the west of (behind) the impacted receptor. Mitigation features are not recommended. | | | | |
| * 23 CFR 772.13(d)(2)(iv) requires that reasonableness factors 1-3 must each be achieved for a noise abatement measure to be considered reasonable. | | | | |
| ** 23 CFR 772.13(d)(2)(iv) allows consideration of these optional abatement factors, which cannot singly eliminate an abatement measure that meets the requirements of 1-3 above. | | | | |