

Appendix E – TNM Output

RESULTS: SOUND LEVELS

SR 167 HOT Lanes

WSDOT
A. Ghebre

28 January 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

SR 167 HOT Lanes

RUN:

Existing

BARRIER DESIGN:

INPUT HEIGHTS

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

ATMOSPHERICS:

68 deg F, 50% RH

| Receiver | | | | | | | | | | | | |
|------------------|-----|------|--------------------|------------|--------|------------------------|---------------------|----------------|----------------------|-----------------|------|-----------------------------|
| Name | No. | #DUs | Existing LAeq1h | No Barrier | | | | | With Barrier | | | |
| | | | | LAeq1h | | Increase over existing | | Type Impact | Calculated LAeq1h | Noise Reduction | | Calculated minus Goal |
| | | | | Calculated | Crit'n | Calculated | Crit'n Sub'l Inc | | | Calculated | Goal | |
| | | | dBA | dBA | dBA | dB | dB | | dBA | dB | dB | dB |
| R1 (1st Row) | 3 | 1 | 0.0 | 71.2 | 66 | 71.2 | 10 | Snd Lvl | 71.2 | 0.0 | 8 | -8.0 |
| R2- M1 (1st Row) | 4 | 1 | 0.0 | 72.6 | 66 | 72.6 | 10 | Snd Lvl | 72.6 | 0.0 | 8 | -8.0 |
| R3-M2 | 5 | 3 | 0.0 | 66.4 | 66 | 66.4 | 10 | Snd Lvl | 66.4 | 0.0 | 8 | -8.0 |
| R4-M3 (1st Row) | 6 | 1 | 0.0 | 71.4 | 66 | 71.4 | 10 | Snd Lvl | 71.4 | 0.0 | 8 | -8.0 |
| R5 (1st Row) | 7 | 1 | 0.0 | 71.7 | 66 | 71.7 | 10 | Snd Lvl | 71.7 | 0.0 | 8 | -8.0 |
| R6-M4 | 8 | 5 | 0.0 | 63.9 | 66 | 63.9 | 10 | --- | 63.9 | 0.0 | 8 | -8.0 |
| R7-M5 (1st Row) | 9 | 1 | 0.0 | 71.7 | 66 | 71.7 | 10 | Snd Lvl | 71.7 | 0.0 | 8 | -8.0 |
| R8 | 10 | 1 | 0.0 | 67.6 | 66 | 67.6 | 10 | Snd Lvl | 67.6 | 0.0 | 8 | -8.0 |
| R9-M6 | 11 | 4 | 0.0 | 65.2 | 66 | 65.2 | 10 | --- | 65.2 | 0.0 | 8 | -8.0 |
| R10 (1st Row) | 12 | 1 | 0.0 | 70.1 | 66 | 70.1 | 10 | Snd Lvl | 70.1 | 0.0 | 8 | -8.0 |
| R11 (1st Row) | 13 | 1 | 0.0 | 69.2 | 66 | 69.2 | 10 | Snd Lvl | 69.2 | 0.0 | 8 | -8.0 |
| R12 | 14 | 6 | 0.0 | 64.1 | 66 | 64.1 | 10 | --- | 64.1 | 0.0 | 8 | -8.0 |
| R13 (1st Row) | 15 | 1 | 0.0 | 68.6 | 66 | 68.6 | 10 | Snd Lvl | 68.6 | 0.0 | 8 | -8.0 |
| R14 | 16 | 2 | 0.0 | 65.0 | 66 | 65.0 | 10 | --- | 65.0 | 0.0 | 8 | -8.0 |
| R15 | 17 | 8 | 0.0 | 62.2 | 66 | 62.2 | 10 | --- | 62.2 | 0.0 | 8 | -8.0 |
| R16 (1st Row) | 18 | 1 | 0.0 | 68.7 | 66 | 68.7 | 10 | Snd Lvl | 68.7 | 0.0 | 8 | -8.0 |
| R17- M9 | 19 | 1 | 0.0 | 68.6 | 66 | 68.6 | 10 | Snd Lvl | 68.6 | 0.0 | 8 | -8.0 |
| R18 | 20 | 1 | 0.0 | 65.6 | 66 | 65.6 | 10 | --- | 65.6 | 0.0 | 8 | -8.0 |
| R19 (1st Row) | 21 | 1 | 0.0 | 67.1 | 66 | 67.1 | 10 | Snd Lvl | 67.1 | 0.0 | 8 | -8.0 |
| R20 | 22 | 1 | 0.0 | 65.0 | 66 | 65.0 | 10 | --- | 65.0 | 0.0 | 8 | -8.0 |
| R21 | 23 | 2 | 0.0 | 64.0 | 66 | 64.0 | 10 | --- | 64.0 | 0.0 | 8 | -8.0 |
| R22 | 24 | 4 | 0.0 | 62.2 | 66 | 62.2 | 10 | --- | 62.2 | 0.0 | 8 | -8.0 |
| R23 (1st Row) | 56 | 1 | 0.0 | 63.0 | 66 | 63.0 | 10 | --- | 63.0 | 0.0 | 8 | -8.0 |

RESULTS: SOUND LEVELS

SR 167 HOT Lanes

| | | | | | | | | | | | | |
|----------------------------------|----|---|-----|------|----|------|----|---------|------|-----|---|------|
| R24 | 57 | 1 | 0.0 | 61.5 | 66 | 61.5 | 10 | ---- | 61.5 | 0.0 | 8 | -8.0 |
| R-56 (1st Row) | 59 | 1 | 0.0 | 63.9 | 66 | 63.9 | 10 | ---- | 63.9 | 0.0 | 8 | -8.0 |
| Receiver62 | 60 | 1 | 0.0 | 64.6 | 66 | 64.6 | 10 | ---- | 64.6 | 0.0 | 8 | -8.0 |
| Receiver64 (1st Row) | 61 | 1 | 0.0 | 65.6 | 66 | 65.6 | 10 | ---- | 65.6 | 0.0 | 8 | -8.0 |
| Receiver65 (1st Row) | 63 | 1 | 0.0 | 65.2 | 66 | 65.2 | 10 | ---- | 65.2 | 0.0 | 8 | -8.0 |
| Receiver67 (1st Row) | 64 | 1 | 0.0 | 66.1 | 66 | 66.1 | 10 | Snd Lvl | 66.1 | 0.0 | 8 | -8.0 |
| Receiver68 (1st Row) | 65 | 1 | 0.0 | 67.3 | 66 | 67.3 | 10 | Snd Lvl | 67.3 | 0.0 | 8 | -8.0 |
| Receiver69 | 66 | 4 | 0.0 | 62.8 | 66 | 62.8 | 10 | ---- | 62.8 | 0.0 | 8 | -8.0 |
| Receiver71 (1st Row) | 67 | 1 | 0.0 | 67.7 | 66 | 67.7 | 10 | Snd Lvl | 67.7 | 0.0 | 8 | -8.0 |
| Receiver72 | 68 | 2 | 0.0 | 65.3 | 66 | 65.3 | 10 | ---- | 65.3 | 0.0 | 8 | -8.0 |
| Receiver74 | 69 | 2 | 0.0 | 66.1 | 66 | 66.1 | 10 | Snd Lvl | 66.1 | 0.0 | 8 | -8.0 |
| Receiver75 | 70 | 2 | 0.0 | 65.0 | 66 | 65.0 | 10 | ---- | 65.0 | 0.0 | 8 | -8.0 |
| Receiver76 (1st Row) | 71 | 1 | 0.0 | 65.8 | 66 | 65.8 | 10 | ---- | 65.8 | 0.0 | 8 | -8.0 |
| Receiver78 (1st Row) | 73 | 1 | 0.0 | 68.5 | 66 | 68.5 | 10 | Snd Lvl | 68.5 | 0.0 | 8 | -8.0 |
| Receiver79 | 74 | 1 | 0.0 | 65.7 | 66 | 65.7 | 10 | ---- | 65.7 | 0.0 | 8 | -8.0 |
| Receiver80 (1st Row) | 75 | 1 | 0.0 | 69.3 | 66 | 69.3 | 10 | Snd Lvl | 69.3 | 0.0 | 8 | -8.0 |
| Receiver81 | 76 | 1 | 0.0 | 67.4 | 66 | 67.4 | 10 | Snd Lvl | 67.4 | 0.0 | 8 | -8.0 |
| Receiver82 | 77 | 1 | 0.0 | 66.8 | 66 | 66.8 | 10 | Snd Lvl | 66.8 | 0.0 | 8 | -8.0 |
| Receiver84 | 78 | 2 | 0.0 | 64.3 | 66 | 64.3 | 10 | ---- | 64.3 | 0.0 | 8 | -8.0 |
| Receiver86 | 79 | 1 | 0.0 | 67.2 | 66 | 67.2 | 10 | Snd Lvl | 67.2 | 0.0 | 8 | -8.0 |
| Receiver88 (1st Row) | 80 | 1 | 0.0 | 70.1 | 66 | 70.1 | 10 | Snd Lvl | 70.1 | 0.0 | 8 | -8.0 |
| Receiver89 (1st Row) | 81 | 1 | 0.0 | 69.8 | 66 | 69.8 | 10 | Snd Lvl | 69.8 | 0.0 | 8 | -8.0 |
| Receiver90 | 82 | 1 | 0.0 | 68.0 | 66 | 68.0 | 10 | Snd Lvl | 68.0 | 0.0 | 8 | -8.0 |
| Receiver91 | 83 | 1 | 0.0 | 68.4 | 66 | 68.4 | 10 | Snd Lvl | 68.4 | 0.0 | 8 | -8.0 |
| Receiver93 (1st Row) | 84 | 1 | 0.0 | 68.4 | 66 | 68.4 | 10 | Snd Lvl | 68.4 | 0.0 | 8 | -8.0 |
| Receiver94 (1st Row) | 85 | 1 | 0.0 | 72.0 | 66 | 72.0 | 10 | Snd Lvl | 72.0 | 0.0 | 8 | -8.0 |
| Receiver95 (1st Row) | 86 | 1 | 0.0 | 73.1 | 66 | 73.1 | 10 | Snd Lvl | 73.1 | 0.0 | 8 | -8.0 |
| Receiver97 (1st Row Church) | 87 | 2 | 0.0 | 72.1 | 66 | 72.1 | 10 | Snd Lvl | 72.1 | 0.0 | 8 | -8.0 |
| Receiver98 | 88 | 1 | 0.0 | 66.6 | 66 | 66.6 | 10 | Snd Lvl | 66.6 | 0.0 | 8 | -8.0 |
| Receiver99 | 89 | 5 | 0.0 | 65.3 | 66 | 65.3 | 10 | ---- | 65.3 | 0.0 | 8 | -8.0 |
| Receiver100 (1st Row Com Center) | 90 | 6 | 0.0 | 71.7 | 66 | 71.7 | 10 | Snd Lvl | 71.7 | 0.0 | 8 | -8.0 |
| Receiver101 (1st Row) | 91 | 1 | 0.0 | 66.5 | 66 | 66.5 | 10 | Snd Lvl | 66.5 | 0.0 | 8 | -8.0 |
| Receiver102 (1st Row) | 92 | 1 | 0.0 | 67.0 | 66 | 67.0 | 10 | Snd Lvl | 67.0 | 0.0 | 8 | -8.0 |
| Receiver103 (1st Row) | 93 | 1 | 0.0 | 68.7 | 66 | 68.7 | 10 | Snd Lvl | 68.7 | 0.0 | 8 | -8.0 |
| Receiver104 (1st Row) | 94 | 1 | 0.0 | 70.2 | 66 | 70.2 | 10 | Snd Lvl | 70.2 | 0.0 | 8 | -8.0 |
| Receiver105 (1st Row) | 95 | 1 | 0.0 | 68.4 | 66 | 68.4 | 10 | Snd Lvl | 68.4 | 0.0 | 8 | -8.0 |
| Receiver106 (1st Row) | 96 | 1 | 0.0 | 69.3 | 66 | 69.3 | 10 | Snd Lvl | 69.3 | 0.0 | 8 | -8.0 |
| Receiver107 (1st Row) | 97 | 1 | 0.0 | 69.9 | 66 | 69.9 | 10 | Snd Lvl | 69.9 | 0.0 | 8 | -8.0 |
| Receiver108 (1st Row) | 98 | 1 | 0.0 | 72.2 | 66 | 72.2 | 10 | Snd Lvl | 72.2 | 0.0 | 8 | -8.0 |
| Receiver109 (1st Row) | 99 | 1 | 0.0 | 70.5 | 66 | 70.5 | 10 | Snd Lvl | 70.5 | 0.0 | 8 | -8.0 |

RESULTS: SOUND LEVELS

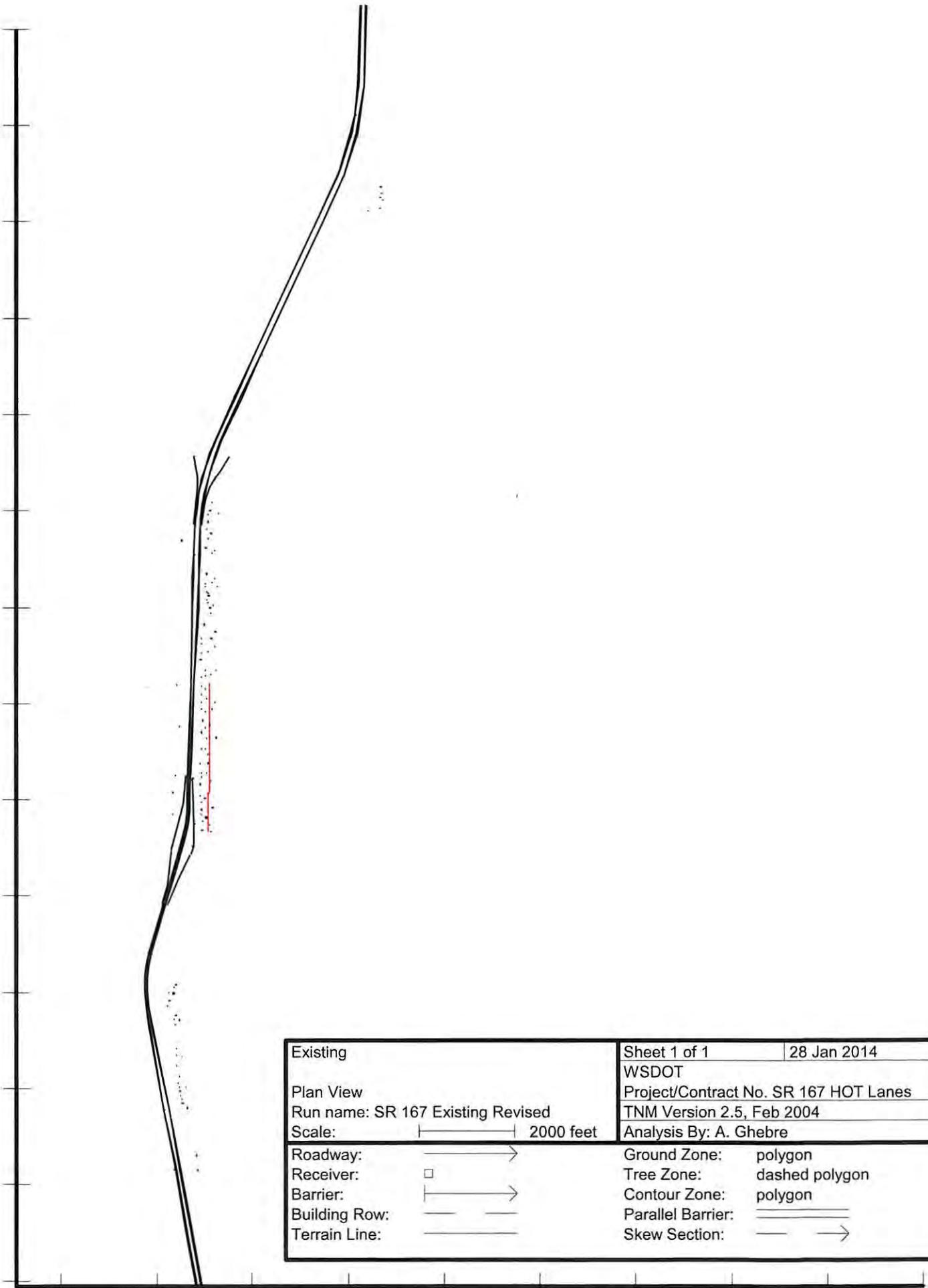
SR 167 HOT Lanes

| | | | | | | | | | | | | |
|------------------------|-----|---|-----|------|----|------|----|---------|------|-----|---|------|
| Receiver111 (1st Row) | 100 | 1 | 0.0 | 72.4 | 66 | 72.4 | 10 | Snd Lvl | 72.4 | 0.0 | 8 | -8.0 |
| Receiver112 (1st Row) | 101 | 1 | 0.0 | 67.4 | 66 | 67.4 | 10 | Snd Lvl | 67.4 | 0.0 | 8 | -8.0 |
| Receiver113 | 102 | 1 | 0.0 | 65.8 | 66 | 65.8 | 10 | ---- | 65.8 | 0.0 | 8 | -8.0 |
| Receiver114 (1st Row) | 103 | 1 | 0.0 | 73.3 | 66 | 73.3 | 10 | Snd Lvl | 73.3 | 0.0 | 8 | -8.0 |
| Receiver115 | 104 | 1 | 0.0 | 68.9 | 66 | 68.9 | 10 | Snd Lvl | 68.9 | 0.0 | 8 | -8.0 |
| Receiver116 (1st Row) | 105 | 1 | 0.0 | 72.7 | 66 | 72.7 | 10 | Snd Lvl | 72.7 | 0.0 | 8 | -8.0 |
| Receiver118 (1st Row) | 106 | 1 | 0.0 | 72.0 | 66 | 72.0 | 10 | Snd Lvl | 72.0 | 0.0 | 8 | -8.0 |
| Receiver119 | 107 | 1 | 0.0 | 66.7 | 66 | 66.7 | 10 | Snd Lvl | 66.7 | 0.0 | 8 | -8.0 |
| Receiver121 | 108 | 3 | 0.0 | 65.0 | 66 | 65.0 | 10 | ---- | 65.0 | 0.0 | 8 | -8.0 |
| Receiver122 | 109 | 4 | 0.0 | 65.2 | 66 | 65.2 | 10 | ---- | 65.2 | 0.0 | 8 | -8.0 |
| Receiver124 | 110 | 2 | 0.0 | 63.6 | 66 | 63.6 | 10 | ---- | 63.6 | 0.0 | 8 | -8.0 |
| Receiver128 | 111 | 2 | 0.0 | 61.8 | 66 | 61.8 | 10 | ---- | 61.8 | 0.0 | 8 | -8.0 |
| Receiver133 | 112 | 5 | 0.0 | 65.7 | 66 | 65.7 | 10 | ---- | 65.7 | 0.0 | 8 | -8.0 |
| Receiver135 | 113 | 6 | 0.0 | 64.5 | 66 | 64.5 | 10 | ---- | 64.5 | 0.0 | 8 | -8.0 |
| R25 (1st Row) | 114 | 1 | 0.0 | 66.8 | 66 | 66.8 | 10 | Snd Lvl | 66.8 | 0.0 | 8 | -8.0 |
| R26 (1st Row) | 115 | 1 | 0.0 | 67.4 | 66 | 67.4 | 10 | Snd Lvl | 67.4 | 0.0 | 8 | -8.0 |
| R-27 (1st Row) | 116 | 1 | 0.0 | 64.8 | 66 | 64.8 | 10 | ---- | 64.8 | 0.0 | 8 | -8.0 |
| R-28 | 117 | 4 | 0.0 | 61.7 | 66 | 61.7 | 10 | ---- | 61.7 | 0.0 | 8 | -8.0 |
| R-29 | 118 | 1 | 0.0 | 63.2 | 66 | 63.2 | 10 | ---- | 63.2 | 0.0 | 8 | -8.0 |
| R-30 (1st Row) | 119 | 1 | 0.0 | 62.7 | 66 | 62.7 | 10 | ---- | 62.7 | 0.0 | 8 | -8.0 |
| R-31 | 120 | 2 | 0.0 | 61.5 | 66 | 61.5 | 10 | ---- | 61.5 | 0.0 | 8 | -8.0 |
| R-32 | 121 | 6 | 0.0 | 62.5 | 66 | 62.5 | 10 | ---- | 62.5 | 0.0 | 8 | -8.0 |
| R-33 / M-10 (1st Row) | 122 | 1 | 0.0 | 64.4 | 66 | 64.4 | 10 | ---- | 64.4 | 0.0 | 8 | -8.0 |
| R-34 (1st Row) | 123 | 1 | 0.0 | 65.4 | 66 | 65.4 | 10 | ---- | 65.4 | 0.0 | 8 | -8.0 |
| R-35 (1st Row) | 124 | 1 | 0.0 | 65.8 | 66 | 65.8 | 10 | ---- | 65.8 | 0.0 | 8 | -8.0 |
| R-36 | 125 | 8 | 0.0 | 63.7 | 66 | 63.7 | 10 | ---- | 63.7 | 0.0 | 8 | -8.0 |
| Receiver150 (1st Row) | 126 | 1 | 0.0 | 65.8 | 66 | 65.8 | 10 | ---- | 65.8 | 0.0 | 8 | -8.0 |
| Receiver151 (1st Row) | 127 | 1 | 0.0 | 65.7 | 66 | 65.7 | 10 | ---- | 65.7 | 0.0 | 8 | -8.0 |
| Receiver152 (1st Row) | 128 | 1 | 0.0 | 65.8 | 66 | 65.8 | 10 | ---- | 65.8 | 0.0 | 8 | -8.0 |
| Receiver153 (1st Row) | 129 | 1 | 0.0 | 65.5 | 66 | 65.5 | 10 | ---- | 65.5 | 0.0 | 8 | -8.0 |
| Receiver154 (1st Row) | 130 | 1 | 0.0 | 64.5 | 66 | 64.5 | 10 | ---- | 64.5 | 0.0 | 8 | -8.0 |
| Receiver155 | 131 | 1 | 0.0 | 64.6 | 66 | 64.6 | 10 | ---- | 64.6 | 0.0 | 8 | -8.0 |
| Receiver157 (1st Row) | 132 | 1 | 0.0 | 63.8 | 66 | 63.8 | 10 | ---- | 63.8 | 0.0 | 8 | -8.0 |
| Receiver158 (1st Row) | 133 | 1 | 0.0 | 63.4 | 66 | 63.4 | 10 | ---- | 63.4 | 0.0 | 8 | -8.0 |
| Receiver159 (1st Row) | 134 | 1 | 0.0 | 62.9 | 66 | 62.9 | 10 | ---- | 62.9 | 0.0 | 8 | -8.0 |
| Receiver160 (1st Row) | 135 | 1 | 0.0 | 62.1 | 66 | 62.1 | 10 | ---- | 62.1 | 0.0 | 8 | -8.0 |
| Receiver161 | 136 | 1 | 0.0 | 64.0 | 66 | 64.0 | 10 | ---- | 64.0 | 0.0 | 8 | -8.0 |
| Receiver162 | 137 | 1 | 0.0 | 61.4 | 66 | 61.4 | 10 | ---- | 61.4 | 0.0 | 8 | -8.0 |
| Receiver163 | 138 | 1 | 0.0 | 62.0 | 66 | 62.0 | 10 | ---- | 62.0 | 0.0 | 8 | -8.0 |
| Receiver165 (Business) | 139 | 1 | 0.0 | 65.4 | 66 | 65.4 | 10 | ---- | 65.4 | 0.0 | 8 | -8.0 |

RESULTS: SOUND LEVELS

SR 167 HOT Lanes

| | | | | | | | | | | | | |
|------------------------|--------------|------------------------|------------|------------|----|------|----|---------|------|-----|---|------|
| Receiver166 (Business) | 140 | 1 | 0.0 | 66.5 | 66 | 66.5 | 10 | Snd Lvl | 66.5 | 0.0 | 8 | -8.0 |
| Receiver168 (1st Row) | 141 | 1 | 0.0 | 65.7 | 66 | 65.7 | 10 | ---- | 65.7 | 0.0 | 8 | -8.0 |
| Receiver170 (Business) | 142 | 1 | 0.0 | 69.7 | 66 | 69.7 | 10 | Snd Lvl | 69.7 | 0.0 | 8 | -8.0 |
| Receiver172 (Business) | 143 | 1 | 0.0 | 68.7 | 66 | 68.7 | 10 | Snd Lvl | 68.7 | 0.0 | 8 | -8.0 |
| Receiver174 (Business) | 144 | 1 | 0.0 | 58.7 | 66 | 58.7 | 10 | ---- | 58.7 | 0.0 | 8 | -8.0 |
| Receiver175 (1st Row) | 145 | 1 | 0.0 | 58.0 | 66 | 58.0 | 10 | ---- | 58.0 | 0.0 | 8 | -8.0 |
| Receiver 176 (1st Row) | 146 | 1 | 0.0 | 57.1 | 66 | 57.1 | 10 | ---- | 57.1 | 0.0 | 8 | -8.0 |
| Receiver177 (1st Row) | 147 | 1 | 0.0 | 57.6 | 66 | 57.6 | 10 | ---- | 57.6 | 0.0 | 8 | -8.0 |
| Receiver179 (1st Row) | 148 | 1 | 0.0 | 57.6 | 66 | 57.6 | 10 | ---- | 57.6 | 0.0 | 8 | -8.0 |
| Receiver180 (1st Row) | 149 | 1 | 0.0 | 57.0 | 66 | 57.0 | 10 | ---- | 57.0 | 0.0 | 8 | -8.0 |
| Receiver182 (Trail) | 150 | 1 | 0.0 | 63.3 | 66 | 63.3 | 10 | ---- | 63.3 | 0.0 | 8 | -8.0 |
| Dwelling Units | # DUs | Noise Reduction | | | | | | | | | | |
| | | Min | Avg | Max | | | | | | | | |
| | | dB | dB | dB | | | | | | | | |
| All Selected | 189 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| All Impacted | 62 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| All that meet NR Goal | 0 | 0.0 | 0.0 | 0.0 | | | | | | | | |



| | | | |
|--|---|---------------------------------------|---|
| Existing | | Sheet 1 of 1 | 28 Jan 2014 |
| Plan View | | WSDOT | |
| Run name: SR 167 Existing Revised | | Project/Contract No. SR 167 HOT Lanes | |
| Scale:  2000 feet | | TNM Version 2.5, Feb 2004 | |
| Analysis By: A. Ghebre | | | |
| Roadway: |  | Ground Zone: | polygon |
| Receiver: |  | Tree Zone: | dashed polygon |
| Barrier: |  | Contour Zone: | polygon |
| Building Row: |  | Parallel Barrier: |  |
| Terrain Line: |  | Skew Section: |  |

RESULTS: SOUND LEVELS

SR 167 Hot Lanes

WSDOT
A. Ghebre

28 January 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

SR 167 Hot Lanes

RUN:

2030 No Build

BARRIER DESIGN:

INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS:

68 deg F, 50% RH

| Receiver | | | | | | | | | | | | |
|------------------|-----|------|-----------------|------------|--------|------------------------|--------|-------------|-------------------|-----------------|------|-----------------------|
| Name | No. | #DUs | Existing LAeq1h | No Barrier | | | | | With Barrier | | | |
| | | | | LAeq1h | | Increase over existing | | Type Impact | Calculated LAeq1h | Noise Reduction | | Calculated minus Goal |
| | | | | Calculated | Crit'n | Calculated | Crit'n | | | Calculated | Goal | |
| | | | dB | dB | dB | dB | dB | | dB | dB | dB | dB |
| R1 (1st Row) | 3 | 1 | 71.2 | 71.5 | 66 | 0.3 | 10 | Snd Lvl | 71.5 | 0.0 | 8 | -8.0 |
| R2- M1 (1st Row) | 4 | 1 | 72.6 | 73.0 | 66 | 0.4 | 10 | Snd Lvl | 73.0 | 0.0 | 8 | -8.0 |
| R3-M2 | 5 | 3 | 66.4 | 66.8 | 66 | 0.4 | 10 | Snd Lvl | 66.8 | 0.0 | 8 | -8.0 |
| R4-M3 (1st Row) | 6 | 1 | 71.4 | 71.8 | 66 | 0.4 | 10 | Snd Lvl | 71.8 | 0.0 | 8 | -8.0 |
| R5 (1st Row) | 7 | 1 | 71.7 | 72.1 | 66 | 0.4 | 10 | Snd Lvl | 72.1 | 0.0 | 8 | -8.0 |
| R6-M4 | 8 | 5 | 63.9 | 64.3 | 66 | 0.4 | 10 | ---- | 64.3 | 0.0 | 8 | -8.0 |
| R7-M5 (1st Row) | 9 | 1 | 71.7 | 72.1 | 66 | 0.4 | 10 | Snd Lvl | 72.1 | 0.0 | 8 | -8.0 |
| R8 | 10 | 1 | 67.6 | 68.0 | 66 | 0.4 | 10 | Snd Lvl | 68.0 | 0.0 | 8 | -8.0 |
| R9-M6 | 11 | 4 | 65.2 | 65.6 | 66 | 0.4 | 10 | ---- | 65.6 | 0.0 | 8 | -8.0 |
| R10 (1st Row) | 12 | 1 | 70.1 | 70.5 | 66 | 0.4 | 10 | Snd Lvl | 70.5 | 0.0 | 8 | -8.0 |
| R11 (1st Row) | 13 | 1 | 69.2 | 69.6 | 66 | 0.4 | 10 | Snd Lvl | 69.6 | 0.0 | 8 | -8.0 |
| R12 | 14 | 6 | 64.1 | 64.5 | 66 | 0.4 | 10 | ---- | 64.5 | 0.0 | 8 | -8.0 |
| R13 (1st Row) | 15 | 1 | 68.6 | 69.0 | 66 | 0.4 | 10 | Snd Lvl | 69.0 | 0.0 | 8 | -8.0 |
| R14 | 16 | 2 | 65.0 | 65.4 | 66 | 0.4 | 10 | ---- | 65.4 | 0.0 | 8 | -8.0 |
| R15 | 17 | 8 | 62.2 | 62.7 | 66 | 0.5 | 10 | ---- | 62.7 | 0.0 | 8 | -8.0 |
| R16 (1st Row) | 18 | 1 | 68.7 | 69.1 | 66 | 0.4 | 10 | Snd Lvl | 69.1 | 0.0 | 8 | -8.0 |
| R17- M9 | 19 | 1 | 68.6 | 69.1 | 66 | 0.5 | 10 | Snd Lvl | 69.1 | 0.0 | 8 | -8.0 |
| R18 | 20 | 1 | 65.6 | 66.0 | 66 | 0.4 | 10 | Snd Lvl | 66.0 | 0.0 | 8 | -8.0 |
| R19 (1st Row) | 21 | 1 | 67.1 | 67.5 | 66 | 0.4 | 10 | Snd Lvl | 67.5 | 0.0 | 8 | -8.0 |
| R20 | 22 | 1 | 65.0 | 65.4 | 66 | 0.4 | 10 | ---- | 65.4 | 0.0 | 8 | -8.0 |
| R21 | 23 | 2 | 64.0 | 64.4 | 66 | 0.4 | 10 | ---- | 64.4 | 0.0 | 8 | -8.0 |
| R22 | 24 | 4 | 62.2 | 62.6 | 66 | 0.4 | 10 | ---- | 62.6 | 0.0 | 8 | -8.0 |
| R23 (1st Row) | 56 | 1 | 63.0 | 63.3 | 66 | 0.3 | 10 | ---- | 63.3 | 0.0 | 8 | -8.0 |

RESULTS: SOUND LEVELS

SR 167 Hot Lanes

| | | | | | | | | | | | | |
|----------------------------------|----|---|------|------|----|-----|----|---------|------|-----|---|------|
| R24 | 57 | 1 | 61.5 | 61.9 | 66 | 0.4 | 10 | ---- | 61.9 | 0.0 | 8 | -8.0 |
| R-56 (1st Row) | 59 | 1 | 63.9 | 64.3 | 66 | 0.4 | 10 | ---- | 64.3 | 0.0 | 8 | -8.0 |
| Receiver62 | 60 | 1 | 64.6 | 65.0 | 66 | 0.4 | 10 | ---- | 65.0 | 0.0 | 8 | -8.0 |
| Receiver64 (1st Row) | 61 | 1 | 65.6 | 66.0 | 66 | 0.4 | 10 | Snd Lvl | 66.0 | 0.0 | 8 | -8.0 |
| Receiver65 (1st Row) | 63 | 1 | 65.2 | 65.6 | 66 | 0.4 | 10 | ---- | 65.6 | 0.0 | 8 | -8.0 |
| Receiver67 (1st Row) | 64 | 1 | 66.1 | 66.5 | 66 | 0.4 | 10 | Snd Lvl | 66.5 | 0.0 | 8 | -8.0 |
| Receiver68 (1st Row) | 65 | 1 | 67.3 | 67.7 | 66 | 0.4 | 10 | Snd Lvl | 67.7 | 0.0 | 8 | -8.0 |
| Receiver69 | 66 | 4 | 62.8 | 63.3 | 66 | 0.5 | 10 | ---- | 63.3 | 0.0 | 8 | -8.0 |
| Receiver71 (1st Row) | 67 | 1 | 67.7 | 68.2 | 66 | 0.5 | 10 | Snd Lvl | 68.2 | 0.0 | 8 | -8.0 |
| Receiver72 | 68 | 2 | 65.3 | 65.7 | 66 | 0.4 | 10 | ---- | 65.7 | 0.0 | 8 | -8.0 |
| Receiver74 | 69 | 2 | 66.1 | 66.5 | 66 | 0.4 | 10 | Snd Lvl | 66.5 | 0.0 | 8 | -8.0 |
| Receiver75 | 70 | 2 | 65.0 | 65.4 | 66 | 0.4 | 10 | ---- | 65.4 | 0.0 | 8 | -8.0 |
| Receiver76 (1st Row) | 71 | 1 | 65.8 | 66.2 | 66 | 0.4 | 10 | Snd Lvl | 66.2 | 0.0 | 8 | -8.0 |
| Receiver78 (1st Row) | 73 | 1 | 68.5 | 69.0 | 66 | 0.5 | 10 | Snd Lvl | 69.0 | 0.0 | 8 | -8.0 |
| Receiver79 | 74 | 1 | 65.7 | 66.2 | 66 | 0.5 | 10 | Snd Lvl | 66.2 | 0.0 | 8 | -8.0 |
| Receiver80 (1st Row) | 75 | 1 | 69.3 | 69.7 | 66 | 0.4 | 10 | Snd Lvl | 69.7 | 0.0 | 8 | -8.0 |
| Receiver81 | 76 | 1 | 67.4 | 67.8 | 66 | 0.4 | 10 | Snd Lvl | 67.8 | 0.0 | 8 | -8.0 |
| Receiver82 | 77 | 1 | 66.8 | 67.2 | 66 | 0.4 | 10 | Snd Lvl | 67.2 | 0.0 | 8 | -8.0 |
| Receiver84 | 78 | 2 | 64.3 | 64.8 | 66 | 0.5 | 10 | ---- | 64.8 | 0.0 | 8 | -8.0 |
| Receiver86 | 79 | 1 | 67.2 | 67.7 | 66 | 0.5 | 10 | Snd Lvl | 67.7 | 0.0 | 8 | -8.0 |
| Receiver88 (1st Row) | 80 | 1 | 70.1 | 70.5 | 66 | 0.4 | 10 | Snd Lvl | 70.5 | 0.0 | 8 | -8.0 |
| Receiver89 (1st Row) | 81 | 1 | 69.8 | 70.2 | 66 | 0.4 | 10 | Snd Lvl | 70.2 | 0.0 | 8 | -8.0 |
| Receiver90 | 82 | 1 | 68.0 | 68.4 | 66 | 0.4 | 10 | Snd Lvl | 68.4 | 0.0 | 8 | -8.0 |
| Receiver91 | 83 | 1 | 68.4 | 68.8 | 66 | 0.4 | 10 | Snd Lvl | 68.8 | 0.0 | 8 | -8.0 |
| Receiver93 (1st Row) | 84 | 1 | 68.4 | 68.8 | 66 | 0.4 | 10 | Snd Lvl | 68.8 | 0.0 | 8 | -8.0 |
| Receiver94 (1st Row) | 85 | 1 | 72.0 | 72.4 | 66 | 0.4 | 10 | Snd Lvl | 72.4 | 0.0 | 8 | -8.0 |
| Receiver95 (1st Row) | 86 | 1 | 73.1 | 73.5 | 66 | 0.4 | 10 | Snd Lvl | 73.5 | 0.0 | 8 | -8.0 |
| Receiver97 (1st Row Church) | 87 | 2 | 72.1 | 72.5 | 66 | 0.4 | 10 | Snd Lvl | 72.5 | 0.0 | 8 | -8.0 |
| Receiver98 | 88 | 1 | 66.6 | 67.1 | 66 | 0.5 | 10 | Snd Lvl | 67.1 | 0.0 | 8 | -8.0 |
| Receiver99 | 89 | 5 | 65.3 | 65.8 | 66 | 0.5 | 10 | ---- | 65.8 | 0.0 | 8 | -8.0 |
| Receiver100 (1st Row Com Center) | 90 | 6 | 71.7 | 72.1 | 66 | 0.4 | 10 | Snd Lvl | 72.1 | 0.0 | 8 | -8.0 |
| Receiver101 (1st Row) | 91 | 1 | 66.5 | 66.9 | 66 | 0.4 | 10 | Snd Lvl | 66.9 | 0.0 | 8 | -8.0 |
| Receiver102 (1st Row) | 92 | 1 | 67.0 | 67.5 | 66 | 0.5 | 10 | Snd Lvl | 67.5 | 0.0 | 8 | -8.0 |
| Receiver103 (1st Row) | 93 | 1 | 68.7 | 69.1 | 66 | 0.4 | 10 | Snd Lvl | 69.1 | 0.0 | 8 | -8.0 |
| Receiver104 (1st Row) | 94 | 1 | 70.2 | 70.5 | 66 | 0.3 | 10 | Snd Lvl | 70.5 | 0.0 | 8 | -8.0 |
| Receiver105 (1st Row) | 95 | 1 | 68.4 | 68.8 | 66 | 0.4 | 10 | Snd Lvl | 68.8 | 0.0 | 8 | -8.0 |
| Receiver106 (1st Row) | 96 | 1 | 69.3 | 69.7 | 66 | 0.4 | 10 | Snd Lvl | 69.7 | 0.0 | 8 | -8.0 |
| Receiver107 (1st Row) | 97 | 1 | 69.9 | 70.3 | 66 | 0.4 | 10 | Snd Lvl | 70.3 | 0.0 | 8 | -8.0 |
| Receiver108 (1st Row) | 98 | 1 | 72.2 | 72.6 | 66 | 0.4 | 10 | Snd Lvl | 72.6 | 0.0 | 8 | -8.0 |
| Receiver109 (1st Row) | 99 | 1 | 70.5 | 70.9 | 66 | 0.4 | 10 | Snd Lvl | 70.9 | 0.0 | 8 | -8.0 |

RESULTS: SOUND LEVELS

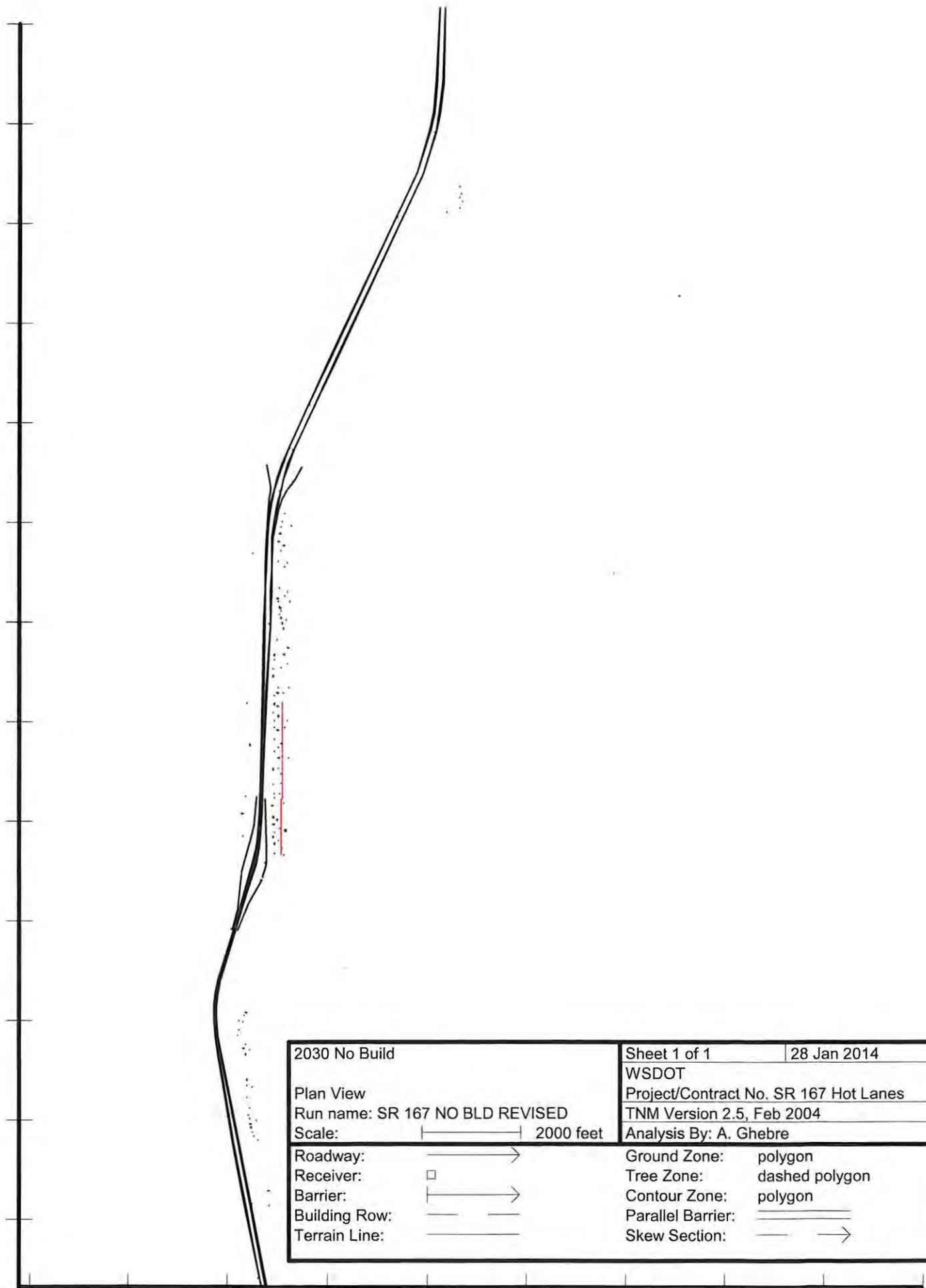
SR 167 Hot Lanes

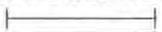
| | | | | | | | | | | | | |
|------------------------|-----|---|------|------|----|-----|----|---------|------|-----|---|------|
| Receiver111 (1st Row) | 100 | 1 | 72.4 | 72.8 | 66 | 0.4 | 10 | Snd Lvl | 72.8 | 0.0 | 8 | -8.0 |
| Receiver112 (1st Row) | 101 | 1 | 67.4 | 67.8 | 66 | 0.4 | 10 | Snd Lvl | 67.8 | 0.0 | 8 | -8.0 |
| Receiver113 | 102 | 1 | 65.8 | 66.2 | 66 | 0.4 | 10 | Snd Lvl | 66.2 | 0.0 | 8 | -8.0 |
| Receiver114 (1st Row) | 103 | 1 | 73.3 | 73.7 | 66 | 0.4 | 10 | Snd Lvl | 73.7 | 0.0 | 8 | -8.0 |
| Receiver115 | 104 | 1 | 68.9 | 69.3 | 66 | 0.4 | 10 | Snd Lvl | 69.3 | 0.0 | 8 | -8.0 |
| Receiver116 (1st Row) | 105 | 1 | 72.7 | 73.1 | 66 | 0.4 | 10 | Snd Lvl | 73.1 | 0.0 | 8 | -8.0 |
| Receiver118 (1st Row) | 106 | 1 | 72.0 | 72.4 | 66 | 0.4 | 10 | Snd Lvl | 72.4 | 0.0 | 8 | -8.0 |
| Receiver119 | 107 | 1 | 66.7 | 67.1 | 66 | 0.4 | 10 | Snd Lvl | 67.1 | 0.0 | 8 | -8.0 |
| Receiver121 | 108 | 3 | 65.0 | 65.4 | 66 | 0.4 | 10 | ---- | 65.4 | 0.0 | 8 | -8.0 |
| Receiver122 | 109 | 4 | 65.2 | 65.6 | 66 | 0.4 | 10 | ---- | 65.6 | 0.0 | 8 | -8.0 |
| Receiver124 | 110 | 2 | 63.6 | 64.0 | 66 | 0.4 | 10 | ---- | 64.0 | 0.0 | 8 | -8.0 |
| Receiver128 | 111 | 2 | 61.8 | 62.2 | 66 | 0.4 | 10 | ---- | 62.2 | 0.0 | 8 | -8.0 |
| Receiver133 | 112 | 5 | 65.7 | 66.2 | 66 | 0.5 | 10 | Snd Lvl | 66.2 | 0.0 | 8 | -8.0 |
| Receiver135 | 113 | 6 | 64.5 | 64.9 | 66 | 0.4 | 10 | ---- | 64.9 | 0.0 | 8 | -8.0 |
| R25 (1st Row) | 114 | 1 | 66.8 | 67.2 | 66 | 0.4 | 10 | Snd Lvl | 67.2 | 0.0 | 8 | -8.0 |
| R26 (1st Row) | 115 | 1 | 67.4 | 67.8 | 66 | 0.4 | 10 | Snd Lvl | 67.8 | 0.0 | 8 | -8.0 |
| R-27 (1st Row) | 116 | 1 | 64.8 | 65.3 | 66 | 0.5 | 10 | ---- | 65.3 | 0.0 | 8 | -8.0 |
| R-28 | 117 | 4 | 61.0 | 62.1 | 66 | 1.1 | 10 | ---- | 62.1 | 0.0 | 8 | -8.0 |
| R-29 | 118 | 1 | 62.6 | 63.7 | 66 | 1.1 | 10 | ---- | 63.7 | 0.0 | 8 | -8.0 |
| R-30 (1st Row) | 119 | 1 | 62.0 | 63.2 | 66 | 1.2 | 10 | ---- | 63.2 | 0.0 | 8 | -8.0 |
| R-31 | 120 | 2 | 60.8 | 61.9 | 66 | 1.1 | 10 | ---- | 61.9 | 0.0 | 8 | -8.0 |
| R-32 | 121 | 6 | 61.8 | 63.0 | 66 | 1.2 | 10 | ---- | 63.0 | 0.0 | 8 | -8.0 |
| R-33 / M-10 (1st Row) | 122 | 1 | 63.7 | 64.8 | 66 | 1.1 | 10 | ---- | 64.8 | 0.0 | 8 | -8.0 |
| R-34 (1st Row) | 123 | 1 | 64.7 | 65.9 | 66 | 1.2 | 10 | ---- | 65.9 | 0.0 | 8 | -8.0 |
| R-35 (1st Row) | 124 | 1 | 65.0 | 66.2 | 66 | 1.2 | 10 | Snd Lvl | 66.2 | 0.0 | 8 | -8.0 |
| R-36 | 125 | 8 | 62.9 | 64.1 | 66 | 1.2 | 10 | ---- | 64.1 | 0.0 | 8 | -8.0 |
| Receiver150 (1st Row) | 126 | 1 | 65.0 | 66.2 | 66 | 1.2 | 10 | Snd Lvl | 66.2 | 0.0 | 8 | -8.0 |
| Receiver151 (1st Row) | 127 | 1 | 65.0 | 66.2 | 66 | 1.2 | 10 | Snd Lvl | 66.2 | 0.0 | 8 | -8.0 |
| Receiver152 (1st Row) | 128 | 1 | 65.0 | 66.2 | 66 | 1.2 | 10 | Snd Lvl | 66.2 | 0.0 | 8 | -8.0 |
| Receiver153 (1st Row) | 129 | 1 | 64.7 | 65.9 | 66 | 1.2 | 10 | ---- | 65.9 | 0.0 | 8 | -8.0 |
| Receiver154 (1st Row) | 130 | 1 | 63.7 | 64.9 | 66 | 1.2 | 10 | ---- | 64.9 | 0.0 | 8 | -8.0 |
| Receiver155 | 131 | 1 | 63.8 | 65.0 | 66 | 1.2 | 10 | ---- | 65.0 | 0.0 | 8 | -8.0 |
| Receiver157 (1st Row) | 132 | 1 | 63.1 | 64.2 | 66 | 1.1 | 10 | ---- | 64.2 | 0.0 | 8 | -8.0 |
| Receiver158 (1st Row) | 133 | 1 | 62.7 | 63.8 | 66 | 1.1 | 10 | ---- | 63.8 | 0.0 | 8 | -8.0 |
| Receiver159 (1st Row) | 134 | 1 | 62.2 | 63.3 | 66 | 1.1 | 10 | ---- | 63.3 | 0.0 | 8 | -8.0 |
| Receiver160 (1st Row) | 135 | 1 | 61.4 | 62.5 | 66 | 1.1 | 10 | ---- | 62.5 | 0.0 | 8 | -8.0 |
| Receiver161 | 136 | 1 | 63.3 | 64.5 | 66 | 1.2 | 10 | ---- | 64.5 | 0.0 | 8 | -8.0 |
| Receiver162 | 137 | 1 | 60.7 | 61.8 | 66 | 1.1 | 10 | ---- | 61.8 | 0.0 | 8 | -8.0 |
| Receiver163 | 138 | 1 | 61.3 | 62.4 | 66 | 1.1 | 10 | ---- | 62.4 | 0.0 | 8 | -8.0 |
| Receiver165 (Business) | 139 | 1 | 64.5 | 65.8 | 66 | 1.3 | 10 | ---- | 65.8 | 0.0 | 8 | -8.0 |

RESULTS: SOUND LEVELS

SR 167 Hot Lanes

| | | | | | | | | | | | | |
|------------------------|--------------|------------------------|------------|------------|----|-----|----|---------|------|-----|---|------|
| Receiver166 (Business) | 140 | 1 | 65.7 | 67.0 | 66 | 1.3 | 10 | Snd Lvl | 67.0 | 0.0 | 8 | -8.0 |
| Receiver168 (1st Row) | 141 | 1 | 65.7 | 66.1 | 66 | 0.4 | 10 | Snd Lvl | 66.1 | 0.0 | 8 | -8.0 |
| Receiver170 (Business) | 142 | 1 | 69.7 | 70.2 | 66 | 0.5 | 10 | Snd Lvl | 70.2 | 0.0 | 8 | -8.0 |
| Receiver172 (Business) | 143 | 1 | 68.7 | 69.2 | 66 | 0.5 | 10 | Snd Lvl | 69.2 | 0.0 | 8 | -8.0 |
| Receiver174 (Business) | 144 | 1 | 58.7 | 59.1 | 66 | 0.4 | 10 | ---- | 59.1 | 0.0 | 8 | -8.0 |
| Receiver175 (1st Row) | 145 | 1 | 58.0 | 58.5 | 66 | 0.5 | 10 | ---- | 58.5 | 0.0 | 8 | -8.0 |
| Receiver 176 (1st Row) | 146 | 1 | 57.1 | 57.5 | 66 | 0.4 | 10 | ---- | 57.5 | 0.0 | 8 | -8.0 |
| Receiver177 (1st Row) | 147 | 1 | 57.6 | 58.1 | 66 | 0.5 | 10 | ---- | 58.1 | 0.0 | 8 | -8.0 |
| Receiver179 (1st Row) | 148 | 1 | 57.6 | 58.1 | 66 | 0.5 | 10 | ---- | 58.1 | 0.0 | 8 | -8.0 |
| Receiver180 (1st Row) | 149 | 1 | 57.0 | 57.5 | 66 | 0.5 | 10 | ---- | 57.5 | 0.0 | 8 | -8.0 |
| Receiver182 (Trail) | 150 | 1 | 62.6 | 63.7 | 66 | 1.1 | 10 | ---- | 63.7 | 0.0 | 8 | -8.0 |
| Dwelling Units | # DUs | Noise Reduction | | | | | | | | | | |
| | | Min | Avg | Max | | | | | | | | |
| | | dB | dB | dB | | | | | | | | |
| All Selected | 189 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| All Impacted | 77 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| All that meet NR Goal | 0 | 0.0 | 0.0 | 0.0 | | | | | | | | |



| | | | |
|--|---|---------------------------------------|---|
| 2030 No Build | | Sheet 1 of 1 | 28 Jan 2014 |
| Plan View | | WSDOT | |
| Run name: SR 167 NO BLD REVISED | | Project/Contract No. SR 167 Hot Lanes | |
| Scale:  2000 feet | | TNM Version 2.5, Feb 2004 | |
| Roadway: |  | Ground Zone: | polygon |
| Receiver: |  | Tree Zone: | dashed polygon |
| Barrier: |  | Contour Zone: | polygon |
| Building Row: |  | Parallel Barrier: |  |
| Terrain Line: |  | Skew Section: |  |

1612000 1614000 1616000 1618000 1620000 1622000 1624000 1626000 1628000

RESULTS: SOUND LEVELS

SR 167 HOT Lanes

WSDOT
Ghebre. A

28 January 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: SR 167 HOT Lanes
RUN: SR 167 Build1(Top Section)
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

| Receiver | | | | | | | | | | | | |
|------------------|-----|------|-----------------|------------|--------|------------------------|------------------|--------------|-------------------|-----------------|------|-----------------------|
| Name | No. | #DUs | Existing LAeq1h | No Barrier | | | | With Barrier | | | | |
| | | | | LAeq1h | | Increase over existing | | Type Impact | Calculated LAeq1h | Noise Reduction | | Calculated minus Goal |
| | | | | Calculated | Crit'n | Calculated | Crit'n Sub'l Inc | | | Calculated | Goal | |
| | | | dBA | dBA | dBA | dB | dB | | dBA | dB | dB | dB |
| R1 (1st Row) | 1 | 1 | 71.2 | 71.7 | 66 | 0.5 | 10 | Snd Lvl | 71.7 | 0.0 | 8 | -8.0 |
| R2- M1 (1st Row) | 2 | 1 | 72.6 | 73.0 | 66 | 0.4 | 10 | Snd Lvl | 73.0 | 0.0 | 8 | -8.0 |
| R3-M2 | 3 | 3 | 66.4 | 67.4 | 66 | 1.0 | 10 | Snd Lvl | 67.4 | 0.0 | 8 | -8.0 |
| R4-M3 (1st Row) | 4 | 1 | 71.4 | 72.1 | 66 | 0.7 | 10 | Snd Lvl | 72.1 | 0.0 | 8 | -8.0 |
| R5 (1st Row) | 5 | 1 | 71.7 | 72.8 | 66 | 1.1 | 10 | Snd Lvl | 72.8 | 0.0 | 8 | -8.0 |
| R6-M4 | 6 | 5 | 63.9 | 65.9 | 66 | 2.0 | 10 | --- | 65.9 | 0.0 | 8 | -8.0 |
| R7-M5 (1st Row) | 7 | 1 | 71.7 | 72.4 | 66 | 0.7 | 10 | Snd Lvl | 72.4 | 0.0 | 8 | -8.0 |
| R8 | 8 | 1 | 67.6 | 69.1 | 66 | 1.5 | 10 | Snd Lvl | 69.1 | 0.0 | 8 | -8.0 |
| R9-M6 | 9 | 4 | 65.2 | 66.0 | 66 | 0.8 | 10 | Snd Lvl | 66.0 | 0.0 | 8 | -8.0 |
| R10 (1st Row) | 10 | 1 | 70.1 | 71.3 | 66 | 1.2 | 10 | Snd Lvl | 71.3 | 0.0 | 8 | -8.0 |
| R11 (1st Row) | 11 | 1 | 69.2 | 70.1 | 66 | 0.9 | 10 | Snd Lvl | 70.1 | 0.0 | 8 | -8.0 |
| R12 | 12 | 6 | 64.1 | 65.0 | 66 | 0.9 | 10 | --- | 65.0 | 0.0 | 8 | -8.0 |
| R13 (1st Row) | 13 | 1 | 68.6 | 69.1 | 66 | 0.5 | 10 | Snd Lvl | 69.1 | 0.0 | 8 | -8.0 |
| R14 | 14 | 2 | 65.0 | 65.6 | 66 | 0.6 | 10 | --- | 65.6 | 0.0 | 8 | -8.0 |
| R15 | 15 | 8 | 62.2 | 63.2 | 66 | 1.0 | 10 | --- | 63.2 | 0.0 | 8 | -8.0 |
| R16 (1st Row) | 16 | 1 | 68.7 | 69.1 | 66 | 0.4 | 10 | Snd Lvl | 69.1 | 0.0 | 8 | -8.0 |
| R17- M9 | 17 | 1 | 68.6 | 69.1 | 66 | 0.5 | 10 | Snd Lvl | 69.1 | 0.0 | 8 | -8.0 |
| R18 | 18 | 1 | 65.6 | 66.0 | 66 | 0.4 | 10 | Snd Lvl | 66.0 | 0.0 | 8 | -8.0 |
| R19 (1st Row) | 19 | 1 | 67.1 | 68.3 | 66 | 1.2 | 10 | Snd Lvl | 68.3 | 0.0 | 8 | -8.0 |
| R20 | 20 | 1 | 65.0 | 66.1 | 66 | 1.1 | 10 | Snd Lvl | 66.1 | 0.0 | 8 | -8.0 |
| R21 | 21 | 2 | 64.0 | 64.8 | 66 | 0.8 | 10 | --- | 64.8 | 0.0 | 8 | -8.0 |
| R22 | 22 | 4 | 62.2 | 63.4 | 66 | 1.2 | 10 | --- | 63.4 | 0.0 | 8 | -8.0 |
| R23 (1st Row) | 23 | 1 | 63.0 | 66.9 | 66 | 3.9 | 10 | Snd Lvl | 66.9 | 0.0 | 8 | -8.0 |

RESULTS: SOUND LEVELS

SR 167 HOT Lanes

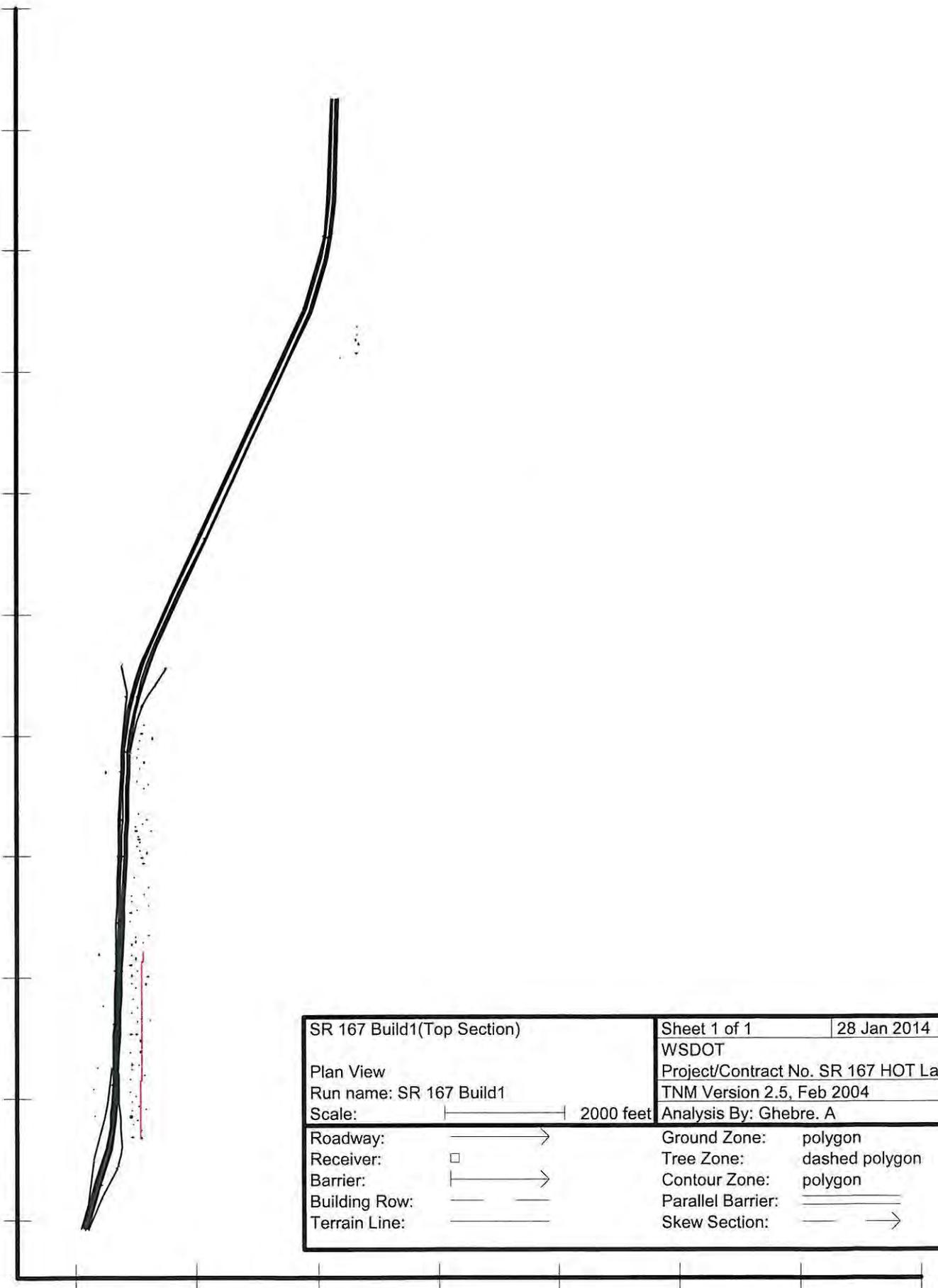
| | | | | | | | | | | | | |
|----------------------------------|----|---|------|------|----|------|----|---------|------|-----|---|------|
| R24 | 24 | 1 | 61.5 | 63.0 | 66 | 1.5 | 10 | ---- | 63.0 | 0.0 | 8 | -8.0 |
| R-56 (1st Row) | 25 | 1 | 63.9 | 65.4 | 66 | 1.5 | 10 | ---- | 65.4 | 0.0 | 8 | -8.0 |
| Receiver62 | 26 | 1 | 64.6 | 65.8 | 66 | 1.2 | 10 | ---- | 65.8 | 0.0 | 8 | -8.0 |
| Receiver64 (1st Row) | 27 | 1 | 65.6 | 66.7 | 66 | 1.1 | 10 | Snd Lvl | 66.7 | 0.0 | 8 | -8.0 |
| Receiver65 (1st Row) | 28 | 1 | 65.2 | 65.9 | 66 | 0.7 | 10 | ---- | 65.9 | 0.0 | 8 | -8.0 |
| Receiver67 (1st Row) | 29 | 1 | 66.1 | 67.6 | 66 | 1.5 | 10 | Snd Lvl | 67.6 | 0.0 | 8 | -8.0 |
| Receiver68 (1st Row) | 30 | 1 | 67.3 | 67.8 | 66 | 0.5 | 10 | Snd Lvl | 67.8 | 0.0 | 8 | -8.0 |
| Receiver69 | 31 | 4 | 62.8 | 63.8 | 66 | 1.0 | 10 | ---- | 63.8 | 0.0 | 8 | -8.0 |
| Receiver71 (1st Row) | 32 | 1 | 67.7 | 68.0 | 66 | 0.3 | 10 | Snd Lvl | 68.0 | 0.0 | 8 | -8.0 |
| Receiver72 | 33 | 2 | 65.3 | 66.2 | 66 | 0.9 | 10 | Snd Lvl | 66.2 | 0.0 | 8 | -8.0 |
| Receiver74 | 34 | 2 | 66.1 | 66.9 | 66 | 0.8 | 10 | Snd Lvl | 66.9 | 0.0 | 8 | -8.0 |
| Receiver75 | 35 | 2 | 65.0 | 65.9 | 66 | 0.9 | 10 | ---- | 65.9 | 0.0 | 8 | -8.0 |
| Receiver76 (1st Row) | 36 | 1 | 65.8 | 66.6 | 66 | 0.8 | 10 | Snd Lvl | 66.6 | 0.0 | 8 | -8.0 |
| Receiver78 (1st Row) | 37 | 1 | 68.5 | 69.3 | 66 | 0.8 | 10 | Snd Lvl | 69.3 | 0.0 | 8 | -8.0 |
| Receiver79 | 39 | 1 | 65.7 | 66.1 | 66 | 0.4 | 10 | Snd Lvl | 66.1 | 0.0 | 8 | -8.0 |
| Receiver80 (1st Row) | 40 | 1 | 69.3 | 70.1 | 66 | 0.8 | 10 | Snd Lvl | 70.1 | 0.0 | 8 | -8.0 |
| Receiver81 | 41 | 1 | 67.4 | 68.0 | 66 | 0.6 | 10 | Snd Lvl | 68.0 | 0.0 | 8 | -8.0 |
| Receiver82 | 42 | 1 | 66.8 | 67.3 | 66 | 0.5 | 10 | Snd Lvl | 67.3 | 0.0 | 8 | -8.0 |
| Receiver84 | 43 | 2 | 64.3 | 65.1 | 66 | 0.8 | 10 | ---- | 65.1 | 0.0 | 8 | -8.0 |
| Receiver86 | 44 | 1 | 67.2 | 68.1 | 66 | 0.9 | 10 | Snd Lvl | 68.1 | 0.0 | 8 | -8.0 |
| Receiver88 (1st Row) | 45 | 1 | 70.1 | 71.3 | 66 | 1.2 | 10 | Snd Lvl | 71.3 | 0.0 | 8 | -8.0 |
| Receiver89 (1st Row) | 46 | 1 | 69.8 | 71.2 | 66 | 1.4 | 10 | Snd Lvl | 71.2 | 0.0 | 8 | -8.0 |
| Receiver90 | 47 | 1 | 68.0 | 69.0 | 66 | 1.0 | 10 | Snd Lvl | 69.0 | 0.0 | 8 | -8.0 |
| Receiver91 | 48 | 1 | 68.4 | 69.4 | 66 | 1.0 | 10 | Snd Lvl | 69.4 | 0.0 | 8 | -8.0 |
| Receiver93 (1st Row) | 49 | 1 | 68.4 | 69.5 | 66 | 1.1 | 10 | Snd Lvl | 69.5 | 0.0 | 8 | -8.0 |
| Receiver94 (1st Row) | 50 | 1 | 72.0 | 72.9 | 66 | 0.9 | 10 | Snd Lvl | 72.9 | 0.0 | 8 | -8.0 |
| Receiver95 (1st Row) | 51 | 1 | 73.1 | 74.4 | 66 | 1.3 | 10 | Snd Lvl | 74.4 | 0.0 | 8 | -8.0 |
| Receiver97 (1st Row Church) | 52 | 2 | 72.1 | 72.7 | 66 | 0.6 | 10 | Snd Lvl | 72.7 | 0.0 | 8 | -8.0 |
| Receiver98 | 53 | 1 | 66.6 | 67.6 | 66 | 1.0 | 10 | Snd Lvl | 67.6 | 0.0 | 8 | -8.0 |
| Receiver99 | 54 | 5 | 65.3 | 66.4 | 66 | 1.1 | 10 | Snd Lvl | 66.4 | 0.0 | 8 | -8.0 |
| Receiver100 (1st Row Com Center) | 55 | 6 | 71.7 | 71.6 | 66 | -0.1 | 10 | Snd Lvl | 71.6 | 0.0 | 8 | -8.0 |
| Receiver101 (1st Row) | 56 | 1 | 66.5 | 68.4 | 66 | 1.9 | 10 | Snd Lvl | 68.4 | 0.0 | 8 | -8.0 |
| Receiver102 (1st Row) | 57 | 1 | 67.0 | 69.2 | 66 | 2.2 | 10 | Snd Lvl | 69.2 | 0.0 | 8 | -8.0 |
| Receiver103 (1st Row) | 58 | 1 | 68.7 | 70.6 | 66 | 1.9 | 10 | Snd Lvl | 70.6 | 0.0 | 8 | -8.0 |
| Receiver104 (1st Row) | 59 | 1 | 70.2 | 71.6 | 66 | 1.4 | 10 | Snd Lvl | 71.6 | 0.0 | 8 | -8.0 |
| Receiver105 (1st Row) | 60 | 1 | 68.4 | 70.5 | 66 | 2.1 | 10 | Snd Lvl | 70.5 | 0.0 | 8 | -8.0 |
| Receiver106 (1st Row) | 61 | 1 | 69.3 | 71.2 | 66 | 1.9 | 10 | Snd Lvl | 71.2 | 0.0 | 8 | -8.0 |
| Receiver107 (1st Row) | 62 | 1 | 69.9 | 71.6 | 66 | 1.7 | 10 | Snd Lvl | 71.6 | 0.0 | 8 | -8.0 |
| Receiver108 (1st Row) | 63 | 1 | 72.2 | 73.2 | 66 | 1.0 | 10 | Snd Lvl | 73.2 | 0.0 | 8 | -8.0 |
| Receiver109 (1st Row) | 64 | 1 | 70.5 | 71.4 | 66 | 0.9 | 10 | Snd Lvl | 71.4 | 0.0 | 8 | -8.0 |

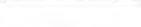
RESULTS: SOUND LEVELS

SR 167 HOT Lanes

| | | | | | | | | | | | | |
|------------------------|----|---|------|------|----|-----|----|---------|------|-----|---|------|
| Receiver111 (1st Row) | 65 | 1 | 72.4 | 73.0 | 66 | 0.6 | 10 | Snd Lvl | 73.0 | 0.0 | 8 | -8.0 |
| Receiver112 (1st Row) | 66 | 1 | 67.4 | 68.8 | 66 | 1.4 | 10 | Snd Lvl | 68.8 | 0.0 | 8 | -8.0 |
| Receiver113 | 67 | 1 | 65.8 | 67.4 | 66 | 1.6 | 10 | Snd Lvl | 67.4 | 0.0 | 8 | -8.0 |
| Receiver114 (1st Row) | 68 | 1 | 73.3 | 73.8 | 66 | 0.5 | 10 | Snd Lvl | 73.8 | 0.0 | 8 | -8.0 |
| Receiver115 | 69 | 1 | 68.9 | 70.1 | 66 | 1.2 | 10 | Snd Lvl | 70.1 | 0.0 | 8 | -8.0 |
| Receiver116 (1st Row) | 70 | 1 | 72.7 | 73.0 | 66 | 0.3 | 10 | Snd Lvl | 73.0 | 0.0 | 8 | -8.0 |
| Receiver118 (1st Row) | 71 | 1 | 72.0 | 72.6 | 66 | 0.6 | 10 | Snd Lvl | 72.6 | 0.0 | 8 | -8.0 |
| Receiver119 | 72 | 1 | 66.7 | 69.3 | 66 | 2.6 | 10 | Snd Lvl | 69.3 | 0.0 | 8 | -8.0 |
| Receiver121 | 73 | 3 | 65.0 | 67.2 | 66 | 2.2 | 10 | Snd Lvl | 67.2 | 0.0 | 8 | -8.0 |
| Receiver122 | 74 | 4 | 65.2 | 68.0 | 66 | 2.8 | 10 | Snd Lvl | 68.0 | 0.0 | 8 | -8.0 |
| Receiver124 | 75 | 2 | 63.6 | 65.1 | 66 | 1.5 | 10 | ---- | 65.1 | 0.0 | 8 | -8.0 |
| Receiver128 | 76 | 2 | 61.8 | 63.0 | 66 | 1.2 | 10 | ---- | 63.0 | 0.0 | 8 | -8.0 |
| Receiver133 | 77 | 5 | 65.7 | 67.3 | 66 | 1.6 | 10 | Snd Lvl | 67.3 | 0.0 | 8 | -8.0 |
| Receiver135 | 78 | 6 | 64.5 | 65.6 | 66 | 1.1 | 10 | ---- | 65.6 | 0.0 | 8 | -8.0 |
| R25 (1st Row) | 79 | 1 | 66.8 | 67.9 | 66 | 1.1 | 10 | Snd Lvl | 67.9 | 0.0 | 8 | -8.0 |
| R26 (1st Row) | 80 | 1 | 67.4 | 68.5 | 66 | 1.1 | 10 | Snd Lvl | 68.5 | 0.0 | 8 | -8.0 |
| R-27 (1st Row) | 81 | 1 | 64.8 | 66.0 | 66 | 1.2 | 10 | Snd Lvl | 66.0 | 0.0 | 8 | -8.0 |
| Receiver168 (1st Row) | 82 | 1 | 65.7 | 67.4 | 66 | 1.7 | 10 | Snd Lvl | 67.4 | 0.0 | 8 | -8.0 |
| Receiver170 (Business) | 83 | 1 | 69.7 | 69.9 | 66 | 0.2 | 10 | Snd Lvl | 69.9 | 0.0 | 8 | -8.0 |
| Receiver172 (Business) | 84 | 1 | 68.7 | 70.1 | 66 | 1.4 | 10 | Snd Lvl | 70.1 | 0.0 | 8 | -8.0 |
| Receiver174 (Business) | 85 | 1 | 58.7 | 60.6 | 66 | 1.9 | 10 | ---- | 60.6 | 0.0 | 8 | -8.0 |
| Receiver175 (1st Row) | 86 | 1 | 58.0 | 59.8 | 66 | 1.8 | 10 | ---- | 59.8 | 0.0 | 8 | -8.0 |
| Receiver 176 (1st Row) | 87 | 1 | 57.1 | 58.7 | 66 | 1.6 | 10 | ---- | 58.7 | 0.0 | 8 | -8.0 |
| Receiver177 (1st Row) | 88 | 1 | 57.6 | 59.5 | 66 | 1.9 | 10 | ---- | 59.5 | 0.0 | 8 | -8.0 |
| Receiver179 (1st Row) | 89 | 1 | 57.6 | 59.5 | 66 | 1.9 | 10 | ---- | 59.5 | 0.0 | 8 | -8.0 |
| Receiver180 (1st Row) | 90 | 1 | 57.0 | 58.8 | 66 | 1.8 | 10 | ---- | 58.8 | 0.0 | 8 | -8.0 |

| Dwelling Units | # DUs | Noise Reduction | | |
|-----------------------|-------|-----------------|-----|-----|
| | | Min | Avg | Max |
| | | dB | dB | dB |
| All Selected | 148 | 0.0 | 0.0 | 0.0 |
| All Impacted | 93 | 0.0 | 0.0 | 0.0 |
| All that meet NR Goal | 0 | 0.0 | 0.0 | 0.0 |



| | | | |
|--|---|---------------------------------------|---|
| SR 167 Build1(Top Section) | | Sheet 1 of 1 | 28 Jan 2014 |
| Plan View | | WSDOT | |
| Run name: SR 167 Build1 | | Project/Contract No. SR 167 HOT Lanes | |
| Scale:  2000 feet | | TNM Version 2.5, Feb 2004 | |
| Roadway: |  | Ground Zone: | polygon |
| Receiver: |  | Tree Zone: | dashed polygon |
| Barrier: |  | Contour Zone: | polygon |
| Building Row: |  | Parallel Barrier: |  |
| Terrain Line: |  | Skew Section: |  |

314000 1616000 1618000 1620000 1622000 1624000 1626000 1628000

RESULTS: SOUND LEVELS

SR 167

WSDOT
A. Ghebre

28 January 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

SR 167

RUN:

2030 Build 2 (Bottom Section)

BARRIER DESIGN:

INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS:

68 deg F, 50% RH

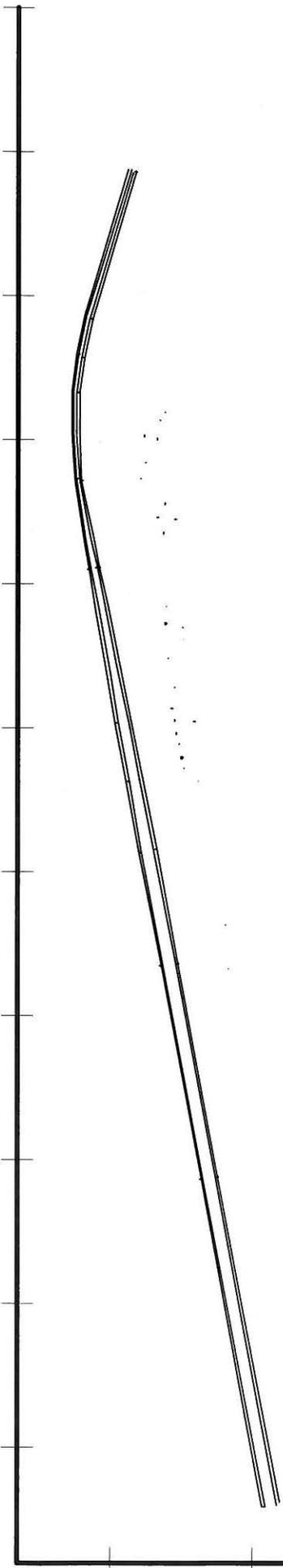
Receiver

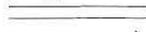
| Name | No. | #DUs | Existing LAeq1h | No Barrier | | | | With Barrier | | | | |
|------------------------|-----|------|-----------------|------------|--------|------------------------|------------------|--------------|-------------------|-----------------|------|-----------------------|
| | | | | LAeq1h | | Increase over existing | | Type Impact | Calculated LAeq1h | Noise Reduction | | Calculated minus Goal |
| | | | | Calculated | Crit'n | Calculated | Crit'n Sub'l Inc | | | Calculated | Goal | |
| | | | dBA | dBA | dBA | dB | dB | | dBA | dB | dB | dB |
| R-28 | 140 | 4 | 61.0 | 62.2 | 66 | 1.2 | 10 | ---- | 62.2 | 0.0 | 8 | -8.0 |
| R-29 | 141 | 1 | 62.6 | 63.8 | 66 | 1.2 | 10 | ---- | 63.8 | 0.0 | 8 | -8.0 |
| R-30 (1st Row) | 142 | 1 | 62.0 | 63.2 | 66 | 1.2 | 10 | ---- | 63.2 | 0.0 | 8 | -8.0 |
| R-31 | 143 | 2 | 60.8 | 62.0 | 66 | 1.2 | 10 | ---- | 62.0 | 0.0 | 8 | -8.0 |
| R-32 | 144 | 6 | 61.8 | 63.0 | 66 | 1.2 | 10 | ---- | 63.0 | 0.0 | 8 | -8.0 |
| R-33 / M-10 (1st Row) | 145 | 1 | 63.7 | 65.5 | 66 | 1.8 | 10 | ---- | 65.5 | 0.0 | 8 | -8.0 |
| R-34 (1st Row) | 146 | 1 | 64.7 | 66.9 | 66 | 2.2 | 10 | Snd Lvl | 66.9 | 0.0 | 8 | -8.0 |
| R-35 (1st Row) | 147 | 1 | 65.0 | 66.6 | 66 | 1.6 | 10 | Snd Lvl | 66.6 | 0.0 | 8 | -8.0 |
| R-36 | 148 | 8 | 62.9 | 63.7 | 66 | 0.8 | 10 | ---- | 63.7 | 0.0 | 8 | -8.0 |
| Receiver150 (1st Row) | 150 | 1 | 65.0 | 66.8 | 66 | 1.8 | 10 | Snd Lvl | 66.8 | 0.0 | 8 | -8.0 |
| Receiver151 (1st Row) | 151 | 1 | 65.0 | 66.8 | 66 | 1.8 | 10 | Snd Lvl | 66.8 | 0.0 | 8 | -8.0 |
| Receiver152 (1st Row) | 152 | 1 | 65.0 | 66.8 | 66 | 1.8 | 10 | Snd Lvl | 66.8 | 0.0 | 8 | -8.0 |
| Receiver153 (1st Row) | 153 | 1 | 64.7 | 66.6 | 66 | 1.9 | 10 | Snd Lvl | 66.6 | 0.0 | 8 | -8.0 |
| Receiver154 (1st Row) | 154 | 1 | 63.7 | 64.6 | 66 | 0.9 | 10 | ---- | 64.6 | 0.0 | 8 | -8.0 |
| Receiver155 | 155 | 1 | 63.8 | 65.7 | 66 | 1.9 | 10 | ---- | 65.7 | 0.0 | 8 | -8.0 |
| Receiver157 (1st Row) | 157 | 1 | 63.1 | 64.9 | 66 | 1.8 | 10 | ---- | 64.9 | 0.0 | 8 | -8.0 |
| Receiver158 (1st Row) | 158 | 1 | 62.7 | 64.3 | 66 | 1.6 | 10 | ---- | 64.3 | 0.0 | 8 | -8.0 |
| Receiver159 (1st Row) | 159 | 1 | 62.2 | 63.7 | 66 | 1.5 | 10 | ---- | 63.7 | 0.0 | 8 | -8.0 |
| Receiver160 (1st Row) | 160 | 1 | 61.4 | 63.0 | 66 | 1.6 | 10 | ---- | 63.0 | 0.0 | 8 | -8.0 |
| Receiver161 | 161 | 1 | 63.3 | 64.4 | 66 | 1.1 | 10 | ---- | 64.4 | 0.0 | 8 | -8.0 |
| Receiver162 | 162 | 1 | 60.7 | 61.8 | 66 | 1.1 | 10 | ---- | 61.8 | 0.0 | 8 | -8.0 |
| Receiver163 | 163 | 1 | 61.3 | 62.5 | 66 | 1.2 | 10 | ---- | 62.5 | 0.0 | 8 | -8.0 |
| Receiver165 (Business) | 165 | 1 | 64.5 | 65.2 | 66 | 0.7 | 10 | ---- | 65.2 | 0.0 | 8 | -8.0 |

RESULTS: SOUND LEVELS

SR 167

| Receiver166 (Business) | 166 | 1 | 65.7 | 66.5 | 66 | 0.8 | 10 | Snd Lvl | 66.5 | 0.0 | 8 | -8.0 |
|------------------------|-------|-----------------|------|------|-----|-----|----|---------|------|-----|---|------|
| Receiver182 (Trail) | 182 | 1 | 62.6 | 64.0 | 66 | 1.4 | 10 | --- | 64.0 | 0.0 | 8 | -8.0 |
| Dwelling Units | # DUs | Noise Reduction | | | | | | | | | | |
| | | Min | Avg | Max | | | | | | | | |
| | | dB | dB | dB | | | | | | | | |
| All Selected | 41 | | 0.0 | 0.0 | 0.0 | | | | | | | |
| All Impacted | 7 | | 0.0 | 0.0 | 0.0 | | | | | | | |
| All that meet NR Goal | 0 | | 0.0 | 0.0 | 0.0 | | | | | | | |



| | | | |
|--|---|-----------------------------|---|
| 2030 Build 2 (Bottom Section) | | Sheet 1 of 1 | 28 Jan 2014 |
| Plan View | | WSDOT | |
| Run name: SR 167 Build2 | | Project/Contract No. SR 167 | |
| Scale:  1000 feet | | TNM Version 2.5, Feb 2004 | |
| Analysis By: A. Ghebre | | | |
| Roadway: |  | Ground Zone: | polygon |
| Receiver: |  | Tree Zone: | dashed polygon |
| Barrier: |  | Contour Zone: | polygon |
| Building Row: |  | Parallel Barrier: |  |
| Terrain Line: |  | Skew Section: |  |

1614000 1615000 1616000 1617000 1618000 1619000 1620000 1621000

RESULTS: SOUND LEVELS

SR 167 HOT Lanes

WSDOT
Ghebre. A

10 April 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: SR 167 HOT Lanes
RUN: SR 167 Build1 w.Wall (Top Section)
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

Receiver

| Name | No. | #DUs | Existing LAeq1h | No Barrier | | | | With Barrier | | | | |
|------------------|-----|------|-----------------|------------|--------|------------------------|------------------|--------------|-------------------|-----------------|------|-----------------------|
| | | | | LAeq1h | | Increase over existing | | Type Impact | Calculated LAeq1h | Noise Reduction | | Calculated minus Goal |
| | | | | Calculated | Crit'n | Calculated | Crit'n Sub'l Inc | | | Calculated | Goal | |
| | | | dBA | dBA | dBA | dB | dB | | dBA | dB | dB | dB |
| R1 (1st Row) | 1 | 1 | 71.2 | 71.6 | 66 | 0.4 | 10 | Snd Lvl | 68.6 | 3.0 | 8 | -5.0 |
| R2- M1 (1st Row) | 2 | 1 | 72.6 | 72.3 | 66 | -0.3 | 10 | Snd Lvl | 66.4 | 5.9 | 8 | -2.1 |
| R3-M2 | 3 | 3 | 66.4 | 67.2 | 66 | 0.8 | 10 | Snd Lvl | 64.5 | 2.7 | 8 | -5.3 |
| R4-M3 (1st Row) | 4 | 1 | 71.4 | 72.1 | 66 | 0.7 | 10 | Snd Lvl | 67.0 | 5.1 | 8 | -2.9 |
| R5 (1st Row) | 5 | 1 | 71.7 | 72.8 | 66 | 1.1 | 10 | Snd Lvl | 66.1 | 6.7 | 8 | -1.3 |
| R6-M4 | 6 | 5 | 63.9 | 65.9 | 66 | 2.0 | 10 | --- | 62.0 | 3.9 | 8 | -4.1 |
| R7-M5 (1st Row) | 7 | 1 | 71.7 | 72.4 | 66 | 0.7 | 10 | Snd Lvl | 66.4 | 6.0 | 8 | -2.0 |
| R8 | 8 | 1 | 67.6 | 68.9 | 66 | 1.3 | 10 | Snd Lvl | 64.5 | 4.4 | 8 | -3.6 |
| R9-M6 | 9 | 4 | 65.2 | 65.8 | 66 | 0.6 | 10 | --- | 61.8 | 4.0 | 8 | -4.0 |
| R10 (1st Row) | 10 | 1 | 70.1 | 70.4 | 66 | 0.3 | 10 | Snd Lvl | 65.0 | 5.4 | 8 | -2.6 |
| R11 (1st Row) | 11 | 1 | 69.2 | 68.2 | 66 | -1.0 | 10 | Snd Lvl | 62.9 | 5.3 | 8 | -2.7 |
| R12 | 12 | 6 | 64.1 | 64.2 | 66 | 0.1 | 10 | --- | 60.3 | 3.9 | 8 | -4.1 |
| R13 (1st Row) | 13 | 1 | 68.6 | 68.6 | 66 | 0.0 | 10 | Snd Lvl | 63.8 | 4.8 | 8 | -3.2 |
| R14 | 14 | 2 | 65.0 | 64.9 | 66 | -0.1 | 10 | --- | 65.6 | -0.7 | 8 | -8.7 |
| R15 | 15 | 8 | 62.2 | 63.0 | 66 | 0.8 | 10 | --- | 59.7 | 3.3 | 8 | -4.7 |
| R16 (1st Row) | 16 | 1 | 68.7 | 68.6 | 66 | -0.1 | 10 | Snd Lvl | 63.5 | 5.1 | 8 | -2.9 |
| R17- M9 | 17 | 1 | 68.6 | 67.9 | 66 | -0.7 | 10 | Snd Lvl | 62.6 | 5.3 | 8 | -2.7 |
| R18 | 18 | 1 | 65.6 | 65.4 | 66 | -0.2 | 10 | --- | 61.5 | 3.9 | 8 | -4.1 |
| R19 (1st Row) | 19 | 1 | 67.1 | 67.4 | 66 | 0.3 | 10 | Snd Lvl | 61.9 | 5.5 | 8 | -2.5 |
| R20 | 20 | 1 | 65.0 | 64.4 | 66 | -0.6 | 10 | --- | 60.3 | 4.1 | 8 | -3.9 |
| R21 | 21 | 2 | 64.0 | 63.9 | 66 | -0.1 | 10 | --- | 59.7 | 4.2 | 8 | -3.8 |
| R22 | 22 | 4 | 62.2 | 63.2 | 66 | 1.0 | 10 | --- | 59.1 | 4.1 | 8 | -3.9 |
| R23 (1st Row) | 23 | 1 | 63.0 | 66.7 | 66 | 3.7 | 10 | Snd Lvl | 61.9 | 4.8 | 8 | -3.2 |

RESULTS: SOUND LEVELS

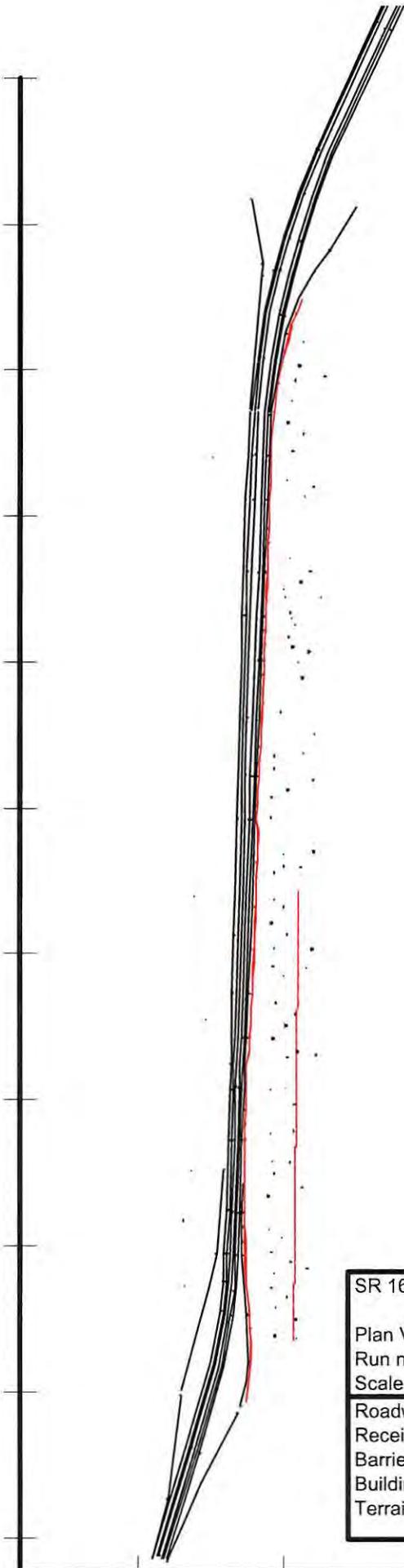
SR 167 HOT Lanes

| | | | | | | | | | | | | |
|----------------------------------|----|---|------|------|----|------|----|---------|------|-----|---|------|
| R24 | 24 | 1 | 61.5 | 63.0 | 66 | 1.5 | 10 | ---- | 61.4 | 1.6 | 8 | -6.4 |
| R-56 (1st Row) | 25 | 1 | 63.9 | 64.6 | 66 | 0.7 | 10 | ---- | 60.6 | 4.0 | 8 | -4.0 |
| Receiver62 | 26 | 1 | 64.6 | 64.4 | 66 | -0.2 | 10 | ---- | 60.4 | 4.0 | 8 | -4.0 |
| Receiver64 (1st Row) | 27 | 1 | 65.6 | 64.9 | 66 | -0.7 | 10 | ---- | 60.7 | 4.2 | 8 | -3.8 |
| Receiver65 (1st Row) | 28 | 1 | 65.2 | 65.0 | 66 | -0.2 | 10 | ---- | 60.5 | 4.5 | 8 | -3.5 |
| Receiver67 (1st Row) | 29 | 1 | 66.1 | 66.1 | 66 | 0.0 | 10 | Snd Lvl | 61.3 | 4.8 | 8 | -3.2 |
| Receiver68 (1st Row) | 30 | 1 | 67.3 | 66.7 | 66 | -0.6 | 10 | Snd Lvl | 61.7 | 5.0 | 8 | -3.0 |
| Receiver69 | 31 | 4 | 62.8 | 63.7 | 66 | 0.9 | 10 | ---- | 59.4 | 4.3 | 8 | -3.7 |
| Receiver71 (1st Row) | 32 | 1 | 67.7 | 66.9 | 66 | -0.8 | 10 | Snd Lvl | 61.8 | 5.1 | 8 | -2.9 |
| Receiver72 | 33 | 2 | 65.3 | 65.5 | 66 | 0.2 | 10 | ---- | 61.2 | 4.3 | 8 | -3.7 |
| Receiver74 | 34 | 2 | 66.1 | 66.1 | 66 | 0.0 | 10 | Snd Lvl | 61.7 | 4.4 | 8 | -3.6 |
| Receiver75 | 35 | 2 | 65.0 | 65.2 | 66 | 0.2 | 10 | ---- | 60.9 | 4.3 | 8 | -3.7 |
| Receiver76 (1st Row) | 36 | 1 | 65.8 | 66.2 | 66 | 0.4 | 10 | Snd Lvl | 61.9 | 4.3 | 8 | -3.7 |
| Receiver78 (1st Row) | 37 | 1 | 68.5 | 67.9 | 66 | -0.6 | 10 | Snd Lvl | 63.0 | 4.9 | 8 | -3.1 |
| Receiver79 | 39 | 1 | 65.7 | 65.3 | 66 | -0.4 | 10 | ---- | 61.6 | 3.7 | 8 | -4.3 |
| Receiver80 (1st Row) | 40 | 1 | 69.3 | 68.3 | 66 | -1.0 | 10 | Snd Lvl | 62.9 | 5.4 | 8 | -2.6 |
| Receiver81 | 41 | 1 | 67.4 | 66.7 | 66 | -0.7 | 10 | Snd Lvl | 62.2 | 4.5 | 8 | -3.5 |
| Receiver82 | 42 | 1 | 66.8 | 66.7 | 66 | -0.1 | 10 | Snd Lvl | 62.6 | 4.1 | 8 | -3.9 |
| Receiver84 | 43 | 2 | 64.3 | 64.4 | 66 | 0.1 | 10 | ---- | 60.5 | 3.9 | 8 | -4.1 |
| Receiver86 | 44 | 1 | 67.2 | 66.6 | 66 | -0.6 | 10 | Snd Lvl | 62.0 | 4.6 | 8 | -3.4 |
| Receiver88 (1st Row) | 45 | 1 | 70.1 | 69.2 | 66 | -0.9 | 10 | Snd Lvl | 63.4 | 5.8 | 8 | -2.2 |
| Receiver89 (1st Row) | 46 | 1 | 69.8 | 69.3 | 66 | -0.5 | 10 | Snd Lvl | 63.7 | 5.6 | 8 | -2.4 |
| Receiver90 | 47 | 1 | 68.0 | 67.6 | 66 | -0.4 | 10 | Snd Lvl | 62.8 | 4.8 | 8 | -3.2 |
| Receiver91 | 48 | 1 | 68.4 | 68.7 | 66 | 0.3 | 10 | Snd Lvl | 64.5 | 4.2 | 8 | -3.8 |
| Receiver93 (1st Row) | 49 | 1 | 68.4 | 69.0 | 66 | 0.6 | 10 | Snd Lvl | 64.9 | 4.1 | 8 | -3.9 |
| Receiver94 (1st Row) | 50 | 1 | 72.0 | 72.8 | 66 | 0.8 | 10 | Snd Lvl | 66.9 | 5.9 | 8 | -2.1 |
| Receiver95 (1st Row) | 51 | 1 | 73.1 | 74.4 | 66 | 1.3 | 10 | Snd Lvl | 67.9 | 6.5 | 8 | -1.5 |
| Receiver97 (1st Row Church) | 52 | 2 | 72.1 | 72.7 | 66 | 0.6 | 10 | Snd Lvl | 66.0 | 6.7 | 8 | -1.3 |
| Receiver98 | 53 | 1 | 66.6 | 67.5 | 66 | 0.9 | 10 | Snd Lvl | 63.0 | 4.5 | 8 | -3.5 |
| Receiver99 | 54 | 5 | 65.3 | 66.3 | 66 | 1.0 | 10 | Snd Lvl | 61.8 | 4.5 | 8 | -3.5 |
| Receiver100 (1st Row Com Center) | 55 | 6 | 71.7 | 71.6 | 66 | -0.1 | 10 | Snd Lvl | 66.0 | 5.6 | 8 | -2.4 |
| Receiver101 (1st Row) | 56 | 1 | 66.5 | 68.4 | 66 | 1.9 | 10 | Snd Lvl | 63.6 | 4.8 | 8 | -3.2 |
| Receiver102 (1st Row) | 57 | 1 | 67.0 | 69.2 | 66 | 2.2 | 10 | Snd Lvl | 64.2 | 5.0 | 8 | -3.0 |
| Receiver103 (1st Row) | 58 | 1 | 68.7 | 70.6 | 66 | 1.9 | 10 | Snd Lvl | 64.6 | 6.0 | 8 | -2.0 |
| Receiver104 (1st Row) | 59 | 1 | 70.2 | 71.7 | 66 | 1.5 | 10 | Snd Lvl | 65.3 | 6.4 | 8 | -1.6 |
| Receiver105 (1st Row) | 60 | 1 | 68.4 | 70.5 | 66 | 2.1 | 10 | Snd Lvl | 64.9 | 5.6 | 8 | -2.4 |
| Receiver106 (1st Row) | 61 | 1 | 69.3 | 71.3 | 66 | 2.0 | 10 | Snd Lvl | 64.9 | 6.4 | 8 | -1.6 |
| Receiver107 (1st Row) | 62 | 1 | 69.9 | 71.6 | 66 | 1.7 | 10 | Snd Lvl | 65.2 | 6.4 | 8 | -1.6 |
| Receiver108 (1st Row) | 63 | 1 | 72.2 | 73.1 | 66 | 0.9 | 10 | Snd Lvl | 66.4 | 6.7 | 8 | -1.3 |
| Receiver109 (1st Row) | 64 | 1 | 70.5 | 71.4 | 66 | 0.9 | 10 | Snd Lvl | 65.9 | 5.5 | 8 | -2.5 |

RESULTS: SOUND LEVELS

SR 167 HOT Lanes

| | | | | | | | | | | | | |
|------------------------|--------------|------------------------|------------|------------|----|------|----|---------|------|-----|---|------|
| Receiver111 (1st Row) | 65 | 1 | 72.4 | 73.0 | 66 | 0.6 | 10 | Snd Lvl | 66.9 | 6.1 | 8 | -1.9 |
| Receiver112 (1st Row) | 66 | 1 | 67.4 | 68.8 | 66 | 1.4 | 10 | Snd Lvl | 64.6 | 4.2 | 8 | -3.8 |
| Receiver113 | 67 | 1 | 65.8 | 67.4 | 66 | 1.6 | 10 | Snd Lvl | 63.6 | 3.8 | 8 | -4.2 |
| Receiver114 (1st Row) | 68 | 1 | 73.3 | 73.4 | 66 | 0.1 | 10 | Snd Lvl | 67.5 | 5.9 | 8 | -2.1 |
| Receiver115 | 69 | 1 | 68.9 | 69.9 | 66 | 1.0 | 10 | Snd Lvl | 65.6 | 4.3 | 8 | -3.7 |
| Receiver116 (1st Row) | 70 | 1 | 72.7 | 71.8 | 66 | -0.9 | 10 | Snd Lvl | 65.7 | 6.1 | 8 | -1.9 |
| Receiver118 (1st Row) | 71 | 1 | 72.0 | 72.3 | 66 | 0.3 | 10 | Snd Lvl | 67.3 | 5.0 | 8 | -3.0 |
| Receiver119 | 72 | 1 | 66.7 | 69.3 | 66 | 2.6 | 10 | Snd Lvl | 64.4 | 4.9 | 8 | -3.1 |
| Receiver121 | 73 | 3 | 65.0 | 67.2 | 66 | 2.2 | 10 | Snd Lvl | 63.3 | 3.9 | 8 | -4.1 |
| Receiver122 | 74 | 4 | 65.2 | 68.0 | 66 | 2.8 | 10 | Snd Lvl | 62.9 | 5.1 | 8 | -2.9 |
| Receiver124 | 75 | 2 | 63.6 | 64.6 | 66 | 1.0 | 10 | ---- | 60.3 | 4.3 | 8 | -3.7 |
| Receiver128 | 76 | 2 | 61.8 | 63.0 | 66 | 1.2 | 10 | ---- | 59.8 | 3.2 | 8 | -4.8 |
| Receiver133 | 77 | 5 | 65.7 | 66.5 | 66 | 0.8 | 10 | Snd Lvl | 62.6 | 3.9 | 8 | -4.1 |
| Receiver135 | 78 | 6 | 64.5 | 65.2 | 66 | 0.7 | 10 | ---- | 61.6 | 3.6 | 8 | -4.4 |
| R25 (1st Row) | 79 | 1 | 66.8 | 67.9 | 66 | 1.1 | 10 | Snd Lvl | 67.9 | 0.0 | 8 | -8.0 |
| R26 (1st Row) | 80 | 1 | 67.4 | 68.5 | 66 | 1.1 | 10 | Snd Lvl | 68.5 | 0.0 | 8 | -8.0 |
| R-27 (1st Row) | 81 | 1 | 64.8 | 66.0 | 66 | 1.2 | 10 | Snd Lvl | 66.0 | 0.0 | 8 | -8.0 |
| Receiver168 (1st Row) | 82 | 1 | 65.7 | 67.4 | 66 | 1.7 | 10 | Snd Lvl | 67.4 | 0.0 | 8 | -8.0 |
| Receiver170 (Business) | 83 | 1 | 69.7 | 69.9 | 66 | 0.2 | 10 | Snd Lvl | 69.9 | 0.0 | 8 | -8.0 |
| Receiver172 (Business) | 84 | 1 | 68.7 | 70.1 | 66 | 1.4 | 10 | Snd Lvl | 70.1 | 0.0 | 8 | -8.0 |
| Receiver174 (Business) | 85 | 1 | 58.7 | 60.6 | 66 | 1.9 | 10 | ---- | 60.6 | 0.0 | 8 | -8.0 |
| Receiver175 (1st Row) | 86 | 1 | 58.0 | 59.8 | 66 | 1.8 | 10 | ---- | 59.8 | 0.0 | 8 | -8.0 |
| Receiver 176 (1st Row) | 87 | 1 | 57.1 | 58.7 | 66 | 1.6 | 10 | ---- | 58.7 | 0.0 | 8 | -8.0 |
| Receiver177 (1st Row) | 88 | 1 | 57.6 | 59.5 | 66 | 1.9 | 10 | ---- | 59.5 | 0.0 | 8 | -8.0 |
| Receiver179 (1st Row) | 89 | 1 | 57.6 | 59.5 | 66 | 1.9 | 10 | ---- | 59.5 | 0.0 | 8 | -8.0 |
| Receiver180 (1st Row) | 90 | 1 | 57.0 | 58.8 | 66 | 1.8 | 10 | ---- | 58.8 | 0.0 | 8 | -8.0 |
| Dwelling Units | # DUs | Noise Reduction | | | | | | | | | | |
| | | Min | Avg | Max | | | | | | | | |
| | | dB | dB | dB | | | | | | | | |
| All Selected | 148 | -0.7 | 4.1 | 6.7 | | | | | | | | |
| All Impacted | 83 | 0.0 | 4.6 | 6.7 | | | | | | | | |
| All that meet NR Goal | 0 | 0.0 | 0.0 | 0.0 | | | | | | | | |



| | | | |
|--|---|---------------------------------------|---|
| SR 167 Build1 w.Wall (Top Section) | | Sheet 1 of 1 | 29 Mar 2014 |
| Plan View | | WSDOT | |
| Run name: SR 167 Build 1Wall2 | | Project/Contract No. SR 167 HOT Lanes | |
| Scale:  1000 feet | | TNM Version 2.5, Feb 2004 | |
| Analysis By: Ghebre. A | | | |
| Roadway: |  | Ground Zone: | polygon |
| Receiver: |  | Tree Zone: | dashed polygon |
| Barrier: |  | Contour Zone: | polygon |
| Building Row: |  | Parallel Barrier: |  |
| Terrain Line: |  | Skew Section: |  |

1614000 1615000 1616000 1617000 1618000 1619000 1620000 1621000

RESULTS: SOUND LEVELS

SR 167

WSDOT
A. Ghebre

28 January 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

SR 167

RUN:

2030 Build2 w.Wall (Bottom Section)

BARRIER DESIGN:

INPUT HEIGHTS

**Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.**

ATMOSPHERICS:

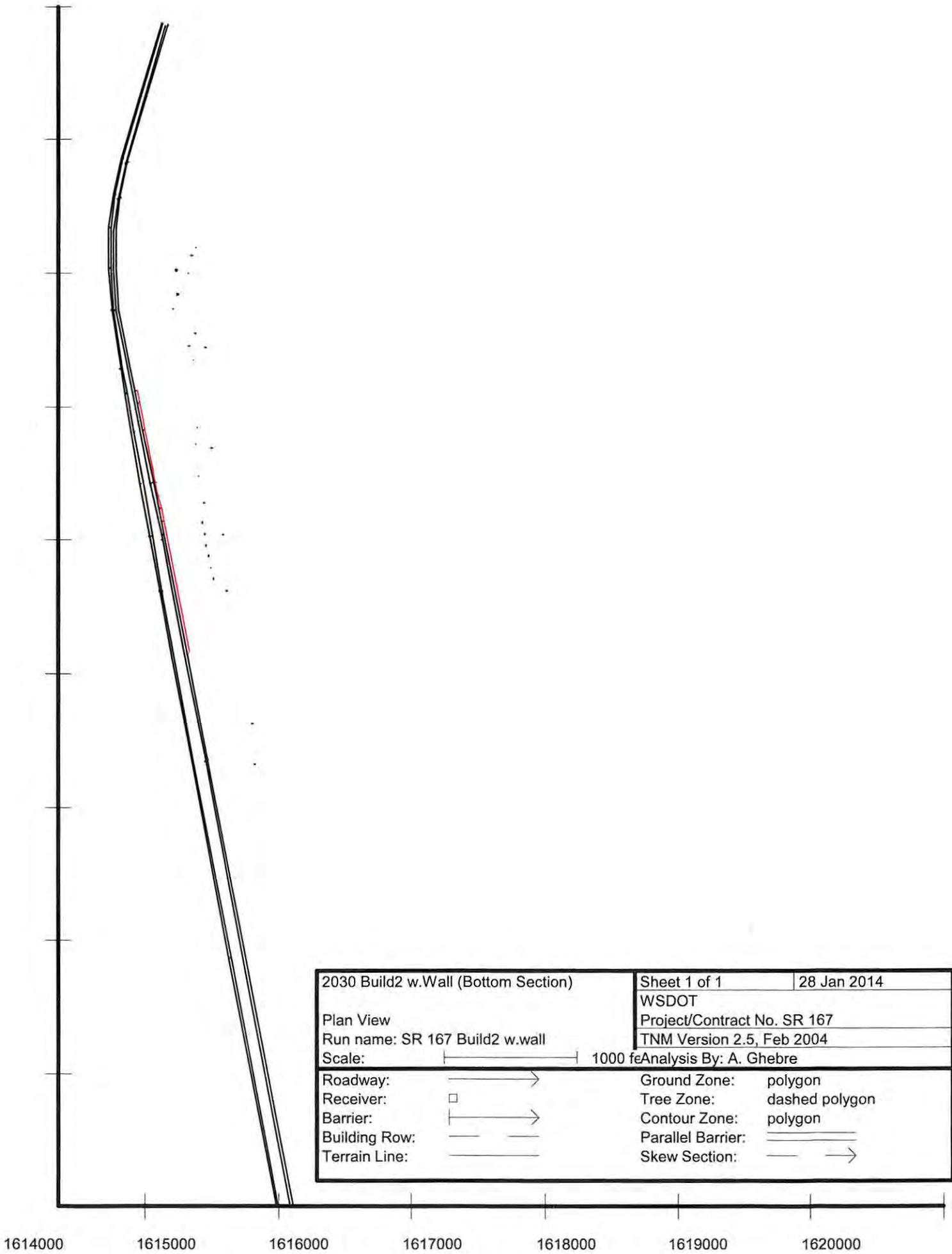
68 deg F, 50% RH

| Receiver | | | | | | | | | | | | | |
|------------------------|-----|------|--------------------|------------|--------|------------------------|---------------------|----------------|----------------------|-----------------|------|-----------------------------|--|
| Name | No. | #DUs | Existing LAeq1h | No Barrier | | | | | With Barrier | | | | |
| | | | | LAeq1h | | Increase over existing | | Type Impact | Calculated LAeq1h | Noise Reduction | | Calculated minus Goal | |
| | | | | Calculated | Crit'n | Calculated | Crit'n Sub'l Inc | | | Calculated | Goal | | |
| | | | dBA | dBA | dBA | dB | dB | | dBA | dB | dB | dB | |
| R-28 | 140 | 4 | 61.0 | 62.2 | 66 | 1.2 | 10 | ---- | 62.1 | 0.1 | 8 | -7.9 | |
| R-29 | 141 | 1 | 62.6 | 63.7 | 66 | 1.1 | 10 | ---- | 63.6 | 0.1 | 8 | -7.9 | |
| R-30 (1st Row) | 142 | 1 | 62.0 | 62.9 | 66 | 0.9 | 10 | ---- | 62.3 | 0.6 | 8 | -7.4 | |
| R-31 | 143 | 2 | 60.8 | 61.5 | 66 | 0.7 | 10 | ---- | 61.1 | 0.4 | 8 | -7.6 | |
| R-32 | 144 | 6 | 61.8 | 62.7 | 66 | 0.9 | 10 | ---- | 60.4 | 2.3 | 8 | -5.7 | |
| R-33 / M-10 (1st Row) | 145 | 1 | 63.7 | 65.4 | 66 | 1.7 | 10 | ---- | 62.4 | 3.0 | 8 | -5.0 | |
| R-34 (1st Row) | 146 | 1 | 64.7 | 66.8 | 66 | 2.1 | 10 | Snd Lvl | 63.4 | 3.4 | 8 | -4.6 | |
| R-35 (1st Row) | 147 | 1 | 65.0 | 66.6 | 66 | 1.6 | 10 | Snd Lvl | 63.8 | 2.8 | 8 | -5.2 | |
| R-36 | 148 | 8 | 62.9 | 63.6 | 66 | 0.7 | 10 | ---- | 61.3 | 2.3 | 8 | -5.7 | |
| Receiver150 (1st Row) | 150 | 1 | 65.0 | 66.8 | 66 | 1.8 | 10 | Snd Lvl | 63.8 | 3.0 | 8 | -5.0 | |
| Receiver151 (1st Row) | 151 | 1 | 65.0 | 66.8 | 66 | 1.8 | 10 | Snd Lvl | 63.6 | 3.2 | 8 | -4.8 | |
| Receiver152 (1st Row) | 152 | 1 | 65.0 | 66.7 | 66 | 1.7 | 10 | Snd Lvl | 63.6 | 3.1 | 8 | -4.9 | |
| Receiver153 (1st Row) | 153 | 1 | 64.7 | 66.5 | 66 | 1.8 | 10 | Snd Lvl | 63.4 | 3.1 | 8 | -4.9 | |
| Receiver154 (1st Row) | 154 | 1 | 63.7 | 64.6 | 66 | 0.9 | 10 | ---- | 62.7 | 1.9 | 8 | -6.1 | |
| Receiver155 | 155 | 1 | 63.8 | 65.7 | 66 | 1.9 | 10 | ---- | 62.5 | 3.2 | 8 | -4.8 | |
| Receiver157 (1st Row) | 157 | 1 | 63.1 | 64.3 | 66 | 1.2 | 10 | ---- | 62.0 | 2.3 | 8 | -5.7 | |
| Receiver158 (1st Row) | 158 | 1 | 62.7 | 63.8 | 66 | 1.1 | 10 | ---- | 61.7 | 2.1 | 8 | -5.9 | |
| Receiver159 (1st Row) | 159 | 1 | 62.2 | 63.3 | 66 | 1.1 | 10 | ---- | 63.0 | 0.3 | 8 | -7.7 | |
| Receiver160 (1st Row) | 160 | 1 | 61.4 | 62.7 | 66 | 1.3 | 10 | ---- | 62.4 | 0.3 | 8 | -7.7 | |
| Receiver161 | 161 | 1 | 63.3 | 64.3 | 66 | 1.0 | 10 | ---- | 64.2 | 0.1 | 8 | -7.9 | |
| Receiver162 | 162 | 1 | 60.7 | 61.8 | 66 | 1.1 | 10 | ---- | 61.7 | 0.1 | 8 | -7.9 | |
| Receiver163 | 163 | 1 | 61.3 | 62.4 | 66 | 1.1 | 10 | ---- | 62.4 | 0.0 | 8 | -8.0 | |
| Receiver165 (Business) | 165 | 1 | 64.5 | 65.2 | 66 | 0.7 | 10 | ---- | 65.1 | 0.1 | 8 | -7.9 | |

RESULTS: SOUND LEVELS

SR 167

| | | | | | | | | | | | | |
|------------------------|--------------|------------------------|------------|------------|----|-----|----|---------|------|-----|---|------|
| Receiver166 (Business) | 166 | 1 | 65.7 | 66.5 | 66 | 0.8 | 10 | Snd Lvl | 66.5 | 0.0 | 8 | -8.0 |
| Receiver182 (Trail) | 182 | 1 | 62.6 | 64.0 | 66 | 1.4 | 10 | --- | 63.9 | 0.1 | 8 | -7.9 |
| Dwelling Units | # DUs | Noise Reduction | | | | | | | | | | |
| | | Min | Avg | Max | | | | | | | | |
| | | dB | dB | dB | | | | | | | | |
| | | | | | | | | | | | | |
| All Selected | 41 | 0.0 | 1.5 | 3.4 | | | | | | | | |
| All Impacted | 7 | 0.0 | 2.7 | 3.4 | | | | | | | | |
| All that meet NR Goal | 0 | 0.0 | 0.0 | 0.0 | | | | | | | | |



| | | | |
|--|---|-----------------------------|---|
| 2030 Build2 w.Wall (Bottom Section) | | Sheet 1 of 1 | 28 Jan 2014 |
| Plan View | | WSDOT | |
| Run name: SR 167 Build2 w.wall | | Project/Contract No. SR 167 | |
| Scale:  1000 ft | | TNM Version 2.5, Feb 2004 | |
| Analysis By: A. Ghebre | | | |
| Roadway: |  | Ground Zone: | polygon |
| Receiver: |  | Tree Zone: | dashed polygon |
| Barrier: |  | Contour Zone: | polygon |
| Building Row: |  | Parallel Barrier: |  |
| Terrain Line: |  | Skew Section: |  |

RESULTS: SOUND LEVELS

SR 167 HOT Lanes

WSDOT
Ghebre. A

7 April 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

SR 167 HOT Lanes

RUN:

SR 167 Build1 w.Wall (Top Section)

BARRIER DESIGN:

8ft-14ft Wall (Optimum Wall1)

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS:

68 deg F, 50% RH

Receiver

| Name | No. | #DUs | Existing LAeq1h | No Barrier | | | | Type Impact | With Barrier | | | |
|------------------|-----|------|-----------------|------------|--------|------------------------|------------------|-------------|-------------------|-----------------|------|-----------------------|
| | | | | LAeq1h | | Increase over existing | | | Calculated LAeq1h | Noise Reduction | | Calculated minus Goal |
| | | | | Calculated | Crit'n | Calculated | Crit'n Sub'l Inc | | | Calculated | Goal | |
| | | | dB | dB | dB | dB | | dB | dB | dB | dB | |
| R1 (1st Row) | 1 | 1 | 71.2 | 71.6 | 66 | 0.4 | 10 | Snd Lvl | 68.6 | 3.0 | 8 | -5.0 |
| R2- M1 (1st Row) | 2 | 1 | 72.6 | 72.3 | 66 | -0.3 | 10 | Snd Lvl | 66.3 | 6.0 | 8 | -2.0 |
| R3-M2 | 3 | 3 | 66.4 | 67.2 | 66 | 0.8 | 10 | Snd Lvl | 64.4 | 2.8 | 8 | -5.2 |
| R4-M3 (1st Row) | 4 | 1 | 71.4 | 72.1 | 66 | 0.7 | 10 | Snd Lvl | 64.6 | 7.5 | 8 | -0.5 |
| R5 (1st Row) | 5 | 1 | 71.7 | 72.8 | 66 | 1.1 | 10 | Snd Lvl | 63.3 | 9.5 | 8 | 1.5 |
| R6-M4 | 6 | 5 | 63.9 | 65.9 | 66 | 2.0 | 10 | ---- | 59.6 | 6.3 | 8 | -1.7 |
| R7-M5 (1st Row) | 7 | 1 | 71.7 | 72.4 | 66 | 0.7 | 10 | Snd Lvl | 63.5 | 8.9 | 8 | 0.9 |
| R8 | 8 | 1 | 67.6 | 68.9 | 66 | 1.3 | 10 | Snd Lvl | 62.1 | 6.8 | 8 | -1.2 |
| R9-M6 | 9 | 4 | 65.2 | 65.8 | 66 | 0.6 | 10 | ---- | 59.6 | 6.2 | 8 | -1.8 |
| R10 (1st Row) | 10 | 1 | 70.1 | 70.4 | 66 | 0.3 | 10 | Snd Lvl | 63.1 | 7.3 | 8 | -0.7 |
| R11 (1st Row) | 11 | 1 | 69.2 | 68.2 | 66 | -1.0 | 10 | Snd Lvl | 61.9 | 6.3 | 8 | -1.7 |
| R12 | 12 | 6 | 64.1 | 64.2 | 66 | 0.1 | 10 | ---- | 58.5 | 5.7 | 8 | -2.3 |
| R13 (1st Row) | 13 | 1 | 68.6 | 68.6 | 66 | 0.0 | 10 | Snd Lvl | 62.6 | 6.0 | 8 | -2.0 |
| R14 | 14 | 2 | 65.0 | 64.9 | 66 | -0.1 | 10 | ---- | 64.8 | 0.1 | 8 | -7.9 |
| R15 | 15 | 8 | 62.2 | 63.0 | 66 | 0.8 | 10 | ---- | 58.8 | 4.2 | 8 | -3.8 |
| R16 (1st Row) | 16 | 1 | 68.7 | 68.6 | 66 | -0.1 | 10 | Snd Lvl | 64.2 | 4.4 | 8 | -3.6 |
| R17- M9 | 17 | 1 | 68.6 | 67.9 | 66 | -0.7 | 10 | Snd Lvl | 61.7 | 6.2 | 8 | -1.8 |
| R18 | 18 | 1 | 65.6 | 65.4 | 66 | -0.2 | 10 | ---- | 60.0 | 5.4 | 8 | -2.6 |
| R19 (1st Row) | 19 | 1 | 67.1 | 67.4 | 66 | 0.3 | 10 | Snd Lvl | 61.1 | 6.3 | 8 | -1.7 |
| R20 | 20 | 1 | 65.0 | 64.4 | 66 | -0.6 | 10 | ---- | 59.7 | 4.7 | 8 | -3.3 |
| R21 | 21 | 2 | 64.0 | 63.9 | 66 | -0.1 | 10 | ---- | 58.8 | 5.1 | 8 | -2.9 |
| R22 | 22 | 4 | 62.2 | 63.2 | 66 | 1.0 | 10 | ---- | 57.9 | 5.3 | 8 | -2.7 |
| R23 (1st Row) | 23 | 1 | 63.0 | 66.7 | 66 | 3.7 | 10 | Snd Lvl | 62.2 | 4.5 | 8 | -3.5 |

RESULTS: SOUND LEVELS

SR 167 HOT Lanes

| | | | | | | | | | | | | |
|----------------------------------|----|---|------|------|----|------|----|---------|------|-----|---|------|
| R24 | 24 | 1 | 61.5 | 63.0 | 66 | 1.5 | 10 | ---- | 60.9 | 2.1 | 8 | -5.9 |
| R-56 (1st Row) | 25 | 1 | 63.9 | 64.6 | 66 | 0.7 | 10 | ---- | 59.9 | 4.7 | 8 | -3.3 |
| Receiver62 | 26 | 1 | 64.6 | 64.4 | 66 | -0.2 | 10 | ---- | 59.7 | 4.7 | 8 | -3.3 |
| Receiver64 (1st Row) | 27 | 1 | 65.6 | 64.9 | 66 | -0.7 | 10 | ---- | 60.1 | 4.8 | 8 | -3.2 |
| Receiver65 (1st Row) | 28 | 1 | 65.2 | 65.0 | 66 | -0.2 | 10 | ---- | 59.5 | 5.5 | 8 | -2.5 |
| Receiver67 (1st Row) | 29 | 1 | 66.1 | 66.1 | 66 | 0.0 | 10 | Snd Lvl | 60.6 | 5.5 | 8 | -2.5 |
| Receiver68 (1st Row) | 30 | 1 | 67.3 | 66.7 | 66 | -0.6 | 10 | Snd Lvl | 60.7 | 6.0 | 8 | -2.0 |
| Receiver69 | 31 | 4 | 62.8 | 63.7 | 66 | 0.9 | 10 | ---- | 57.8 | 5.9 | 8 | -2.1 |
| Receiver71 (1st Row) | 32 | 1 | 67.7 | 66.9 | 66 | -0.8 | 10 | Snd Lvl | 60.9 | 6.0 | 8 | -2.0 |
| Receiver72 | 33 | 2 | 65.3 | 65.5 | 66 | 0.2 | 10 | ---- | 59.4 | 6.1 | 8 | -1.9 |
| Receiver74 | 34 | 2 | 66.1 | 66.1 | 66 | 0.0 | 10 | Snd Lvl | 61.9 | 4.2 | 8 | -3.8 |
| Receiver75 | 35 | 2 | 65.0 | 65.2 | 66 | 0.2 | 10 | ---- | 60.3 | 4.9 | 8 | -3.1 |
| Receiver76 (1st Row) | 36 | 1 | 65.8 | 66.2 | 66 | 0.4 | 10 | Snd Lvl | 61.4 | 4.8 | 8 | -3.2 |
| Receiver78 (1st Row) | 37 | 1 | 68.5 | 67.9 | 66 | -0.6 | 10 | Snd Lvl | 61.8 | 6.1 | 8 | -1.9 |
| Receiver79 | 39 | 1 | 65.7 | 65.3 | 66 | -0.4 | 10 | ---- | 60.2 | 5.1 | 8 | -2.9 |
| Receiver80 (1st Row) | 40 | 1 | 69.3 | 68.3 | 66 | -1.0 | 10 | Snd Lvl | 62.0 | 6.3 | 8 | -1.7 |
| Receiver81 | 41 | 1 | 67.4 | 66.7 | 66 | -0.7 | 10 | Snd Lvl | 61.0 | 5.7 | 8 | -2.3 |
| Receiver82 | 42 | 1 | 66.8 | 66.7 | 66 | -0.1 | 10 | Snd Lvl | 61.3 | 5.4 | 8 | -2.6 |
| Receiver84 | 43 | 2 | 64.3 | 64.4 | 66 | 0.1 | 10 | ---- | 58.7 | 5.7 | 8 | -2.3 |
| Receiver86 | 44 | 1 | 67.2 | 66.6 | 66 | -0.6 | 10 | Snd Lvl | 60.8 | 5.8 | 8 | -2.2 |
| Receiver88 (1st Row) | 45 | 1 | 70.1 | 69.2 | 66 | -0.9 | 10 | Snd Lvl | 62.4 | 6.8 | 8 | -1.2 |
| Receiver89 (1st Row) | 46 | 1 | 69.8 | 69.3 | 66 | -0.5 | 10 | Snd Lvl | 62.6 | 6.7 | 8 | -1.3 |
| Receiver90 | 47 | 1 | 68.0 | 67.6 | 66 | -0.4 | 10 | Snd Lvl | 61.5 | 6.1 | 8 | -1.9 |
| Receiver91 | 48 | 1 | 68.4 | 68.7 | 66 | 0.3 | 10 | Snd Lvl | 62.5 | 6.2 | 8 | -1.8 |
| Receiver93 (1st Row) | 49 | 1 | 68.4 | 69.0 | 66 | 0.6 | 10 | Snd Lvl | 62.9 | 6.1 | 8 | -1.9 |
| Receiver94 (1st Row) | 50 | 1 | 72.0 | 72.8 | 66 | 0.8 | 10 | Snd Lvl | 63.7 | 9.1 | 8 | 1.1 |
| Receiver95 (1st Row) | 51 | 1 | 73.1 | 74.4 | 66 | 1.3 | 10 | Snd Lvl | 64.9 | 9.5 | 8 | 1.5 |
| Receiver97 (1st Row Church) | 52 | 2 | 72.1 | 72.7 | 66 | 0.6 | 10 | Snd Lvl | 63.5 | 9.2 | 8 | 1.2 |
| Receiver98 | 53 | 1 | 66.6 | 67.5 | 66 | 0.9 | 10 | Snd Lvl | 60.5 | 7.0 | 8 | -1.0 |
| Receiver99 | 54 | 5 | 65.3 | 66.3 | 66 | 1.0 | 10 | Snd Lvl | 59.4 | 6.9 | 8 | -1.1 |
| Receiver100 (1st Row Com Center) | 55 | 6 | 71.7 | 71.6 | 66 | -0.1 | 10 | Snd Lvl | 63.0 | 8.6 | 8 | 0.6 |
| Receiver101 (1st Row) | 56 | 1 | 66.5 | 68.4 | 66 | 1.9 | 10 | Snd Lvl | 60.9 | 7.5 | 8 | -0.5 |
| Receiver102 (1st Row) | 57 | 1 | 67.0 | 69.2 | 66 | 2.2 | 10 | Snd Lvl | 61.3 | 7.9 | 8 | -0.1 |
| Receiver103 (1st Row) | 58 | 1 | 68.7 | 70.6 | 66 | 1.9 | 10 | Snd Lvl | 62.1 | 8.5 | 8 | 0.5 |
| Receiver104 (1st Row) | 59 | 1 | 70.2 | 71.7 | 66 | 1.5 | 10 | Snd Lvl | 62.7 | 9.0 | 8 | 1.0 |
| Receiver105 (1st Row) | 60 | 1 | 68.4 | 70.5 | 66 | 2.1 | 10 | Snd Lvl | 62.0 | 8.5 | 8 | 0.5 |
| Receiver106 (1st Row) | 61 | 1 | 69.3 | 71.3 | 66 | 2.0 | 10 | Snd Lvl | 62.4 | 8.9 | 8 | 0.9 |
| Receiver107 (1st Row) | 62 | 1 | 69.9 | 71.6 | 66 | 1.7 | 10 | Snd Lvl | 62.6 | 9.0 | 8 | 1.0 |
| Receiver108 (1st Row) | 63 | 1 | 72.2 | 73.1 | 66 | 0.9 | 10 | Snd Lvl | 63.5 | 9.6 | 8 | 1.6 |
| Receiver109 (1st Row) | 64 | 1 | 70.5 | 71.4 | 66 | 0.9 | 10 | Snd Lvl | 63.0 | 8.4 | 8 | 0.4 |

RESULTS: SOUND LEVELS

SR 167 HOT Lanes

| | | | | | | | | | | | | |
|-----------------------|----|---|------|------|----|------|----|---------|------|-----|---|------|
| Receiver111 (1st Row) | 65 | 1 | 72.4 | 73.0 | 66 | 0.6 | 10 | Snd Lvl | 64.3 | 8.7 | 8 | 0.7 |
| Receiver112 (1st Row) | 66 | 1 | 67.4 | 68.8 | 66 | 1.4 | 10 | Snd Lvl | 62.1 | 6.7 | 8 | -1.3 |
| Receiver113 | 67 | 1 | 65.8 | 67.4 | 66 | 1.6 | 10 | Snd Lvl | 61.5 | 5.9 | 8 | -2.1 |
| Receiver114 (1st Row) | 68 | 1 | 73.3 | 73.4 | 66 | 0.1 | 10 | Snd Lvl | 66.4 | 7.0 | 8 | -1.0 |
| Receiver115 | 69 | 1 | 68.9 | 69.9 | 66 | 1.0 | 10 | Snd Lvl | 64.2 | 5.7 | 8 | -2.3 |
| Receiver116 (1st Row) | 70 | 1 | 72.7 | 71.8 | 66 | -0.9 | 10 | Snd Lvl | 65.4 | 6.4 | 8 | -1.6 |
| Receiver118 (1st Row) | 71 | 1 | 72.0 | 72.3 | 66 | 0.3 | 10 | Snd Lvl | 67.3 | 5.0 | 8 | -3.0 |
| Receiver119 | 72 | 1 | 66.7 | 69.3 | 66 | 2.6 | 10 | Snd Lvl | 61.7 | 7.6 | 8 | -0.4 |
| Receiver121 | 73 | 3 | 65.0 | 67.2 | 66 | 2.2 | 10 | Snd Lvl | 60.8 | 6.4 | 8 | -1.6 |
| Receiver122 | 74 | 4 | 65.2 | 68.0 | 66 | 2.8 | 10 | Snd Lvl | 60.4 | 7.6 | 8 | -0.4 |
| Receiver124 | 75 | 2 | 63.6 | 64.6 | 66 | 1.0 | 10 | ---- | 59.7 | 4.9 | 8 | -3.1 |
| Receiver128 | 76 | 2 | 61.8 | 63.0 | 66 | 1.2 | 10 | ---- | 59.2 | 3.8 | 8 | -4.2 |
| Receiver133 | 77 | 5 | 65.7 | 66.5 | 66 | 0.8 | 10 | Snd Lvl | 60.9 | 5.6 | 8 | -2.4 |
| Receiver135 | 78 | 6 | 64.5 | 65.2 | 66 | 0.7 | 10 | ---- | 59.8 | 5.4 | 8 | -2.6 |

| Dwelling Units | # DUs | Noise Reduction | | |
|-----------------------|-------|-----------------|-----|-----|
| | | Min | Avg | Max |
| | | dB | dB | dB |
| All Selected | 136 | 0.1 | 6.2 | 9.6 |
| All Impacted | 77 | 2.8 | 6.8 | 9.6 |
| All that meet NR Goal | 20 | 8.4 | 9.0 | 9.6 |

RESULTS: BARRIER DESCRIPTIONS

SR 167 HOT Lanes

WSDOT
Ghebre. A

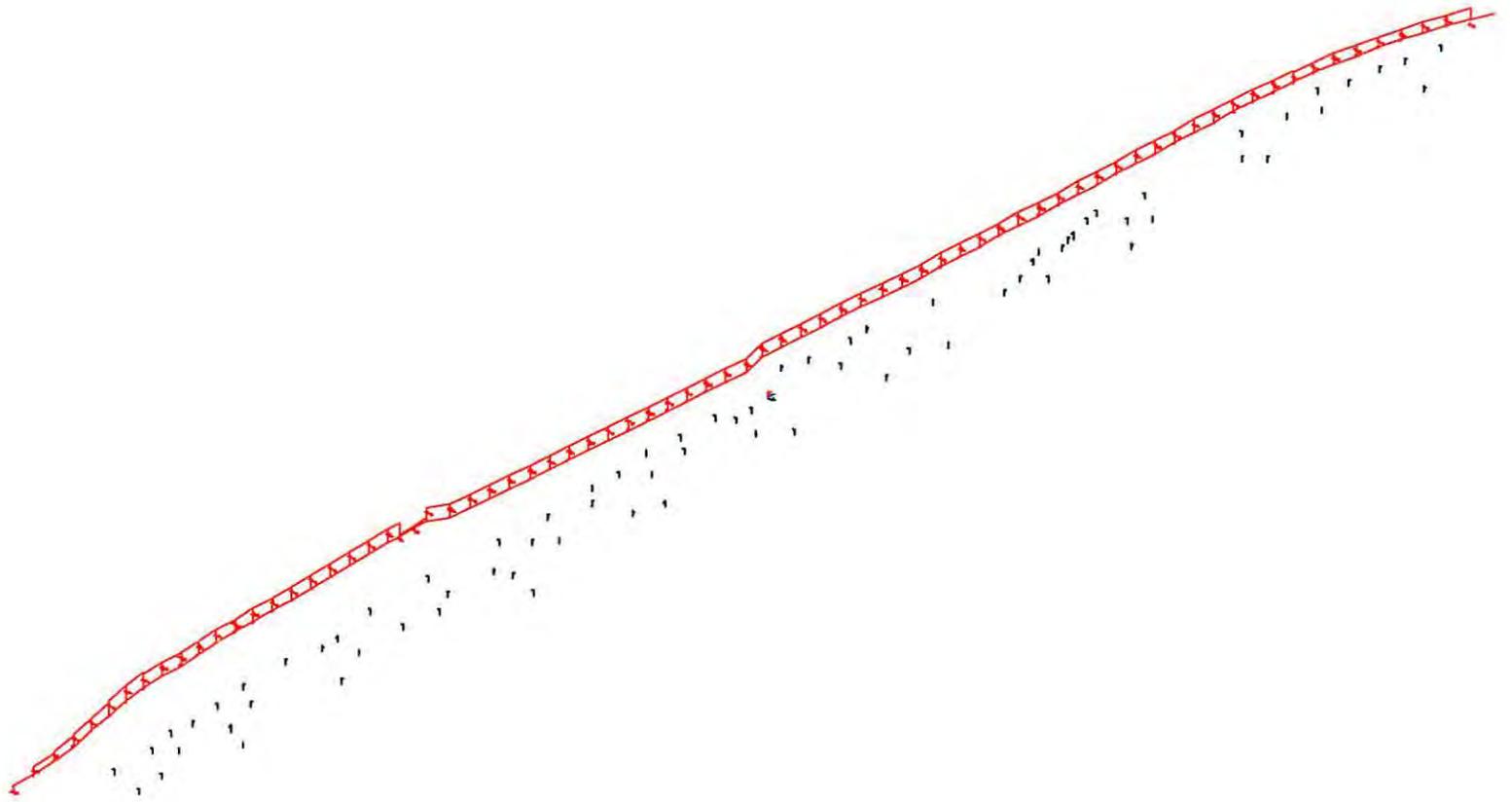
7 April 2014
TNM 2.5

RESULTS: BARRIER DESCRIPTIONS

PROJECT/CONTRACT: SR 167 HOT Lanes
RUN: SR 167 Build1 w.Wall (Top Section)
BARRIER DESIGN: 8ft-14ft Wall (Optimum Wall1)

Barriers

| Name | Type | Heights along Barrier | | | Length | If Wall | If Berm | | | Cost |
|----------|------|-----------------------|-------|-------|--------|---------|---------|-----------|-------------|---------|
| | | Min | Avg | Max | | Area | Volume | Top Width | Run:Rise | |
| | | ft | ft | ft | ft | sq ft | cu yd | ft | ft:ft | \$ |
| Barrier6 | W | 2.00 | 11.55 | 14.00 | 7295 | 84269 | | | | 4349128 |
| | | | | | | | | | Total Cost: | 4349128 |



| | | | |
|--|---------|---------------------------------------|----------------|
| SR 167 Build1 w.Wall (Top Section) | | Sheet 1 of 1 | 7 Apr 2014 |
| Barrier View-8ft-14ft Wall (Optimum Wall1) | | WSDOT | |
| Run name: SR 167 Build 1Wall2 | | Project/Contract No. SR 167 HOT Lanes | |
| Scale: <DNA - due to perspective> | | TNM Version 2.5, Feb 2004 | |
| | | Analysis By: Ghebre. A | |
| Roadway: | —————> | Ground Zone: | polygon |
| Receiver: | □ | Tree Zone: | dashed polygon |
| Barrier: | —————> | Contour Zone: | polygon |
| Building Row: | — — — — | Parallel Barrier: | ===== |
| Terrain Line: | ————— | Skew Section: | — — —> |

RESULTS: SOUND LEVELS

SR 167

WSDOT
A. Ghebre

28 January 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: SR 167
RUN: 2030 Build2 w.Wall (Bottom Section)
BARRIER DESIGN: 12ft-14ft Wall Min

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

| Receiver | | | | | | | | | | | | | |
|-----------------------|-----|-------|-----------------|------------|--------|------------------------|--------|-------------|-------------------|-----------------|------------|-----------------------|------|
| Name | No. | #DUs | Existing LAeq1h | No Barrier | | | | | With Barrier | | | | |
| | | | | LAeq1h | | Increase over existing | | Type Impact | Calculated LAeq1h | Noise Reduction | | Calculated minus Goal | |
| | | | | Calculated | Crit'n | Calculated | Crit'n | | | Sub'l Inc | Calculated | | Goal |
| | | | dBA | dBA | dBA | dB | dB | | dBA | dB | dB | dB | |
| Receiver158 (1st Row) | 158 | 1 | 62.7 | 63.8 | 66 | 1.1 | 10 | ---- | 59.6 | 4.2 | 8 | -3.8 | |
| Receiver157 (1st Row) | 157 | 1 | 63.1 | 64.3 | 66 | 1.2 | 10 | ---- | 59.5 | 4.8 | 8 | -3.2 | |
| R-32 | 144 | 6 | 61.8 | 62.7 | 66 | 0.9 | 10 | ---- | 58.2 | 4.5 | 8 | -3.5 | |
| R-33 / M-10 (1st Row) | 145 | 1 | 63.7 | 65.4 | 66 | 1.7 | 10 | ---- | 59.5 | 5.9 | 8 | -2.1 | |
| Receiver155 | 155 | 1 | 63.8 | 65.7 | 66 | 1.9 | 10 | ---- | 59.5 | 6.2 | 8 | -1.8 | |
| R-34 (1st Row) | 146 | 1 | 64.7 | 66.8 | 66 | 2.1 | 10 | Snd Lvl | 60.3 | 6.5 | 8 | -1.5 | |
| R-36 | 148 | 8 | 62.9 | 63.6 | 66 | 0.7 | 10 | ---- | 58.7 | 4.9 | 8 | -3.1 | |
| Receiver153 (1st Row) | 153 | 1 | 64.7 | 66.5 | 66 | 1.8 | 10 | Snd Lvl | 60.4 | 6.1 | 8 | -1.9 | |
| Receiver152 (1st Row) | 152 | 1 | 65.0 | 66.7 | 66 | 1.7 | 10 | Snd Lvl | 60.8 | 5.9 | 8 | -2.1 | |
| Receiver151 (1st Row) | 151 | 1 | 65.0 | 66.8 | 66 | 1.8 | 10 | Snd Lvl | 61.1 | 5.7 | 8 | -2.3 | |
| Receiver150 (1st Row) | 150 | 1 | 65.0 | 66.8 | 66 | 1.8 | 10 | Snd Lvl | 61.6 | 5.2 | 8 | -2.8 | |
| R-35 (1st Row) | 147 | 1 | 65.0 | 66.6 | 66 | 1.6 | 10 | Snd Lvl | 62.1 | 4.5 | 8 | -3.5 | |
| Receiver154 (1st Row) | 154 | 1 | 63.7 | 64.6 | 66 | 0.9 | 10 | ---- | 61.4 | 3.2 | 8 | -4.8 | |
| Dwelling Units | | # DUs | Noise Reduction | | | | | | | | | | |
| | | | Min | Avg | Max | | | | | | | | |
| | | | dB | dB | dB | | | | | | | | |
| All Selected | | 25 | 3.2 | 5.2 | 6.5 | | | | | | | | |
| All Impacted | | 6 | 4.5 | 5.7 | 6.5 | | | | | | | | |
| All that meet NR Goal | | 0 | 0.0 | 0.0 | 0.0 | | | | | | | | |

RESULTS: BARRIER DESCRIPTIONS

SR 167

WSDOT
A. Ghebre

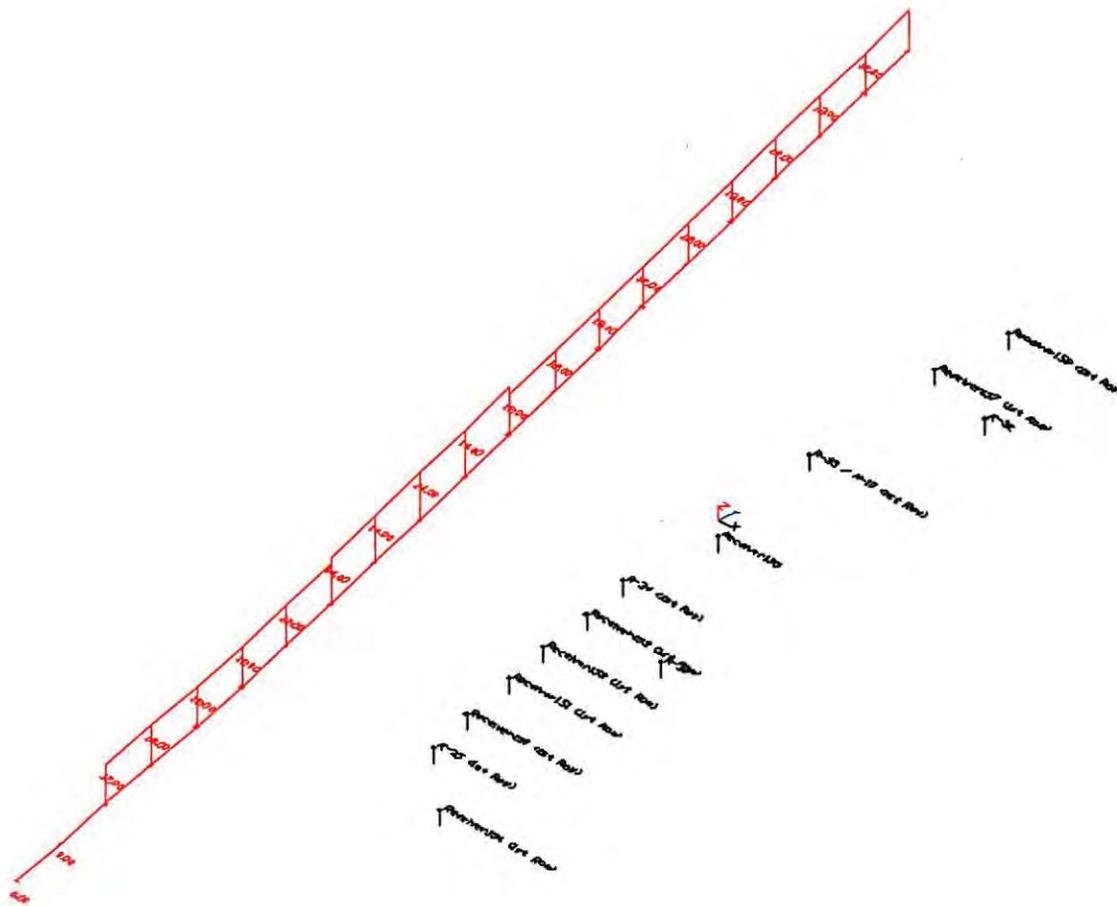
10 April 2014
TNM 2.5

RESULTS: BARRIER DESCRIPTIONS

PROJECT/CONTRACT: SR 167
 RUN: 2036 Build2 w.Wall (Bottom Section)
 BARRIER DESIGN: 12ft-14ft Wall Min

Barriers

| Name | Type | Heights along Barrier | | | Length | If Wall | If Berm | | | Cost |
|-----------|------|-----------------------|-------|-------|--------|---------|---------|-----------|-------------|---------|
| | | Min | Avg | Max | | Area | Volume | Top Width | Run:Rise | |
| | | ft | ft | ft | ft | sq ft | cu yd | ft | ft:ft | \$ |
| Barrier12 | W | 12.00 | 12.44 | 14.00 | 1800 | 22400 | | | | 1156055 |
| | | | | | | | | | Total Cost: | 1156055 |



| | | | |
|-------------------------------------|--------|-----------------------------|----------------|
| 2030 Build2 w.Wall (Bottom Section) | | Sheet 1 of 1 | 28 Jan 2014 |
| Barrier View-12ft-14ft Wall Min | | WSDOT | |
| Run name: SR 167 Build2 w.wall | | Project/Contract No. SR 167 | |
| Scale: <DNA - due to perspective> | | TNM Version 2.5, Feb 2004 | |
| | | Analysis By: A. Ghebre | |
| Roadway: | —————> | Ground Zone: | polygon |
| Receiver: | □ | Tree Zone: | dashed polygon |
| Barrier: | —————> | Contour Zone: | polygon |
| Building Row: | —— ——— | Parallel Barrier: | ===== |
| Terrain Line: | ————— | Skew Section: | —— ———> |