

## **I.1 - Noise Modeling**



## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

**Scenario: Maximum Roadway Classification Volumes**

**Project: Fresno General Plan  
Site Conditions: Soft**

Vehicle Type	Vehicle Mix 1 (Collectors)				Vehicle Mix 2 (Arterials)				Vehicle Mix 3 (SR-41 Freeway)			
	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evening	Night	Daily
Automobiles	72.72%	12.09%	9.58%	94.39%	73.30%	10.20%	10.00%	93.40%	65.76%	13.48%	15.77%	95.00%
Medium Trucks	4.16%	0.46%	0.31%	4.92%	2.70%	0.30%	0.30%	3.20%	1.48%	0.27%	0.75%	2.50%
Heavy Trucks	0.23%	0.46%	0.01%	0.69%	2.90%	0.20%	0.30%	3.40%	1.37%	0.13%	1.00%	2.50%
Vehicle Type	Vehicle Mix 4 (SR-99 Freeway)				Vehicle Mix 5 (SR-180 Freeway)				Vehicle Mix 6 (SR-168 Freeway)			
	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evening	Night	Daily
Automobiles	53.30%	10.92%	12.78%	77.00%	65.76%	13.48%	15.77%	95.00%	62.30%	12.77%	14.94%	90.00%
Medium Trucks	2.86%	0.52%	1.45%	4.83%	2.07%	0.38%	1.05%	3.50%	5.10%	0.92%	2.58%	8.60%
Heavy Trucks	9.95%	0.95%	7.27%	18.17%	0.82%	0.08%	0.60%	1.50%	0.77%	0.07%	0.56%	1.40%

**Road Name: 2-Lane Collector      Segment: Existing**  
 Average Daily Traffic: 23100 Vehicles      Vehicle Speed: 40 MPH      Vehicle Mix: 1      Roadway Classification: 2-Lane Collector

Vehicle Type	NOISE PARAMETERS AT 72 FEET FROM CENTERLINE (Equiv. Lane Dist: 67.71 ft)										Centerline Distance to Noise Contour (in feet)		
	Noise Adjustments				Unmitigated Noise Levels								
	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL	Ldn	CNEL		
Automobiles	67.36	2.06	-2.08	-1.20	66.1	64.0	62.2	56.4	64.9	65.49	70 dBA:	<b>33</b>	<b>36</b>
Medium Trucks	76.31	-10.77	-2.08	-1.20	62.3	47.7	44.1	37.6	47.3	47.84	65 dBA:	<b>72</b>	<b>79</b>
Heavy Trucks	81.16	-19.32	-2.08	-1.20	58.6	31.4	40.4	19.0	33.7	37.25	60 dBA:	<b>155</b>	<b>169</b>
<b>Total:</b>					<b>68.1</b>	<b>64.1</b>	<b>62.3</b>	<b>56.5</b>	<b>65.0</b>	<b>65.6</b>	55 dBA:	<b>333</b>	<b>365</b>

**Road Name: 2-Lane Collector      Segment: Existing Plus Project**  
 Average Daily Traffic: 27700 Vehicles      Vehicle Speed: 40 MPH      Vehicle Mix: 1      Roadway Classification: 2-Lane Collector

Vehicle Type	NOISE PARAMETERS AT 72 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.26 ft)										Centerline Distance to Noise Contour (in feet)		
	Noise Adjustments				Unmitigated Noise Levels								
	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL	Ldn	CNEL		
Automobiles	67.36	2.85	-2.41	-1.20	66.6	64.4	62.7	56.9	65.4	65.9	70 dBA:	<b>36</b>	<b>39</b>
Medium Trucks	76.31	-9.98	-2.41	-1.20	62.7	48.1	44.6	38.0	47.8	48.3	65 dBA:	<b>77</b>	<b>84</b>
Heavy Trucks	81.16	-18.53	-2.41	-1.20	59.0	31.8	40.9	19.5	34.2	37.7	60 dBA:	<b>166</b>	<b>182</b>
<b>Total:</b>					<b>68.6</b>	<b>64.5</b>	<b>62.7</b>	<b>56.9</b>	<b>65.4</b>	<b>66.0</b>	55 dBA:	<b>358</b>	<b>391</b>

**Road Name: 2-Lane Collector      Segment: Cumulative Plus Project**  
 Average Daily Traffic: 29900 Vehicles      Vehicle Speed: 40 MPH      Vehicle Mix: 1      Roadway Classification: 2-Lane Collector

Vehicle Type	NOISE PARAMETERS AT 72 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.26 ft)										Centerline Distance to Noise Contour (in feet)		
	Noise Adjustments				Unmitigated Noise Levels								
	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL	Ldn	CNEL		
Automobiles	67.36	3.18	-2.41	-1.20	66.9	64.8	63.0	57.2	65.7	66.3	70 dBA:	<b>38</b>	<b>41</b>
Medium Trucks	76.31	-9.65	-2.41	-1.20	63.1	48.5	44.9	38.4	48.1	48.6	65 dBA:	<b>81</b>	<b>89</b>
Heavy Trucks	81.16	-18.20	-2.41	-1.20	59.3	32.2	41.2	19.8	34.5	38.0	60 dBA:	<b>175</b>	<b>191</b>
<b>Total:</b>					<b>68.9</b>	<b>64.9</b>	<b>63.1</b>	<b>57.3</b>	<b>65.8</b>	<b>66.4</b>	55 dBA:	<b>376</b>	<b>412</b>







## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

**Scenario: Maximum Roadway Classification Volumes**

**Project: Fresno General Plan  
Site Conditions: Soft**

<b>Road Name: 6-Lane Arterial</b>				<b>Segment: Existing</b>														
Average Daily Traffic: 62600 Vehicles				Vehicle Speed: 45 MPH		Vehicle Mix: 2		Roadway Classification: 6-Lane Arterial										
NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)											<b>Centerline Distance to Noise Contour (in feet)</b>							
<b>Noise Adjustments</b>											<b>Unmitigated Noise Levels</b>							
Vehicle Type	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL						
Automobiles	69.34	5.83	-5.57	-1.20	68.4	66.3	63.7	58.9	67.2	67.7	70 dBA:	<b>83</b>	<b>89</b>					
Medium Trucks	77.62	-8.82	-5.57	-1.20	62.0	45.6	42.0	37.3	46.0	46.5	65 dBA:	<b>178</b>	<b>192</b>					
Heavy Trucks	82.14	-8.56	-5.57	-1.20	66.8	50.6	45.1	42.0	50.9	51.2	60 dBA:	<b>384</b>	<b>414</b>					
<b>Total:</b>				<b>71.2</b>	<b>66.4</b>	<b>63.8</b>	<b>59.0</b>	<b>67.4</b>	<b>67.9</b>		55 dBA:	<b>828</b>	<b>893</b>					

<b>Road Name: 6-Lane Arterial</b>				<b>Segment: Existing Plus Project</b>														
Average Daily Traffic: 75200 Vehicles				Vehicle Speed: 45 MPH		Vehicle Mix: 2		Roadway Classification: 6-Lane Arterial										
NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)											<b>Centerline Distance to Noise Contour (in feet)</b>							
<b>Noise Adjustments</b>											<b>Unmitigated Noise Levels</b>							
Vehicle Type	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL						
Automobiles	69.34	6.63	-5.57	-1.20	69.2	67.1	64.5	59.7	68.0	68.5	70 dBA:	<b>94</b>	<b>101</b>					
Medium Trucks	77.62	-8.02	-5.57	-1.20	62.8	46.3	42.8	38.1	46.8	47.3	65 dBA:	<b>202</b>	<b>217</b>					
Heavy Trucks	82.14	-7.76	-5.57	-1.20	67.6	51.4	45.8	42.8	51.7	52.0	60 dBA:	<b>434</b>	<b>468</b>					
<b>Total:</b>				<b>72.0</b>	<b>67.2</b>	<b>64.6</b>	<b>59.8</b>	<b>68.2</b>	<b>68.7</b>		55 dBA:	<b>936</b>	<b>1009</b>					

<b>Road Name: 6-Lane Arterial</b>				<b>Segment: Cumulative Plus Project</b>														
Average Daily Traffic: 81400 Vehicles				Vehicle Speed: 45 MPH		Vehicle Mix: 2		Roadway Classification: 6-Lane Arterial										
NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)											<b>Centerline Distance to Noise Contour (in feet)</b>							
<b>Noise Adjustments</b>											<b>Unmitigated Noise Levels</b>							
Vehicle Type	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL						
Automobiles	69.34	6.97	-5.57	-1.20	69.5	67.4	64.9	60.0	68.4	68.9	70 dBA:	<b>99</b>	<b>106</b>					
Medium Trucks	77.62	-7.68	-5.57	-1.20	63.2	46.7	43.2	38.4	47.2	47.6	65 dBA:	<b>213</b>	<b>229</b>					
Heavy Trucks	82.14	-7.42	-5.57	-1.20	68.0	51.8	46.2	43.2	52.0	52.3	60 dBA:	<b>458</b>	<b>494</b>					
<b>Total:</b>				<b>72.4</b>	<b>67.6</b>	<b>64.9</b>	<b>60.1</b>	<b>68.5</b>	<b>69.0</b>		55 dBA:	<b>987</b>	<b>1063</b>					

<b>Road Name: Scenic Arterial</b>				<b>Segment: Existing</b>														
Average Daily Traffic: 20400 Vehicles				Vehicle Speed: 40 MPH		Vehicle Mix: 2		Roadway Classification: Scenic Arterial										
NOISE PARAMETERS AT 122 FEET FROM CENTERLINE (Equiv. Lane Dist: 118.18 ft)											<b>Centerline Distance to Noise Contour (in feet)</b>							
<b>Noise Adjustments</b>											<b>Unmitigated Noise Levels</b>							
Vehicle Type	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL						
Automobiles	67.36	1.47	-5.71	-1.20	61.9	59.8	57.2	52.4	60.8	61.3	70 dBA:	<b>30</b>	<b>33</b>					
Medium Trucks	76.31	-13.18	-5.71	-1.20	56.2	39.7	36.2	31.5	40.2	40.7	65 dBA:	<b>65</b>	<b>70</b>					
Heavy Trucks	81.16	-12.91	-5.71	-1.20	61.3	45.2	39.6	36.6	45.4	45.7	60 dBA:	<b>141</b>	<b>151</b>					
<b>Total:</b>				<b>65.2</b>	<b>60.0</b>	<b>57.3</b>	<b>52.5</b>	<b>60.9</b>	<b>61.4</b>		55 dBA:	<b>303</b>	<b>326</b>					













## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing  
Road Type: 2-Lane Collector

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	23,100 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	2,310 vehicles	Autos:	72.7%	12.1%	9.6%	94.4%
Vehicle Speed:	40 mph	Medium Trucks:	4.2%	0.5%	0.3%	4.9%
Near/Far Lane Distance:	50 feet	Heavy Trucks:	0.2%	0.5%	0.0%	0.7%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>3 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	62 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	72 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	82 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	67.36	2.06	-2.08	-1.20	0.00	-1.4	-3.8	0
Med Trucks:	76.31	-10.77	-2.08	-1.20	0.00	-0.74	-1.175	0
Hvy Trucks:	81.16	-19.32	-2.08	-1.20	0.00	-0.3	-0.3	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.1	64.0	62.2	56.4	64.9	65.5
Med Trucks:	62.3	47.7	44.1	37.6	47.3	47.8
Hvy Trucks:	58.6	31.4	40.4	19.0	33.7	37.3
<b>Traffic Noise:</b>	<b>68.1</b>	<b>64.1</b>	<b>62.3</b>	<b>56.5</b>	<b>65.0</b>	<b>65.6</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.7	62.6	60.8	55.0	63.5	64.1
Med Trucks:	61.5	46.9	43.4	36.8	46.6	47.1
Hvy Trucks:	58.3	31.1	40.1	18.7	33.4	37.0
<b>Traffic Noise:</b>	<b>67.1</b>	<b>62.7</b>	<b>60.9</b>	<b>55.1</b>	<b>63.6</b>	<b>64.2</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project  
Road Type: 2-Lane Collector

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	27,700 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	2,770 vehicles	Autos:	72.7%	12.1%	9.6%	94.4%
Vehicle Speed:	40 mph	Medium Trucks:	4.2%	0.5%	0.3%	4.9%
Near/Far Lane Distance:	23 feet	Heavy Trucks:	0.2%	0.5%	0.0%	0.7%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>3 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	62 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	72 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	82 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	67.36	2.85	-2.41	-1.20	0.00	-1.4	-3.8	0
Med Trucks:	76.31	-9.98	-2.41	-1.20	0.00	-0.74	-1.175	0
Hvy Trucks:	81.16	-18.53	-2.41	-1.20	0.00	-0.3	-0.3	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.5	64.3	62.5	56.8	65.3	65.8
Med Trucks:	62.7	48.1	44.6	38.0	47.8	48.3
Hvy Trucks:	59.0	31.8	40.9	19.5	34.2	37.7
<b>Traffic Noise:</b>	<b>68.5</b>	<b>64.4</b>	<b>62.6</b>	<b>56.8</b>	<b>65.3</b>	<b>65.9</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.2	63.0	61.3	55.5	64.0	64.5
Med Trucks:	62.0	47.4	43.8	37.3	47.0	47.6
Hvy Trucks:	58.7	31.5	40.6	19.2	33.9	37.4
<b>Traffic Noise:</b>	<b>67.5</b>	<b>63.1</b>	<b>61.4</b>	<b>55.5</b>	<b>64.1</b>	<b>64.6</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project  
Road Type: 2-Lane Collector

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	29,900 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	2,990 vehicles	Autos:	72.7%	12.1%	9.6%	94.4%
Vehicle Speed:	40 mph	Medium Trucks:	4.2%	0.5%	0.3%	4.9%
Near/Far Lane Distance:	23 feet	Heavy Trucks:	0.2%	0.5%	0.0%	0.7%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>3 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	62 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	72 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	82 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	67.36	3.18	-2.41	-1.20	0.00	-1.4	-3.8	0
Med Trucks:	76.31	-9.65	-2.41	-1.20	0.00	-0.74	-1.175	0
Hvy Trucks:	81.16	-18.20	-2.41	-1.20	0.00	-0.3	-0.3	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.8	64.7	62.9	57.1	65.6	66.2
Med Trucks:	63.1	48.5	44.9	38.4	48.1	48.6
Hvy Trucks:	59.3	32.2	41.2	19.8	34.5	38.0
<b>Traffic Noise:</b>	<b>68.9</b>	<b>64.8</b>	<b>63.0</b>	<b>57.2</b>	<b>65.7</b>	<b>66.3</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.5	63.4	61.6	55.8	64.3	64.9
Med Trucks:	62.3	47.7	44.1	37.6	47.4	47.9
Hvy Trucks:	59.0	31.9	40.9	19.5	34.2	37.7
<b>Traffic Noise:</b>	<b>67.8</b>	<b>63.5</b>	<b>61.7</b>	<b>55.9</b>	<b>64.4</b>	<b>65.0</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing  
Road Type: 4-Lane Collector

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	28,600 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	2,860 vehicles	Autos:	72.7%	12.1%	9.6%	94.4%
Vehicle Speed:	30 mph	Medium Trucks:	4.2%	0.5%	0.3%	4.9%
Near/Far Lane Distance:	43 feet	Heavy Trucks:	0.2%	0.5%	0.0%	0.7%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>0 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	82 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	92 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	102 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	62.51	4.24	-3.90	-1.20	0.00	0	-0.183	0
Med Trucks:	73.11	-8.59	-3.90	-1.20	0.00	0	-0.119	0
Hvy Trucks:	80.26	-17.14	-3.90	-1.20	0.00	0	0	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.6	59.5	57.7	51.9	60.4	61.0
Med Trucks:	59.4	44.8	41.3	34.7	44.5	45.0
Hvy Trucks:	58.0	30.8	39.8	18.5	33.2	36.7
<b>Traffic Noise:</b>	<b>64.7</b>	<b>59.6</b>	<b>57.9</b>	<b>52.0</b>	<b>60.5</b>	<b>61.1</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.6	59.5	57.7	51.9	60.4	61.0
Med Trucks:	59.4	44.8	41.3	34.7	44.5	45.0
Hvy Trucks:	58.0	30.8	39.8	18.5	33.2	36.7
<b>Traffic Noise:</b>	<b>64.7</b>	<b>59.6</b>	<b>57.9</b>	<b>52.0</b>	<b>60.5</b>	<b>61.1</b>



## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project  
Road Type: 4-Lane Collector

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	32,600 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	3,260 vehicles	Autos:	72.7%	12.1%	9.6%	94.4%
Vehicle Speed:	30 mph	Medium Trucks:	4.2%	0.5%	0.3%	4.9%
Near/Far Lane Distance:	43 feet	Heavy Trucks:	0.2%	0.5%	0.0%	0.7%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>0 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	82 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	92 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	102 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	62.51	4.80	-3.90	-1.20	0.00	0	-0.183	0
Med Trucks:	73.11	-8.02	-3.90	-1.20	0.00	0	-0.119	0
Hvy Trucks:	80.26	-16.58	-3.90	-1.20	0.00	0	0	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.2	60.0	58.3	52.5	61.0	61.6
Med Trucks:	60.0	45.4	41.8	35.3	45.0	45.6
Hvy Trucks:	58.6	31.4	40.4	19.0	33.7	37.3
<b>Traffic Noise:</b>	<b>65.3</b>	<b>60.2</b>	<b>58.4</b>	<b>52.6</b>	<b>61.1</b>	<b>61.7</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.2	60.0	58.3	52.5	61.0	61.6
Med Trucks:	60.0	45.4	41.8	35.3	45.0	45.6
Hvy Trucks:	58.6	31.4	40.4	19.0	33.7	37.3
<b>Traffic Noise:</b>	<b>65.3</b>	<b>60.2</b>	<b>58.4</b>	<b>52.6</b>	<b>61.1</b>	<b>61.7</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project  
Road Type: 4-Lane Collector

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	32,800 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	3,280 vehicles	Autos:	72.7%	12.1%	9.6%	94.4%
Vehicle Speed:	30 mph	Medium Trucks:	4.2%	0.5%	0.3%	4.9%
Near/Far Lane Distance:	43 feet	Heavy Trucks:	0.2%	0.5%	0.0%	0.7%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>0 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	82 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	92 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	102 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	62.51	4.83	-3.90	-1.20	0.00	0	-0.183	0
Med Trucks:	73.11	-8.00	-3.90	-1.20	0.00	0	-0.119	0
Hvy Trucks:	80.26	-16.55	-3.90	-1.20	0.00	0	0	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.2	60.1	58.3	52.5	61.0	61.6
Med Trucks:	60.0	45.4	41.9	35.3	45.1	45.6
Hvy Trucks:	58.6	31.4	40.4	19.1	33.8	37.3
<b>Traffic Noise:</b>	<b>65.3</b>	<b>60.2</b>	<b>58.5</b>	<b>52.6</b>	<b>61.1</b>	<b>61.7</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.2	60.1	58.3	52.5	61.0	61.6
Med Trucks:	60.0	45.4	41.9	35.3	45.1	45.6
Hvy Trucks:	58.6	31.4	40.4	19.1	33.8	37.3
<b>Traffic Noise:</b>	<b>65.3</b>	<b>60.2</b>	<b>58.5</b>	<b>52.6</b>	<b>61.1</b>	<b>61.7</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing  
Road Type: 3-Lane Arterial

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	21,200 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	2,120 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	40 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	40 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>0 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	67 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	77 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	87 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	67.36	1.64	-2.70	-1.20	0.00	-0.1	-0.188	0
Med Trucks:	76.31	-13.01	-2.70	-1.20	0.00	0	-0.12	0
Hvy Trucks:	81.16	-12.75	-2.70	-1.20	0.00	0	0	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.0	62.9	60.3	55.5	63.8	64.3
Med Trucks:	59.4	42.9	39.4	34.6	43.4	43.8
Hvy Trucks:	64.5	48.3	42.7	39.7	48.6	48.9
<b>Traffic Noise:</b>	<b>68.4</b>	<b>63.0</b>	<b>60.4</b>	<b>55.6</b>	<b>64.0</b>	<b>64.5</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.0	62.9	60.3	55.5	63.8	64.3
Med Trucks:	59.4	42.9	39.4	34.6	43.4	43.8
Hvy Trucks:	64.5	48.3	42.7	39.7	48.6	48.9
<b>Traffic Noise:</b>	<b>68.4</b>	<b>63.0</b>	<b>60.4</b>	<b>55.6</b>	<b>64.0</b>	<b>64.5</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project  
Road Type: 3-Lane Arterial

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	19,900 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	1,990 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	40 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	66 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>0 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	90 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	100 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	110 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	67.36	1.37	-4.25	-1.20	0.00	0	-0.181	0
Med Trucks:	76.31	-13.29	-4.25	-1.20	0.00	0	-0.119	0
Hvy Trucks:	81.16	-13.02	-4.25	-1.20	0.00	0	0	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	61.1	58.6	53.7	62.1	62.6
Med Trucks:	57.6	41.1	37.6	32.8	41.6	42.0
Hvy Trucks:	62.7	46.5	40.9	37.9	46.7	47.0
<b>Traffic Noise:</b>	<b>66.6</b>	<b>61.3</b>	<b>58.7</b>	<b>53.9</b>	<b>62.3</b>	<b>62.8</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	61.1	58.6	53.7	62.1	62.6
Med Trucks:	57.6	41.1	37.6	32.8	41.6	42.0
Hvy Trucks:	62.7	46.5	40.9	37.9	46.7	47.0
<b>Traffic Noise:</b>	<b>66.6</b>	<b>61.3</b>	<b>58.7</b>	<b>53.9</b>	<b>62.3</b>	<b>62.8</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project  
Road Type: 3-Lane Arterial

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	20,200 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	2,020 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	40 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	66 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>0 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	90 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	100 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	110 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	67.36	1.43	-4.25	-1.20	0.00	0	-0.181	0
Med Trucks:	76.31	-13.22	-4.25	-1.20	0.00	0	-0.119	0
Hvy Trucks:	81.16	-12.96	-4.25	-1.20	0.00	0	0	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	61.2	58.7	53.8	62.2	62.7
Med Trucks:	57.6	41.2	37.6	32.9	41.6	42.1
Hvy Trucks:	62.7	46.6	41.0	38.0	46.8	47.1
<b>Traffic Noise:</b>	<b>66.6</b>	<b>61.4</b>	<b>58.8</b>	<b>53.9</b>	<b>62.3</b>	<b>62.8</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	61.2	58.7	53.8	62.2	62.7
Med Trucks:	57.6	41.2	37.6	32.9	41.6	42.1
Hvy Trucks:	62.7	46.6	41.0	38.0	46.8	47.1
<b>Traffic Noise:</b>	<b>66.6</b>	<b>61.4</b>	<b>58.8</b>	<b>53.9</b>	<b>62.3</b>	<b>62.8</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing  
Road Type: 4-Lane Arterial

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	36,900 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	3,690 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	45 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	66 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>4 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	90 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	100 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	110 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	69.34	3.54	-4.25	-1.20	0.00	-4.6	-4.8	0
Med Trucks:	77.62	-11.12	-4.25	-1.20	0.00	-3.9	-4.1	0
Hvy Trucks:	82.14	-10.85	-4.25	-1.20	0.00	-1.22	-0.95	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.4	65.3	62.7	57.9	66.3	66.8
Med Trucks:	61.1	44.6	41.1	36.3	45.0	45.5
Hvy Trucks:	65.8	49.7	44.1	41.1	49.9	50.2
<b>Traffic Noise:</b>	<b>70.3</b>	<b>65.4</b>	<b>62.8</b>	<b>58.0</b>	<b>66.4</b>	<b>66.9</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.8	60.7	58.1	53.3	61.7	62.2
Med Trucks:	57.2	40.7	37.2	32.4	41.1	41.6
Hvy Trucks:	64.6	48.4	42.9	39.8	48.7	49.0
<b>Traffic Noise:</b>	<b>67.3</b>	<b>61.0</b>	<b>58.3</b>	<b>53.5</b>	<b>61.9</b>	<b>62.4</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project  
Road Type: 4-Lane Arterial

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	52,400 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	5,240 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	45 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	66 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>4 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	90 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	100 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	110 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	69.34	5.06	-4.25	-1.20	0.00	-4.6	-4.8	0
Med Trucks:	77.62	-9.59	-4.25	-1.20	0.00	-3.9	-4.1	0
Hvy Trucks:	82.14	-9.33	-4.25	-1.20	0.00	-1.22	-0.95	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.0	66.8	64.3	59.4	67.8	68.3
Med Trucks:	62.6	46.1	42.6	37.8	46.6	47.0
Hvy Trucks:	67.4	51.2	45.6	42.6	51.4	51.7
<b>Traffic Noise:</b>	<b>71.8</b>	<b>67.0</b>	<b>64.4</b>	<b>59.5</b>	<b>67.9</b>	<b>68.4</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.4	62.2	59.7	54.8	63.2	63.7
Med Trucks:	58.7	42.2	38.7	33.9	42.7	43.1
Hvy Trucks:	66.1	50.0	44.4	41.4	50.2	50.5
<b>Traffic Noise:</b>	<b>68.8</b>	<b>62.5</b>	<b>59.8</b>	<b>55.0</b>	<b>63.4</b>	<b>63.9</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project  
Road Type: 4-Lane Arterial

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	55,300 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	5,530 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	45 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	66 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>5 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	90 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	100 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	110 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	69.34	5.29	-4.25	-1.20	0.00	-5.2	-5.1	0
Med Trucks:	77.62	-9.36	-4.25	-1.20	0.00	-5.1	-4.9	0
Hvy Trucks:	82.14	-9.10	-4.25	-1.20	0.00	-4.8	-4.1	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.2	67.0	64.5	59.6	68.0	68.5
Med Trucks:	62.8	46.3	42.8	38.0	46.8	47.2
Hvy Trucks:	67.6	51.4	45.8	42.8	51.6	51.9
<b>Traffic Noise:</b>	<b>72.0</b>	<b>67.2</b>	<b>64.6</b>	<b>59.8</b>	<b>68.2</b>	<b>68.6</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.0	61.8	59.3	54.4	62.8	63.3
Med Trucks:	57.7	41.2	37.7	32.9	41.7	42.1
Hvy Trucks:	62.8	46.6	41.0	38.0	46.8	47.1
<b>Traffic Noise:</b>	<b>67.0</b>	<b>62.0</b>	<b>59.4</b>	<b>54.6</b>	<b>63.0</b>	<b>63.4</b>



## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project  
Road Type: 4-Lane Super Arterial

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	52,300 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	5,230 vehicles	Autos:	72.7%	12.1%	9.6%	94.4%
Vehicle Speed:	50 mph	Medium Trucks:	4.2%	0.5%	0.3%	4.9%
Near/Far Lane Distance:	90 feet	Heavy Trucks:	0.2%	0.5%	0.0%	0.7%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>4 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	114 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	124 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	134 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	71.12	4.64	-5.57	-1.20	0.00	-4.5	-4.6	0
Med Trucks:	78.79	-8.19	-5.57	-1.20	0.00	-3.8	-3.9	0
Hvy Trucks:	83.02	-16.74	-5.57	-1.20	0.00	-1.355	-1.13	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.0	66.8	65.0	59.3	67.8	68.3
Med Trucks:	63.8	49.2	45.7	39.1	48.9	49.4
Hvy Trucks:	59.5	32.3	41.3	20.0	34.7	38.2
<b>Traffic Noise:</b>	<b>70.5</b>	<b>66.9</b>	<b>65.1</b>	<b>59.3</b>	<b>67.8</b>	<b>68.4</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.5	62.3	60.5	54.8	63.3	63.8
Med Trucks:	60.0	45.4	41.9	35.3	45.1	45.6
Hvy Trucks:	58.2	31.0	40.0	18.6	33.3	36.9
<b>Traffic Noise:</b>	<b>66.5</b>	<b>62.4</b>	<b>60.6</b>	<b>54.8</b>	<b>63.3</b>	<b>63.9</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing  
Road Type: 6-Lane Arterial

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	62,600 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	6,260 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	45 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	90 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>4 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	114 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	124 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	134 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	69.34	5.83	-5.57	-1.20	0.00	-4.5	-4.6	0
Med Trucks:	77.62	-8.82	-5.57	-1.20	0.00	-3.8	-3.9	0
Hvy Trucks:	82.14	-8.56	-5.57	-1.20	0.00	-1.355	-1.13	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.4	66.3	63.7	58.9	67.2	67.7
Med Trucks:	62.0	45.6	42.0	37.3	46.0	46.5
Hvy Trucks:	66.8	50.7	45.1	42.0	50.9	51.2
<b>Traffic Noise:</b>	<b>71.3</b>	<b>66.4</b>	<b>63.8</b>	<b>59.0</b>	<b>67.4</b>	<b>67.9</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.9	61.8	59.2	54.4	62.7	63.2
Med Trucks:	58.2	41.8	38.2	33.5	42.2	42.7
Hvy Trucks:	65.5	49.3	43.7	40.7	49.5	49.8
<b>Traffic Noise:</b>	<b>68.2</b>	<b>62.0</b>	<b>59.4</b>	<b>54.6</b>	<b>63.0</b>	<b>63.5</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project  
Road Type: 6-Lane Arterial

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	75,200 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	7,520 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	45 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	90 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>5 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	114 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	124 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	134 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	69.34	6.63	-5.57	-1.20	0.00	-5.1	-4.9	0
Med Trucks:	77.62	-8.02	-5.57	-1.20	0.00	-4.9	-4.9	0
Hvy Trucks:	82.14	-7.76	-5.57	-1.20	0.00	-4.9	-4.2	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.2	67.1	64.5	59.7	68.0	68.5
Med Trucks:	62.8	46.4	42.8	38.1	46.8	47.3
Hvy Trucks:	67.6	51.4	45.9	42.8	51.7	52.0
<b>Traffic Noise:</b>	<b>72.0</b>	<b>67.2</b>	<b>64.6</b>	<b>59.8</b>	<b>68.2</b>	<b>68.7</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.1	62.0	59.4	54.6	62.9	63.4
Med Trucks:	57.9	41.5	37.9	33.2	41.9	42.4
Hvy Trucks:	62.7	46.5	41.0	37.9	46.8	47.1
<b>Traffic Noise:</b>	<b>67.0</b>	<b>62.1</b>	<b>59.5</b>	<b>54.7</b>	<b>63.1</b>	<b>63.6</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project  
Road Type: 6-Lane Arterial

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	81,400 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	8,140 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	45 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	90 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>5 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	114 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	124 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	134 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	69.34	6.97	-5.57	-1.20	0.00	-5.1	-4.9	0
Med Trucks:	77.62	-7.68	-5.57	-1.20	0.00	-4.9	-4.9	0
Hvy Trucks:	82.14	-7.42	-5.57	-1.20	0.00	-4.9	-4.2	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.6	67.4	64.9	60.0	68.4	68.9
Med Trucks:	63.2	46.7	43.2	38.4	47.2	47.6
Hvy Trucks:	68.0	51.8	46.2	43.2	52.0	52.3
<b>Traffic Noise:</b>	<b>72.4</b>	<b>67.6</b>	<b>65.0</b>	<b>60.1</b>	<b>68.5</b>	<b>69.0</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.5	62.3	59.8	54.9	63.3	63.8
Med Trucks:	58.3	41.8	38.3	33.5	42.3	42.7
Hvy Trucks:	63.1	46.9	41.3	38.3	47.1	47.4
<b>Traffic Noise:</b>	<b>67.4</b>	<b>62.5</b>	<b>59.9</b>	<b>55.0</b>	<b>63.4</b>	<b>63.9</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing  
Road Type: Scenic Arterial

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	20,400 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	2,040 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	40 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	62 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>0 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	112 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	122 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	132 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	67.36	1.47	-5.70	-1.20	0.00	0	-0.177	0
Med Trucks:	76.31	-13.18	-5.70	-1.20	0.00	0	-0.118	0
Hvy Trucks:	81.16	-12.91	-5.70	-1.20	0.00	0	0	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.9	59.8	57.2	52.4	60.8	61.3
Med Trucks:	56.2	39.8	36.2	31.5	40.2	40.7
Hvy Trucks:	61.3	45.2	39.6	36.6	45.4	45.7
<b>Traffic Noise:</b>	<b>65.2</b>	<b>60.0</b>	<b>57.4</b>	<b>52.5</b>	<b>60.9</b>	<b>61.4</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.9	59.8	57.2	52.4	60.8	61.3
Med Trucks:	56.2	39.8	36.2	31.5	40.2	40.7
Hvy Trucks:	61.3	45.2	39.6	36.6	45.4	45.7
<b>Traffic Noise:</b>	<b>65.2</b>	<b>60.0</b>	<b>57.4</b>	<b>52.5</b>	<b>60.9</b>	<b>61.4</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project  
Road Type: Scenic Arterial

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	31,600 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	3,160 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	40 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	66 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>0 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	112 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	122 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	132 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	67.36	3.37	-5.67	-1.20	0.00	0	-0.177	0
Med Trucks:	76.31	-11.28	-5.67	-1.20	0.00	0	-0.118	0
Hvy Trucks:	81.16	-11.01	-5.67	-1.20	0.00	0	0	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.9	61.7	59.2	54.3	62.7	63.2
Med Trucks:	58.2	41.7	38.2	33.4	42.1	42.6
Hvy Trucks:	63.3	47.1	41.5	38.5	47.3	47.6
<b>Traffic Noise:</b>	<b>67.2</b>	<b>61.9</b>	<b>59.3</b>	<b>54.5</b>	<b>62.9</b>	<b>63.3</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.9	61.7	59.2	54.3	62.7	63.2
Med Trucks:	58.2	41.7	38.2	33.4	42.1	42.6
Hvy Trucks:	63.3	47.1	41.5	38.5	47.3	47.6
<b>Traffic Noise:</b>	<b>67.2</b>	<b>61.9</b>	<b>59.3</b>	<b>54.5</b>	<b>62.9</b>	<b>63.3</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project  
 Road Type: Scenic Arterial

Project Name: Fresno GP  
 Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	32,400 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	3,240 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	40 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	66 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>0 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	112 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	122 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	132 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	67.36	3.48	-5.67	-1.20	0.00	0	-0.177	0
Med Trucks:	76.31	-11.17	-5.67	-1.20	0.00	0	-0.118	0
Hvy Trucks:	81.16	-10.91	-5.67	-1.20	0.00	0	0	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.0	61.8	59.3	54.4	62.8	63.3
Med Trucks:	58.3	41.8	38.3	33.5	42.3	42.7
Hvy Trucks:	63.4	47.2	41.6	38.6	47.4	47.7
<b>Traffic Noise:</b>	<b>67.3</b>	<b>62.0</b>	<b>59.4</b>	<b>54.6</b>	<b>63.0</b>	<b>63.5</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.0	61.8	59.3	54.4	62.8	63.3
Med Trucks:	58.3	41.8	38.3	33.5	42.3	42.7
Hvy Trucks:	63.4	47.2	41.6	38.6	47.4	47.7
<b>Traffic Noise:</b>	<b>67.3</b>	<b>62.0</b>	<b>59.4</b>	<b>54.6</b>	<b>63.0</b>	<b>63.5</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing  
Road Type: 6-Lane Expressway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	72,800 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	7,280 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	50 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	72 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>6 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	100 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	110 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	120 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	71.12	6.03	-4.88	-1.20	0.00	-6.94	-6.08	0
Med Trucks:	78.79	-8.62	-4.88	-1.20	0.00	-6.87	-5.7	0
Hvy Trucks:	83.02	-8.36	-4.88	-1.20	0.00	-5.7	-4.9	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	68.9	66.4	61.5	69.9	70.4
Med Trucks:	64.1	47.6	44.1	39.3	48.1	48.5
Hvy Trucks:	68.6	52.4	46.8	43.8	52.6	52.9
<b>Traffic Noise:</b>	<b>73.5</b>	<b>69.1</b>	<b>66.5</b>	<b>61.6</b>	<b>70.0</b>	<b>70.5</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.1	62.0	59.4	54.6	63.0	63.5
Med Trucks:	57.2	40.7	37.2	32.5	41.2	41.6
Hvy Trucks:	62.9	46.7	41.1	38.1	46.9	47.2
<b>Traffic Noise:</b>	<b>67.0</b>	<b>62.1</b>	<b>59.5</b>	<b>54.7</b>	<b>63.1</b>	<b>63.6</b>



## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project  
Road Type: 6-Lane Expressway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	88,100 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	8,810 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	50 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	83 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>6 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	100 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	110 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	120 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	71.12	6.86	-4.75	-1.20	0.00	-6.94	-6.08	0
Med Trucks:	78.79	-7.79	-4.75	-1.20	0.00	-6.87	-5.7	0
Hvy Trucks:	83.02	-7.53	-4.75	-1.20	0.00	-5.7	-4.9	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.0	69.9	67.3	62.5	70.9	71.4
Med Trucks:	65.1	48.6	45.1	40.3	49.0	49.5
Hvy Trucks:	69.5	53.4	47.8	44.8	53.6	53.9
<b>Traffic Noise:</b>	<b>74.5</b>	<b>70.0</b>	<b>67.4</b>	<b>62.6</b>	<b>71.0</b>	<b>71.5</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.1	62.9	60.4	55.5	63.9	64.4
Med Trucks:	58.2	41.7	38.2	33.4	42.2	42.6
Hvy Trucks:	63.8	47.7	42.1	39.1	47.9	48.2
<b>Traffic Noise:</b>	<b>68.0</b>	<b>63.1</b>	<b>60.5</b>	<b>55.7</b>	<b>64.1</b>	<b>64.5</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project  
Road Type: 6-Lane Expressway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	91,400 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	9,140 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	50 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	83 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>6 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	100 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	110 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	120 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	71.12	7.02	-4.75	-1.20	0.00	-6.94	-6.08	0
Med Trucks:	78.79	-7.63	-4.75	-1.20	0.00	-6.87	-5.7	0
Hvy Trucks:	83.02	-7.37	-4.75	-1.20	0.00	-5.7	-4.9	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.2	70.0	67.5	62.6	71.0	71.5
Med Trucks:	65.2	48.7	45.2	40.4	49.2	49.6
Hvy Trucks:	69.7	53.5	47.9	44.9	53.8	54.1
<b>Traffic Noise:</b>	<b>74.7</b>	<b>70.2</b>	<b>67.6</b>	<b>62.7</b>	<b>71.1</b>	<b>71.6</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.3	63.1	60.6	55.7	64.1	64.6
Med Trucks:	58.3	41.9	38.3	33.6	42.3	42.8
Hvy Trucks:	64.0	47.8	42.2	39.2	48.1	48.4
<b>Traffic Noise:</b>	<b>68.2</b>	<b>63.3</b>	<b>60.7</b>	<b>55.8</b>	<b>64.2</b>	<b>64.7</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing  
Road Type: Scenic Expressway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	53,100 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	5,310 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	50 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	90 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>4 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	124 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	134 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	144 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	71.12	4.66	-6.14	-1.20	0.00	-4.4	-4.5	0
Med Trucks:	78.79	-9.99	-6.14	-1.20	0.00	-3.8	-3.8	0
Hvy Trucks:	83.02	-9.73	-6.14	-1.20	0.00	-1.355	-1.175	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.4	66.3	63.8	58.9	67.3	67.8
Med Trucks:	61.5	45.0	41.5	36.7	45.4	45.9
Hvy Trucks:	66.0	49.8	44.2	41.2	50.0	50.3
<b>Traffic Noise:</b>	<b>70.9</b>	<b>66.4</b>	<b>63.8</b>	<b>59.0</b>	<b>67.4</b>	<b>67.9</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.0	61.9	59.4	54.5	62.9	63.4
Med Trucks:	57.7	41.2	37.7	32.9	41.6	42.1
Hvy Trucks:	64.6	48.4	42.8	39.8	48.6	48.9
<b>Traffic Noise:</b>	<b>67.8</b>	<b>62.1</b>	<b>59.5</b>	<b>54.7</b>	<b>63.1</b>	<b>63.6</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project  
Road Type: Scenic Expressway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	75,200 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	7,520 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	50 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	90 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>5 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	124 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	134 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	144 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	71.12	6.17	-6.14	-1.20	0.00	-5.1	-4.9	0
Med Trucks:	78.79	-8.48	-6.14	-1.20	0.00	-4.9	-4.9	0
Hvy Trucks:	83.02	-8.22	-6.14	-1.20	0.00	-4.9	-4.2	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.9	67.8	65.3	60.4	68.8	69.3
Med Trucks:	63.0	46.5	43.0	38.2	47.0	47.4
Hvy Trucks:	67.5	51.3	45.7	42.7	51.5	51.8
<b>Traffic Noise:</b>	<b>72.4</b>	<b>67.9</b>	<b>65.3</b>	<b>60.5</b>	<b>68.9</b>	<b>69.4</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.8	62.7	60.2	55.3	63.7	64.2
Med Trucks:	58.1	41.6	38.1	33.3	42.1	42.5
Hvy Trucks:	62.6	46.4	40.8	37.8	46.6	46.9
<b>Traffic Noise:</b>	<b>67.4</b>	<b>62.8</b>	<b>60.2</b>	<b>55.4</b>	<b>63.8</b>	<b>64.3</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project  
Road Type: SR-41 Freeway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix			
Average Daily Traffic: ##### vehicles		Day	Evening	Night	Daily
Peak Hour Volume: 10,430 vehicles		Autos: 65.8%	13.5%	15.8%	95.0%
Vehicle Speed: 65 mph		Medium Trucks: 1.5%	0.3%	0.8%	2.5%
Near/Far Lane Distance: 120 feet		Heavy Trucks: 1.4%	0.1%	1.0%	2.5%
Site Data		Elevations			
<b>Barrier Height:</b> 8 feet		Barrier Base Elevation:	0.0 feet		
Barrier Type(Wall/Berm): Wall		Road Elevation:	0.0 feet		
Site Conditions(Hard/Soft): Soft		Noise Source Elevation above Road			
Centerline (C.L.) Dist. to Barrier: 140 feet		Autos:	0 feet		
C.L. Dist. To Observer (Backyard): 150 feet		Med Trucks:	2.3 feet		
Barrier Dist. To Observer (Backyard): 10 feet		Hvy Trucks:	8 feet		
C.L. Dist. To Observer (Structure): 160 feet		Pad Elevation:	0.0 feet		
Barrier Dist. To Observer (Structure): 20 feet		Observer Heights Above Pad Elevation			
Road Grade: 0.00 %		Exterior:	5 feet		
Left View: -90 degrees		First Floor:	5.5 feet		
Right View: 90 degrees		Second Floor:	14 feet		

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	75.54	6.53	-6.70	-1.20	0.00	-10.58	-8.8	-0.182
Med Trucks:	81.71	-9.27	-6.70	-1.20	0.00	-10.94	-8.95	-0.13
Hvy Trucks:	85.21	-9.27	-6.70	-1.20	0.00	-10.34	-7.65	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.2	71.6	70.7	66.6	74.1	74.6
Med Trucks:	64.5	45.5	44.1	43.7	50.4	50.7
Hvy Trucks:	68.0	48.6	44.4	48.5	54.8	54.9
<b>Traffic Noise:</b>	<b>75.5</b>	<b>71.6</b>	<b>70.7</b>	<b>66.7</b>	<b>74.2</b>	<b>74.7</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.6	61.0	60.1	56.0	63.5	64.0
Med Trucks:	53.6	34.5	33.1	32.8	39.5	39.7
Hvy Trucks:	57.7	38.3	34.1	38.2	44.5	44.6
<b>Traffic Noise:</b>	<b>64.9</b>	<b>61.0</b>	<b>60.1</b>	<b>56.1</b>	<b>63.6</b>	<b>64.1</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project  
Road Type: SR-41 Freeway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix			
Average Daily Traffic:	108,400 vehicles	Day	Evening	Night	Daily
Peak Hour Volume:	10,840 vehicles	Autos:	65.8%	13.5%	15.8%
Vehicle Speed:	65 mph	Medium Trucks:	1.5%	0.3%	0.8%
Near/Far Lane Distance:	120 feet	Heavy Trucks:	1.4%	0.1%	1.0%
			2.5%		2.5%
Site Data		Elevations			
<b>Barrier Height:</b>	<b>8 feet</b>	Barrier Base Elevation:	0.0 feet		
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet		
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road			
Centerline (C.L.) Dist. to Barrier:	140 feet	Autos:	0 feet		
C.L. Dist. To Observer (Backyard):	150 feet	Med Trucks:	2.3 feet		
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet		
C.L. Dist. To Observer (Structure):	160 feet	Pad Elevation:	0.0 feet		
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation			
Road Grade:	0.00 %	Exterior:	5 feet		
Left View:	-90 degrees	First Floor:	5.5 feet		
Right View:	90 degrees	Second Floor:	14 feet		

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	75.54	6.69	-6.70	-1.20	0.00	-10.58	-8.8	-0.182
Med Trucks:	81.71	-9.10	-6.70	-1.20	0.00	-10.94	-8.95	-0.13
Hvy Trucks:	85.21	-9.10	-6.70	-1.20	0.00	-10.34	-7.65	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.3	71.7	70.9	66.8	74.3	74.8
Med Trucks:	64.7	45.6	44.2	43.9	50.6	50.8
Hvy Trucks:	68.2	48.8	44.6	48.7	55.0	55.1
<b>Traffic Noise:</b>	<b>75.6</b>	<b>71.8</b>	<b>70.9</b>	<b>66.9</b>	<b>74.4</b>	<b>74.8</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.8	61.1	60.3	56.2	63.7	64.2
Med Trucks:	53.8	34.7	33.3	33.0	39.6	39.9
Hvy Trucks:	57.9	38.4	34.3	38.3	44.7	44.8
<b>Traffic Noise:</b>	<b>65.1</b>	<b>61.2</b>	<b>60.3</b>	<b>56.3</b>	<b>63.8</b>	<b>64.3</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing  
Road Type: SR-180 Freeway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	68,740 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	6,874 vehicles	Autos:	53.3%	10.9%	12.8%	77.0%
Vehicle Speed:	65 mph	Medium Trucks:	2.9%	0.5%	1.4%	4.8%
Near/Far Lane Distance:	140 feet	Heavy Trucks:	9.9%	1.0%	7.3%	18.2%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>7 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	180 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	190 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	200 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	75.54	3.80	-8.33	-1.20	0.00	-8.6	-6.94	-0.11
Med Trucks:	81.71	-8.22	-8.33	-1.20	0.00	-8.95	-6.94	0
Hvy Trucks:	85.21	-2.47	-8.33	-1.20	0.00	-8.2	-6	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.8	66.3	65.4	61.3	68.8	69.4
Med Trucks:	64.0	47.7	46.3	46.0	52.7	52.9
Hvy Trucks:	73.2	62.4	58.2	62.3	68.6	68.7
<b>Traffic Noise:</b>	<b>75.2</b>	<b>67.8</b>	<b>66.2</b>	<b>64.9</b>	<b>71.8</b>	<b>72.1</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.2	57.7	56.8	52.7	60.2	60.8
Med Trucks:	55.0	38.8	37.4	37.1	43.7	44.0
Hvy Trucks:	65.0	54.2	50.0	54.1	60.4	60.5
<b>Traffic Noise:</b>	<b>66.8</b>	<b>59.3</b>	<b>57.7</b>	<b>56.5</b>	<b>63.4</b>	<b>63.7</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project  
Road Type: SR-180 Freeway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	97,700 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	9,770 vehicles	Autos:	53.3%	10.9%	12.8%	77.0%
Vehicle Speed:	65 mph	Medium Trucks:	2.9%	0.5%	1.4%	4.8%
Near/Far Lane Distance:	140 feet	Heavy Trucks:	9.9%	1.0%	7.3%	18.2%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>7 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	180 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	190 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	200 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	75.54	5.33	-8.33	-1.20	0.00	-8.6	-6.94	-0.11
Med Trucks:	81.71	-6.70	-8.33	-1.20	0.00	-8.95	-6.94	0
Hvy Trucks:	85.21	-0.94	-8.33	-1.20	0.00	-8.2	-6	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.3	67.8	67.0	62.9	70.4	70.9
Med Trucks:	65.5	49.3	47.9	47.6	54.2	54.5
Hvy Trucks:	74.7	63.9	59.8	63.8	70.2	70.3
<b>Traffic Noise:</b>	<b>76.7</b>	<b>69.3</b>	<b>67.8</b>	<b>66.4</b>	<b>73.3</b>	<b>73.6</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.7	59.2	58.4	54.3	61.8	62.3
Med Trucks:	56.5	40.3	38.9	38.6	45.3	45.5
Hvy Trucks:	66.5	55.7	51.6	55.6	62.0	62.1
<b>Traffic Noise:</b>	<b>68.3</b>	<b>60.9</b>	<b>59.2</b>	<b>58.0</b>	<b>64.9</b>	<b>65.2</b>



## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project  
Road Type: SR-180 Freeway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	99,700 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	9,970 vehicles	Autos:	53.3%	10.9%	12.8%	77.0%
Vehicle Speed:	65 mph	Medium Trucks:	2.9%	0.5%	1.4%	4.8%
Near/Far Lane Distance:	140 feet	Heavy Trucks:	9.9%	1.0%	7.3%	18.2%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>7 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	180 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	190 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	200 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	75.54	5.42	-8.33	-1.20	0.00	-8.6	-6.94	-0.11
Med Trucks:	81.71	-6.61	-8.33	-1.20	0.00	-8.95	-6.94	0
Hvy Trucks:	85.21	-0.85	-8.33	-1.20	0.00	-8.2	-6	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.4	67.9	67.0	63.0	70.5	71.0
Med Trucks:	65.6	49.4	48.0	47.6	54.3	54.6
Hvy Trucks:	74.8	64.0	59.8	63.9	70.2	70.4
<b>Traffic Noise:</b>	<b>76.8</b>	<b>69.4</b>	<b>67.8</b>	<b>66.5</b>	<b>73.4</b>	<b>73.7</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.8	59.3	58.4	54.4	61.9	62.4
Med Trucks:	56.6	40.4	39.0	38.7	45.3	45.6
Hvy Trucks:	66.6	55.8	51.6	55.7	62.0	62.2
<b>Traffic Noise:</b>	<b>68.4</b>	<b>61.0</b>	<b>59.3</b>	<b>58.1</b>	<b>65.0</b>	<b>65.3</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing  
Road Type: SR-99 Freeway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	58,100 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	5,810 vehicles	Autos:	53.3%	10.9%	12.8%	77.0%
Vehicle Speed:	65 mph	Medium Trucks:	2.9%	0.5%	1.4%	4.8%
Near/Far Lane Distance:	80 feet	Heavy Trucks:	9.9%	1.0%	7.3%	18.2%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>7 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	110 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	120 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	130 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	75.54	3.98	-5.43	-1.20	0.00	-9.03	-7.55	-0.148
Med Trucks:	81.71	-10.35	-5.43	-1.20	0.00	-9.18	-7.43	0
Hvy Trucks:	85.21	-14.03	-5.43	-1.20	0.00	-8.05	-5.9	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.9	70.3	69.4	65.3	72.8	73.3
Med Trucks:	64.7	47.1	45.7	45.4	52.0	52.3
Hvy Trucks:	64.5	42.9	38.7	42.8	49.1	49.2
<b>Traffic Noise:</b>	<b>74.0</b>	<b>70.3</b>	<b>69.4</b>	<b>65.4</b>	<b>72.9</b>	<b>73.4</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.9	61.3	60.4	56.3	63.8	64.3
Med Trucks:	55.5	37.9	36.5	36.2	42.9	43.1
Hvy Trucks:	56.5	34.8	30.7	34.7	41.1	41.2
<b>Traffic Noise:</b>	<b>65.1</b>	<b>61.3</b>	<b>60.4</b>	<b>56.4</b>	<b>63.9</b>	<b>64.4</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project  
Road Type: SR-99 Freeway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	98,700 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	9,870 vehicles	Autos:	53.3%	10.9%	12.8%	77.0%
Vehicle Speed:	65 mph	Medium Trucks:	2.9%	0.5%	1.4%	4.8%
Near/Far Lane Distance:	80 feet	Heavy Trucks:	9.9%	1.0%	7.3%	18.2%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>7 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	110 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	120 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	130 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	75.54	6.29	-5.43	-1.20	0.00	-12.02	-7.55	-0.148
Med Trucks:	81.71	-8.05	-5.43	-1.20	0.00	-12.51	-7.43	0
Hvy Trucks:	85.21	-11.73	-5.43	-1.20	0.00	-11.62	-5.9	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.9	72.3	71.4	67.3	74.8	75.3
Med Trucks:	66.9	49.2	47.8	47.5	54.2	54.4
Hvy Trucks:	66.7	45.1	40.9	44.9	51.3	51.4
<b>Traffic Noise:</b>	<b>76.1</b>	<b>72.3</b>	<b>71.4</b>	<b>67.4</b>	<b>74.9</b>	<b>75.4</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.2	60.6	59.7	55.6	63.1	63.6
Med Trucks:	54.5	36.9	35.5	35.2	41.8	42.1
Hvy Trucks:	55.2	33.6	29.4	33.5	39.8	39.9
<b>Traffic Noise:</b>	<b>64.3</b>	<b>60.6</b>	<b>59.7</b>	<b>55.7</b>	<b>63.2</b>	<b>63.7</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project  
 Road Type: SR-99 Freeway

Project Name: Fresno GP  
 Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	104,100 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	10,410 vehicles	Autos:	53.3%	10.9%	12.8%	77.0%
Vehicle Speed:	65 mph	Medium Trucks:	2.9%	0.5%	1.4%	4.8%
Near/Far Lane Distance:	80 feet	Heavy Trucks:	9.9%	1.0%	7.3%	18.2%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>7 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	110 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	120 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	130 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	75.54	6.52	-5.43	-1.20	0.00	-12.02	-7.55	-0.148
Med Trucks:	81.71	-7.82	-5.43	-1.20	0.00	-12.51	-7.43	0
Hvy Trucks:	85.21	-11.50	-5.43	-1.20	0.00	-11.62	-5.9	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.1	72.5	71.6	67.6	75.1	75.6
Med Trucks:	67.1	49.5	48.1	47.8	54.4	54.7
Hvy Trucks:	66.9	45.3	41.1	45.2	51.5	51.6
<b>Traffic Noise:</b>	<b>76.3</b>	<b>72.5</b>	<b>71.7</b>	<b>67.6</b>	<b>75.1</b>	<b>75.6</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.4	60.8	59.9	55.8	63.4	63.9
Med Trucks:	54.8	37.1	35.7	35.4	42.1	42.3
Hvy Trucks:	55.5	33.8	29.7	33.7	40.1	40.2
<b>Traffic Noise:</b>	<b>64.5</b>	<b>60.8</b>	<b>60.0</b>	<b>55.9</b>	<b>63.4</b>	<b>63.9</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing  
Road Type: SR-168 Freeway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	56,900 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	5,690 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	65 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	120 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>6 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	150 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	160 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	170 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	75.54	3.66	-7.19	-1.20	0.00	-6.56	-5.7	0
Med Trucks:	81.71	-6.54	-7.19	-1.20	0.00	-6.64	-5.5	0
Hvy Trucks:	85.21	-14.42	-7.19	-1.20	0.00	-5.8	-4.9	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	68.0	67.1	63.0	70.5	71.0
Med Trucks:	66.8	53.1	51.7	51.4	58.0	58.3
Hvy Trucks:	62.4	40.4	36.3	40.3	46.7	46.8
<b>Traffic Noise:</b>	<b>72.7</b>	<b>68.1</b>	<b>67.2</b>	<b>63.3</b>	<b>70.8</b>	<b>71.3</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.2	61.4	60.5	56.4	64.0	64.5
Med Trucks:	60.1	46.4	45.0	44.7	51.4	51.6
Hvy Trucks:	56.6	34.6	30.5	34.5	40.9	41.0
<b>Traffic Noise:</b>	<b>66.2</b>	<b>61.5</b>	<b>60.7</b>	<b>56.8</b>	<b>64.2</b>	<b>64.7</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project  
Road Type: SR-168 Freeway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	75,600 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	7,560 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	65 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	120 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>7 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	150 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	160 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	170 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	75.54	4.89	-7.19	-1.20	0.00	-8.75	-7.15	-0.122
Med Trucks:	81.71	-5.30	-7.19	-1.20	0.00	-9.03	-7.08	0
Hvy Trucks:	85.21	-13.19	-7.19	-1.20	0.00	-8.15	-6	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.0	69.2	68.3	64.2	71.8	72.3
Med Trucks:	68.0	54.3	52.9	52.6	59.2	59.5
Hvy Trucks:	63.6	41.7	37.5	41.6	47.9	48.0
<b>Traffic Noise:</b>	<b>73.9</b>	<b>69.3</b>	<b>68.5</b>	<b>64.6</b>	<b>72.0</b>	<b>72.5</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	60.4	59.6	55.5	63.0	63.5
Med Trucks:	59.0	45.3	43.9	43.6	50.2	50.5
Hvy Trucks:	55.5	33.5	29.4	33.4	39.8	39.9
<b>Traffic Noise:</b>	<b>65.2</b>	<b>60.6</b>	<b>59.7</b>	<b>55.8</b>	<b>63.2</b>	<b>63.7</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project  
Road Type: SR-168 Freeway

Project Name: Fresno GP  
Job Number: 31680016

### NOISE MODEL INPUTS

Highway Data		Vehicle Mix				
Average Daily Traffic:	86,900 vehicles	Day	Evening	Night	Daily	
Peak Hour Volume:	8,690 vehicles	Autos:	73.3%	10.2%	10.0%	93.4%
Vehicle Speed:	65 mph	Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Near/Far Lane Distance:	120 feet	Heavy Trucks:	2.9%	0.2%	0.3%	3.4%
Site Data		Elevations				
<b>Barrier Height:</b>	<b>7 feet</b>	Barrier Base Elevation:	0.0 feet			
Barrier Type(Wall/Berm):	Wall	Road Elevation:	0.0 feet			
Site Conditions(Hard/Soft):	Soft	Noise Source Elevation above Road				
Centerline (C.L.) Dist. to Barrier:	150 feet	Autos:	0 feet			
C.L. Dist. To Observer (Backyard):	160 feet	Med Trucks:	2.3 feet			
Barrier Dist. To Observer (Backyard):	10 feet	Hvy Trucks:	8 feet			
C.L. Dist. To Observer (Structure):	170 feet	Pad Elevation:	0.0 feet			
Barrier Dist. To Observer (Structure):	20 feet	Observer Heights Above Pad Elevation				
Road Grade:	0.00 %	Exterior:	5 feet			
Left View:	-90 degrees	First Floor:	5.5 feet			
Right View:	90 degrees	Second Floor:	14 feet			

### FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation		
						Exterior	1st Flr	2nd Flr
Autos:	75.54	5.50	-7.19	-1.20	0.00	-8.75	-7.15	-0.122
Med Trucks:	81.71	-4.70	-7.19	-1.20	0.00	-9.03	-7.08	0
Hvy Trucks:	85.21	-12.58	-7.19	-1.20	0.00	-8.15	-6	0

### UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.6	69.8	68.9	64.8	72.4	72.9
Med Trucks:	68.6	54.9	53.5	53.2	59.8	60.1
Hvy Trucks:	64.2	42.3	38.1	42.2	48.5	48.6
<b>Traffic Noise:</b>	<b>74.5</b>	<b>69.9</b>	<b>69.1</b>	<b>65.2</b>	<b>72.6</b>	<b>73.1</b>

### MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.9	61.1	60.2	56.1	63.6	64.1
Med Trucks:	59.6	45.9	44.5	44.2	50.8	51.1
Hvy Trucks:	56.1	34.1	30.0	34.0	40.4	40.5
<b>Traffic Noise:</b>	<b>65.8</b>	<b>61.2</b>	<b>60.3</b>	<b>56.4</b>	<b>63.8</b>	<b>64.3</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

**Scenario: MAXIMUM INCREASES BY ROAD CLASSIFICATION - WITHOUT PROJECT**

**Project: Fresno General Plan  
Site Conditions: Soft**

Vehicle Type	Vehicle Mix 1 (Collectors)			Vehicle Mix 2 (Arterials)			Vehicle Mix 3 (SR-41 Freeway)		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Automobiles	72.72%	12.09%	9.58%	73.30%	10.20%	10.00%	65.76%	13.48%	15.77%
Medium Trucks	4.16%	0.46%	0.31%	2.70%	0.30%	0.30%	1.48%	0.27%	0.75%
Heavy Trucks	0.23%	0.46%	0.01%	2.90%	0.20%	0.30%	1.37%	0.13%	1.00%
Vehicle Type	Vehicle Mix 4 (SR-99 Freeway)			Vehicle Mix 5 (SR-180 Freeway)			Vehicle Mix 6 (SR-168 Freeway)		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Automobiles	53.30%	10.92%	12.78%	65.76%	13.48%	15.77%	62.30%	12.77%	14.94%
Medium Trucks	2.86%	0.52%	1.45%	2.07%	0.38%	1.05%	5.10%	0.92%	2.58%
Heavy Trucks	9.95%	0.95%	7.27%	0.82%	0.08%	0.60%	0.77%	0.07%	0.56%

**Road Name: 6-Lane Expressway Segment: 0**

Average Daily Traffic: 13000 Vehicles Vehicle Speed: 50 MPH Vehicle Mix: 2 Roadway Classification: 6-Lane Expressway

Vehicle Type	NOISE PARAMETERS AT 110 FEET FROM CENTERLINE (Equiv. Lane Dist: 104.13 ft)						Centerline Distance to Noise Contour (in feet)		
	Noise Adjustments			Unmitigated Noise Levels			Ldn	CNEL	
	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL
Automobiles	71.12	-1.45	-4.88	63.6	61.4	58.9	54.0	62.4	62.91
Medium Trucks	78.79	-16.10	-4.88	56.6	40.1	36.6	31.8	40.6	41.03
Heavy Trucks	83.02	-15.84	-4.88	61.1	44.9	39.3	36.3	45.1	45.45
<b>Total:</b>				<b>66.1</b>	<b>61.6</b>	<b>59.0</b>	<b>54.1</b>	<b>62.5</b>	<b>63.0</b>

**Road Name: 6-Lane Super Arterial Segment: 0**

Average Daily Traffic: 26700 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: 6-Lane Arterial

Vehicle Type	NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)						Centerline Distance to Noise Contour (in feet)		
	Noise Adjustments			Unmitigated Noise Levels			Ldn	CNEL	
	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL
Automobiles	69.34	2.13	-5.57	64.7	62.6	60.0	55.2	63.5	64.0
Medium Trucks	77.62	-12.52	-5.57	58.3	41.9	38.3	33.6	42.3	42.8
Heavy Trucks	82.14	-12.26	-5.57	63.1	46.9	41.4	38.3	47.2	47.5
<b>Total:</b>				<b>67.5</b>	<b>62.7</b>	<b>60.1</b>	<b>55.3</b>	<b>63.7</b>	<b>64.2</b>

**Road Name: 3-Lane Arterial Segment: 0**

Average Daily Traffic: 6300 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 2 Roadway Classification: 3-Lane Arterial

Vehicle Type	NOISE PARAMETERS AT 77 FEET FROM CENTERLINE (Equiv. Lane Dist: 74.54 ft)						Centerline Distance to Noise Contour (in feet)		
	Noise Adjustments			Unmitigated Noise Levels			Ldn	CNEL	
	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL
Automobiles	67.36	-3.63	-2.70	59.8	57.7	55.1	50.3	58.7	59.2
Medium Trucks	76.31	-18.28	-2.70	54.1	37.6	34.1	29.4	38.1	38.6
Heavy Trucks	81.16	-18.02	-2.70	59.2	43.1	37.5	34.5	43.3	43.6
<b>Total:</b>				<b>63.1</b>	<b>57.9</b>	<b>55.2</b>	<b>50.4</b>	<b>58.8</b>	<b>59.3</b>







## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: **MAXIMUM INCREASES BY ROAD CLASSIFICATION - WITHOUT PROJECT**

Project: **Fresno General Plan**  
Site Conditions: **Soft**

Road Name: **Connector**

Segment: **0**

Average Daily Traffic: 100 Vehicles

Vehicle Speed: 40 MPH

Vehicle Mix: 2

Roadway Classification: 2-Lane Collector

Vehicle Type	NOISE PARAMETERS AT 72 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.26 ft)										Centerline Distance to Noise Contour (in feet)		
	Noise Adjustments				Unmitigated Noise Levels						Ldn	CNEL	
	REMEL Traffic Adj.	Dist Adj.	Finite Adj.		Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL			
Automobiles	67.36	-21.62	-2.41	-1.20	42.1	40.0	37.4	32.6	41.0	41.5	70 dBA:	<b>1</b>	<b>1</b>
Medium Trucks	76.31	-36.27	-2.41	-1.20	36.4	19.9	16.4	11.7	20.4	20.9	65 dBA:	<b>2</b>	<b>2</b>
Heavy Trucks	81.16	-36.01	-2.41	-1.20	41.5	25.4	19.8	16.8	25.6	25.9	60 dBA:	<b>4</b>	<b>4</b>
<b>Total:</b>					<b>45.4</b>	<b>40.2</b>	<b>37.5</b>	<b>32.7</b>	<b>41.1</b>	<b>41.6</b>	55 dBA:	<b>9</b>	<b>9</b>

## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

**Scenario: MAXIMUM INCREASES BY ROAD CLASSIFICATION - WITH PROJECT**

**Project: Fresno General Plan  
Site Conditions: Soft**

Vehicle Type	Vehicle Mix 1 (Collectors)				Vehicle Mix 2 (Arterials)				Vehicle Mix 3 (SR-41 Freeway)			
	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evening	Night	Daily
Automobiles	72.72%	12.09%	9.58%	94.39%	73.30%	10.20%	10.00%	93.40%	65.76%	13.48%	15.77%	95.00%
Medium Trucks	4.16%	0.46%	0.31%	4.92%	2.70%	0.30%	0.30%	3.20%	1.48%	0.27%	0.75%	2.50%
Heavy Trucks	0.23%	0.46%	0.01%	0.69%	2.90%	0.20%	0.30%	3.40%	1.37%	0.13%	1.00%	2.50%

**Road Name: 6-Lane Expressway      Segment: 0**  
 Average Daily Traffic: 88100 Vehicles      Vehicle Speed: 50 MPH      Vehicle Mix: 2      Roadway Classification: 6-Lane Expressway

Vehicle Type	NOISE PARAMETERS AT 110 FEET FROM CENTERLINE (Equiv. Lane Dist: 104.13 ft)										Centerline Distance to Noise Contour (in feet)		
	Noise Adjustments				Unmitigated Noise Levels						Ldn	CNEL	
	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL				
Automobiles	71.12	6.86	-4.88	-1.20	71.9	69.8	67.2	62.4	70.7	71.2	70 dBA:	125	135
Medium Trucks	78.79	-7.79	-4.88	-1.20	64.9	48.4	44.9	40.1	48.9	49.3	65 dBA:	270	291
Heavy Trucks	83.02	-7.53	-4.88	-1.20	69.4	53.2	47.6	44.6	53.5	53.8	60 dBA:	581	626
<b>Total:</b>					<b>74.4</b>	<b>69.9</b>	<b>67.3</b>	<b>62.5</b>	<b>70.8</b>	<b>71.3</b>	55 dBA:	<b>1251</b>	<b>1349</b>

**Road Name: 6-Lane Super Arterial      Segment: 0**  
 Average Daily Traffic: 87300 Vehicles      Vehicle Speed: 45 MPH      Vehicle Mix: 2      Roadway Classification: 6-Lane Arterial

Vehicle Type	NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)										Centerline Distance to Noise Contour (in feet)		
	Noise Adjustments				Unmitigated Noise Levels						Ldn	CNEL	
	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL				
Automobiles	69.34	7.28	-5.57	-1.20	69.9	67.7	65.2	60.3	68.7	69.2	70 dBA:	103	111
Medium Trucks	77.62	-7.38	-5.57	-1.20	63.5	47.0	43.5	38.7	47.5	47.9	65 dBA:	223	240
Heavy Trucks	82.14	-7.11	-5.57	-1.20	68.3	52.1	46.5	43.5	52.3	52.6	60 dBA:	480	517
<b>Total:</b>					<b>72.7</b>	<b>67.9</b>	<b>65.3</b>	<b>60.4</b>	<b>68.8</b>	<b>69.3</b>	55 dBA:	<b>1034</b>	<b>1114</b>

**Road Name: 3-Lane Arterial      Segment: 0**  
 Average Daily Traffic: 19900 Vehicles      Vehicle Speed: 40 MPH      Vehicle Mix: 2      Roadway Classification: 3-Lane Arterial

Vehicle Type	NOISE PARAMETERS AT 77 FEET FROM CENTERLINE (Equiv. Lane Dist: 74.54 ft)										Centerline Distance to Noise Contour (in feet)		
	Noise Adjustments				Unmitigated Noise Levels						Ldn	CNEL	
	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL				
Automobiles	67.36	1.37	-2.70	-1.20	64.8	62.7	60.1	55.3	63.7	64.1	70 dBA:	30	32
Medium Trucks	76.31	-13.29	-2.70	-1.20	59.1	42.6	39.1	34.4	43.1	43.5	65 dBA:	64	69
Heavy Trucks	81.16	-13.02	-2.70	-1.20	64.2	48.1	42.5	39.5	48.3	48.6	60 dBA:	138	149
<b>Total:</b>					<b>68.1</b>	<b>62.9</b>	<b>60.2</b>	<b>55.4</b>	<b>63.8</b>	<b>64.3</b>	55 dBA:	<b>298</b>	<b>321</b>





## FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

**Scenario: MAXIMUM INCREASES BY ROAD CLASSIFICATION - WITH PROJECT**

**Project: Fresno General Plan  
Site Conditions: Soft**

**Road Name: Connector**

**Segment: 0**

Average Daily Traffic: 13700 Vehicles

Vehicle Speed: 40 MPH

Vehicle Mix: 2

Roadway Classification: 2-Lane Collector

Vehicle Type	NOISE PARAMETERS AT 72 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.26 ft)										Centerline Distance to Noise Contour (in feet)		
	Noise Adjustments				Unmitigated Noise Levels						Ldn	CNEL	
REMEF Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL	Ldn	CNEL			
Automobiles	67.36	-0.26	-2.41	-1.20	63.5	61.4	58.8	54.0	62.3	62.8	70 dBA:	<b>23</b>	<b>24</b>
Medium Trucks	76.31	-14.91	-2.41	-1.20	57.8	41.3	37.8	33.0	41.8	42.2	65 dBA:	<b>49</b>	<b>53</b>
Heavy Trucks	81.16	-14.64	-2.41	-1.20	62.9	46.7	41.1	38.1	47.0	47.3	60 dBA:	<b>105</b>	<b>114</b>
<b>Total:</b>					<b>66.8</b>	<b>61.5</b>	<b>58.9</b>	<b>54.1</b>	<b>62.5</b>	<b>63.0</b>	55 dBA:	<b>227</b>	<b>245</b>