Appendix I

Noise Study Report

Noise Study Report
Interstate 20 Improvements

Vicksburg, Mississippi

March 11, 2011

Prepared for:

The Mississippi Department of Transportation

Prepared by:

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LIST OF ACRONYMS

ADT	Average Daily Traffic
CFR	Code of Federal Regulations
dB	Decibels
dBA	Decibels, A-weighted
DHV	Design Hourly Volume
EA	Environmental Assessment
ft	feet
h	hour
L_{10}	Noise level exceeded 10% of the time
Leq	Equivalent Continuous Sound Level
MDOT	Mississippi Department of Transportation
NAC	Noise Abatement Criteria
SR	State Route
TSM	Transportation System Management
vpd	vehicles per day

1.0 Introduction

The Mississippi Department of Transportation (MDOT) is conducting an Environmental Assessment (EA) for proposed improvements to Interstate 20 and the interstate frontage roads through Vicksburg, Mississippi. At present, Interstate 20 is a four-lane divided freeway with a posted 60 mile per hour speed limit. Existing frontage roads parallel I-20 to the north and south between Old State Route 27 and Halls Ferry Road. The north and south frontage roads are two-lane, two-way roadways.

The proposed improvements will begin at the Washington Avenue interchange and continue east through the US Highway 61 North interchange. The existing frontage roads between Halls Ferry Road and Old State Route 27 will be improved and tied into new collector distributer (CD) roads on both sides of I-20 east of Old SR 27. The CD road will serve the Clay Street and US 61 North interchanges. In Alternative B, the frontage roads would be converted to one-way operation with three lanes in each direction. For Alternative B, the frontage roads will have the same one-way direction as their adjacent interstate lanes. In Alternative C, the frontage roads would be widened to include a center two-way left-turn lane and maintain one-lane per direction on both sides of the interstate. In both Alternatives B and C, improvements will be made to the interchanges at:

- US Highway 61 South (Exit 1B),
- Halls Ferry Road (Exit 1C),
- Indiana Avenue (Exit 3),
- Clay Street (Exits 4A and 4B), and
- US Highway 61 North (Exits 5A and 5B).

Alternative A, representing the no build scenario, was also analyzed and is presented in this report.

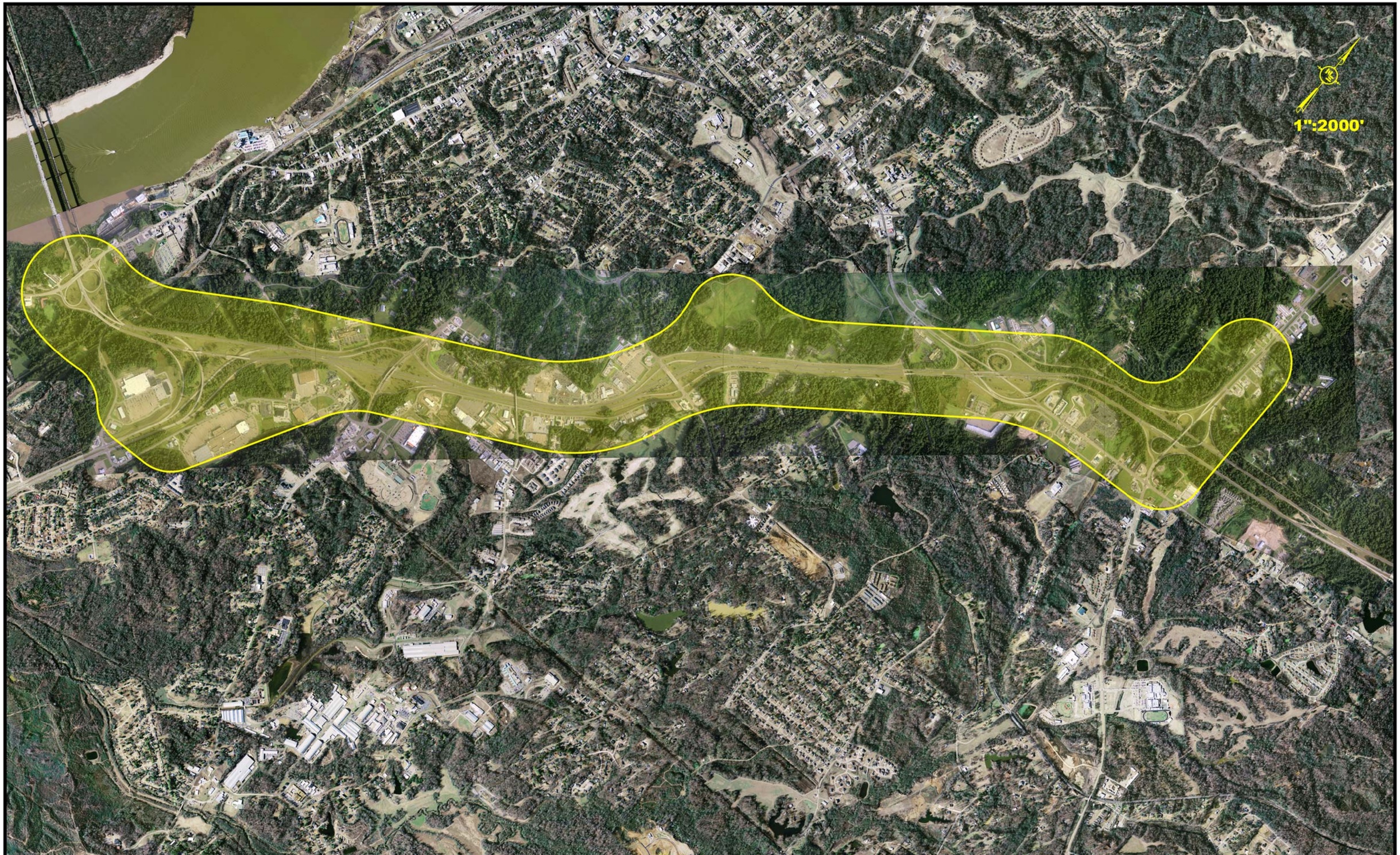
Roadway plans and aerial photography were used as the base map of the proposed project; therefore, it was necessary to base this noise study on planned alignments depicted on these

plans. The distances from the pavement edge of the proposed project to occupied facilities are approximate. Since noise level calculations are based on the distance from the pavement centerline to occupied facilities, noise level estimates at each facility are also approximate.

A noise study was conducted for the proposed project to:

- predict the effects that the proposed project will have on the noise environment,
- identify where noise impact is likely to occur,
- determine if there are any feasible noise abatement measures that will eliminate or reduce the expected noise impact, and
- satisfy the requirements of Title 23 of the *Code of Federal Regulations Part 772* (23 CFR 772).

Figure 1 presents the study area, Alternative B is shown in **Figure 2**, and Alternative C is shown in **Figure 3**.



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PROJECT STUDY AREA
INTERSTATE 20, VICKSBURG, MS

FIGURE
1

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ALTERNATE B: ONE-WAY FRONTAGE ROADS

FIGURE
2

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ALTERNATE C: TWO-WAY FRONTAGE ROADS

FIGURE
3

2.0 Fundamentals of Sound and Noise

The intensity or loudness of sound is measured in units called decibels (dB). However, since the human ear does not hear sound waves of different frequencies at the same subjective loudness, an adjustment or weighting of the high-pitched and low-pitched sounds is made to approximate how an average person hears sounds. When such adjustments to the sound levels are made, they are called "A-weighted levels" and are usually labeled "dBA." **Table 1** presents some common A-weighted noise levels.

Table 1.
Common Indoor and Outdoor Noise Levels[1]

Common Outdoor Noise Levels	Noise Level (dBA)	Common Indoor Noise Levels
Jet Flyover at 1,000 ft.	110	Rock Band
Gas Lawnmower at 3 ft.	100	
Diesel Truck at 50 ft.	90	Inside Subway Train (New York)
Noisy Urban Daytime	80	Food Blender at 3 ft. Garbage Disposal at 3 ft. Shouting at 3 ft.
Gas Lawn Mower at 100 ft.	70	Vacuum Cleaner at 10 ft. Normal Speech at 3 ft.
Commercial Area Heavy Traffic at 300 ft.	60	Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Small Theater, Large Conference Room (Background) Library
Quiet Suburban Nighttime	30	Bedroom at Night Concert Hall (Background)
Quiet Rural Nighttime	20	Broadcast and Recording Studio
	10	Threshold of hearing
	0	

[1] *Fundamentals and Abatement of Highway Traffic Noise*, Bolt Beranek and Newman Inc., June 1973.

The decibel scale for measuring the intensity of sound is based on the logarithm of the sound level pressure relative to a reference sound level pressure. Logarithmic scales are based on powers of ten, and are not linear.

It has been found that a 10 dBA increase in the sound level is perceived to be doubling of the sound level as heard by the human ear. This means that a sound level of 60 dBA sounds twice as loud as a sound level of 50 dBA and sound level of 70 dBA sounds twice as loud as a sound level of 60 dBA. Also, this means that a sound level of 70 dBA sounds four times as loud as a sound level of 50 dBA.

Because of the logarithmic nature of the decibel scale for sound levels, changes in sound levels are complex to define. For example, if a sound of 60 dBA is added to another sound of 60 dBA, the resulting sound is 63 dBA instead of 120 dBA.

Noise is defined as unwanted sound. Since highway traffic sound is normally unwanted, highway traffic sound is usually called highway traffic noise. The level of highway traffic noise is never constant; therefore, it is necessary to use a statistical descriptor to describe the varying traffic noise levels. The equivalent continuous sound level (Leq) is the statistical descriptor used in this report. The Leq sound level is the steady A-weighted sound level which would produce the same A-weighted sound energy over a stated period of time as specified time-varying sound.

3.0 Noise Impact Criteria

Title 23 of the Code of Federal Regulations, Part 772 (23 CFR 772) defines traffic noise impacts as "impacts which occur when the predicted traffic noise levels approach or exceed the Noise Abatement Criteria (NAC) or when the predicted traffic noise levels substantially exceed the existing noise levels." **Table 2** indicates the criteria for residential and commercial facilities.

A memorandum dated December 1, 1993 from the Director, Office of Environment and Planning, Federal Highway Administration, states that, "effective from the date of this memorandum, all State Highway Agencies must establish a definition of 'approach' that is at least 1 dBA less than the NAC for use in identifying traffic noise impacts in traffic noise analysis." Therefore, MDOT has defined "approach" to be 1 dBA less than the NAC. MDOT has also defined a substantial increase in traffic noise levels to be 15 dBA or more.

Table 2. Noise Abatement Criteria
Hourly A-Weighted Sound Levels – Decibels (dBA)[2]

Activity Category		Leq (h)		L_{10}(h)		Description of Activity Category
A		57 (Exterior)		60 (Exterior)		Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B		67 (Exterior)		70 (Exterior)		Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C		72 (Exterior)		75 (Exterior)		Developed lands, properties, or activities not included in Categories A or B above
D		—		—		Undeveloped lands.
E		52 (Interior)		55 (Interior)		Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

[1]Either L_{10}(h) or Leq(h) (but not both) may be used on a project.

4.0 Noise Level Measurements

Noise level measurements were recorded at 20 sites in the vicinity of the proposed alignments on March 25 through April 1, 2010 using a Quest-Model 2500 sound level meter during hours of maximum traffic volume. These sites are illustrated in **Figures 4** through **7** as Noise Receivers 3, 5, 6, 9, 13, 14, 17, 23, 36, 49, 53, 66, 68, 77, 79, 87, 93, 107, 108, and 114. The sound level meter was checked with an acoustical calibrator before and after each noise level measurement was taken. The results of the measurements are listed in **Table 3**. In recording the noise measurements, it was noted that the areas were largely commercial and were typically designed to be within the line of sight of motorists on roadways with high traffic volumes. The difference in what was measured in the field and what the model predicted was negligible.

5.0 Noise Level Estimates

Estimates were made for existing (2007) conditions, design year (2040) conditions if Alternative B is constructed, design year (2040) conditions if Alternative C is constructed, and design year (2040) conditions if neither of the proposed alternatives is constructed (Alternative A). In making these estimates the traffic volume, operating speed, and terrain were considered. The results are given in **Table 3**. Printouts from the traffic noise model runs are provided in the appendix.

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NOISE RECEPTOR LOCATIONS

FIGURE
4

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FIGURE
5

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FIGURE
6

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NOISE RECEPTOR LOCATIONS

FIGURE 7

Table 3. Exterior Noise Levels

Noise Receiver	Category and 23 CFR 722 Noise Abatement Level (Leq) dBA	Traffic Noise Source(s)	Distance from Receiver to Existing Centerline	Distance from Receiver to Alternative B and Alternate C Centerline	Existing			2040 No Build		2040 Alternative B		2040 Alternative C	
					Measured Leq (dBA)	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact
1	Hotel 67	I-20	490	490	-	60.8	No	63.6	No	63.6	No	63.6	No
2	Visitor Center 67	I-20	130	130	-	***70.5***	***Yes***	***73.7***	***Yes***	***73.7***	***Yes***	***73.7***	***Yes***
3	Hotel 67	I-20	880	880	58.7	58.9	No	61.8	No	61.7	No	61.7	No
4	Residential 67	I-20	345	345	-	62.7	No	***66.4***	***Yes***	***66.3***	***Yes***	***66.3***	***Yes***
5	Commercial 72	I-20	900	1015	56.1	56.5	No	59.5	No	61.6	No	61.6	No
6	Commercial 72	I-20	1340	1460	64.9	63.7	No	67.0	No	63.8	No	63.8	No
7	Commercial 72	I-20	1000	1125	-	58.7	No	62.0	No	58.1	No	58.1	No
8	Residential 67	I-20	405	380	-	63.6	No	***66.6***	***Yes***	***68.2***	***Yes***	***68.2***	***Yes***
9	Commercial 72	I-20	305	305	67.1	68.1	No	***71.2***	***Yes***	68.5	No	68.5	No
10	Commercial 72	I-20	415	415	-	65.0	No	67.6	No	65.6	No	65.6	No
11	Commercial 72	I-20	510	510	-	52.3	No	54.8	No	54.4	No	54.4	No
12	Hotel 67	I-20	325	325	-	63.7	No	***66.5***	***Yes***	64.6	No	64.6	No
13	Hotel 67	I-20	580	580	54.0	51.1	No	53.0	No	53.5	No	53.5	No
14	Commercial 72	I-20	550	550	62.9	66.6	No	69.2	No	67.5	No	67.5	No
15	Residential 67	Halls Ferry	295	295	-	54.9	No	57.2	No	57.3	No	57.1	No

Table 3. Exterior Noise Levels, Continued

Noise Receiver	Category and 23 CFR 722 Noise Abatement Level (Leq) dBA	Traffic Noise Source(s)	Distance from Receiver to Existing Centerline	Distance from Receiver to Alternative B and Alternate C Centerline	Existing			2040 No Build		2040 Alternative B		2040 Alternative C	
					Measured Leq (dBA)	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact
16	Hotel 67	I-20	360	360	-	61.3	No	64.1	No	***66.0***	***Yes***	***66.1***	***Yes***
17	Commercial 72	I-20	255	255	68.8	70.8	No	***73.4***	***Yes***	70.9	No	70.7	No
18	Commercial 72	I-20	190	190	-	69.4	No	***71.7***	***Yes***	69.5	No	69.4[B]	No[B]
19	Commercial 72	I-20	195	195	-	67.9	No	70.2	No	69.7[B]	No[B]	69.6[B]	No[B]
20	Residential 67	I-20	330	330	-	***66.0***	***Yes***	***68.5***	***Yes***	***69.1***	***Yes***	***68.9***	***Yes***
21	Commercial 72	I-20	170	170	-	***72.6***	***Yes***	***75.1***	***Yes***	***74.5***	***Yes***	***74.6***	***Yes***
22	Commercial 72	I-20	200	200	-	66.1	No	69.0	No	68.7	No	69.1	No
23	Commercial 72	I-20	185	185	***70.1***	***72.4***	***Yes***	***75.4***	***Yes***	***76.2***	***Yes***	***76.1***	***Yes***
24	Commercial 72	I-20	195	195	-	***71.5***	***Yes***	***74.4***	***Yes***	***75.0***	***Yes***	***74.9***	***Yes***
25	Commercial 72	I-20	210	210	-	70.8	No	***73.8***	***Yes***	***74.7***	***Yes***	***74.6***	***Yes***
26	Commercial 72	I-20	220	220	-	70.1	No	***73.1***	***Yes***	***74.5***	***Yes***	***74.3***	***Yes***
27	Commercial 72	I-20	185	185	-	***71.5***	***Yes***	***74.5***	***Yes***	***75.4***	***Yes***	***75.5***	***Yes***
28	Commercial 72	I-20	305	305	-	67.9	No	70.9	No	70.6	No	70.8	No
29	Commercial 72	I-20	310	310	-	66.6	No	69.5	No	69.4	No	70.2[B]	No[B]
30	Commercial 72	Indiana Ave.	155	155	-	55.8	No	58.2	No	58.7	No	58.6	No

Table 3. Exterior Noise Levels, Continued

Noise Receiver	Category and 23 CFR 722 Noise Abatement Level (Leq) dBA	Traffic Noise Source(s)	Distance from Receiver to Existing Centerline	Distance from Receiver to Alternative B and Alternate C Centerline	Existing			2040 No Build		2040 Alternative B		2040 Alternative C	
					Measured Leq (dBA)	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact
31	Commercial 72	I-20	535	535	-	60.3	No	62.7	No	63.0	No	68.9[B]	No[B]
32	Residential 67	I-20	640	640	-	58.4	No	60.8	No	59.8	No	60.3	No
33	Commercial 72	I-20	180	180	-	70.3	No	***73.2***	***Yes***	***72.4***	***Yes***	***72.5***	***Yes***
34	Commercial 72	I-20	235	235	-	68.4	No	***71.3***	***Yes***	***71.8***	***Yes***	***71.8***	***Yes***
35	Commercial 72	I-20	215	215	-	63.5	No	66.3	No	69.2	No	69.4	No
36	Commercial 72	I-20	280	280	64.2	65.8	No	68.8	No	70.1	No	70.4	No
37	Commercial 72	I-20	260	260	-	68.3	No	***71.3***	***Yes***	***72.5***	***Yes***	***72.5***	***Yes***
38	Commercial 72	I-20	225	225	-	68.0	No	70.9	No	***71.7***	***Yes***	***72.0***	***Yes***
39	Commercial 72	I-20	425	425	-	60.4	No	63.3	No	63.3	No	63.4	No
40	Commercial 72	I-20	375	375	-	63.5	No	66.4	No	65.9	No	66.1	No
41	Commercial 72	I-20	415	415	-	65.9	No	68.8	No	68.6	No	69.2	No
42	Commercial 72	I-20	465	465	-	65.8	No	68.7	No	68.4	No	68.7	No
43	Commercial 72	I-20	475	475	-	63.0	No	66.0	No	66.0	No	65.7	No
44	Commercial 72	I-20	335	335	-	67.4	No	70.3	No	68.8	No	68.8	No
45	Commercial 72	I-20	405	405	-	65.9	No	68.5	No	67.6[B]	No[B]	68.0[B]	No[B]

Table 3. Exterior Noise Levels, Continued

Noise Receiver	Category and 23 CFR 722 Noise Abatement Level (Leq) dBA	Traffic Noise Source(s)	Distance from Receiver to Existing Centerline	Distance from Receiver to Alternative B and Alternate C Centerline	Existing			2040 No Build		2040 Alternative B		2040 Alternative C	
					Measured Leq (dBA)	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact
46	Residential 67	I-20	645	645	-	63.7	No	***66.6***	***Yes***	***66.9***	***Yes***	***67.3***	***Yes***
47	Residential 67	I-20	700	700	-	62.7	No	65.6	No	65.8	No	***66.2***	***Yes***
48	Hotel 67	I-20	405	405	-	***68.2***	***Yes***	***71.0***	***Yes***	***71.1***	***Yes***	***71.3***[B]	***Yes***[B]
49	Commercial 72	I-20	670	670	60.1	62.5	No	65.2	No	65.4	No	68.1[B]	No[B]
50	Commercial 72	I-20	620	620	-	60.0	No	62.4	No	63.0	No	64.9[B]	No[B]
51	Commercial 72	Indiana Ave.	140	140	-	61.9	No	64.4	No	64.8	No	70.3[B]	No[B]
52	Commercial 72	Indiana Ave.	140	140	-	60.6	No	62.9	No	64.1	No	66.1	No
53	Commercial 72	I-20	290	290	58.4	66.6	No	69.5	No	69.4[B]	No[B]	70.3[B]	No[B]
54	National Park 67	I-20	770	770	-	53.8	No	56.8	No	56.3	No	57.6	No
55	National Park 67	I-20	1500	1500	-	48.7	No	51.6	No	52.1	No	53.2	No
56	Commercial 72	I-20	265	265	-	62.4	No	65.2	No	68.8	No	70.9	No
57	Commercial 72	I-20	245	245	-	61.7	No	64.5	No	69.0	No	70.4[B]	No[B]
58	Commercial 72	I-20	320	320	-	62.0	No	65.0	No	69.2	No	***71.9***	***Yes***
59	Church 67	I-20	310	310	-	***69.0***	***Yes***	***72.0***	***Yes***	***74.1***	***Yes***	***76.2***	***Yes***
60	Residential 67	I-20	220	220	-	***72.9***	***Yes***	***75.9***	***Yes***	***75.4***[B]	***Yes***[B]	***76.9***[B]	***Yes***[B]

Table 3. Exterior Noise Levels, Continued

Noise Receiver	Category and 23 CFR 722 Noise Abatement Level (Leq) dBA	Traffic Noise Source(s)	Distance from Receiver to Existing Centerline	Distance from Receiver to Alternative B and Alternate C Centerline	Existing			2040 No Build		2040 Alternative B		2040 Alternative C	
					Measured Leq (dBA)	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact
61	Residential 67	I-20	495	495	-	64.4	No	***67.4***	***Yes***	***69.3***	***Yes***	***70.6***	***Yes***
62	Residential 67	I-20	215	215	-	***73.0***	***Yes***	***76.0***	***Yes***	***75.2***[B]	***Yes***[B]	***75.9***[B]	***Yes***[B]
63	Commercial 72	I-20	250	250	-	69.1	No	***71.9***	***Yes***	68.4	No	68.8	No
64	Commercial 72	I-20	400	400	-	65.3	No	68.2	No	66.0	No	66.1	No
65	Hotel 67	Clay St.	155	155	-	59.2	No	61.7	No	61.3	No	61.4	No
66	Hotel 67	I-20	335	335	65.0	***66.9***	***Yes***	***69.9***	***Yes***	63.4	No	63.4	No
67	Commercial 72	I-20	490	490	-	63.7	No	66.6	No	66.3	No	68.5	No
68	Residential 67	I-20	335	335	62.5	64.5	No	***67.5***	***Yes***	***68.7***	***Yes***	***72.3***	***Yes***
69	Commercial 72	I-20	265	265	-	61.8	No	64.6	No	68.5[B]	No[B]	***72.6***[B]	***Yes***[B]
70	Residential 67	I-20	480	480	-	64.3	No	***67.2***	***Yes***	***70.3***	***Yes***	***73.2***	***Yes***
71	Residential 67	I-20	545	545	-	62.3	No	65.3	No	***68.9***	***Yes***	***71.9***	***Yes***
72	Residential 67	I-20	250	250	-	***71.3***	***Yes***	***74.2***	***Yes***	***75.6***[B]	***Yes***[B]	***78.7***[B]	***Yes***[B]
73	Residential 67	I-20	335	335	-	***68.3***	***Yes***	***71.3***	***Yes***	***73.4***[B]	***Yes***[B]	***76.1***[B]	***Yes***[B]
74	Residential 67	I-20	555	555	-	63.2	No	***66.1***	***Yes***	***68.7***	***Yes***	***69.8***	***Yes***
75	Residential 67	I-20	500	500	-	61.4	No	64.2	No	***66.9***	***Yes***	***67.7***	***Yes***

Table 3. Exterior Noise Levels, Continued

Noise Receiver	Category and 23 CFR 722 Noise Abatement Level (Leq) dBA	Traffic Noise Source(s)	Distance from Receiver to Existing Centerline	Distance from Receiver to Alternative B and Alternate C Centerline	Existing			2040 No Build		2040 Alternative B		2040 Alternative C	
					Measured Leq (dBA)	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact
76	Residential 67	I-20	305	305	-	60.1	No	63.0	No	***66.3***	***Yes***	***67.4***	***Yes***
77	Hotel 67	I-20	500	500	50.6	52.8	No	55.8	No	54.3	No	54.1	No
78	Commercial 72	I-20	735	735	-	55.0	No	57.8	No	60.9	No	60.1	No
79	Hotel 67	Clay St.	480	480	60.7	58.4	No	61.3	No	62.6	No	62.7	No
80	Hotel 67	I-20	960	960	-	60.7	No	63.7	No	63.8	No	63.9	No
81	Commercial 72	I-20	800	800	-	61.5	No	64.6	No	64.6	No	64.7	No
82	Residential 67	I-20	730	730	-	63.5	No	***66.6***	***Yes***	***66.0***	***Yes***	***66.1***	***Yes***
83	Residential 67	I-20	545	545	-	60.2	No	63.2	No	63.1	No	63.1	No
84	Residential 67	I-20	495	495	-	62.4	No	65.5	No	64.2	No	64.3	No
85	Residential 67	I-20	405	405	-	63.9	No	***67.0***	***Yes***	64.1	No	64.1	No
86	Residential 67	I-20	410	375	-	62.9	No	***66.0***	***Yes***	***66.2***	***Yes***	***66.2***	***Yes***
87	Residential 67	I-20	310	270	60.2	62.0	No	65.1	No	***67.6***	***Yes***	***67.7***	***Yes***
88	Residential 67	I-20	285	230	-	***67.2***	***Yes***	***70.3***	***Yes***	***74.0***	***Yes***	***74.0***	***Yes***
89	Residential 67	I-20	435	360	-	59.9	No	63.0	No	***67.5***	***Yes***	***67.6***	***Yes***
90	Commercial 72	Clay St	470	590	-	61.3	No	64.0	No	63.5	No	63.2	No

Table 3. Exterior Noise Levels, Continued

Noise Receiver	Category and 23 CFR 722 Noise Abatement Level (Leq) dBA	Traffic Noise Source(s)	Distance from Receiver to Existing Centerline	Distance from Receiver to Alternative B and Alternate C Centerline	Existing			2040 No Build		2040 Alternative B		2040 Alternative C	
					Measured Leq (dBA)	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact
91	Commercial 72	Clay St	330	330	-	62.4	No	64.9	No	64.1	No	64.0	No
92	Commercial 72	I-20	450	450	-	63.0	No	65.7	No	67.3	No	67.4	No
93	Commercial 72	I-20	385	430	58.1	60.0	No	63.0	No	63.1	No	63.1	No
94	Commercial 72	I-20	390	490	-	56.0	No	59.0	No	57.5	No	57.5	No
95	Commercial 72	Clay St	190	190	-	60.8	No	62.8	No	62.8	No	62.8	No
96	Hotel 67	Clay St	105	105	-	63.9	No	65.7	No	65.8	No	65.8	No
97	Hotel 67	Clay St	275	275	-	59.0	No	61.5	No	61.3	No	61.3	No
98	Commercial 72	Clay St	140	140	-	62.0	No	63.9	No	63.6	No	63.6	No
99	Commercial 72	Clay St	125	125	-	62.5	No	64.2	No	64.0	No	64.0	No
100	Commercial 72	Clay St	110	110	-	62.9	No	64.5	No	64.4	No	64.3	No
101	Commercial 72	Clay St	125	125	-	61.4	No	63.1	No	63.0	No	63.0	No
102	Commercial 72	Clay St	195	195	-	57.1	No	59.1	No	59.1	No	59.1	No
103	Commercial 72	Clay St	90	90	-	62.8	No	64.4	No	64.4	No	64.4	No
104	Commercial 72	Clay St	170	170	-	58.2	No	60.0	No	59.9	No	59.9	No
105	Commercial 72	Clay St	180	180	-	57.3	No	59.1	No	59.2	No	59.2	No

Table 3. Exterior Noise Levels, Continued

Noise Receiver	Category and 23 CFR 722 Noise Abatement Level (Leq) dBA	Traffic Noise Source(s)	Distance from Receiver to Existing Centerline	Distance from Receiver to Alternative B and Alternate C Centerline	Existing			2040 No Build		2040 Alternative B		2040 Alternative C	
					Measured Leq (dBA)	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact	Estimated Leq (dBA)	Noise Impact
106	Commercial 72	Clay St	200	200	-	57.8	No	59.7	No	59.6	No	59.6	No
107	Commercial 72	US 61 N.	85	85	66.4	64.4	No	66.5	No	66.0	No	66.0	No
108	Hotel 67	Clay St	115	115	62.3	62.8	No	64.6	No	64.6	No	64.6	No
109	Residential 67	US 61 N.	380	380	-	61.1	No	64.0	No	65.6	No	65.6	No
110	Residential 67	US 61 N.	320	320	-	60.0	No	62.7	No	62.9	No	62.9	No
111	Residential 67	US 61 N.	280	280	-	59.9	No	62.5	No	62.4	No	62.4	No
112	Residential 67	US 61 N.	340	340	-	57.6	No	60.2	No	60.1	No	60.1	No
113	Commercial 72	US 61 N.	145	145	-	65.0	No	67.3	No	67.3	No	67.3	No
114	Church 67	US 61 N.	150	150	***67.6***	***65.0***	***Yes***	***67.4***	***Yes***	***67.4***	***Yes***	***67.4***	***Yes***
115	Commercial 72	US 61 N.	170	170	-	63.9	No	66.5	No	66.5	No	66.5	No
116	Commercial 72	US 61 N.	160	160	-	65.3	No	68.0	No	68.1[B]	No[B]	68.1[B]	No[B]
117	Commercial 72	US 61 N.	160	160	-	65.9	No	68.5	No	68.5	No	68.5	No

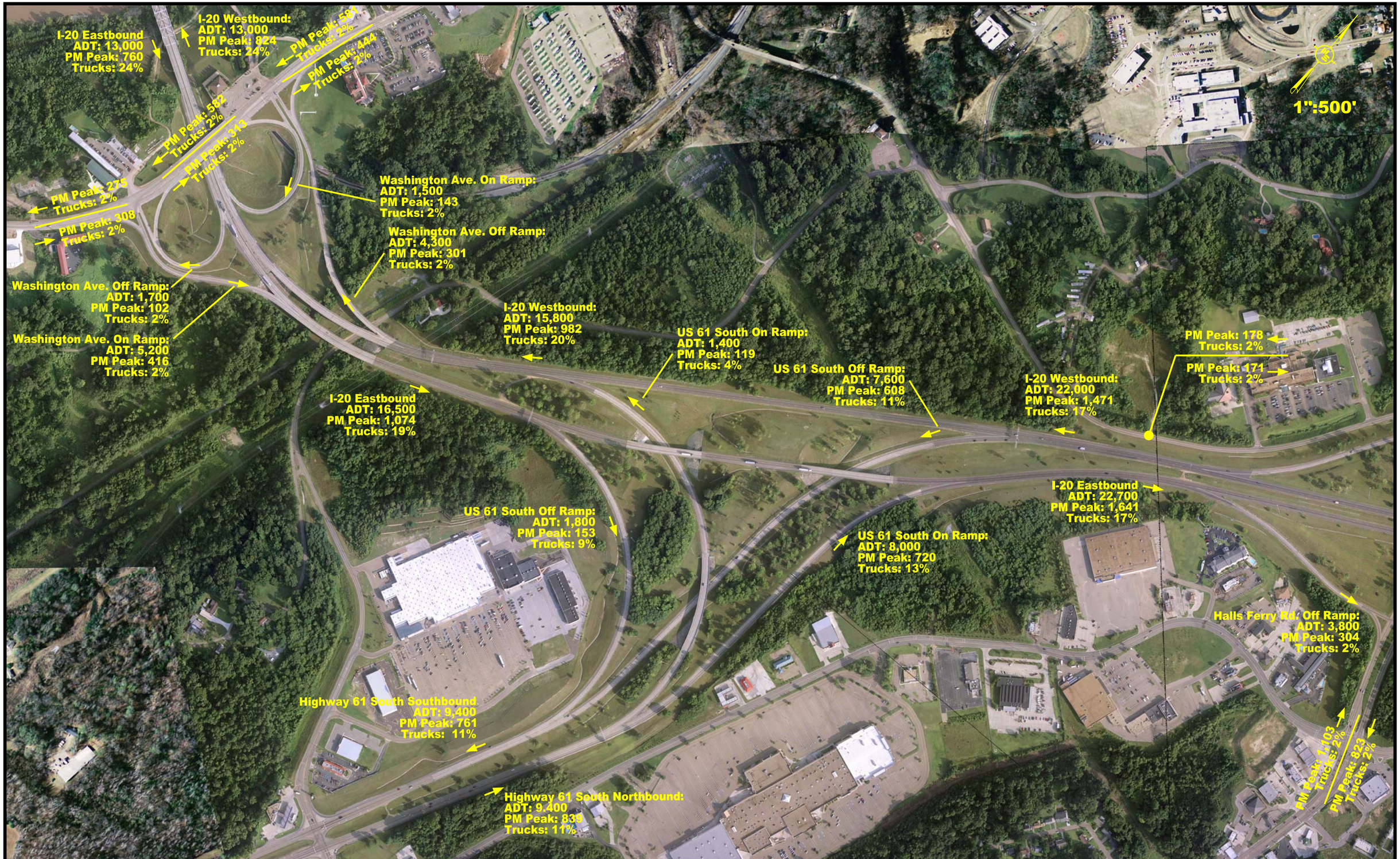
Notes: (A) The Mississippi Department of Transportation has defined 1 dBA below the 23 CFR 722 Noise Abatement Level as approaching. and thus results exceeding 1 dBA below the stated noise abatement level are considered as impacts. **(B)** The indicated noise receiver is located on a site that will be displaced by the indicated alternative.

Source: Neel-Schaffer, Inc.

6.0 Traffic

Paragraph b, Section 772.17 of 23 CFR 772 says that, "in predicting noise levels and assessing noise impacts, traffic characteristics which will yield the worst hourly traffic noise impact on a regular basis for the design year shall be used." Since the level of highway traffic noise is normally related directly to the traffic volume, the traffic characteristics which will yield the worst hourly traffic noise impact on a regular basis for the design year will be the average hourly volume for the highest hour of each day of the design year. For this study, the heaviest peak hour traffic volume predicted by a traffic analysis of the concepts was used.

The traffic analysis found that the interstate and frontage roads in Vicksburg have one dominate peak hour occurring during the late afternoon. No clear AM or mid-day peak hour was observed in the traffic analysis. Instead, it was noted that there is consistent and steady increase in traffic throughout the day that culminates in a PM peak hour. **Figures 8** through **11** provide existing (2007) PM peak hour traffic volumes. **Figures 12** through **15** provide the projected 2040 no build traffic volumes. **Figures 16** through **19** provide the projected 2040 traffic volumes for Alternate B (one-way frontage roads). **Figures 20** through **23** provide the projected PM peak hour traffic volumes for Alternate C (two-way frontage roads).



NEEL-SCHAFFER
Solutions you can build upon

EXISTING TRAFFIC VOLUMES (2007)

FIGURE
8

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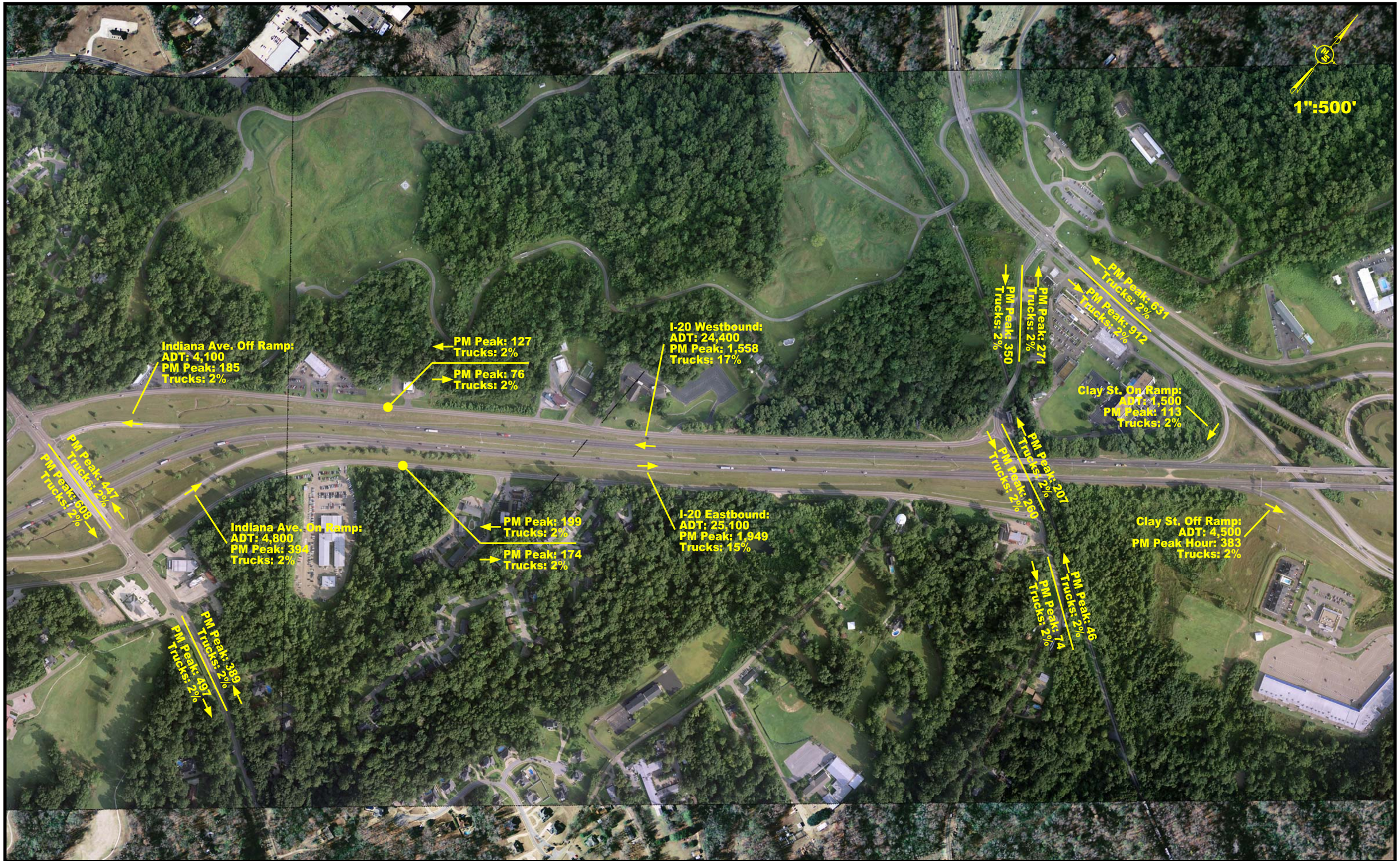
EXISTING TRAFFIC VOLUMES (2007)

FIGURE
9



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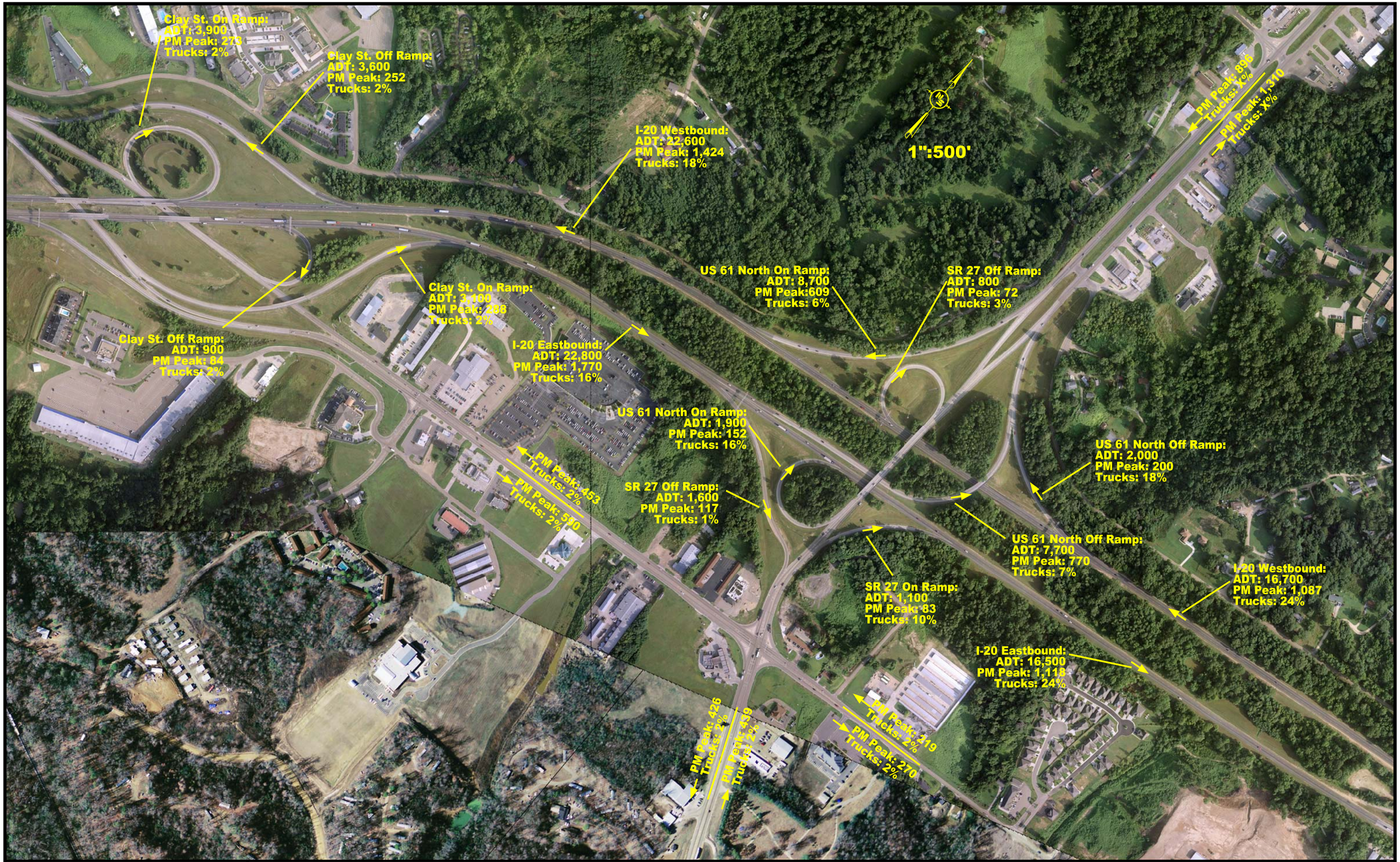
EXISTING TRAFFIC VOLUMES (2007)

FIGURE
10



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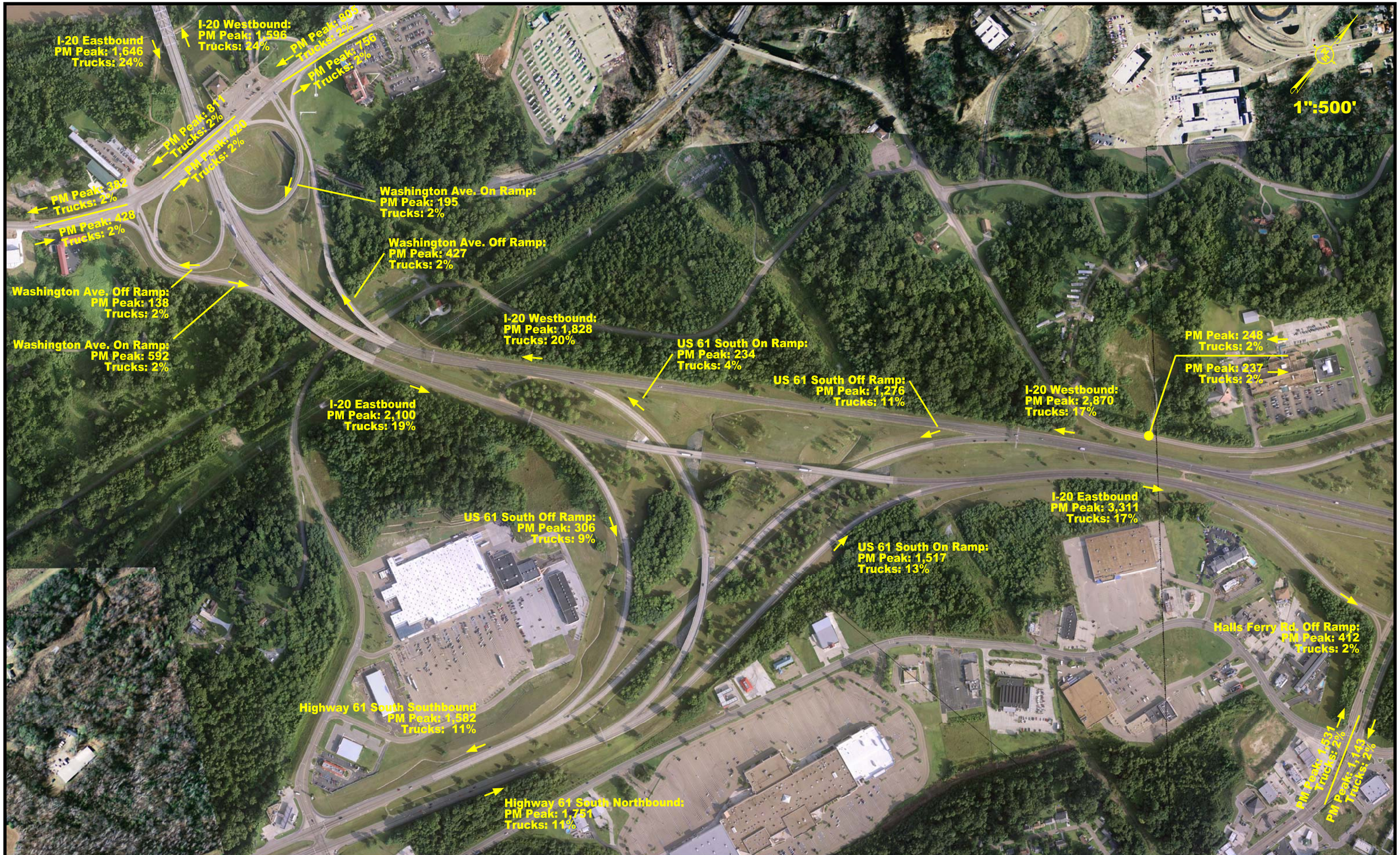
EXISTING TRAFFIC VOLUMES (2007)

FIGURE
11



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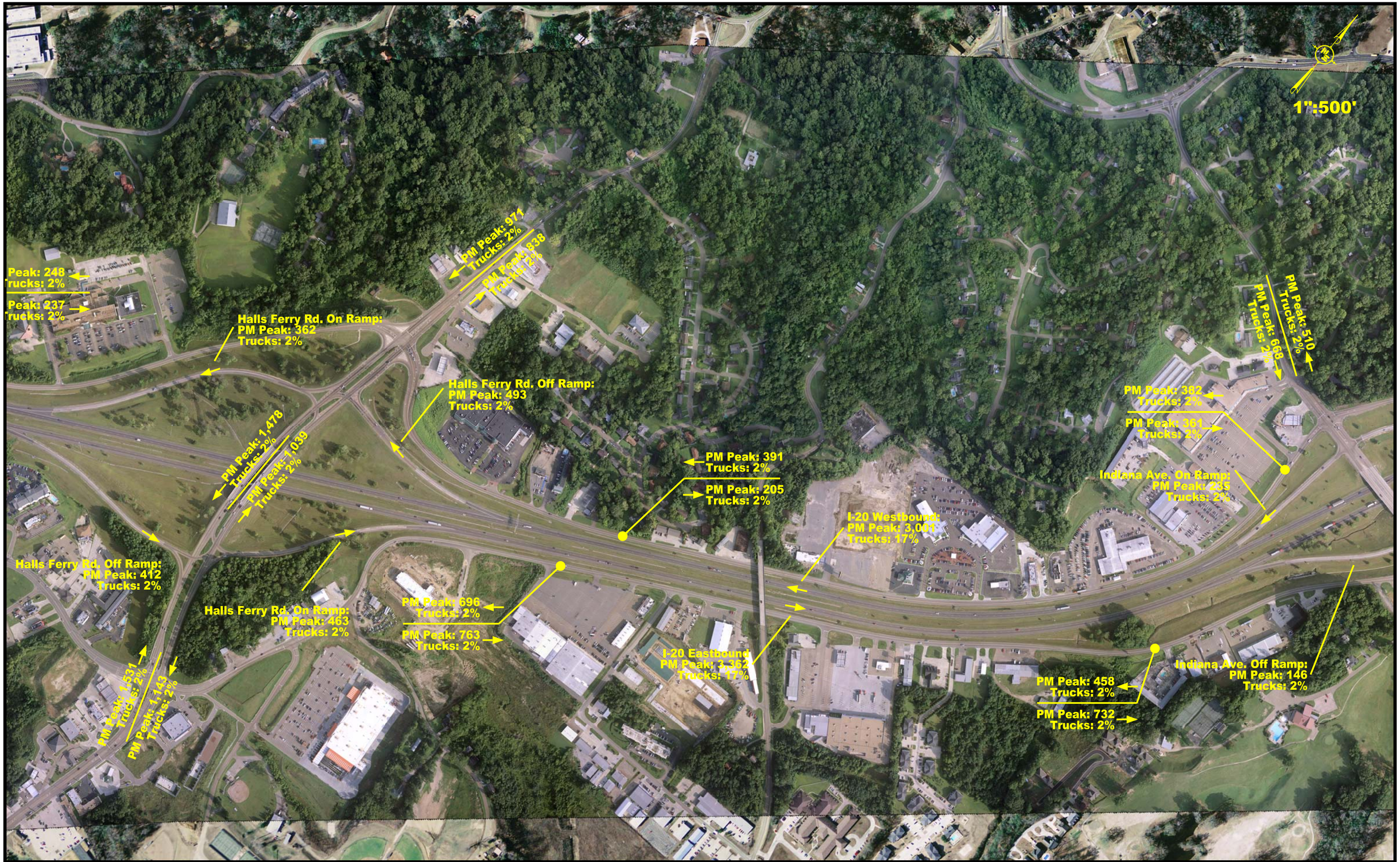
ALTERNATE A TRAFFIC VOLUMES (2040 NO BUILD)

FIGURE
12



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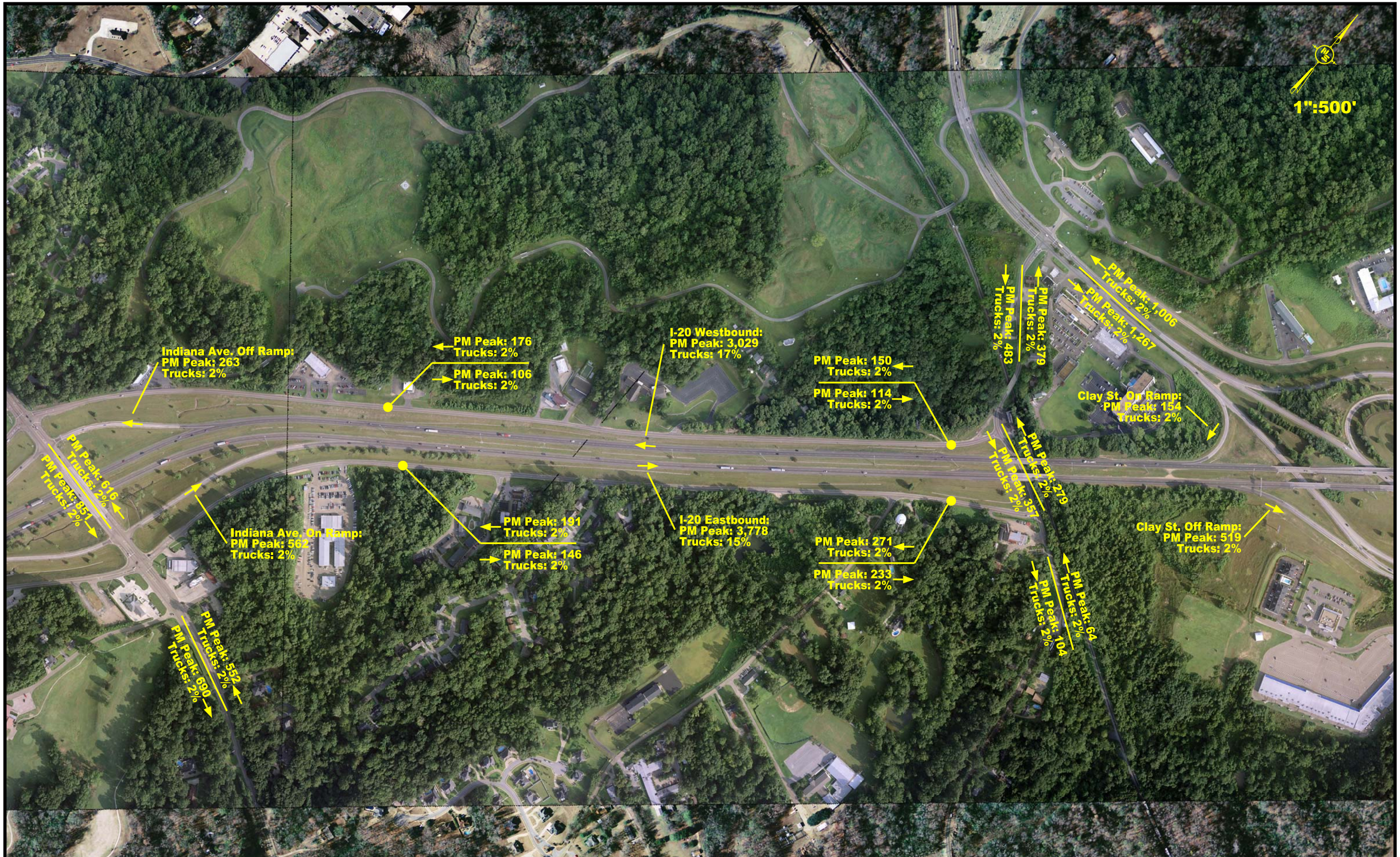
Solutions you can build upon

ALTERNATE A TRAFFIC VOLUMES (2040 NO BUILD)

FIGURE
13



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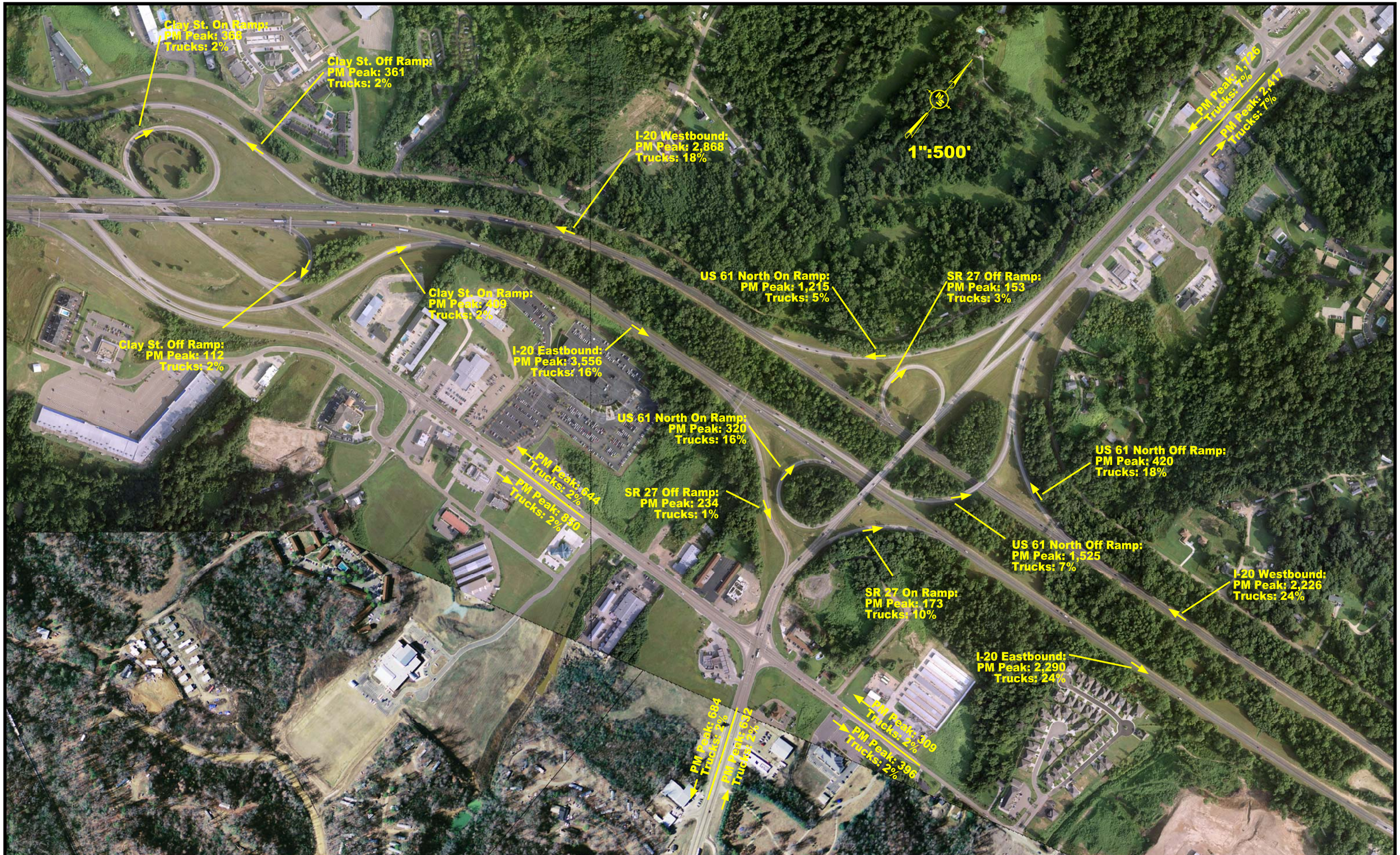
ALTERNATE A TRAFFIC VOLUMES (2040 NO BUILD)

FIGURE
14



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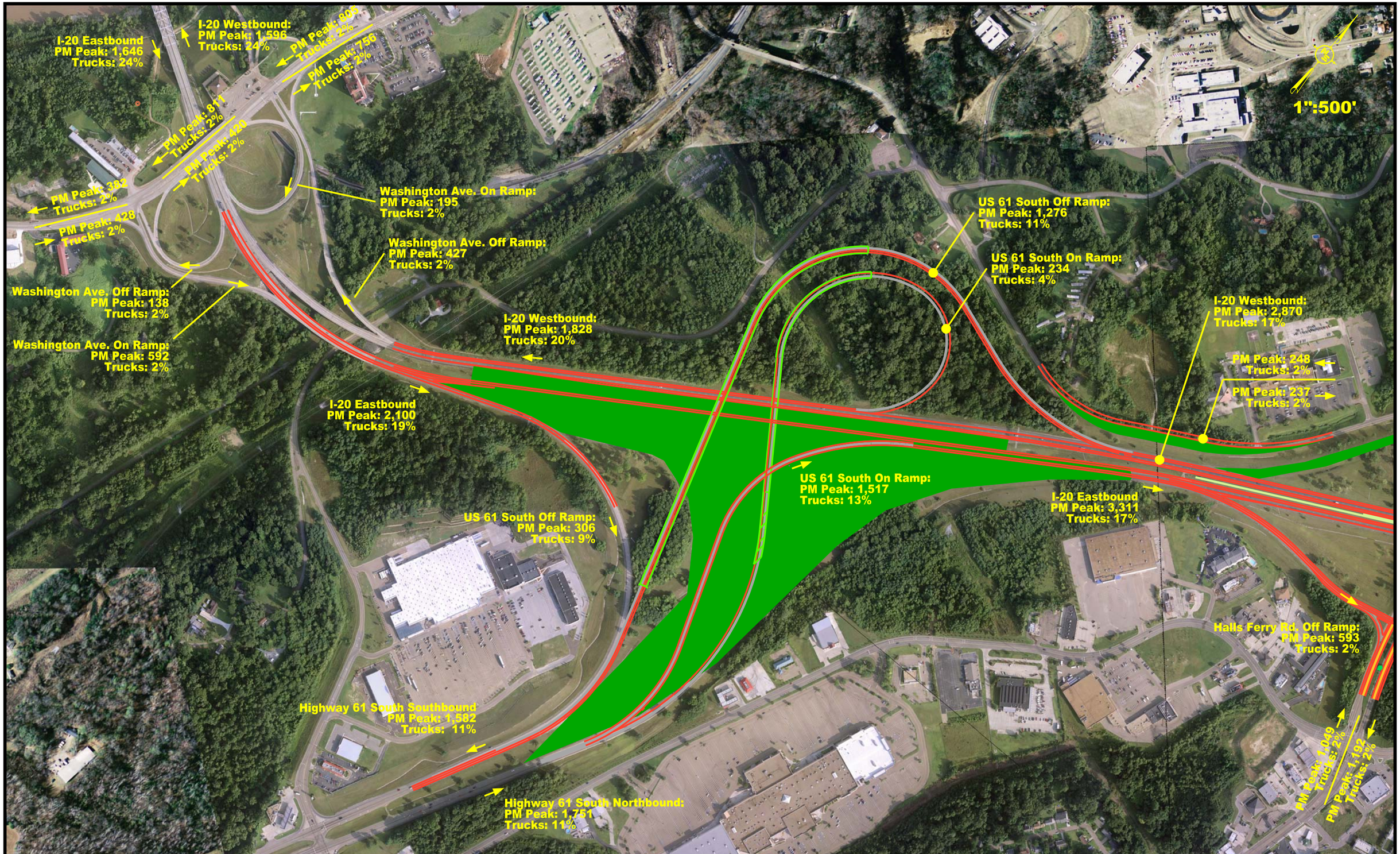
ALTERNATE A TRAFFIC VOLUMES (2040 NO BUILD)

FIGURE
15



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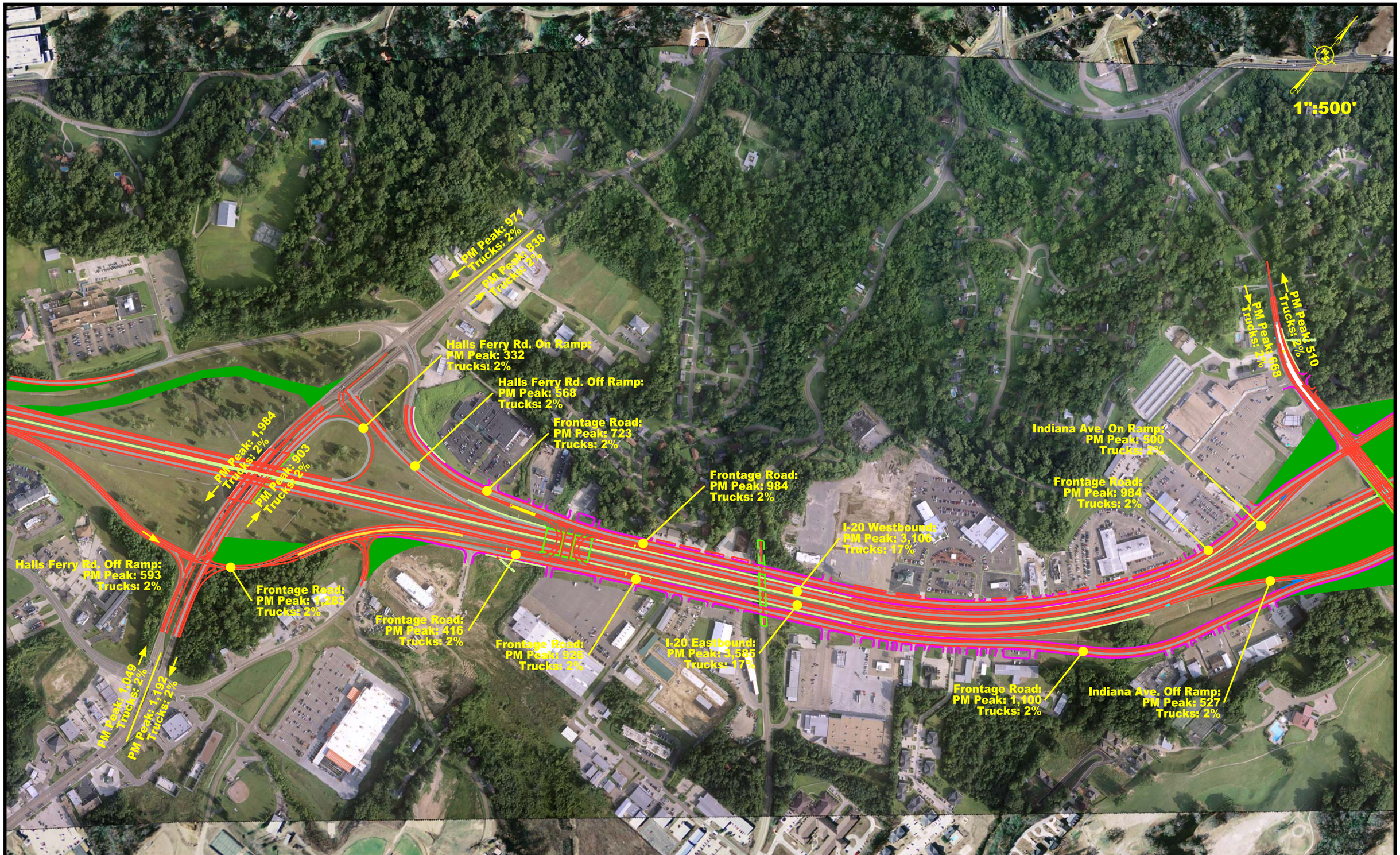
ALTERNATE B TRAFFIC VOLUMES (2040)
ONE-WAY FRONTAGE ROADS

FIGURE
16



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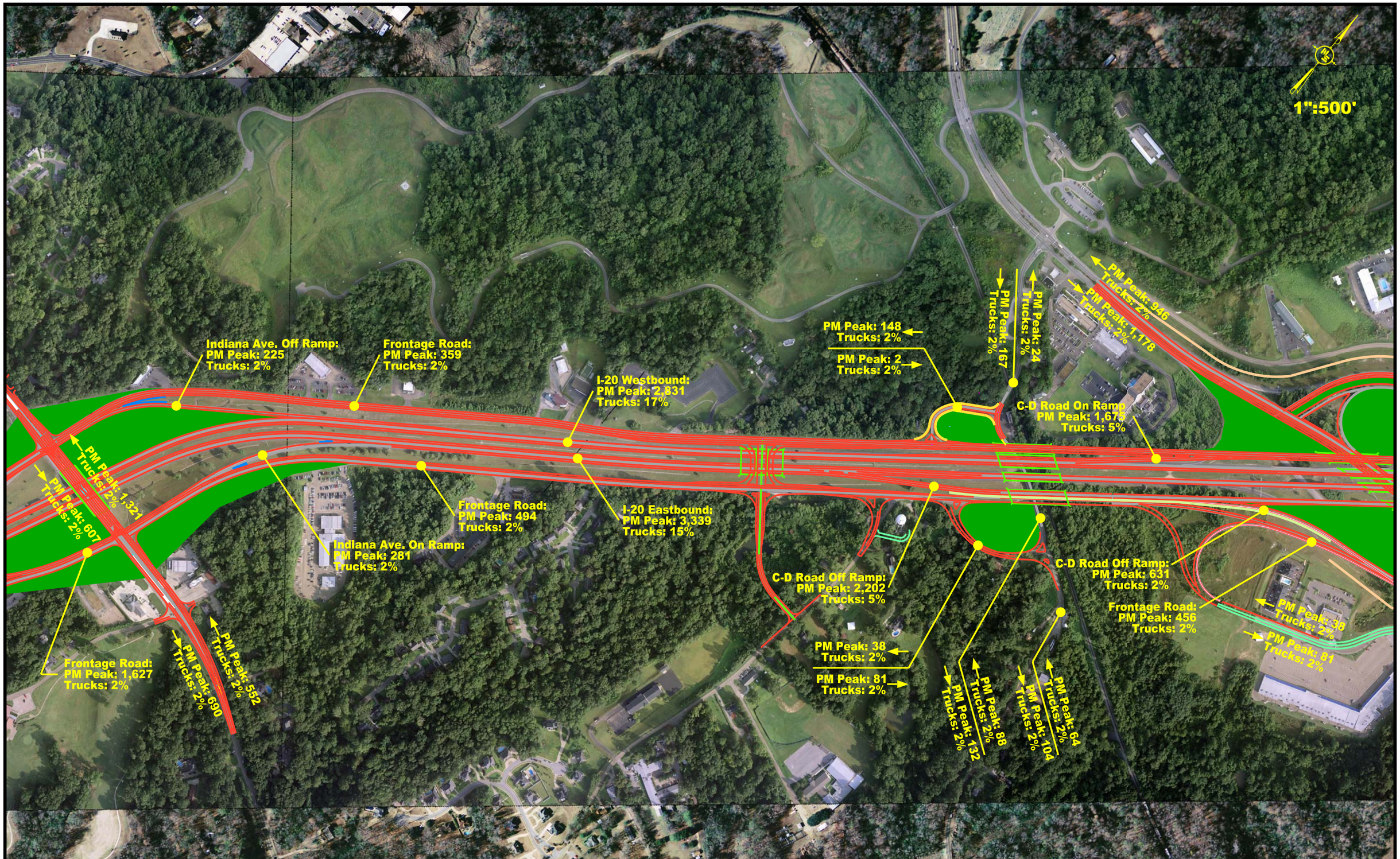
ALTERNATE B TRAFFIC VOLUMES (2040)
ONE-WAY FRONTAGE ROADS

FIGURE
17



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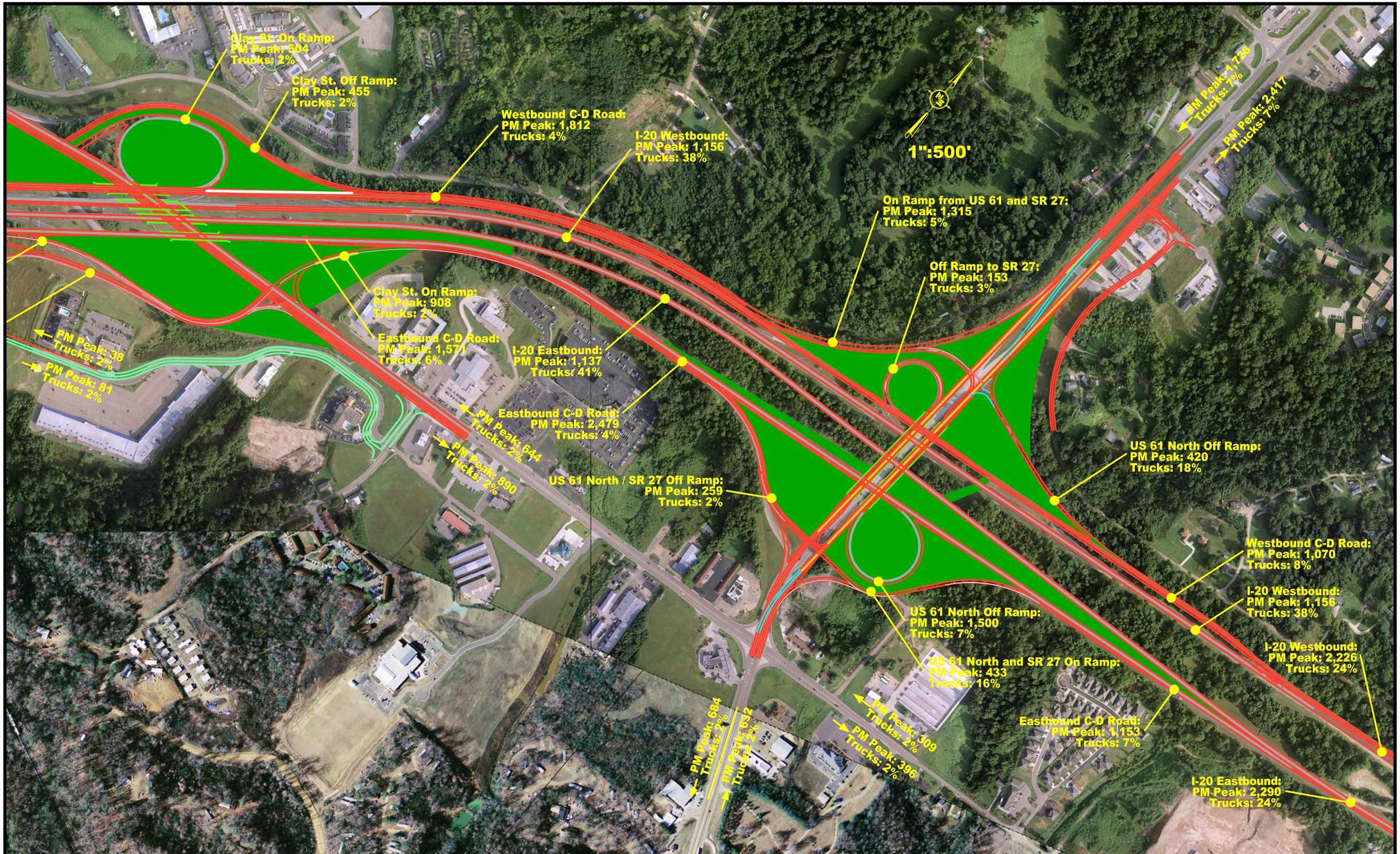
ALTERNATE B TRAFFIC VOLUMES (2040)
ONE-WAY FRONTAGE ROADS

FIGURE
18



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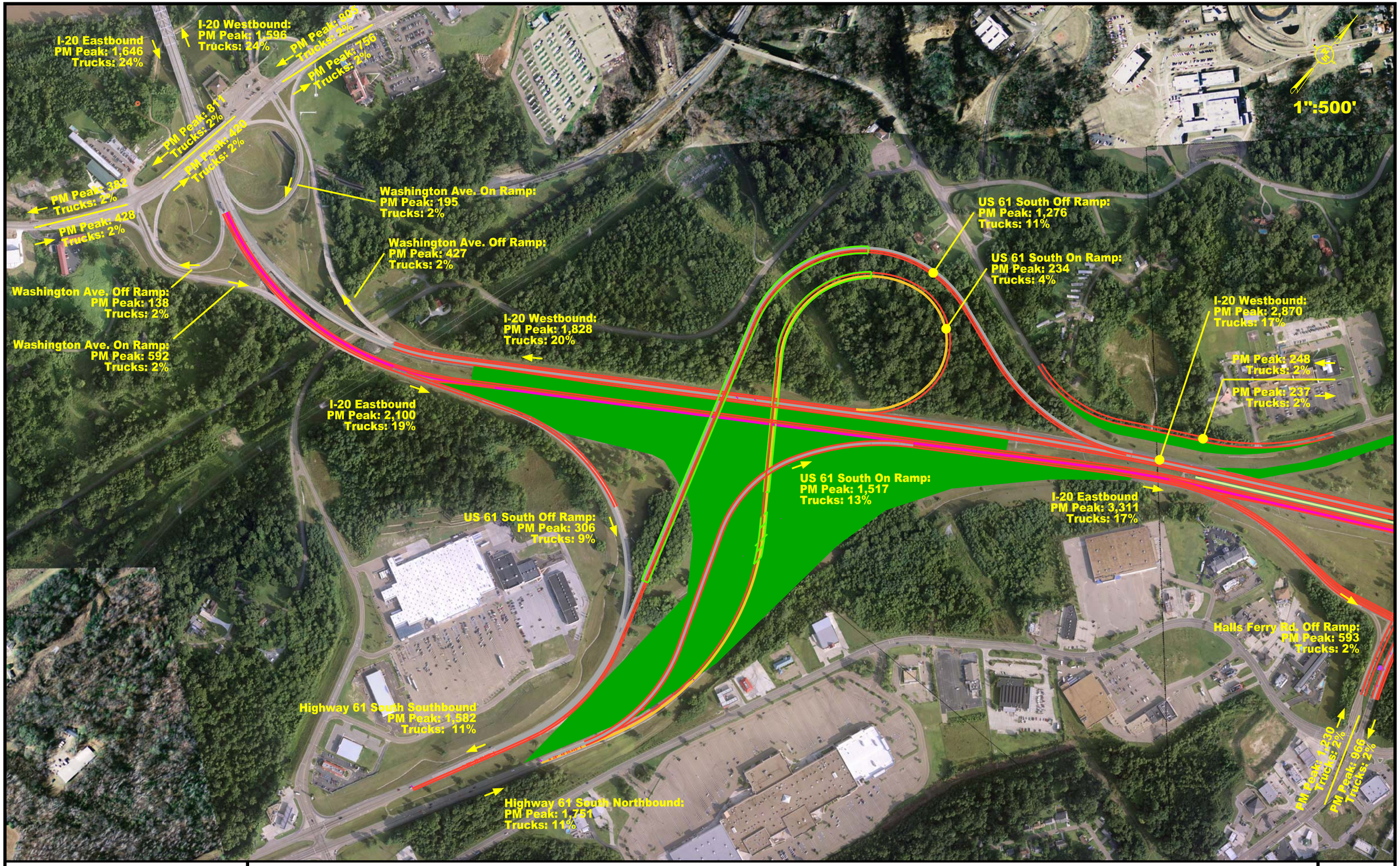
ALTERNATE B TRAFFIC VOLUMES (2040)
ONE-WAY FRONTAGE ROADS

FIGURE
19



NEEL-SCHAFFER
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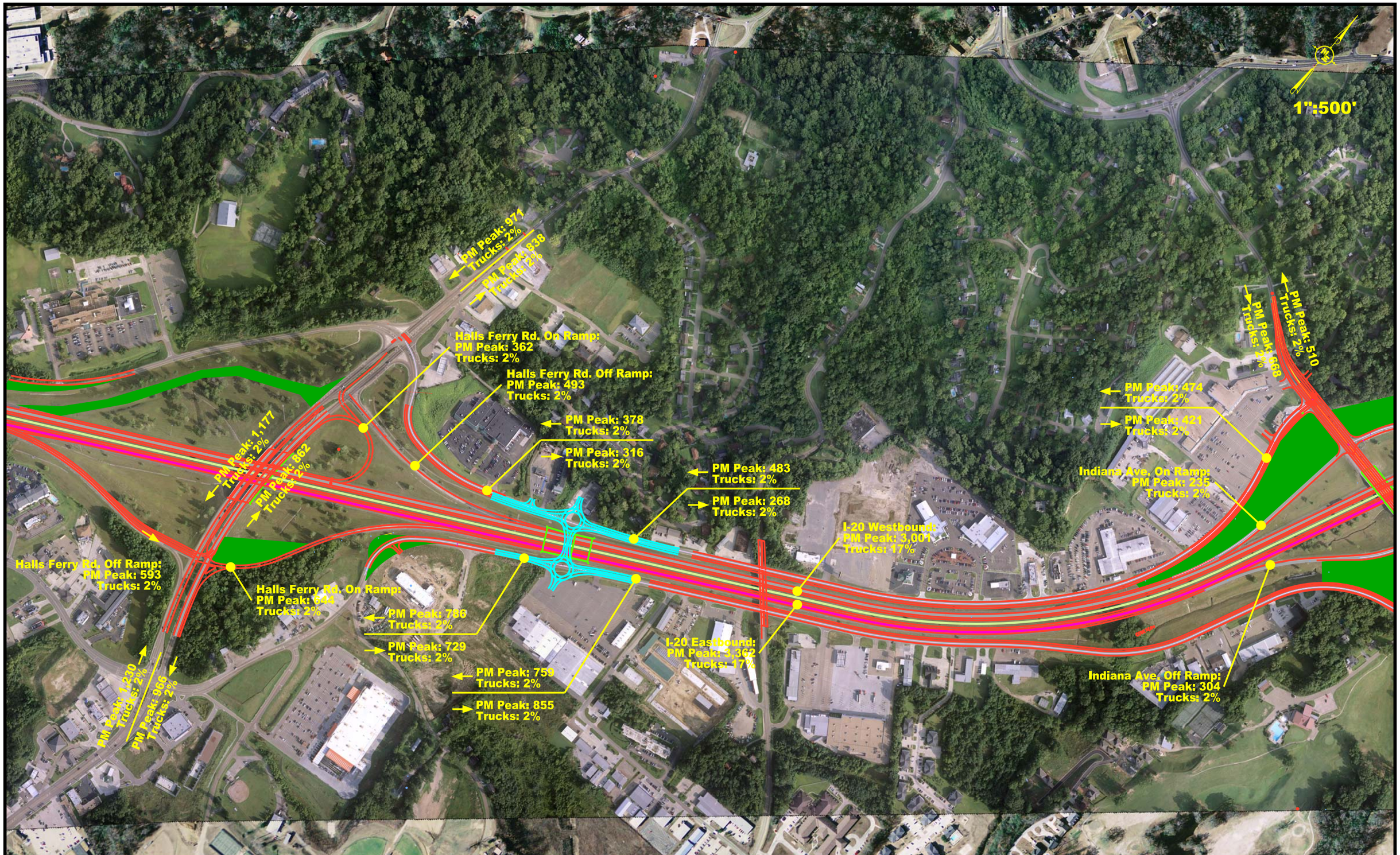
ALTERNATE C TRAFFIC VOLUMES (2040)
TWO-WAY FRONTAGE ROADS

FIGURE
20



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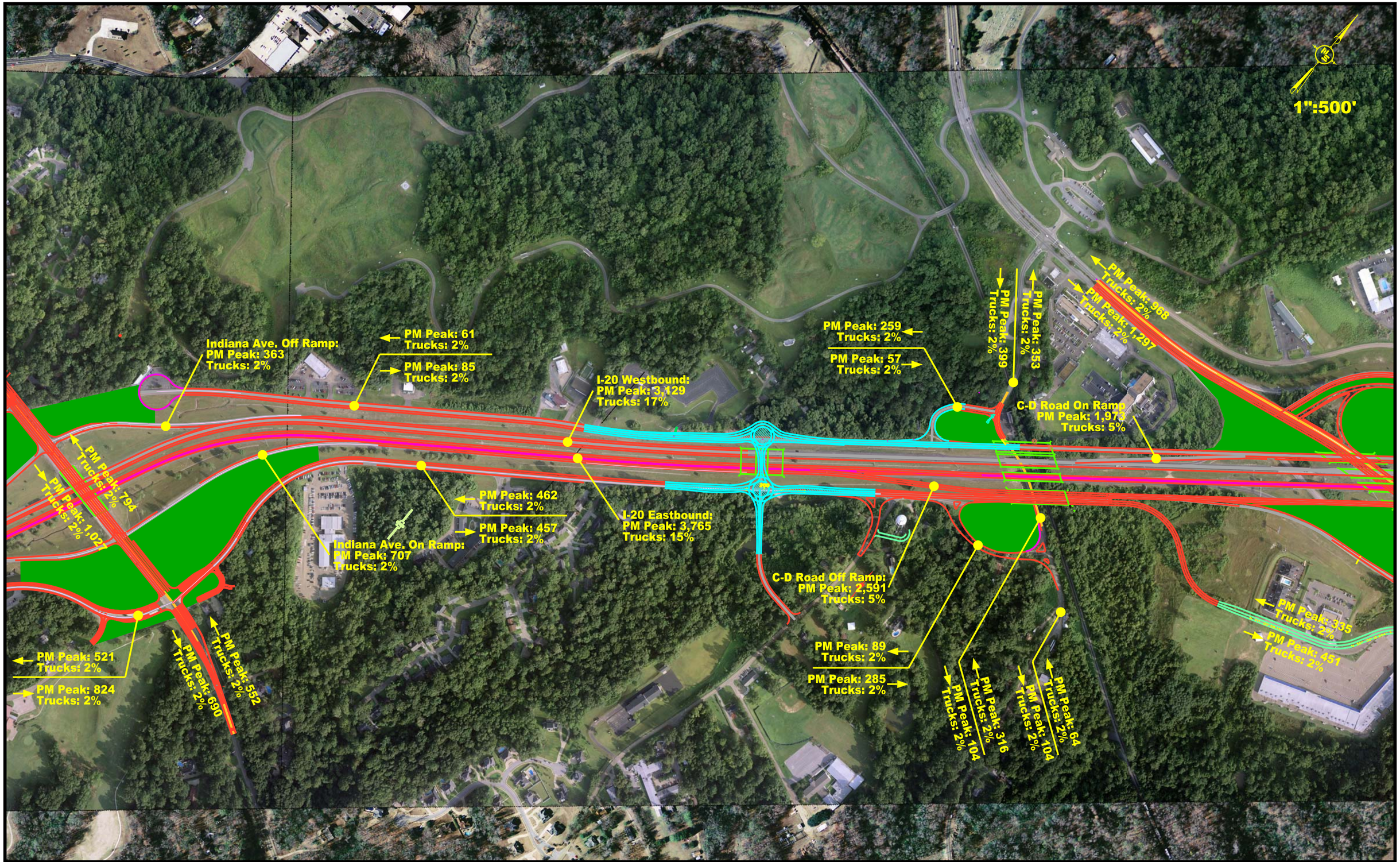
Solutions you can build upon

ALTERNATE C TRAFFIC VOLUMES (2040)
TWO-WAY FRONTAGE ROADS

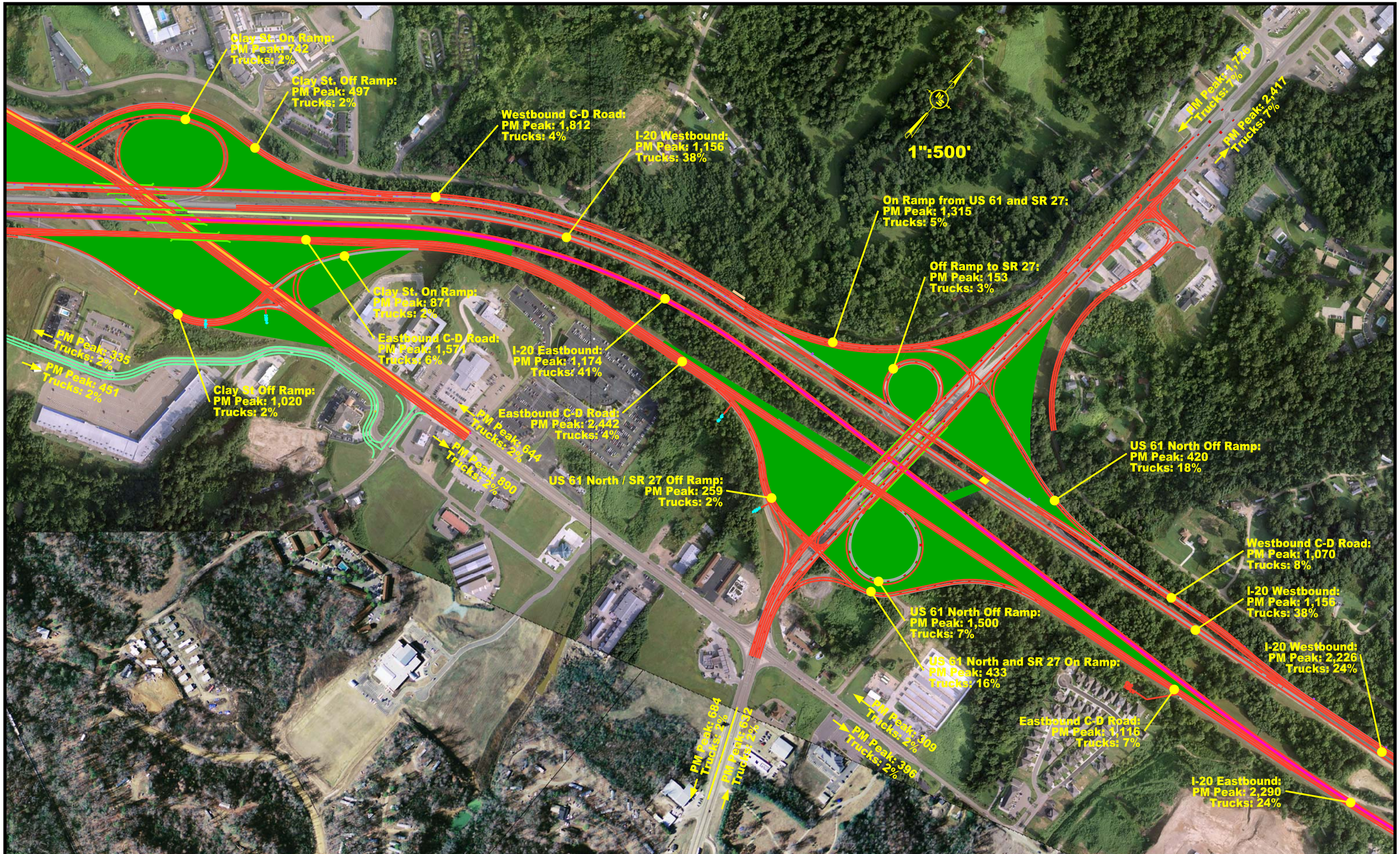
FIGURE
21



NEEL-SCHAFFER
Solutions you can build upon

ALTERNATE C TRAFFIC VOLUMES (2040)
TWO-WAY FRONTAGE ROADS

FIGURE
22



NEEL-SCHAFFER
Solutions you can build upon

ALTERNATE C TRAFFIC VOLUMES (2040)
TWO-WAY FRONTAGE ROADS

FIGURE
23

7.0 Existing Noise Environment

Sixty-eight commercial properties, thirty residences, fourteen hotels, two churches, a Mississippi Welcome Center, and two receivers located within the Vicksburg National Military Park are included in the noise analysis. Based on the estimated Leq dBA, fifteen of the 117 sites are currently impacted by traffic noise. A detailed listing of all sites is provided in **Table 2**, and the total number of impacted sites by land use and alternative is provided in **Table 4**.

Table 4. Noise Impact Summary

Land Use	Total Sites	Existing		2040 No Build		2040 Alternate B			2040 Alternate C		
		Yes	No	Yes	No	Yes, Including Displacees	Yes, Excluding Displacees	No	Yes, Including Displacees	Yes, Excluding Displacees	No
Commercial	68	4	64	13	55	10	10	58	12	11	56
Residential	30	6	24	16	14	20	16	10	21	17	9
Hotel	14	2	12	3	11	2	2	12	2	1	12
Church	2	2	0	2	0	2	2	0	2	2	0
Visitor Center	1	1	0	1	0	1	1	0	1	1	0
National Park	2	0	2	0	2	0	0	2	0	0	2
Total	***117***	***15***	***102***	***35***	***82***	***35***	***31***	***82***	***38***	***32***	***79***

8.0 Design Year (2040) No-Build Alternative Noise Environment

In the year 2040, the Leq noise levels from highway traffic at the occupied facilities located along the route of the proposed project are expected to be an overall average of 2.7 dBA higher than the existing noise levels if the proposed project is not constructed. The number of impacted

sites will increase from 15 under existing conditions to 35 in 2040 for no build conditions. The increase in impacted sites is due solely to the projected increases in traffic volumes within the study area. A detailed listing of all sites is provided in **Table 2**, and the total number of impacted sites by land use and alternative is provided in **Table 4**.

9.0 Design Year (2040) Build Alternative B Noise Environment

If Alternative B is constructed, the Leq noise levels in 2040 are expected to be higher in most cases than the existing noise levels. An overall average increase of 2.9 dBA over existing levels is predicted. Highway traffic noise impacts are expected to occur at 35 locations under Alternative B, which is unchanged from the 2040 no build alternative. The 35 impacted locations include 20 residences, 10 commercial properties, two churches, two hotels, and the Mississippi Welcome Center. Of the 35 impacted locations, four residences are displacements.

10.0 Design Year (2040) Build Alternative C Noise Environment

If the proposed Alternative C is constructed, the Leq noise levels in 2040 are expected to be higher in most cases than the existing noise levels. An overall average increase of 3.3 dBA over existing levels is predicted. Highway traffic noise impacts are expected to occur at 38 locations under Alternative C compared to 35 locations under the 2040 no build alternative and Alternative B. The 38 impacted locations include 21 residences, 12 commercial properties, two churches, two hotels, and the Mississippi Welcome Center. Of the 38 impacted locations, four residences, one commercial property and one hotel are displacements.

11.0 Traffic Noise Abatement

Noise barriers are the primary form of traffic noise abatement that will be considered for the proposed Alternatives B and C. Noise levels are reduced by noise barriers consisting of concrete, wood, metal, earth, or vegetative noise barriers blocking the sound path between roadways and noise-sensitive areas. They are generally used on high-speed, limited-access facilities where noise levels are high and adequate room for barriers is available. MDOT summarizes its noise reduction criteria in their June 18, 1996 *Highway Traffic Noise Policy*. Their guidelines will be used to evaluate the feasibility and reasonableness of noise barriers. Feasibility and reasonableness will be considered based on the following conditions:

The ability to achieve noise reductions will be limited by: (1) topography: (2) access requirements for driveways, ramps, etc.; (3) the presence of local cross streets; or (4) other noise sources in the area.

Each barrier should reduce the noise level by at least 5 dBA at four or more residences that are expected to receive noise impact.

The residences were constructed or the building permits were issued before the date of public knowledge of the proposed highway project.

The barrier cost is no more than $20,000 per residence. All residences with noise reductions of 5 dBA or more will be counted.

Due to the preceding conditions and the predominately commercial nature of the study area, a barrier analysis is unnecessary. All impacted commercial properties have access requirements that eliminate noise barriers as an effective mitigation. The impacted residences in both

alternatives are widely dispersed or have access requirements. Proper barriers in terms of height and length providing significant noise reduction are cost-prohibitive due to a high cost per residence and are therefore not reasonable.

Preliminary studies and cost data were used for the conclusions concerning traffic noise abatement measures for this project. At the completion of the project design and public involvement process a final decision on the installation of noise abatement measures will be made.

The FHWA requires that various noise abatement measures be considered when the noise levels of a proposed roadway approach or exceed NAC. The following measures other than noise barriers have been considered for the proposed project:

Transportation system management (TSM) is not considered appropriate for noise abatement due to their effect on the capacity and level-of-service on the proposed roadway. TSM measures which limit speed, vehicle type, volume, and time of operations will aid in traffic noise reduction. A reduction in speed limit of 10 MPH would result in a noise level reduction of approximately 1 to 2 dBA, which is barely perceptible to the human ear, while increasing travel time and user cost.

Vegetation used for noise barriers is not considered to be reasonable or feasible for reducing noise levels for this project. This is due to the substantial amount of right-of-way necessary to make vegetative barriers effective. FHWA research has shown that vegetative barriers should be

composed of closely-spaced, densely foliated trees and shrubs approximately 100 feet wide to provide a 3 dBA reduction in noise levels. The cost to acquire the right-of-way and to plant that amount of vegetation is estimated to exceed the $20,000/unit cost-effectiveness requirement. However, a narrower vegetative barrier is often desirable from a visual perspective.

The *acquisition of property* as buffer zones to minimize noise impacts is not considered a feasible abatement measure for this project. The cost to acquire impacted residences for buffer zones would exceed the MDOT's abatement threshold of $20,000 per residential unit. The use of buffer zones to minimize impacts to future sensitive areas is not recommended because this could be accomplished through land use controls.

Earthen berms to minimize noise impacts are not considered a feasible abatement for this project. Earthen berms generally provide more cost-effective noise reduction than other barrier materials, but they are limited by right-of-way and other engineering considerations (e.g., drainage, access, and future development).

Land use controls to minimize future impacts are one of the most effective noise abatement measures. Local jurisdictions with zoning control could use the information contained in the final noise evaluation to develop policies limiting the growth of noise-sensitive land uses adjacent to the beltway such as setback requirements, building codes, and zoning.

12.0 Construction Noise Abatement

The following construction noise abatement measures will be incorporated in the contract plans and specifications to prevent construction noise in the vicinity of the proposed project:

a. The contractor shall comply with all state and local sound control and noise level rules, regulations, and ordinances which apply to any work performed pursuant to the contract.

b. Each internal combustion engine used for any purpose on work related to the project shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without such muffler.

13.0 FHWA Policy Regarding Land Use Development and Future Noise Abatement

The Federal Highway Administration will not normally participate in noise abatement measures for those activities and land uses that come into existence after May 24, 1976, unless there is construction or reconstruction of a highway section (or portion thereof). However, the Federal Highway Administration may participate in noise abatement measures to protect activities and land use which come into existence after May 24, 1976, provided local authorities have taken measures to exercise land use control over the remaining undeveloped land adjacent to highways in the local jurisdiction to prevent further development of incompatible activities and land use.

14.0 Summary of Results

Study area noise levels were examined at 117 sites. The 117 sites consisted of 30 residences, two churches, 68 commercial facilities, 14 hotels, the Mississippi Welcome Center, and two sites in the Vicksburg National Military Park. Noise levels at 15 of the sites currently exceed 23 CFR

772 NAC levels. Those 15 sites are six residences, two churches, four commercial facilities, 2 hotels, and the welcome center.

Of the 117 sites examined, 35 sites consisting of 16 residences, two churches, 13 commercial facilities, three hotels, and the welcome center are expected to receive traffic noise impacts in the design year if the proposed project is not constructed due to increased traffic volumes.

Under Alternative B for the 117 sites examined 35 sites consisting of 20 residences, two churches, 10 commercial facilities, two hotels, and the welcome center are expected to receive traffic noise impacts in the design year. However, four of the residences receiving noise impacts in the design year are displacements.

Under Alternative C for the 117 sites examined 38 sites consisting of 21 residences, two churches, 12 commercial facilities, two hotels, and the welcome center are expected to receive traffic noise impacts in the design year. However, four of the residences, one commercial facility and one hotel receiving noise impacts in the design year are displacements. The impacted sites are summarized in **Table 4**.

Due to the MDOT noise reduction criteria stated in their June 18, 1996 *Highway Traffic Noise Policy* and the low population density of the study area, a barrier analysis is unnecessary. The impacted sites under Alternative B and Alternative C have access requirements. Additionally, proper barriers in terms of height and length providing significant noise reduction are cost-prohibitive due to a high cost per dwelling unit and are therefore not reasonable.

Noise Study Report
Appendix

RESULTS: SOUND LEVELS <Project Name?>

Neel-Schaffer, Inc. 6 April 2011
MS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Existing
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ReportReceiverNo. 3	1	1	58.7	58.9	66	0.2	10	----	58.9	0.0	8	-8.0
ReportReceiverNo. 5	2	1	56.1	56.5	66	0.4	10	----	56.5	0.0	8	-8.0
ReportReceiverNo. 6	3	1	64.9	63.7	66	-1.2	10	----	63.7	0.0	8	-8.0
ReportReceiverNo. 9	4	1	67.1	68.1	66	1.0	10	Snd Lvl	68.1	0.0	8	-8.0
ReportReceiverNo. 14	5	1	62.9	66.6	66	3.7	10	Snd Lvl	66.6	0.0	8	-8.0
ReportReceiverNo. 13	6	1	54.0	51.1	66	-2.9	10	----	51.1	0.0	8	-8.0
ReportReceiverNo. 17	7	1	68.8	70.8	66	2.0	10	Snd Lvl	70.8	0.0	8	-8.0
ReportReceiverNo. 1	8	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
ReportReceiverNo. 2	9	1	0.0	70.5	66	70.5	10	Snd Lvl	70.5	0.0	8	-8.0
ReportReceiverNo. 4	10	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
ReportReceiverNo. 7	12	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0
ReportReceiverNo. 8	13	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
ReportReceiverNo. 10	14	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
ReportReceiverNo. 12	15	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
ReportReceiverNo. 11	16	1	0.0	52.3	66	52.3	10	----	52.3	0.0	8	-8.0
ReportReceiverNo. 16	18	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
ReportReceiverNo. 18	21	1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0
ReportReceiverNo. 20	22	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
ReportReceiverNo. 19	24	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
ReportReceiverNo. 33	26	1	0.0	70.3	66	70.3	10	Snd Lvl	70.3	0.0	8	-8.0
ReportReceiverNo. 21	27	1	0.0	72.6	66	72.6	10	Snd Lvl	72.6	0.0	8	-8.0
ReportReceiverNo. 34	28	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
ReportReceiverNo. 15	30	1	0.0	54.9	66	54.9	10	----	54.9	0.0	8	-8.0

RESULTS: SOUND LEVELS **<Project Name?>**

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	23	0.0	0.0	0.0
All Impacted	10	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

RESULTS: SOUND LEVELS <Project Name?>

Neel-Schaffer, Inc. 6 April 2011
MS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Existing
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Report Receiver No. 23	12	1	0.0	72.4	66	72.4	10	Snd Lvl	72.4	0.0	8	-8.0
Report Receiver No. 36	13	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0
Report Receiver No. 49	16	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
Not Reported	17	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
Report Receiver No. 68	19	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
Report Receiver No. 35	39	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
Report Receiver No. 37	40	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
Report Receiver No. 38	41	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
Report Receiver No. 39	42	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
Report Receiver No. 40	43	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
Report Receiver No. 41	44	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
Report Receiver No. 42	45	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0
Report Receiver No. 43	46	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
Report Receiver No. 44	47	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
Report Receiver No. 45	48	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
Report Receiver No. 46	49	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
Report Receiver No. 47	50	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
Report Receiver No. 50	52	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
Report Receiver No. 51	53	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
Report Receiver No. 52	54	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
Report Receiver No. 48	55	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
Report Receiver No. 32	56	1	0.0	58.4	66	58.4	10	----	58.4	0.0	8	-8.0
Report Receiver No. 31	57	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
Report Receiver No. 29	58	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0

RESULTS: SOUND LEVELS **<Project Name?>**

Report Receiver No. 28	59	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
Report Receiver No. 27	60	1	0.0	71.5	66	71.5	10	Snd Lvl	71.5	0.0	8	-8.0
Report Receiver No. 26	61	1	0.0	70.1	66	70.1	10	Snd Lvl	70.1	0.0	8	-8.0
Report Receiver No. 25	62	1	0.0	70.8	66	70.8	10	Snd Lvl	70.8	0.0	8	-8.0
Report Receiver No. 24	63	1	0.0	71.5	66	71.5	10	Snd Lvl	71.5	0.0	8	-8.0
Report Receiver No. 53	64	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
Report Receiver No. 56	65	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
Report Receiver No. 67	66	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
Report Receiver No. 69	67	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
Report Receiver No. 57	68	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
Report Receiver No. 58	69	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
Report Receiver No. 59	70	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
Report Receiver No. 72	71	1	0.0	71.3	66	71.3	10	Snd Lvl	71.3	0.0	8	-8.0
Report Receiver No. 70	72	1	0.0	64.3	66	64.3	10	----	64.3	0.0	8	-8.0
Report Receiver No. 71	73	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
Report Receiver No. 73	74	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
Report Receiver No. 74	75	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
Report Receiver No. 75	76	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0
Report Receiver No. 76	77	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
Report Receiver No. 60	78	1	0.0	72.9	66	72.9	10	Snd Lvl	72.9	0.0	8	-8.0
Report Receiver No. 62	79	1	0.0	73.0	66	73.0	10	Snd Lvl	73.0	0.0	8	-8.0
Report Receiver No. 61	80	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
Report Receiver No. 22	81	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
Report Receiver No. 30	82	1	0.0	55.8	66	55.8	10	----	55.8	0.0	8	-8.0
Report Receiver No. 55	85	1	0.0	48.7	57	48.7	10	----	48.7	0.0	8	-8.0
Report Receiver No. 54	87	1	0.0	53.8	57	53.8	10	----	53.8	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	50	0.0	0.0	0.0
All Impacted	18	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

RESULTS: SOUND LEVELS <Project Name?>

Neel-Schaffer, Inc. 6 April 2011
MS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Existing
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Report Receiver No. 66	21	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
Report Receiver No. 79	22	1	0.0	58.4	66	58.4	10	----	58.4	0.0	8	-8.0
Report Receiver No. 77	23	1	0.0	52.8	66	52.8	10	----	52.8	0.0	8	-8.0
Report Receiver No. 87	24	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
Report Receiver No. 93	25	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
Report Receiver No. 107	26	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
Report Receiver No. 114	27	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
Report Receiver No. 108	30	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
Report Receiver No. 63	34	1	0.0	69.1	66	69.1	10	Snd Lvl	69.1	0.0	8	-8.0
Report Receiver No. 64	35	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
Report Receiver No. 78	36	1	0.0	55.0	66	55.0	10	----	55.0	0.0	8	-8.0
Report Receiver No. 90	37	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
Report Receiver No. 91	38	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
Report Receiver No. 97	39	1	0.0	59.0	66	59.0	10	----	59.0	0.0	8	-8.0
Report Receiver No. 99	40	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
Report Receiver No. 100	41	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
Report Receiver No. 98	42	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
Report Receiver No. 101	43	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0
Report Receiver No. 102	44	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0
Report Receiver No. 103	45	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
Report Receiver No. 104	46	1	0.0	58.2	66	58.2	10	----	58.2	0.0	8	-8.0
Report Receiver No. 105	47	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
Report Receiver No. 95	48	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
Report Receiver No. 96	49	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0

Report Receiver No. 92	50	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
Report Receiver No. 65	51	1	0.0	59.2	66	59.2	10	----	59.2	0.0	8	-8.0
Report Receiver No. 80	52	1	0.0	60.7	66	60.7	10	----	60.7	0.0	8	-8.0
Report Receiver No. 81	53	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
Report Receiver No. 82	54	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
Report Receiver No. 83	55	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
Report Receiver No. 84	56	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
Report Receiver No. 85	57	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0
Report Receiver No. 86	58	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
Report Receiver No. 88	59	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
Report Receiver No. 89	60	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
Report Receiver No. 94	61	1	0.0	56.0	66	56.0	10	----	56.0	0.0	8	-8.0
Report Receiver No. 106	62	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0
Report Receiver No. 109	63	1	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0
Report Receiver No. 116	64	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
Report Receiver No. 110	65	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
Report Receiver No. 111	66	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
Report Receiver No. 113	67	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
Report Receiver No. 117	68	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
Report Receiver No. 112	69	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
Report Receiver No. 115	70	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	45	0.0	0.0	0.0
All Impacted	3	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

RESULTS: SOUND LEVELS <Project Name?>

<Organization?> 6 April 2011
<Analysis By?> TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ReportReceiverNo. 3	1	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
ReportReceiverNo. 5	2	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
ReportReceiverNo. 6	3	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
ReportReceiverNo. 9	4	1	0.0	71.2	66	71.2	10	Snd Lvl	71.2	0.0	8	-8.0
ReportReceiverNo. 14	5	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
ReportReceiverNo. 13	6	1	0.0	53.0	66	53.0	10	----	53.0	0.0	8	-8.0
ReportReceiverNo. 17	7	1	0.0	73.4	66	73.4	10	Snd Lvl	73.4	0.0	8	-8.0
ReportReceiverNo. 1	8	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
ReportReceiverNo. 2	9	1	0.0	73.7	66	73.7	10	Snd Lvl	73.7	0.0	8	-8.0
ReportReceiverNo. 4	10	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
ReportReceiverNo. 7	12	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
ReportReceiverNo. 8	13	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
ReportReceiverNo. 10	14	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
ReportReceiverNo. 12	15	1	0.0	66.5	66	66.5	10	Snd Lvl	66.5	0.0	8	-8.0
ReportReceiverNo. 11	16	1	0.0	54.8	66	54.8	10	----	54.8	0.0	8	-8.0
ReportReceiverNo. 16	18	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
ReportReceiverNo. 18	21	1	0.0	71.7	66	71.7	10	Snd Lvl	71.7	0.0	8	-8.0
ReportReceiverNo. 20	22	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
ReportReceiverNo. 19	24	1	0.0	70.2	66	70.2	10	Snd Lvl	70.2	0.0	8	-8.0
ReportReceiverNo. 33	26	1	0.0	73.2	66	73.2	10	Snd Lvl	73.2	0.0	8	-8.0
ReportReceiverNo. 21	27	1	0.0	75.1	66	75.1	10	Snd Lvl	75.1	0.0	8	-8.0
ReportReceiverNo. 34	28	1	0.0	71.3	66	71.3	10	Snd Lvl	71.3	0.0	8	-8.0
ReportReceiverNo. 15	30	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0

RESULTS: SOUND LEVELS **<Project Name?>**

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	23	0.0	0.0	0.0
All Impacted	15	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

RESULTS: SOUND LEVELS <Project Name?>

Neel-Schaffer, Inc. 6 April 2011
MS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: 2040 No Build
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Report Receiver No. 23	12	1	0.0	75.4	66	75.4	10	Snd Lvl	75.4	0.0	8	-8.0
Report Receiver No. 36	13	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
Report Receiver No. 49	16	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
Not Reported	17	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
Report Receiver No. 68	19	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
Report Receiver No. 35	39	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
Report Receiver No. 37	40	1	0.0	71.3	66	71.3	10	Snd Lvl	71.3	0.0	8	-8.0
Report Receiver No. 38	41	1	0.0	70.9	66	70.9	10	Snd Lvl	70.9	0.0	8	-8.0
Report Receiver No. 39	42	1	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
Report Receiver No. 40	43	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
Report Receiver No. 41	44	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
Report Receiver No. 42	45	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
Report Receiver No. 43	46	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
Report Receiver No. 44	47	1	0.0	70.3	66	70.3	10	Snd Lvl	70.3	0.0	8	-8.0
Report Receiver No. 45	48	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
Report Receiver No. 46	49	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
Report Receiver No. 47	50	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
Report Receiver No. 50	52	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
Report Receiver No. 51	53	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
Report Receiver No. 52	54	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
Report Receiver No. 48	55	1	0.0	71.0	66	71.0	10	Snd Lvl	71.0	0.0	8	-8.0
Report Receiver No. 32	56	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
Report Receiver No. 31	57	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
Report Receiver No. 29	58	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0

RESULTS: SOUND LEVELS **<Project Name?>**

Report Receiver No. 28	59	1	0.0	70.9	66	70.9	10	Snd Lvl	70.9	0.0	8	-8.0
Report Receiver No. 27	60	1	0.0	74.5	66	74.5	10	Snd Lvl	74.5	0.0	8	-8.0
Report Receiver No. 26	61	1	0.0	73.1	66	73.1	10	Snd Lvl	73.1	0.0	8	-8.0
Report Receiver No. 25	62	1	0.0	73.8	66	73.8	10	Snd Lvl	73.8	0.0	8	-8.0
Report Receiver No. 24	63	1	0.0	74.4	66	74.4	10	Snd Lvl	74.4	0.0	8	-8.0
Report Receiver No. 53	64	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
Report Receiver No. 56	65	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
Report Receiver No. 67	66	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
Report Receiver No. 69	67	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
Report Receiver No. 57	68	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
Report Receiver No. 58	69	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
Report Receiver No. 59	70	1	0.0	72.0	66	72.0	10	Snd Lvl	72.0	0.0	8	-8.0
Report Receiver No. 72	71	1	0.0	74.2	66	74.2	10	Snd Lvl	74.2	0.0	8	-8.0
Report Receiver No. 70	72	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
Report Receiver No. 71	73	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
Report Receiver No. 73	74	1	0.0	71.3	66	71.3	10	Snd Lvl	71.3	0.0	8	-8.0
Report Receiver No. 74	75	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
Report Receiver No. 75	76	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
Report Receiver No. 76	77	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
Report Receiver No. 60	78	1	0.0	75.9	66	75.9	10	Snd Lvl	75.9	0.0	8	-8.0
Report Receiver No. 62	79	1	0.0	76.0	66	76.0	10	Snd Lvl	76.0	0.0	8	-8.0
Report Receiver No. 61	80	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
Report Receiver No. 22	81	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
Report Receiver No. 30	82	1	0.0	58.2	66	58.2	10	----	58.2	0.0	8	-8.0
Report Receiver No. 55	84	1	0.0	51.6	57	51.6	10	----	51.6	0.0	8	-8.0
Report Receiver No. 54	85	1	0.0	56.8	57	56.8	10	----	56.8	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	50	0.0	0.0	0.0
All Impacted	31	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

RESULTS: SOUND LEVELS <Project Name?>

Neel-Schaffer, Inc. 6 April 2011
MS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: 2040 No Build
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Report Receiver No. 66	21	1	0.0	69.9	66	69.9	10	Snd Lvl	69.9	0.0	8	-8.0
Report Receiver No. 79	22	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
Report Receiver No. 77	23	1	0.0	55.8	66	55.8	10	----	55.8	0.0	8	-8.0
Report Receiver No. 87	24	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
Report Receiver No. 93	25	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
Report Receiver No. 107	26	1	0.0	66.5	66	66.5	10	Snd Lvl	66.5	0.0	8	-8.0
Report Receiver No. 114	27	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
Report Receiver No. 108	30	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
Report Receiver No. 63	34	1	0.0	71.9	66	71.9	10	Snd Lvl	71.9	0.0	8	-8.0
Report Receiver No. 64	35	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
Report Receiver No. 78	36	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0
Report Receiver No. 90	37	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
Report Receiver No. 91	38	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
Report Receiver No. 97	39	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
Report Receiver No. 99	40	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
Report Receiver No. 100	41	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
Report Receiver No. 98	42	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0
Report Receiver No. 101	43	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
Report Receiver No. 102	44	1	0.0	59.1	66	59.1	10	----	59.1	0.0	8	-8.0
Report Receiver No. 103	45	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
Report Receiver No. 104	46	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
Report Receiver No. 105	47	1	0.0	59.1	66	59.1	10	----	59.1	0.0	8	-8.0
Report Receiver No. 95	48	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
Report Receiver No. 96	49	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0

RESULTS: SOUND LEVELS **<Project Name?>**

Report Receiver No. 92	50	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
Report Receiver No. 65	51	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
Report Receiver No. 80	52	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
Report Receiver No. 81	53	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
Report Receiver No. 82	54	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
Report Receiver No. 83	55	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
Report Receiver No. 84	56	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
Report Receiver No. 85	57	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
Report Receiver No. 86	58	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
Report Receiver No. 88	59	1	0.0	70.3	66	70.3	10	Snd Lvl	70.3	0.0	8	-8.0
Report Receiver No. 89	60	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
Report Receiver No. 94	61	1	0.0	59.0	66	59.0	10	----	59.0	0.0	8	-8.0
Report Receiver No. 106	62	1	0.0	59.7	66	59.7	10	----	59.7	0.0	8	-8.0
Report Receiver No. 109	63	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
Report Receiver No. 116	64	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
Report Receiver No. 110	65	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
Report Receiver No. 111	66	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
Report Receiver No. 113	67	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
Report Receiver No. 117	68	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
Report Receiver No. 112	69	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
Report Receiver No. 115	70	1	0.0	66.5	66	66.5	10	Snd Lvl	66.5	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	45	0.0	0.0	0.0
All Impacted	13	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

RESULTS: SOUND LEVELS <Project Name?>

Neel-Schaffer, Inc. 6 April 2011
MS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: 2040 1-way Frontage Roads
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ReportReceiverNo. 3	1	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
ReportReceiverNo. 5	2	1	0.0	61.6	66	61.6	10	----	61.6	0.0	8	-8.0
ReportReceiverNo. 6	3	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
ReportReceiverNo. 9	4	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
ReportReceiverNo. 14	5	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
ReportReceiverNo. 13	6	1	0.0	53.5	66	53.5	10	----	53.5	0.0	8	-8.0
ReportReceiverNo. 17	7	1	0.0	70.9	66	70.9	10	Snd Lvl	70.9	0.0	8	-8.0
ReportReceiverNo. 1	8	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
ReportReceiverNo. 2	9	1	0.0	73.7	66	73.7	10	Snd Lvl	73.7	0.0	8	-8.0
ReportReceiverNo. 4	10	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
ReportReceiverNo. 7	12	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
ReportReceiverNo. 8	13	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
ReportReceiverNo. 10	14	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
ReportReceiverNo. 12	15	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
ReportReceiverNo. 11	16	1	0.0	54.4	66	54.4	10	----	54.4	0.0	8	-8.0
ReportReceiverNo. 16	18	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
ReportReceiverNo. 18	21	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
ReportReceiverNo. 20	22	1	0.0	69.1	66	69.1	10	Snd Lvl	69.1	0.0	8	-8.0
ReportReceiverNo. 19	24	1	0.0	69.7	66	69.7	10	Snd Lvl	69.7	0.0	8	-8.0
ReportReceiverNo. 33	26	1	0.0	72.4	66	72.4	10	Snd Lvl	72.4	0.0	8	-8.0
ReportReceiverNo. 21	27	1	0.0	74.5	66	74.5	10	Snd Lvl	74.5	0.0	8	-8.0
ReportReceiverNo. 34	28	1	0.0	71.8	66	71.8	10	Snd Lvl	71.8	0.0	8	-8.0
ReportReceiverNo. 15	30	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0

RESULTS: SOUND LEVELS **<Project Name?>**

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	23	0.0	0.0	0.0
All Impacted	13	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

RESULTS: SOUND LEVELS <Project Name?>

Neel-Schaffer, Inc. 6 April 2011
MS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: 2040 1-way Frontage Roads
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Report Receiver No. 23	12	1	0.0	76.2	66	76.2	10	Snd Lvl	76.2	0.0	8	-8.0
Report Receiver No. 36	13	1	0.0	70.1	66	70.1	10	Snd Lvl	70.1	0.0	8	-8.0
Report Receiver No. 49	16	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
Not Reported	17	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
Report Receiver No. 68	19	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
Report Receiver No. 35	39	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
Report Receiver No. 37	40	1	0.0	72.5	66	72.5	10	Snd Lvl	72.5	0.0	8	-8.0
Report Receiver No. 38	41	1	0.0	71.7	66	71.7	10	Snd Lvl	71.7	0.0	8	-8.0
Report Receiver No. 39	42	1	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
Report Receiver No. 40	43	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
Report Receiver No. 41	44	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
Report Receiver No. 42	45	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
Report Receiver No. 43	46	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
Report Receiver No. 44	47	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
Report Receiver No. 45	48	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
Report Receiver No. 46	49	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
Report Receiver No. 47	50	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0
Report Receiver No. 50	52	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
Report Receiver No. 51	53	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
Report Receiver No. 52	54	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
Report Receiver No. 48	55	1	0.0	71.1	66	71.1	10	Snd Lvl	71.1	0.0	8	-8.0
Report Receiver No. 32	56	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
Report Receiver No. 31	57	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
Report Receiver No. 29	58	1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0

RESULTS: SOUND LEVELS **<Project Name?>**

Report Receiver No. 28	59	1	0.0	70.6	66	70.6	10	Snd Lvl	70.6	0.0	8	-8.0
Report Receiver No. 27	60	1	0.0	75.4	66	75.4	10	Snd Lvl	75.4	0.0	8	-8.0
Report Receiver No. 26	61	1	0.0	74.5	66	74.5	10	Snd Lvl	74.5	0.0	8	-8.0
Report Receiver No. 25	62	1	0.0	74.7	66	74.7	10	Snd Lvl	74.7	0.0	8	-8.0
Report Receiver No. 24	63	1	0.0	75.0	66	75.0	10	Snd Lvl	75.0	0.0	8	-8.0
Report Receiver No. 53	64	1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0
Report Receiver No. 56	65	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
Report Receiver No. 67	66	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
Report Receiver No. 69	67	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
Report Receiver No. 57	68	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
Report Receiver No. 58	69	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
Report Receiver No. 59	70	1	0.0	74.1	66	74.1	10	Snd Lvl	74.1	0.0	8	-8.0
Report Receiver No. 72	71	1	0.0	75.6	66	75.6	10	Snd Lvl	75.6	0.0	8	-8.0
Report Receiver No. 70	72	1	0.0	70.3	66	70.3	10	Snd Lvl	70.3	0.0	8	-8.0
Report Receiver No. 71	73	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
Report Receiver No. 73	74	1	0.0	73.4	66	73.4	10	Snd Lvl	73.4	0.0	8	-8.0
Report Receiver No. 74	75	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
Report Receiver No. 75	76	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
Report Receiver No. 76	77	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
Report Receiver No. 60	78	1	0.0	75.4	66	75.4	10	Snd Lvl	75.4	0.0	8	-8.0
Report Receiver No. 62	79	1	0.0	75.2	66	75.2	10	Snd Lvl	75.2	0.0	8	-8.0
Report Receiver No. 61	80	1	0.0	69.3	66	69.3	10	Snd Lvl	69.3	0.0	8	-8.0
Report Receiver No. 22	81	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
Report Receiver No. 30	82	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0
Report Receiver No. 55	84	1	0.0	52.1	57	52.1	10	----	52.1	0.0	8	-8.0
Report Receiver No. 54	85	1	0.0	56.3	57	56.3	10	----	56.3	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	50	0.0	0.0	0.0
All Impacted	37	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

RESULTS: SOUND LEVELS <Project Name?>

Neel-Schaffer, Inc. 6 April 2011
MS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: 2040 1-way Frontage Roads
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Report Receiver No. 66	21	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
Report Receiver No. 79	22	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
Report Receiver No. 77	23	1	0.0	54.3	66	54.3	10	----	54.3	0.0	8	-8.0
Report Receiver No. 87	24	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
Report Receiver No. 93	25	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
Report Receiver No. 107	26	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
Report Receiver No. 114	27	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
Report Receiver No. 108	30	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
Report Receiver No. 63	34	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
Report Receiver No. 64	35	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
Report Receiver No. 78	36	1	0.0	60.9	66	60.9	10	----	60.9	0.0	8	-8.0
Report Receiver No. 90	37	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
Report Receiver No. 91	38	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
Report Receiver No. 97	39	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
Report Receiver No. 99	40	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
Report Receiver No. 100	41	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
Report Receiver No. 98	42	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
Report Receiver No. 101	43	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
Report Receiver No. 102	44	1	0.0	59.1	66	59.1	10	----	59.1	0.0	8	-8.0
Report Receiver No. 103	45	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
Report Receiver No. 104	46	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
Report Receiver No. 105	47	1	0.0	59.2	66	59.2	10	----	59.2	0.0	8	-8.0
Report Receiver No. 95	48	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
Report Receiver No. 96	49	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0

RESULTS: SOUND LEVELS **<Project Name?>**

Report Receiver No. 92	50	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
Report Receiver No. 65	51	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
Report Receiver No. 80	52	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
Report Receiver No. 81	53	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
Report Receiver No. 82	54	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
Report Receiver No. 83	55	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
Report Receiver No. 84	56	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
Report Receiver No. 85	57	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
Report Receiver No. 86	58	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
Report Receiver No. 88	59	1	0.0	74.0	66	74.0	10	Snd Lvl	74.0	0.0	8	-8.0
Report Receiver No. 89	60	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
Report Receiver No. 94	61	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
Report Receiver No. 106	62	1	0.0	59.6	66	59.6	10	----	59.6	0.0	8	-8.0
Report Receiver No. 109	63	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
Report Receiver No. 116	64	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
Report Receiver No. 110	65	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
Report Receiver No. 111	66	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
Report Receiver No. 113	67	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
Report Receiver No. 117	68	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
Report Receiver No. 112	69	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
Report Receiver No. 115	70	1	0.0	66.5	66	66.5	10	Snd Lvl	66.5	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	45	0.0	0.0	0.0
All Impacted	14	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

RESULTS: SOUND LEVELS <Project Name?>

Neel-Schaffer, Inc. 6 April 2011
MS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: 2040 2-way Frontage Roads
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ReportReceiverNo. 3	1	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
ReportReceiverNo. 5	2	1	0.0	61.6	66	61.6	10	----	61.6	0.0	8	-8.0
ReportReceiverNo. 6	3	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
ReportReceiverNo. 9	4	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
ReportReceiverNo. 14	5	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
ReportReceiverNo. 13	6	1	0.0	53.5	66	53.5	10	----	53.5	0.0	8	-8.0
ReportReceiverNo. 17	7	1	0.0	70.7	66	70.7	10	Snd Lvl	70.7	0.0	8	-8.0
ReportReceiverNo. 1	8	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
ReportReceiverNo. 2	9	1	0.0	73.7	66	73.7	10	Snd Lvl	73.7	0.0	8	-8.0
ReportReceiverNo. 4	10	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
ReportReceiverNo. 7	12	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
ReportReceiverNo. 8	13	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
ReportReceiverNo. 10	14	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
ReportReceiverNo. 12	15	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
ReportReceiverNo. 11	16	1	0.0	54.4	66	54.4	10	----	54.4	0.0	8	-8.0
ReportReceiverNo. 16	18	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
ReportReceiverNo. 18	21	1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0
ReportReceiverNo. 20	22	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
ReportReceiverNo. 19	24	1	0.0	69.6	66	69.6	10	Snd Lvl	69.6	0.0	8	-8.0
ReportReceiverNo. 33	26	1	0.0	72.5	66	72.5	10	Snd Lvl	72.5	0.0	8	-8.0
ReportReceiverNo. 21	27	1	0.0	74.6	66	74.6	10	Snd Lvl	74.6	0.0	8	-8.0
ReportReceiverNo. 34	28	1	0.0	71.8	66	71.8	10	Snd Lvl	71.8	0.0	8	-8.0
ReportReceiverNo. 15	30	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0

RESULTS: SOUND LEVELS **<Project Name?>**

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	23	0.0	0.0	0.0
All Impacted	13	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

RESULTS: SOUND LEVELS <Project Name?>

Neel-Schaffer, Inc. 6 April 2011
MS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: 2040 1-way Frontage Roads
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Report Receiver No. 23	12	1	0.0	76.1	66	76.1	10	Snd Lvl	76.1	0.0	8	-8.0
Report Receiver No. 36	13	1	0.0	70.4	66	70.4	10	Snd Lvl	70.4	0.0	8	-8.0
Not Reported	17	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
Report Receiver No. 68	19	1	0.0	72.3	66	72.3	10	Snd Lvl	72.3	0.0	8	-8.0
Report Receiver No. 35	39	1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0
Report Receiver No. 37	40	1	0.0	72.5	66	72.5	10	Snd Lvl	72.5	0.0	8	-8.0
Report Receiver No. 38	41	1	0.0	72.0	66	72.0	10	Snd Lvl	72.0	0.0	8	-8.0
Report Receiver No. 39	42	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
Report Receiver No. 40	43	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
Report Receiver No. 41	44	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
Report Receiver No. 42	45	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
Report Receiver No. 43	46	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
Report Receiver No. 44	47	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
Report Receiver No. 45	48	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
Report Receiver No. 46	49	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
Report Receiver No. 47	50	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
Report Receiver No. 50	52	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
Report Receiver No. 52	54	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
Report Receiver No. 48	55	1	0.0	71.3	66	71.3	10	Snd Lvl	71.3	0.0	8	-8.0
Report Receiver No. 32	56	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
Report Receiver No. 29	58	1	0.0	70.2	66	70.2	10	Snd Lvl	70.2	0.0	8	-8.0
Report Receiver No. 28	59	1	0.0	70.8	66	70.8	10	Snd Lvl	70.8	0.0	8	-8.0
Report Receiver No. 27	60	1	0.0	75.5	66	75.5	10	Snd Lvl	75.5	0.0	8	-8.0
Report Receiver No. 26	61	1	0.0	74.3	66	74.3	10	Snd Lvl	74.3	0.0	8	-8.0

RESULTS: SOUND LEVELS **<Project Name?>**

Report Receiver No. 25	62	1	0.0	74.6	66	74.6	10	Snd Lvl	74.6	0.0	8	-8.0
Report Receiver No. 24	63	1	0.0	74.9	66	74.9	10	Snd Lvl	74.9	0.0	8	-8.0
Report Receiver No. 53	64	1	0.0	70.3	66	70.3	10	Snd Lvl	70.3	0.0	8	-8.0
Report Receiver No. 56	65	1	0.0	70.9	66	70.9	10	Snd Lvl	70.9	0.0	8	-8.0
Report Receiver No. 67	66	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
Report Receiver No. 69	67	1	0.0	72.6	66	72.6	10	Snd Lvl	72.6	0.0	8	-8.0
Report Receiver No. 57	68	1	0.0	70.4	66	70.4	10	Snd Lvl	70.4	0.0	8	-8.0
Report Receiver No. 58	69	1	0.0	71.9	66	71.9	10	Snd Lvl	71.9	0.0	8	-8.0
Report Receiver No. 59	70	1	0.0	76.2	66	76.2	10	Snd Lvl	76.2	0.0	8	-8.0
Report Receiver No. 72	71	1	0.0	78.7	66	78.7	10	Snd Lvl	78.7	0.0	8	-8.0
Report Receiver No. 70	72	1	0.0	73.2	66	73.2	10	Snd Lvl	73.2	0.0	8	-8.0
Report Receiver No. 71	73	1	0.0	71.9	66	71.9	10	Snd Lvl	71.9	0.0	8	-8.0
Report Receiver No. 73	74	1	0.0	76.1	66	76.1	10	Snd Lvl	76.1	0.0	8	-8.0
Report Receiver No. 74	75	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0
Report Receiver No. 75	76	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
Report Receiver No. 76	77	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
Report Receiver No. 60	78	1	0.0	76.9	66	76.9	10	Snd Lvl	76.9	0.0	8	-8.0
Report Receiver No. 62	79	1	0.0	75.9	66	75.9	10	Snd Lvl	75.9	0.0	8	-8.0
Report Receiver No. 61	80	1	0.0	70.6	66	70.6	10	Snd Lvl	70.6	0.0	8	-8.0
Report Receiver No. 22	81	1	0.0	69.1	66	69.1	10	Snd Lvl	69.1	0.0	8	-8.0
Report Receiver No. 30	82	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
Report Receiver No. 55	84	1	0.0	53.2	57	53.2	10	----	53.2	0.0	8	-8.0
Report Receiver No. 54	85	1	0.0	57.6	57	57.6	10	Snd Lvl	57.6	0.0	8	-8.0
Report Receiver No. 49	87	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
Report Receiver No. 51	88	1	0.0	70.3	66	70.3	10	Snd Lvl	70.3	0.0	8	-8.0
Report Receiver No. 31	89	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	50	0.0	0.0	0.0
All Impacted	43	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

RESULTS: SOUND LEVELS <Project Name?>

Neel-Schaffer, Inc. 6 April 2011
MS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: 2040 2-way Frontage Roads
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Report Receiver No. 66	21	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
Report Receiver No. 79	22	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
Report Receiver No. 77	23	1	0.0	54.1	66	54.1	10	----	54.1	0.0	8	-8.0
Report Receiver No. 87	24	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
Report Receiver No. 93	25	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
Report Receiver No. 107	26	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
Report Receiver No. 114	27	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
Report Receiver No. 108	30	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
Report Receiver No. 63	34	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
Report Receiver No. 64	35	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
Report Receiver No. 78	36	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
Report Receiver No. 90	37	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
Report Receiver No. 91	38	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
Report Receiver No. 97	39	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
Report Receiver No. 99	40	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
Report Receiver No. 100	41	1	0.0	64.3	66	64.3	10	----	64.3	0.0	8	-8.0
Report Receiver No. 98	42	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
Report Receiver No. 101	43	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
Report Receiver No. 102	44	1	0.0	59.1	66	59.1	10	----	59.1	0.0	8	-8.0
Report Receiver No. 103	45	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
Report Receiver No. 104	46	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
Report Receiver No. 105	47	1	0.0	59.2	66	59.2	10	----	59.2	0.0	8	-8.0
Report Receiver No. 95	48	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
Report Receiver No. 96	49	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0

RESULTS: SOUND LEVELS **<Project Name?>**

Report Receiver No. 92	50	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
Report Receiver No. 65	51	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0
Report Receiver No. 80	52	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0
Report Receiver No. 81	53	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
Report Receiver No. 82	54	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
Report Receiver No. 83	55	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
Report Receiver No. 84	56	1	0.0	64.3	66	64.3	10	----	64.3	0.0	8	-8.0
Report Receiver No. 85	57	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
Report Receiver No. 86	58	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
Report Receiver No. 88	59	1	0.0	74.0	66	74.0	10	Snd Lvl	74.0	0.0	8	-8.0
Report Receiver No. 89	60	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
Report Receiver No. 94	61	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
Report Receiver No. 106	62	1	0.0	59.6	66	59.6	10	----	59.6	0.0	8	-8.0
Report Receiver No. 109	63	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
Report Receiver No. 116	64	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
Report Receiver No. 110	65	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
Report Receiver No. 111	66	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
Report Receiver No. 113	67	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
Report Receiver No. 117	68	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
Report Receiver No. 112	69	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
Report Receiver No. 115	70	1	0.0	66.5	66	66.5	10	Snd Lvl	66.5	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	45	0.0	0.0	0.0
All Impacted	14	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0