Arizona Department of Transportation

Environmental Planning

FINAL
Noise Analysis Technical Report

SR 101L System TI Improvements with I-10
Design Concept Report and Environmental Document

Federal Project No. 101-A(218)T
ADOT Project No. 101 MA 000 F0475 01D

Submittal Date: 6/21/2023

DocuSigned by:
Ivan Racic
D00D4A7BCC34420...
6/27/2023

Submittal Number (2)

FINAL Noise Analysis Technical Report
FOR
SR 101L System TI Improvements with I-10
Design Concept Report and Environmental Document

Federal Project No. 101-A(218)T
ADOT Project No. 101 MA 000 F0475 01D

Prepared for:
Arizona Department of Transportation
Environmental Planning
205 S. 17th Ave, MD EM02
Phoenix, Arizona 85007

Prepared by:
Jacobs Engineering Inc.
1501 W Fountainhead Parkway, Suite 401
Tempe, AZ 85020

JUNE 21, 2023

Table of Contents

TABLES

FIGURES

EXECUTIVE SUMMARY

Project Objectives

The Arizona Department of Transportation (ADOT) is studying design concepts and environmental impacts for system improvements on State Route 101L (SR 101L) at the traffic interchange (TI) with Interstate 10 (I-10). The Project would extend north on SR 101L from milepost (MP) 0.0 to Indian School Road (MP 4.0) and on I-10 from west of Avondale Boulevard (MP 131.5) to east of 83rd Avenue (MP 136.2). The SR 101L and I-10 System TI is located within the limits of the City of Phoenix, the Town of Tolleson, and the City of Avondale in Maricopa County (Figure 1 – State Map and Figure 2 – Vicinity Map). The Project would occur within existing ADOT right-of-way (ROW) and may also require new ROW and temporary construction easements.

The West Valley is experiencing some of the fastest growth in the region, and with this growth comes an increase in traffic. During peak demand, the existing SR 101L and I-10 TI cannot handle the flow of traffic and experiences significant delays and backups, frustrating drivers. These backups extend in all directions and impact the local roadways and service TIs. Increased congestion requires motorists to more frequently change lanes and adjust speeds to contend with the complexity of traffic patterns on the roadways. With numerous commercial and industrial developments in the vicinity, ADOT, Maricopa Association of Governments (MAG), and West Valley cities recognize the need to improve freeway operations, mobility, and local access in this area.

Current Noise Environment

Land use in the project area may be categorized as Federal Highway Administration (FHWA) Activity Category B, C, D, E, F and G as defined in the Code of Federal Regulations (CFR) Title 23 Part 772 (23 CFR 772) and ADOT Noise Abatement Requirements (NAR) (ADOT, 2017). The study area for this noise analysis is defined by a 650-foot buffer around the edge of pavement for the Recommended Build Alternative.

The *SR 101L at I-10 System Traffic Interchange Improvements Design Concept Report* (DCR) traffic data indicate a peak hour between 3:30 p.m. and 4:30 p.m. Noise measurements were recorded between 9:06 a.m. and 6:08 p.m. including this peak period for the purpose of noise model validation. Traffic was free flowing during much of the measurement interval with some slower periods with lower levels of service occurring. Measurements ranged between 58 A-weighted decibels dB(A) or dBA at a condominium complex common area located approximately 75 feet north of the I-10 westbound (WB) ROW and shielded from the I-10 freeway to 73 dBA at an unshielded location approximately 175 feet north of the I-10 WB lanes in a commercial property parking lot.

The proposed improvements include a reconfiguration and shifting of existing system interchange directional lanes and the addition of through travel lanes for a portion of the freeway mainline within the project limits. As such, the project is considered a Type I project per 23 CFR

Part 772.5 and a determination of impacts and mitigation must be considered under 23 CFR 772 and the National Environmental Policy Act (NEPA).

Noise Impact Information

This analysis was performed in compliance with the current ADOT NAR. The ADOT NAR establishes official policy on highway noise and describes the process that is used in determining traffic noise impacts and evaluating abatement measures. The ADOT NAR is based on the noise levels approaching the FHWA Noise Abatement Criteria (NAC). ADOT defines "approaching" as within 1 dBA of the FHWA NAC for Activity Categories A, B, C, D, and E. There are no noise impact thresholds for Activity Category F or G. ADOT requires that feasible and reasonable measures be considered and evaluated to abate traffic noise at all identified traffic noise impacts.

A summary of noise analysis parameters is presented in Table ES-1. In general, peak hour noise levels for the Recommended Build Alternative are predicted to increase less than a decibel above the 2050 No-Build, with the number of impacted noise-sensitive land uses (receptors) increasing by 14 compared to existing peak hour conditions and 8 compared to No-Build peak hour conditions.

Table ES-1. Summary of Noise Analysis

SR 101L System Traffic Interchange Improvements with I-10			
Noise Analysis Parameters	Existing 2017	Future 2050	
		No-Build	Build
No. of Modeled Receivers[1]	207	207	207
No. of Representative Noise Receptors	762	762	762
Range of Peak Hour Noise Levels, dBA	53 - 76	53 - 76	53 - 76
No. of Receptors Exceeding the ADOT Approach of the FHWA NAC	235	241	249
No. of Barriers Evaluated for Mitigation	N/A	N/A	8
No. of Barriers Satisfying ADOT NAR Reasonableness and Feasibility Criterion	N/A	N/A	7
No. of Benefited Receptors	N/A	N/A	281
Total Cost of Recommended Mitigation	N/A	N/A	$5,282,186[3]
Average Cost per benefited (5 dBA or more)	N/A	N/A	$18,798

1. Does not include receivers added to evaluate non-residential land use mitigation.
2. One wall that does not satisfy the ADOT NAR reasonable cost-benefit criterion is not recommended.
3. Mitigation cost is based on $35/ft^2 for new construction; $85/ft^2 for wall segments on structure; $20/ft^2 for existing wall removal/replacement.

Noise Abatement Measures Determination (Recommended/Not Recommended)

ADOT considers mitigation for noise sensitive areas predicted to be impacted by highway traffic noise levels from ADOT's transportation improvement projects. The noise level impact determination used in this analysis is based on the ADOTNAR, dated May 2017. Noise barriers

(walls) were considered as mitigation measures that would provide noise shielding to impacted locations. Reasonableness and feasibility criteria were evaluated for each proposed noise wall or wall combination (two or more wall) per ADOT NAR guidelines.

A total of eight noise walls were evaluated to provide mitigation of future (2050) peak hour noise levels associated with the Recommended Build Alternative. Seven of the evaluated walls meet all ADOT NAR requirements and are recommended. One wall does not meet the ADOT NAR Reasonable cost-per-benefit criterion. The total estimated cost of recommended mitigation is $7,078,554 at an average cost of $25,190 per benefited receptor. All recommendations are based on preliminary (15% or less) design information and should be revaluated at future stages of design.

The feasibility of wall construction should account for adequate drainage, access for maintenance, access to adjacent properties outside the ADOT ROW and additional costs for relocation of utilities. Walls should not be constructed in such a manner as to create a potential safety hazard or inhibit response to a safety emergency. ADOT encourages designers to examine and explore all possibilities that would be conducive to project delivery schedule, eliminating impacts while safeguarding taxpayers' money.

INTRODUCTION

The Arizona Department of Transportation (ADOT) is studying design concepts and environmental impacts for system improvements on State Route 101L (SR 101L) at the traffic interchange (TI) with Interstate 10 (I-10). The Project would extend north on SR 101L from milepost (MP) 0.0 to Indian School Road at MP 4.0 and on I-10, starting from Avondale Boulevard at MP 131.5 and ending at MP 136.2, east of 83rd Avenue[1]. The SR 101L and I-10 System TI is located within the limits of the City of Phoenix, the Town of Tolleson and the City of Avondale in Maricopa County (Figure 1 – State Map and Figure 2 – Vicinity Map). The project would occur within existing ADOT right-of-way (ROW) and may also require new ROW along SR 101L.

The Arizona Department of Transportation (ADOT) is initiating an engineering and environmental study to evaluate (1) a new Direct High-Occupancy Vehicle (DHOV) ramp within the existing SR 101L/ I- 10 System TI and (2) a new connection between southbound SR 101L and 91st Avenue. The proposed DHOV ramp will accommodate travel to/from the north along SR 101L and to/from the east along I-10. The proposed connection between SR 101L and 91st Avenue supplements the I-10/SR 101L system TI ramps and I-10/91st Avenue service TI ramps. Several other locations within the System TI were evaluated for improvements as listed in the Technical Memorandum #4 of a 2021 Maricopa Association of Governments study to enhance regional travel, mitigate existing weaving and safety issues, and improve connectivity to support economic development for the I-10 and SR 101L.

Purpose and Need

Maricopa Association of Governments (MAG) has been studying TI Improvements to enhance regional travel, mitigate existing weaving and safety issues, and improve connectivity to support economic development for the I-10 and SR 101L Interchange. As a result of these previous studies two components are being evaluated for this System TI: (1) a new DHOV ramp and (2) a new connection between southbound SR 101L and 91st Avenue. The proposed DHOV ramp will accommodate travel to/from the north along SR 101L and to/from the east along I-10. The proposed connection between SR 101L and 91st Avenue supplements the I-10/SR 101L system TI ramps and I-10/91st Avenue service TI ramps.

The purpose of this study is to prepare a DCR and Environmental Document to evaluate potential improvements at the SR 101L and I-10 System TI in accordance with the MAG study.

[1] The Project Design Footprint shown in Figure 2 includes placement of advance traffic control signs on spring stands on I-10, SR 101L and local roads. All roadway design elements and the extent of traffic volumes predicted for the No Build and Recommended Build occur within the noise study limits.

Figure 1. Project Location Map

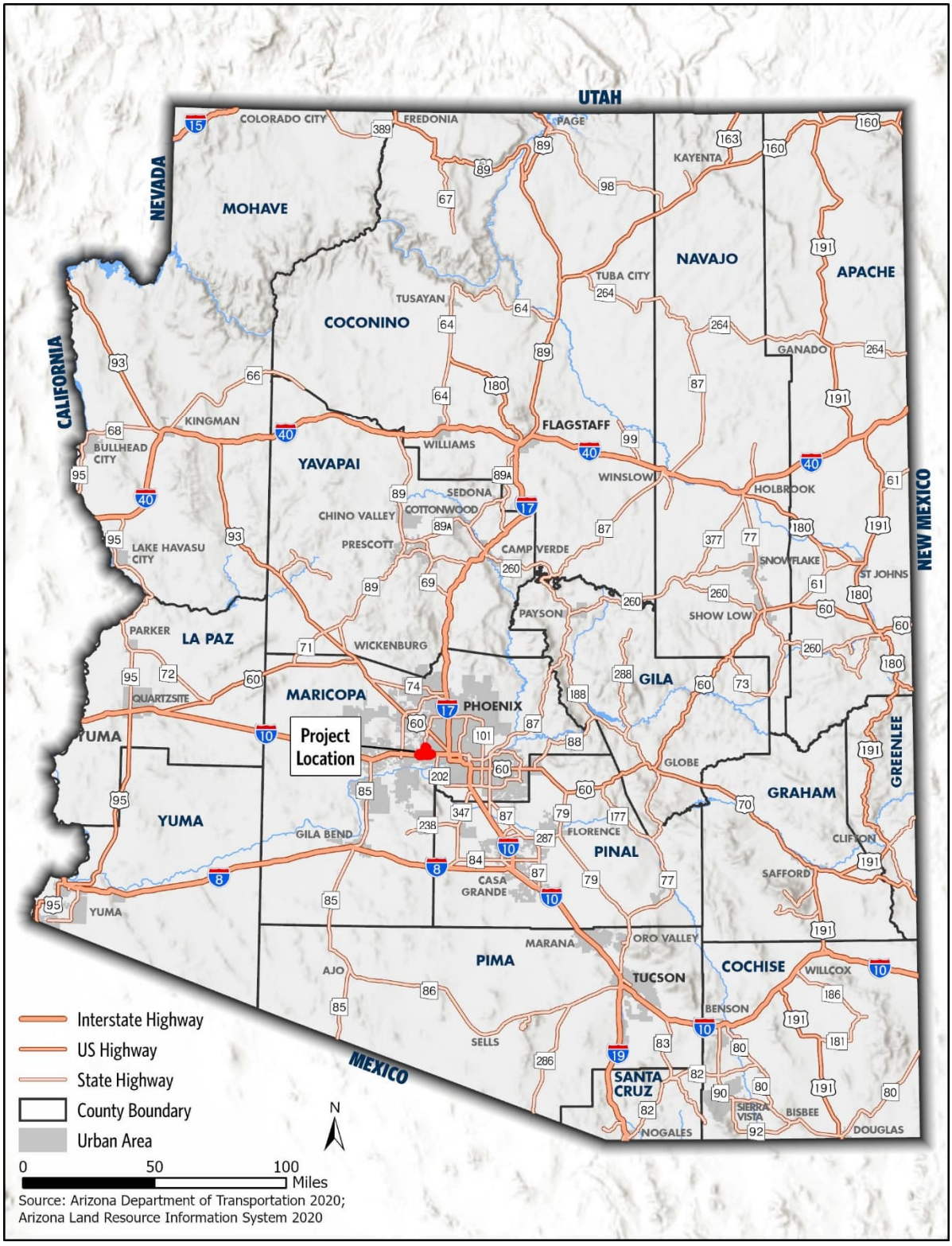
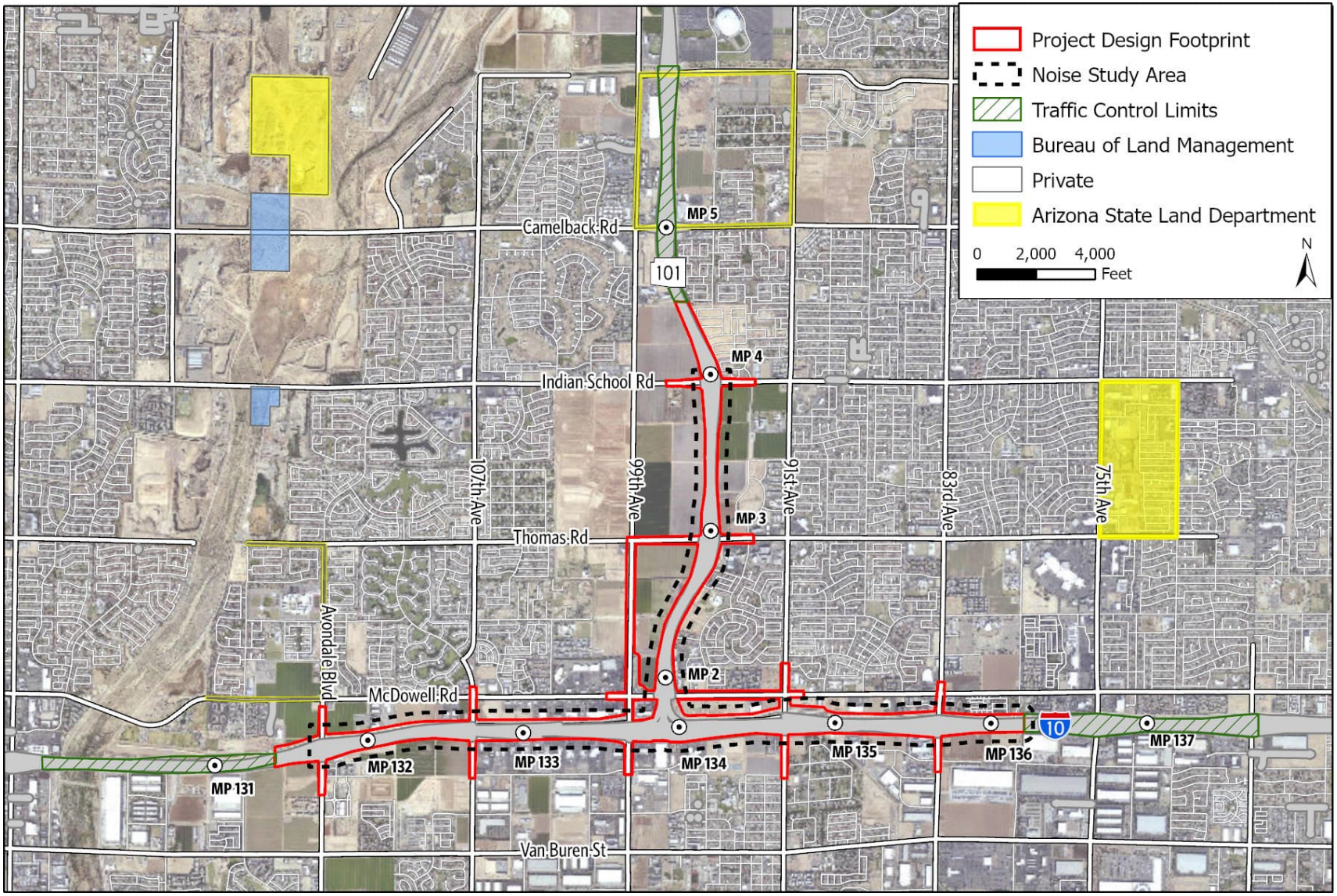


Figure 2. Project Vicinity Map



Project Description

The project scope includes evaluating the design and environmental impacts for the following proposed improvements:

- Construction of a DHOV lane from I-10 to the median of SR 101L between McDowell Road and Indian School Road
- Construction of crossroad, ramp, and bridge improvements between McDowell Road and Indian School Road on SR 101L
- Construction of crossroad and ramp improvements between Avondale Boulevard and east of 83rd Avenue on I-10
- Construction of a 91st Avenue connector from south SR 101L
- Installation of new permanent signage, pavement markings, lighting, traffic signals, and Intelligent Transportation System infrastructure
- Construction of new pavement, barriers, bridges, and walls
- Adjustment of existing drainage facilities to accommodate improvements
- Installation of irrigation system and landscaping
- Relocation or modification of impacted utilities
- Placement of advance traffic control signs on spring stands on I-10, SR 101L, and local roads

Type I Trigger for Noise Analysis

As per 23 CFR 772 and the ADOT NAR traffic noise analysis is required for any projects that receive federal-aid funds or are otherwise subject to FHWA approval. They include federal projects that are administered by Local Public Agencies (LPAs) as well as ADOT. In addition to federal projects, it is required for other ADOT-funded projects that involve:

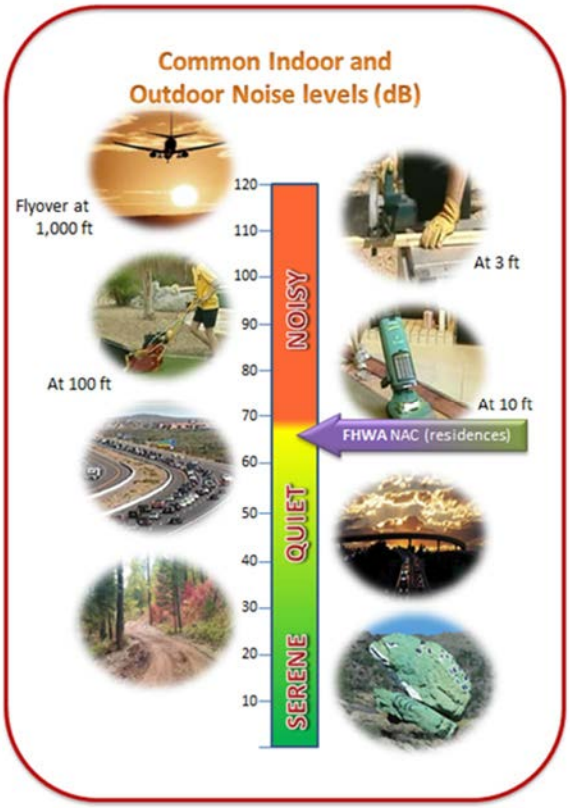
- construction of a highway on new alignment or
- a significant change in the horizontal or vertical alignment of an existing highway or
- adding new through lanes to an existing highway.

The proposed improvements include a significant reconfiguration and shifting of an existing traffic interchange and the addition of DHOV lanes. Therefore, this project meets the definition of a Type I project as defined in ADOT NAR (ADOT, 2017) and a detailed traffic noise analysis is required. Per 23 CFR 772, if any segment or component of an alternative meets the definition of a Type I project, then the entire alternative is considered a Type I project and subject to noise analysis requirements. Land use in the project area may be primarily categorized as FHWA Activity Category B, C, D, E and includes single-family and multi-family units (apartments and condominiums), schools/recreation areas, a church with recreation areas, commercial uses including hotels with outdoor pool areas, medical facilities, retail, and

office buildings. Category F and G activity areas for which noise abatement criteria are not defined include agricultural areas, sports club/event, racetracks, and undeveloped parcels.

FUNDAMENTALS OF TRAFFIC NOISE

Sound is the sensation produced by stimulation of the hearing organs produced by continuous and regular vibrations of a longitudinal pressure wave that travels through an elastic medium (air, water, metal, wood) and can be heard when they reach a person's or animal's ear. When sound travels through air, the atmospheric pressure wave variations occur periodically. It travels in air at a speed of approximately 1087 ft. per second at sea level and temperature of 32 °F. *Noise* is usually defined as any "unwanted sound," and consists of sounds that are perceived as interfering with communication, work, rest, and recreation. It is characterized as a non-harmonious or discordant group of sounds.



Sound Pressure Levels, Decibels, Frequencies and A-Weighted Decibels-dBA

Noise can be measured in Pa (Pascal). A healthy human ear can detect a pressure variation of 20 µPa and it is referred to as threshold of hearing. Logarithmic scale is useful for handling numbers on a wide scale, but for a smaller span, the decibel or (dB) scale is used. Sound pressure level (SPL) is calculated using measured sound level and the hearing threshold of 20 µPa or 20 x 10^{-6} Pa as the reference level, this level can also be defined as 0 dB. The decibel alone is insufficient to describe how human ear responds to sound pressures at all frequencies. The human ear has peak response in the range of 2,500 to 3,000 Hz and has a somewhat low response at low or even high frequencies. In response to the human ear sensitivity, the A-weighted noise level, referenced in units of dB(A), was determined to better resemble people's perception of sound levels. This dBA unit of measurement is used in noise studies and reporting. Changes in sound level under 3 dBA are not noticed by human ear, while the human ear perceives a 10 dBA increase in sound level to be a doubling of sound.

Noise Descriptors

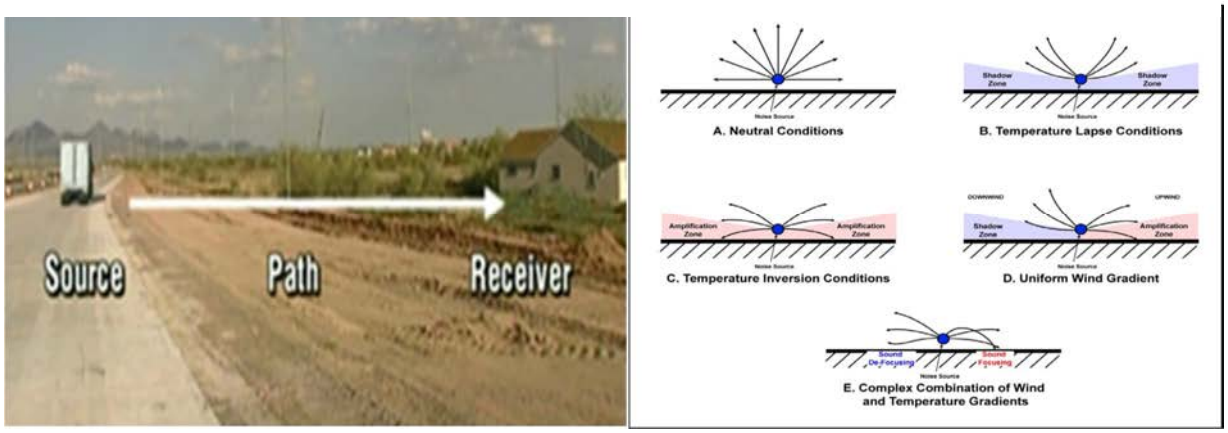
The most commonly used noise descriptor in traffic noise analysis is Equivalent Sound Level (L_{eq}). L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level [$L_{Aeq(h)}$] is the energy average of A-weighted sound levels occurring during a one-hour period and is the basis for noise criteria used by ADOT.

What are source, receiver, receptor, and path when talking about traffic noise?

Traffic noise is a combination of the noises produced by vehicle engines, exhaust, and tires. The source of highway traffic comes from vehicles traveling on highways. The noise level at the *Source* depends on pavement type, number of heavy trucks, traffic volumes, and traffic speeds. The predominant noise sources in vehicles at speeds less than 30 miles per hour (mph) are engine and exhaust. At speeds greater than 30 mph, tire noise becomes the dominant noise source.

In Figure 3, the Receptor is any location where people are affected by the traffic noise. It can be residence, park, school, playground and any other place where frequent human use occurs. An area between the source and the receptor *(receiver* represents a receptor(s) when modeled in FHWA Traffic Noise Model) is considered a path. Depending on the path surface, propagation of sound may be reduced; such is the case for the soft ground and fresh snow. Doubling the distance between the source and receptor reduces noise by 3 dBA depending on the ground.

Figure 3. Source, Propagation Path, Receptor



Air changes its density due to variation of humidity and temperature, and wind influences refraction of sound waves. Wind, humidity, and temperature may have a significant impact, but only influences the receptors located a long distance away from source. As residents are usually much closer to the noise source, any atmospheric conditions are insignificant for consideration. For more information on noise, please visit ADOT Environmental Planning Noise webpage.

NOISE IMPACT CRITERIA

As required by 23 CFR 772.11(e), the point at which noise levels "approach" the NAC established by the FHWA is defined by ADOT as 1 dBA, for Activity Categories A, B, C, D, and E (Table 2). There is no noise impact threshold for Category F or Category G locations. As required by 23 CFR 772.5, ADOT defines a Substantial Increase in noise levels as an increase in noise levels of 15 dBA in the predicted noise level over the existing noise level.

Table 2. FHWA Noise Abatement Criteria

Activity Category	dBA, Leq1h[1]	Activity Description
A	57 (exterior)	Land on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 (exterior)	Residential
C	67 (exterior)	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52 (interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio structures, recording studios, schools, and television studios
E	72 (exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in categories A–D or F
F	---	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	---	Undeveloped lands that are not permitted

Source: Federal Highway Administration (2011); 23 Code of Federal Regulations § 772

1. The 1-hour equivalent loudness in A-weighted decibels, which is the logarithmic average of noise over a 1-hour period.

NOISE SENSITIVE LAND USES

The noise analysis study was established by a 650-foot offset from the future roadway edge of pavement for the I-10 and SR 101L mainline, service interchange ramps and system interchange directional ramps. In general, the closest noise-sensitive locations for each category were considered first and additional locations further removed from the freeway were added up to the point where noise levels drop below ADOT impact thresholds. Within the noise study area, land use in the project area is categorized as FHWA Activity Category B, C, D, E, F, and G.

The activity category B land uses include single-family homes and multi-family (apartments/condominiums). Activity category C uses include residential common areas/playgrounds/pools, recreation and outdoor use areas associated with schools and a church. Activity category D uses, which are evaluated for interior noise, include medical office, school and church buildings without an associated outdoor use area. In addition, only those commercial locations with outdoor use areas (pools or other common areas) were included in the evaluation of activity category E uses. Activity category G land uses include undeveloped residential parcels and activity category F uses include active agriculture. These activity categories do not have an associated impact threshold but noise level predictions at selected locations 300 feet from the Build Alternative ROW will be made available to local officials responsible for zoning/permitting decisions for these locations.

For this analysis, peak traffic hour noise levels have been calculated at locations representing one or more receptor locations (receivers). Figure 4, Exhibits 1 - 7 shows the receiver locations and Table 4 lists the Activity Category, description and number of receptors represented by each.

EXISTING NOISE ENVIRONMENT

The methodology used for highway noise level measurements is to comply with procedures specified in Section 4 - Existing-Noise Measurements in the Vicinity of Highways - of the FHWA document FHWA-PD-96-046/DOT-VNTC-FHWA-96-5, *Measurement of Highway-Related Noise* (FHWA, 1996).

Ambient noise levels were established by field measurements Activity Categories B, C and E for validation of the FHWA Traffic Noise Model version 2.5 (TNM). Existing noise levels were predicted using the FHWA TNM model and the existing peak hour traffic as reported in the *Initial Design Concept Report – SR 101 at I-10 System Traffic Interchange Improvements* [DCR] (ADOT, 2023).

Figure 4. Noise Receivers

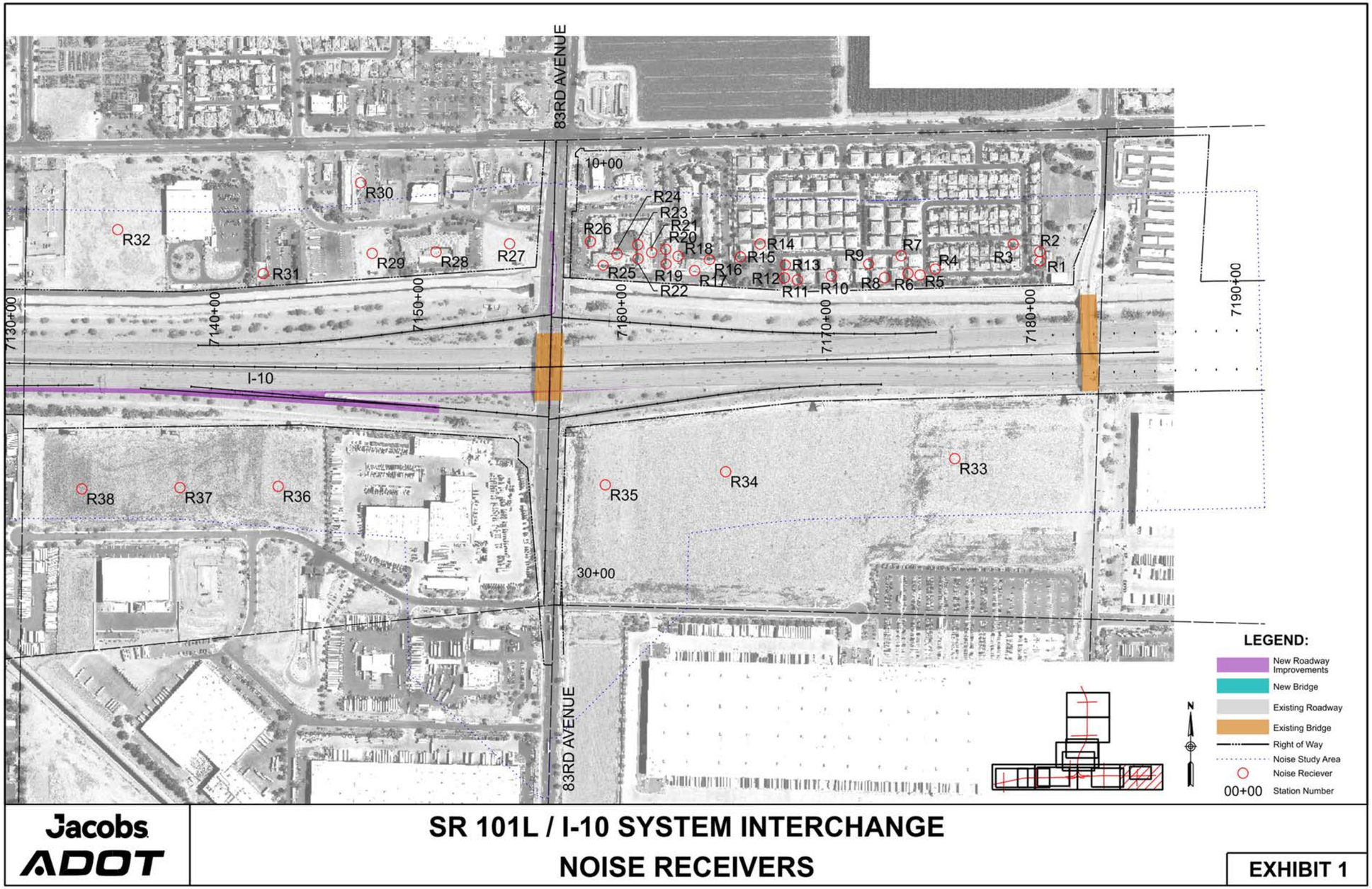


Figure 4. Noise Receivers

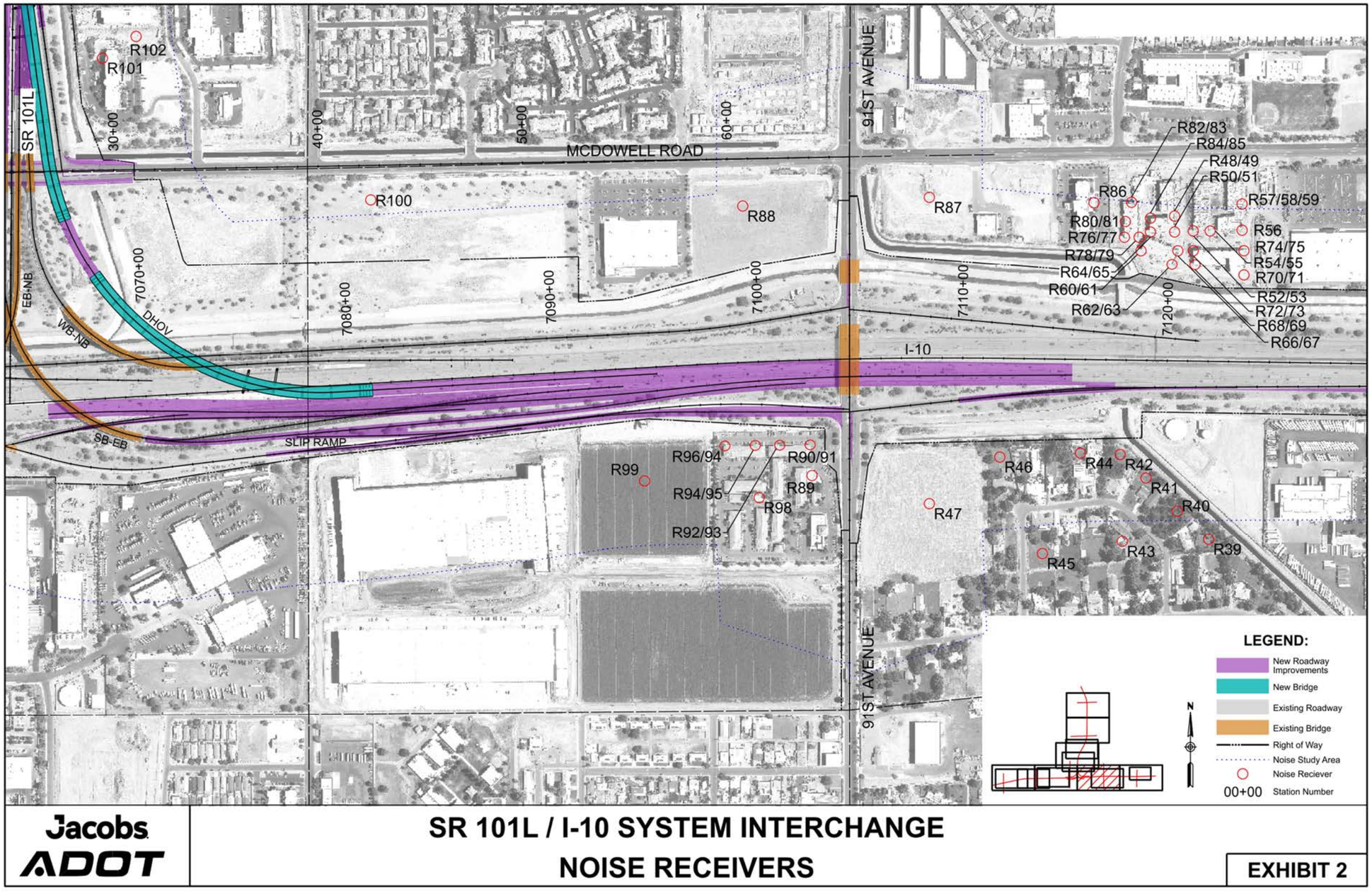


Figure 4. Noise Receivers

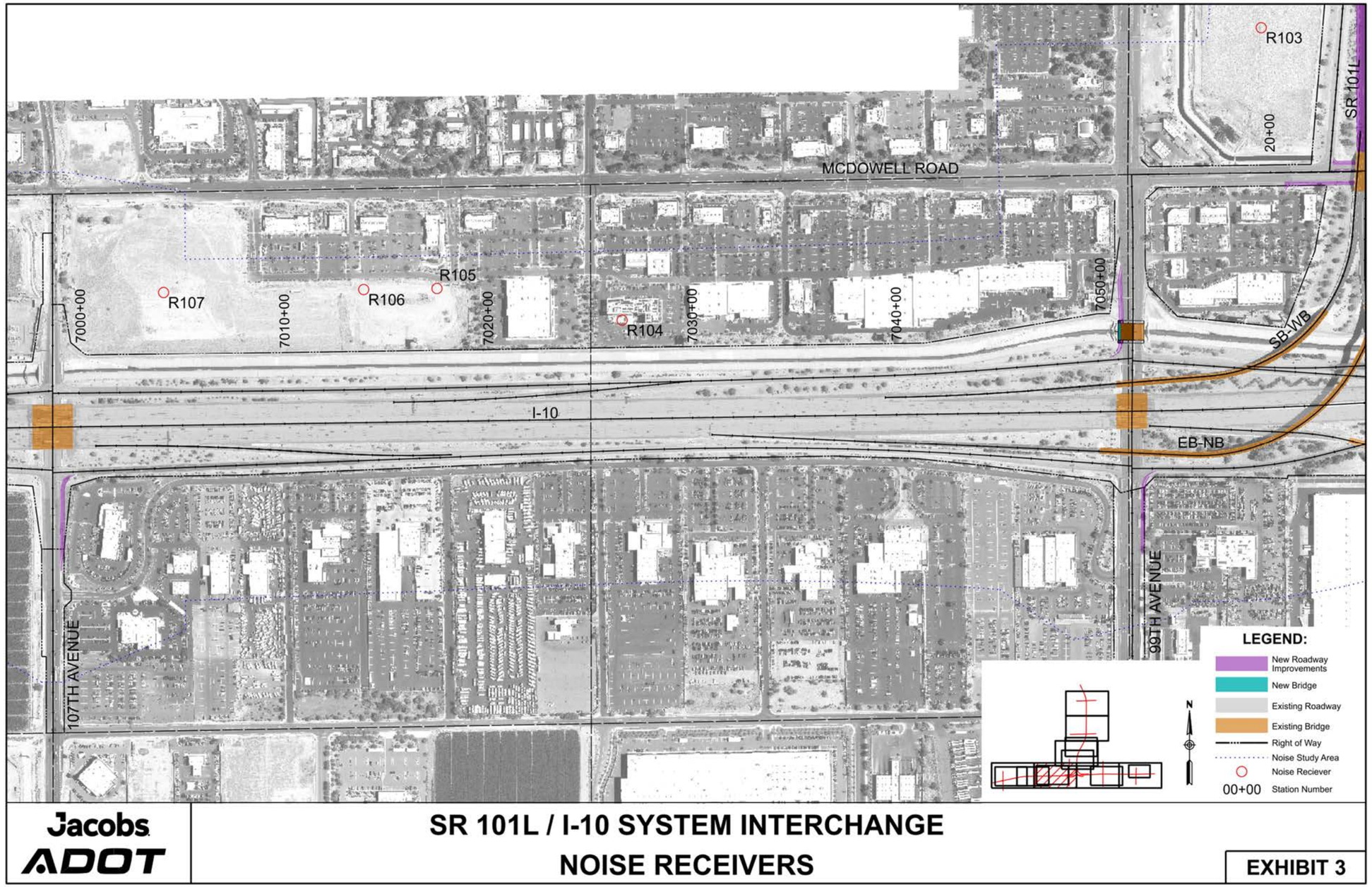


Figure 4. Noise Receivers

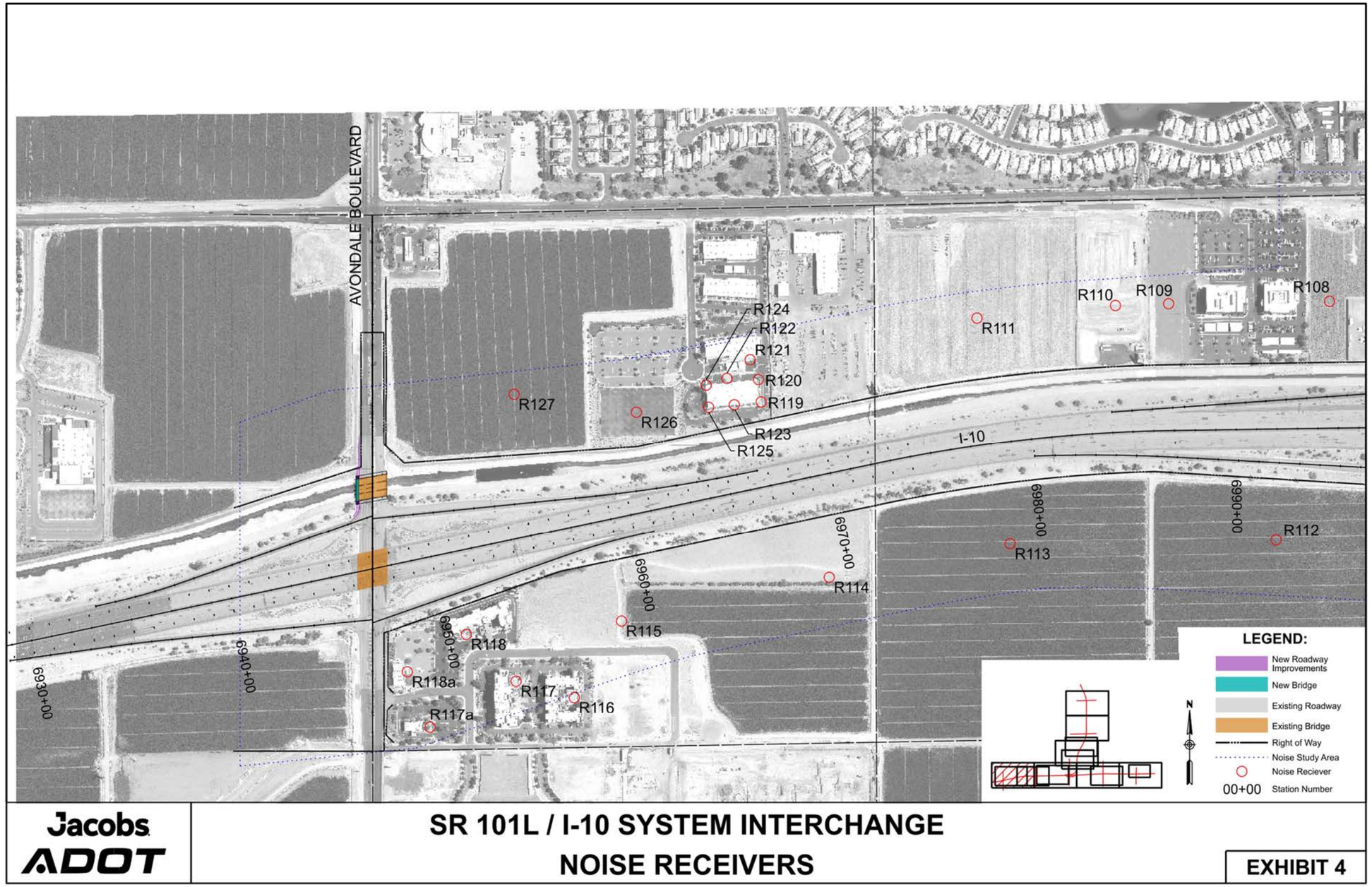


Figure 4. Noise Receivers

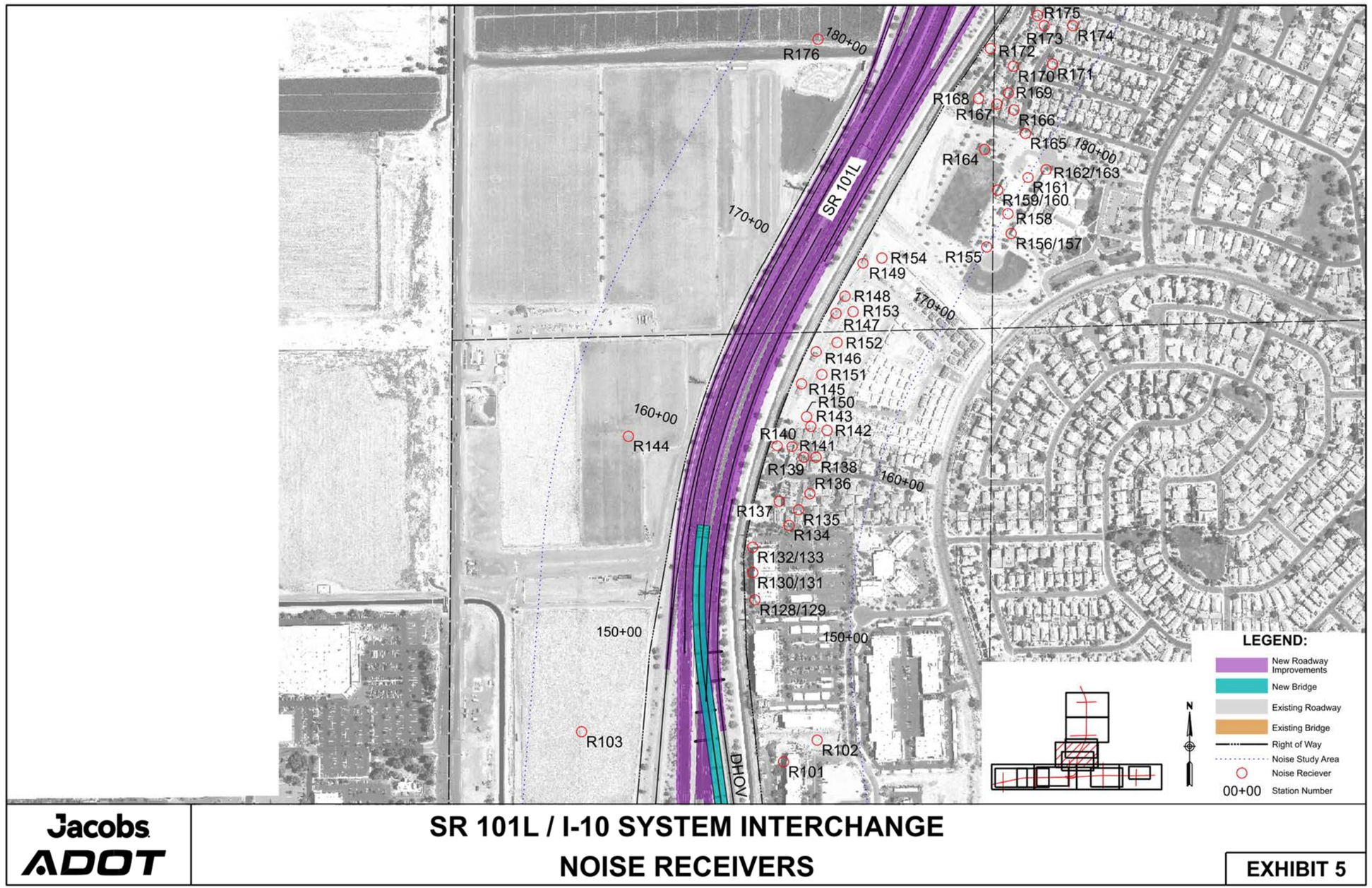


Figure 4. Noise Receivers

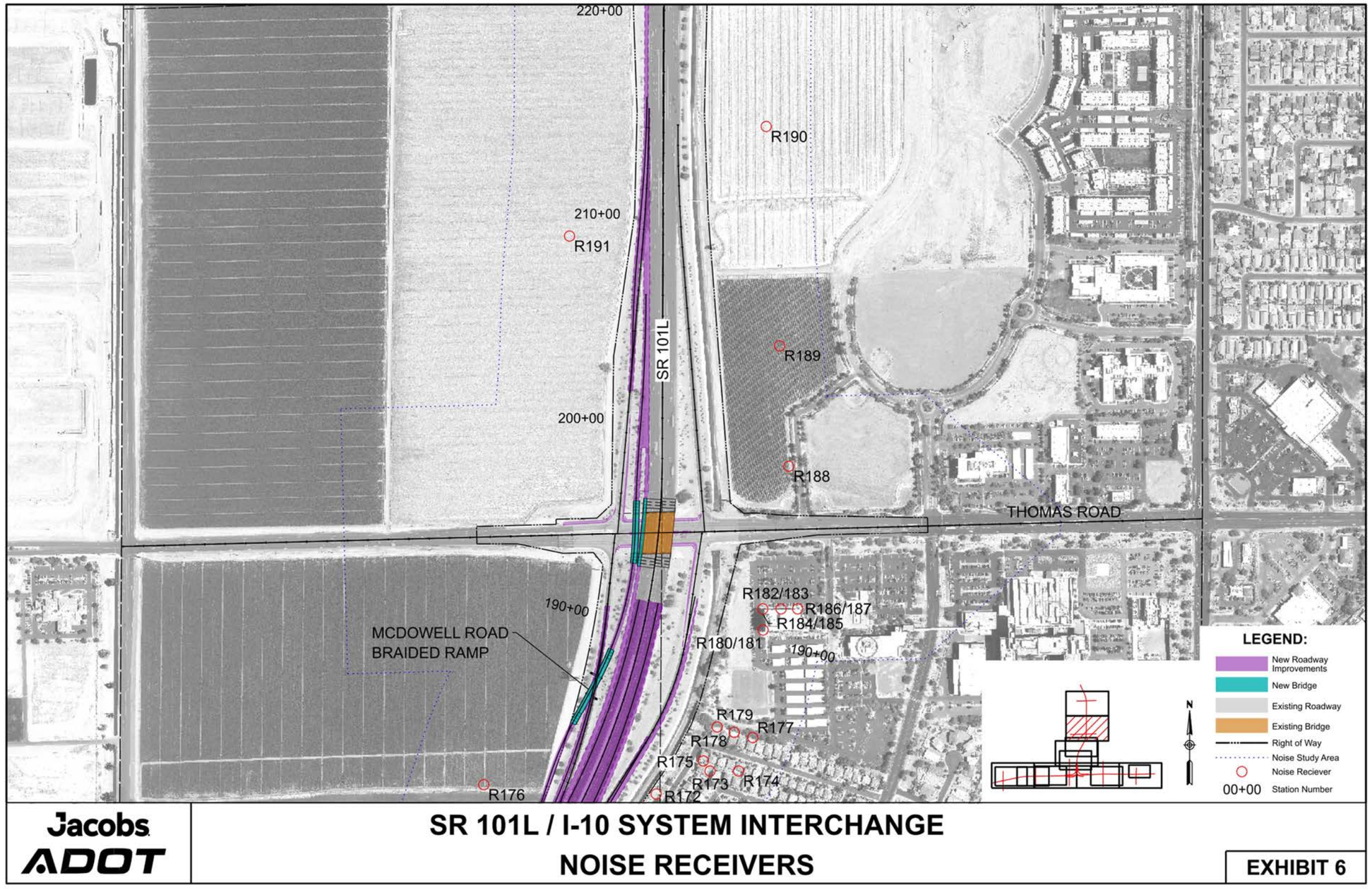
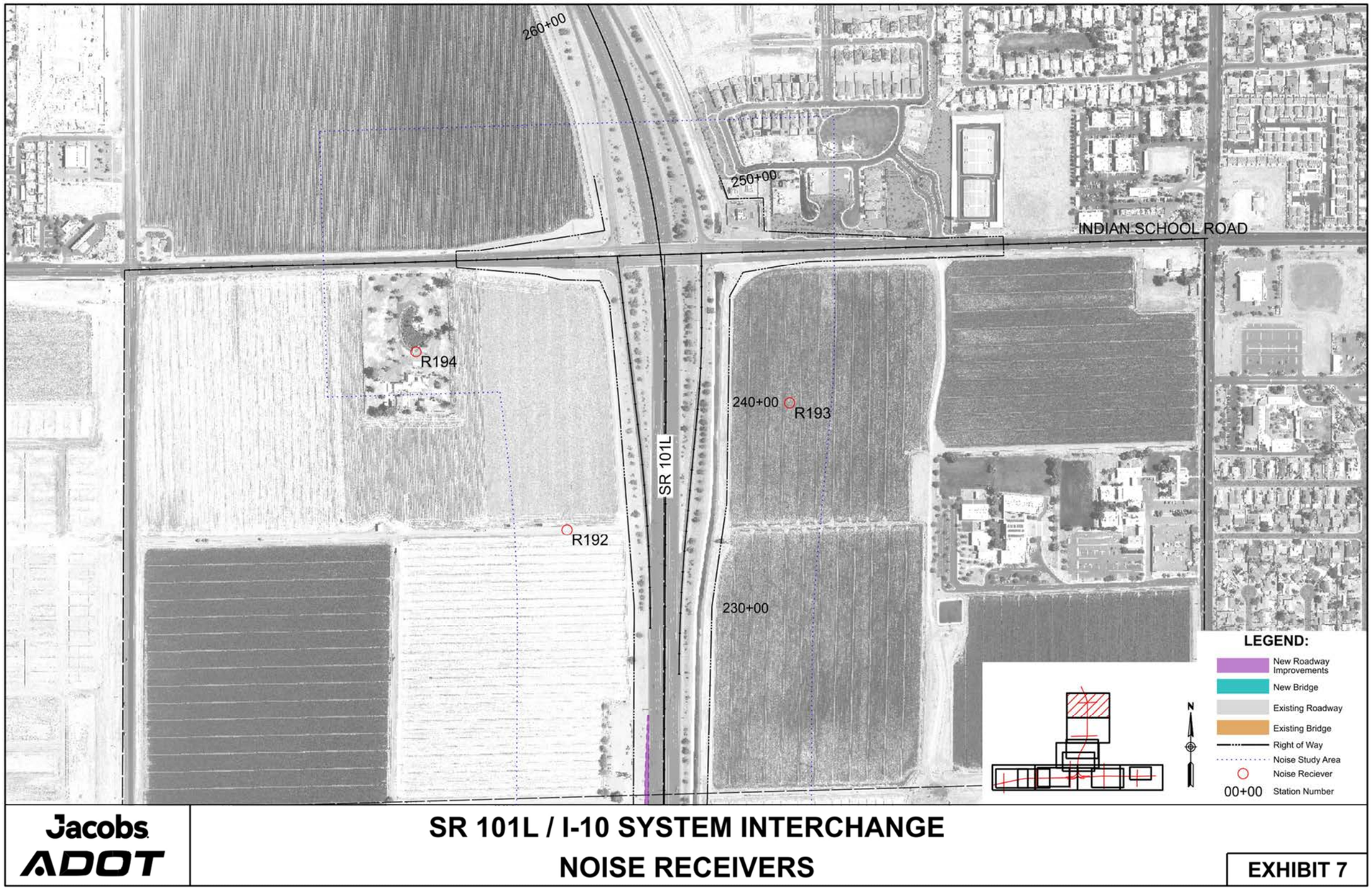


Figure 4. Noise Receivers



Short-term noise level measurements were completed on October 13, 2022 and November 30, 2022. Three 15-minute measurements were taken under meteorologically acceptable conditions, with winds less than 3 mph and dry pavement at eight locations representing Activity Categories B, C or E. If a variation of 3 or dBA or more was recorded for the first two measurements, additional measurements were taken until consecutive measurements were within the 3 dBA tolerance. Measurements were recorded with a Larson Davis Model 820 Class I integrating sound level meter (SLM). The SLM was calibrated prior to each measurement with a Larson Davis Model CAL200.[2] The measured noise level ranged from 61 dBA to 73 dBA. Appendix A includes the noise measurement data sheets.

Background Noise Consideration

Noise sources contributing to the noise levels at a receptor, other than observed traffic noise, must be identified and captured in the TNM model per the ADOT NAR (ADOT, 2017). Potential noise sources in the study area include train traffic and plane flights. The Union Pacific Railroad (UPRR) Phoenix Subdivision runs parallel to I-10 originating west of Avondale Boulevard and continuing east of 83rd Avenue. The closest parallel line is approximately 1 mile south of the noise area with a north/south spur east of 86th Avenue that terminates approximately 4,300 feet south of the noise study limits. Freight and passenger rail noise impacts generally occur within 750 feet of the track alignment to a maximum of 1,600 feet for at-grade crossings where train horns are activited for safety purposes; therefore, train noise was not considered further in this traffic noise study. Appendix D shows the UPRR Phoenix Subdivision alignment in the project area avalable at https://www.openstreetmap.org/relation/9097925#map=14/33.4497/-112.2606.

The Phoenix Goodyear Airport (PGA) is located approximately 3.5 miles southwest of the noise area. Appendix D shows a noise contour available at httLps://apps.azdot.gov/files/Airports/MP_PDF/PHX_Goodyear/GYR-Final-MP-May-2018.pdf that was developed for the airport master plan (PGA, 2017). The 65 day-night noise level (Ldn) and 70 Ldn noise contours are contained well within the aiport boundaries. Per 14 CFR Part 150, Appendix A Table 1, the 65 Ldn contour is the threshold for residential land uses and a 70 Ldn is the threshold of compatibility for outdoor recreation uses. Because the airport is located approximately 3.5 miles southwest of the project area and the residential and recreational use impact threshold is within its boundaries, noise from the PGA was not evaluated further in this analysis.

The Luke Air Force Base (AFB) is located approximately 5.3 miles northwest of the noise study area. Appendix D shows a noise contour available at https://dema.az.gov/sites/default/files/MAC-RCP_JLUS-Luke-AFB-WMC_2003-March.pdf that was developed for the Western Maricopa County/Luke AFB Regional Compability Plan (United States Department of Defense, 2003). The 65 Ldn noise contour extends approximately ½-mile

[2] A valid calibration certificate is on file with the ADOT EP Noise and Air Team at the time of measurements, in line with ADOT NAR and *Instruction on Determination of Existing Noise Levels and Noise Measurement Data Form*.

from the runway and 4.7 miles from the noise study area; therefore, noise from the Luke AFB was not evaluated further in this analysis.

Traffic Noise Model - Validation

For the purpose of validation of the FHWA TNM, the noise level measurements taken are representative of free-flow conditions, without traffic controls as much a practicable, without being influenced by other noise sources (aircrafts, lawn mowers, idling engines running, running water, loud insects, birds, animals, etc), and with a clear view to the roadway.

To ensure that the noise models used to predict traffic noise impacts accurately reflect the conditions in the noise study area, a model was constructed using traffic volumes that were counted during each measurement interval as well as the average traffic speeds and vehicle types observed. Modeled values must be within ±3.0 dBA of the measured levels for the model to be validated.

Validated FHWA TNM runs incorporate features of the topographic and built environment that were then used to accurately predict both existing and future $L_{eq(h)}$ peak hour traffic noise levels. Design files mapping major roadways, topographical features, and sensitive receptors in the noise study area were imported into the TNM model and the corresponding traffic volumes were entered manually. The measured and modeled noise levels are provided in Table 3. As indicated in the table, three of the eight locations had a clear view of the roadway and were used in the model validation.

Table 3. Model Calibration of Measured Noise Levels

Monitoring Location (Receiver)	Activity Category	Land Use Description	Average Measured Level	Modeled Noise Level	Model Variation
			dBA	dBA	dBA
M1	B	Condominium Common Area	58.2	n/a	n/a[1]
M2	B	Residential Adjacent	61.6	64.0[2] (66.7)[3]	+2.4 (+5.1)
M2a	B	Residential Adjacent	65.3	n/a[4]	n/a
M3	C	School (soccer field)	64.2	66.0[1] (66.9)[2]	+2.7 (+1.8)
M3a	B	SHF Neighborhood Common Area	61.3	n/a	n/a[1]
M5	E	Main Event Parking lot	72.8	72.7[2] (74.3)[3]	-0.1 (+1.5)
M6	C	Church	65.3	n/a[5]	n/a[5]
M6a	B	Residential Adjacent	62.0	n/a	n/a[1]
				Average Variation[5]	Loose Soil: 0.89 Hard Soil: 1.33

1. Location was shielded from traffic source and data was not included in the model validation.
2. Modeled ground type was loose soil.

3. Modeled noise levels in parentheses were calculated with the hard soil condition.
4. Traffic counts were not recorded during the measurement interval(s).
5. Traffic slowed with periodic stops, compromising model validation.
6. Average of the absolute deviation (+ or -) from the mean value.

A comparison of measured to modeled noise levels shows there is not a substantial (3 dBA+) variation with either the loose soil or hard soil ground type. The variation for the hard soil assumption is slightly greater; therefore, the loose soil condition was selected for modeling of existing and future peak hour noise levels for this project.

PREDICTED PEAK HOUR NOISE LEVELS

Traffic noise analysis predictions rely on project specific traffic data as listed below and which pertains to all lanes including, general purpose, ramps, High Occupancy Vehicle, system and service Traffic Interchange operating at Level of Service (LOS) C (free flow conditions).

- Traffic volumes, with lateral distribution.
- Vehicle type, vehicle distribution of automobiles, medium trucks, heavy trucks, busses and motorcycles with particular attention to percentage of heavy trucks with lateral distribution.
- Speed of traffic that is uniform per roadway segment (through lanes, off ramps, cross-streets, turn lanes, etc).

When predicting noise levels for the design year, a 'worst-case' approach, wherein the traffic conditions that produce the worst traffic noise impact is used. In general, this should reflect LOS C traffic conditions during the peak noise hour with traffic moving at five miles per hour above the posted speed limit. If future traffic volumes are less than maximum LOS C volumes, future traffic volumes are utilized. If no other information is available, the peak hourly volume should be 10% of the predicted Annual average daily traffic (AADT), with factors K (peak hour), D (directional), and T (percent trucks) included in the analysis and with lateral lanes across the travel lanes of a multiple-lane highway.

An exception to worst-case approach is pavement type, as all TNM-noise level predictions must utilize "average" pavement type unless, FHWA approval to use a different pavement type has been obtained.

Roadway Geometry & Topographic Data and Ground Type

The roadway geometry data used for the noise modeling effort, such as roadway and lane width, horizontal and vertical coordinates, were based on the electronic roadway geometry data and 15% design plans using OpenRoads © (Jacobs, 2023). Aerial photographs were extracted from Google Earth™ and orthorectified to the roadway coordinates (Google, 2023). Terrain lines determine the elevation of sound propagation interfering feature between source and the noise receiver. Ground type for modeling purposes is determined as loose soil. One and two-lane cross sections were modeled with one representative roadway in each direction for all roadway segments.

Traffic Volumes and Mix

Different vehicle types have different noise emission levels, with trucks producing higher noise levels than passenger automobiles. Furthermore, trucks with higher cargo weight capacity produce higher noise levels than trucks of lower cargo weight capacity. Vehicles are categorized as follows:

- Automobiles are categorized as vehicles with two axles and four wheels designed primarily for passenger or cargo (light trucks) transportation. Generally, the gross weight of an automobile is less than 10,000 pounds.
- Medium trucks are categorized as vehicles having two axles. Generally, the gross weight of a medium truck is greater than 10,000 pounds but less than 26,400 pounds.
- Heavy trucks are categorized as vehicles having three or more axles and designed for the transportation of cargo. Generally, the gross weight of a heavy truck is greater than 26,400 pounds.

I-10 and SR 101L are the dominant sources of traffic in the study area. Peak traffic activity occurs between 6:30 a.m. and 8:30 a.m. and between 3:30 p.m. and 5:30 p.m. Within the project limits, the highest volumes occur between 3:30 p.m. to 4:30 p.m. on both freeways as reported in the DCR (ADOT, 2023).

Modeled roadway segments include I-10 beginning just west of Avondale Boulevard at MP 131.7 to 79th Avenue at MP 136.2, the I-10/SR 101L System Interchange including all directional ramps, and SR 101L beginning at MP 0.0 within the TI north to Indian School Road at MP 4.0. Peak hour volumes from the traffic study for the existing, No Build and Recommended Build Alternative are presented in Appendix C. LOS C volumes referenced in the *Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis* (Transportation Research Board, 2016), were used for all scenarios where they are exceeded by peak hour volumes.

The following truck percentages for the modeled roadway segments within the study area were communicated via e-mail and included in Appendix C (AECOM, 2023):

- I-10 Eastbound Peak Hour: AM (12%), PM (8%)
- I-10 Westbound Peak Hour: AM (12%), PM (5%)
- SR 101L Northbound Peak Hour: AM (6%), PM (3%)
- SR 101L Southbound Peak Hour: AM (6%), PM (3%)
- System Interchange Directional Ramps East-North and South-East AM Peak Hour: AM (7%), PM (4%)
- System Interchange Directional Ramps West-North and South-West AM Peak Hour: AM (9%), PM (2%)

- Service Interchange Ramps and Cross-Streets: 5%[3]

Percentages assigned to medium vs. heavy trucks were multiplied by the generally observed ratio of medium to heavy truck counts recorded during the noise measurement intervals, which are generally three to one heavy to medium trucks on I-10 eastbound, four to one heavy to medium trucks on I-10 westbound, and two to one heavy to medium trucks on SR 101L.

Vehicle Speed

The modeled vehicle speeds are as follows:

- All vehicles - 5 mph above posted speed, or 70 mph on existing and future I-10 and SR 101L mainline general purpose lanes
- Cars – 5 mph above posted speed, or 70 mph on existing and future I-10 and SR 101L mainline high occupancy vehicle lanes
- Cars - 5 mph above design speed, or 60 mph on system interchange directional ramps
- All vehicles – 5 mph above design speed, or 60 mph for service interchange ramps
- All vehicles – 5 mph above posted speed, or 45 mph on Avondale Boulevard, 99th Avenue, 91st Avenue, 83rd Avenue, McDowell Road, Thomas Road and Indian School Road
- All vehicles – 5 mph above posed speed, or 50 mph on I-10 westbound frontage road
- Traffic signals within the project limits were modeled per *Final Report on Project 25-34 Supplemental Guidance on the Application of FHWA's TNM – Appendix B Signalized Interchanges, Intersections and Roundabouts* guidelines (Transportation Research Board, 2014).

Atmospheric Variables

Noise level is affected by temperature and humidity. For noise modeling purposes, FHWA recommends the default values for the temperature of 68 degrees Fahrenheit and the humidity of 50 percent.

Receptor and Receiver Locations

The ADOT NAR defines a "receptor" as a discrete or representative location of a noise sensitive area(s) for any of the land uses listed in Table 2. The "receiver" is defined as a location used in noise modeling to represent the measured and predicted noise level at a particular point. The noise-sensitive receptors are located in the backyard or common outdoor areas of Category B residential properties. Placement of receivers for Category C, D, E and G land uses follow ADOT NAR guidelines.

[3] Truck percentages were based on non-automobile (car) field counts observed on McDowell Road which were approximately 5%.

Shielding Effects

TNM 2.5 can account for the noise shielding effects created by existing noise barriers, privacy walls, buildings, and terrain changes that are an obstruction between noise sources and receptors. Neighborhood privacy walls and large buildings were modeled as barriers and the second and third row of homes in residential areas were modeled as building rows. Jersey barriers are located or planned for the system TI directional ramps, the I-10 median and SR 101L median. Although the barriers can provide some shielding of tire-pavement noise to adjacent land uses, the locations are currently shielded by existing privacy walls and/or noise walls; therefore, jersey barriers were not included in any noise modeling scenarios.

Based on the assumptions stated in this report, FHWA TNM 2.5 predicts noise levels along the project route in the design year after construction of the project has occurred. Actual noise levels in the future may differ somewhat due to a number of factors outside the scope of this modeling effort.

This analysis determines the traffic noise impacts based upon the FHWA NAC, which is referred to in ADOT's NAR. The FHWA NAC specify an allowable traffic noise level for different categories of land use and activities. Homes in the noise study area are classified in Category B. Churches, schools, medical facilities and recreation facilities are classified in Category C. The noise abatement criteria for both categories is a 67 dBA hourly equivalent sound level ($L_{eq(h)}$). Hotels and restaurants in the noise study area are classified as Category E uses with a NAC of 72 dBA. Medical facilities, schools and a church without adjacent exterior use areas are classified in Category D with and interior NAC of 52 dBA. In the absence of traffic noise impacts, the consideration of noise abatement measures is not warranted. Active agricultural land and undeveloped parcels in the noise study area are classified as Category F and G, respectively. These land use categories don't have a NAC.

Noise Impact Evaluation Summary

Table 4 shows the list of receivers with predicted existing and future PM peak hour noise levels[4]. Noise levels formatted in bold meet or exceed the ADOT approach criteria of the FHWA NAC at the respective receiver.

[4] The PM peak hour volumes are in general higher than AM peak hour volumes within the noise study area; however, truck percentages are higher in the AM peak hour with volumes exceeding the PM peak hour. The variation in overall traffic vs truck volumes results in a +/- 1 dBA or less in most locations without an increase in noise impacts for either modeling scenario. As a result, noise levels for the PM peak hour are presented in this report and are the basis for impact determination and mitigation design for this project.

Table 4. Peak Hour Noise Levels

Receiver No.	Activity Category	NAC[1]	No. of Receptors	Description	Existing (2022)	No Build (2050)	Build Alt. (2050)[2]	Mitigation Considered
Daravante AMD (Figure 4, Exhibit 1)								
R1	B	66	1	SFH	59	59	60	No
R2	B	66	1	SFH	58	58	59	
R3	B	66	9	SFH	59	59	60	
Daravante Condominiums (Figure 4, Exhibit 1)								
R4	B	66	9	SFH	58	58	58	No
R5	B	66	8	SFH	59	59	60	
R6	B	66	4	Condominium	57	58	58	
R7	B	66	9	Condominium	57	57	57	
R8	B	66	4	Condominium	57	57	57	
R9	B	66	8	Condominium	53	53	53	
R10	B	66	4	Condominium	57	57	58	
R11	B	66	4	Condominium	59	59	60	
R12	B	66	4	Condominium	58	59	59	
R13	B	66	8	Condominium	58	59	59	
R14	B	66	2	Condominium	58	59	58	
R15	B	66	4	Condominium	60	60	60	
Residence at McDowell Apartments (Figure 4, Exhibit 1)								
R16	B	66	4	Apartment	57	57	57	Yes
R16a	B	66	4	Apartment (2nd story)	61	61	61	
R17	B	66	4	Apartment	64	64	65	
R17a	B	66	4	Apartment (2nd story)	73	73	74	
R18	B	66	4	Apartment	60	60	61	
R18a	B	66	4	Apartment (2nd story)	68	69	69	
R19	B	66	2	Apartment	62	62	62	

Receiver No.	Activity Category	NAC[1]	No. of Receptors	Description	Existing (2022)	No Build (2050)	Build Alt. (2050)[2]	Mitigation Considered
Residence at McDowell Apartments (Figure 4, Exhibit 1)								
R19a	B	66	2	Apartment (2nd story)	70	71	71	Yes
R20	B	66	2	Apartment	60	61	60	
R20a	B	66	2	Apartment (2nd story)	67	67	67	
R21	B	66	4	Apartment	59	60	60	
R21a	B	66	4	Apartment (2nd story)	67	67	68	
R22	B	66	22	Apartment	62	62	62	
R22a	B	66	2	Apartment (2nd story)	68	69	69	
R23	B	66	2	Apartment	61	61	61	
R23a	B	66	2	Apartment (2nd story)	66	66	66	
R24	B	66	4	Apartment	56	57	56	
R24a	B	66	4	Apartment (2nd story)	59	60	60	
R25	B	66	4	Apartment	65	66	66	
R25a	B	66	4	Apartment (2nd story)	72	72	72	
R26	B	66	2	Apartment	68	69	68	
R26a	B	66	2	Apartment (2nd story)	70	71	70	
Inn at Tolleson/Premier Inns Tolleson (Figure 4, Exhibit 1)								
R27	G	--	1	Undeveloped Parcel	67	69	68	No
R28	E	71	1	Hotel (pool)	56	56	56	
R29	G	--	1	Undeveloped Parcel	62	63	63	
Best Western Tolleson/Victory Inn (Figure 4, Exhibit 1)								
R30	E	71	1	Hotel (pool)	64	64	64	No
R31	E	71	1	Hotel (pool)	63	64	64	
Undeveloped Parcel (Figure 4, Exhibit 1)								
R32	G	--	1	Undeveloped Parcel	63	63	63	No

Receiver No.	Activity Category	NAC[1]	No. of Receptors	Description	Existing (2022)	No Build (2050)	Build Alt. (2050)[2]	Mitigation Considered
Undeveloped Parcels (Figure 4, Exhibit 1)								
R33	G	--	1	Undeveloped Parcel	66	66	67	No
R34	G	--	1	Undeveloped Parcel	65	65	65	
R35	G	--	1	Undeveloped Parcel	65	66	65	
R36	G	--	1	Undeveloped Parcel	60	60	60	
R37	G	--	1	Undeveloped Parcel	59	60	60	
R38	G	--	1	Undeveloped Parcel	60	60	60	
Tolsun Farms (Figure 4, Exhibit 2)								
R39	B	66	1	SFH	58	59	59	No
R40	B	66	1	SFH	59	59	59	
R41	B	66	1	SFH	61	61	61	
R42	B	66	1	SFH	62	62	62	
R43	B	66	2	SFH	58	58	59	
R44	B	66	2	SFH	62	62	62	
R45	B	66	2	SFH	58	59	59	
R46	B	66	2	SFH	62	63	63	
Undeveloped Parcel (Figure 4, Exhibit 2)								
R47	G	--	1	Undeveloped Parcel	62	63	62	No
Parc Tolleson (Figure 4, Exhibit 2)								
R48	B	66	5	Apartment	60	60	60	Yes
R49	B	66	5	Apartment	57	57	57	
R50	B	66	2	Apartment	61	61	61	
R51	B	66	2	Apartment	55	56	56	
R52	B	66	3	Apartment	62	62	62	
R53	B	66	3	Apartment (2nd story)	65	66	65	
R54	B	66	2	Apartment	60	60	61	

Receiver No.	Activity Category	NAC[1]	No. of Receptors	Description	Existing (2022)	No Build (2050)	Build Alt. (2050)[2]	Mitigation Considered
Parc Tolleson (Figure 4, Exhibit 2)								
R55	B	66	2	Apartment (2nd story)	64	65	64	Yes
R56	B	66	3	Apartment	62	62	64	
R57	B	66	3	Apartment (2nd story)	66	66	67	
R58	B	66	4	Apartment	62	62	63	
R59	B	66	4	Apartment (2nd story)	66	66	66	
R60	B	66	2	Apartment	64	64	66	
R61	B	66	2	Apartment (2nd story)	70	71	71	
R62	B	66	2	Apartment	67	67	67	
R63	B	66	2	Apartment (2nd story)	72	72	72	
R64	B	66	2	Apartment	60	61	62	
R65	B	66	2	Apartment (2nd story)	67	67	68	
R66	B	66	4	Apartment	65	65	64	
R67	B	66	4	Apartment (2nd story)	70	70	70	
R68	B	66	6	Apartment	67	67	67	
R69	B	66	6	Apartment (2nd story)	71	72	72	
R70	B	66	3	Apartment	66	67	68	
R71	B	66	3	Apartment (2nd story)	73	73	73	
R72	B	66	4	Apartment	64	64	64	
R73	B	66	4	Apartment (2nd story)	69	70	69	
R74	B	66	4	Apartment	63	63	65	
R75	B	66	4	Apartment (2nd story)	69	70	70	
R76	B	66	1	Apartment	64	65	66	
R77	B	66	1	Apartment (2nd story)	68	69	69	
R78	B	66	3	Apartment	63	63	63	

Receiver No.	Activity Category	NAC[1]	No. of Receptors	Description	Existing (2022)	No Build (2050)	Build Alt. (2050)[2]	Mitigation Considered
Parc Tolleson (Figure 4, Exhibit 2)								
R79	B	66	3	Apartment (2nd story)	68	68	68	Yes
R80	B	66	2	Apartment	62	62	63	
R81	B	66	2	Apartment (2nd story)	67	67	68	
R82	B	66	3	Apartment	62	62	62	
R83	B	66	3	Apartment (2nd story)	66	67	67	
R84	B	66	3	Apartment	60	60	60	
R85	B	66	3	Apartment (2nd story)	64	65	65	
Fairfield Inn and Suites (Figure 4, Exhibit 2)								
R86	E	71	1	Hotel (pool)	63	63	61	No
Undeveloped Parcel (Figure 4, Exhibit 2)								
R87	G	--	1	Undeveloped Parcel	67	67	66	No
R88	G	--	1	Undeveloped Parcel	67	67	66	
Residence Inn at Tolleson (Figure 4, Exhibit 2)								
R89	C	71	2	Apartment (pool)	66	67	66	Yes
R90	B	66	5	Apartment	66	66	66	
R91	B	66	5	Apartment (2nd Story)	73	74	74	
R92	B	66	5	Apartment	65	65	65	
R93	B	66	5	Apartment (2nd Story)	73	74	74	
R94	B	66	5	Apartment	64	65	64	
R95	B	66	5	Apartment (2nd Story)	73	74	75	
R96	B	66	5	Apartment	64	65	65	
R97	B	66	5	Apartment (2nd Story)	74	74	75	
R98	C	66	1	Apartment (pool)	62	63	63	

Receiver No.	Activity Category	NAC[1]	No. of Receptors	Description	Existing (2022)	No Build (2050)	Build Alt. (2050)[2]	Mitigation Considered
Undeveloped Parcel (Figure 4, Exhibit 2)								
R99	G	--	1	Undeveloped Parcel	64	65	65	No
Undeveloped Parcels (Figure 4, Exhibits 2 & 5)								
R100	G	--	1	Undeveloped Parcel	69	69	68	No
R102	G	--	1	Undeveloped Parcel	64	62	63	
Courtyard by Marriot (Figure 4, Exhibits 2 & 5)								
R101	E	71	1	Hotel (pool)	62	62	61	No
Hammers Park club (Figure 4, Exhibits 3 & 5)								
R103	F	--	1	Retail (event track)	63	64	64	No
Home2Suites (Figure 4, Exhibit 3)								
R104	E	71	1	Hotel (pool)	71	72	72	Yes
Undeveloped Parcels (Figure 4, Exhibit 3)								
R105	G	--	1	Undeveloped Parcel	69	70	71	No
R106	G	--	1	Undeveloped Parcel	70	71	71	
R107	G	--	1	Undeveloped Parcel	69	70	70	
IMS Medical/Akos Urgent Care/Clear Skye Health (Figure 4, Exhibit 4)								
R108	D[3]	51	20	Medical Facility Bldg	70	70	71	No
R109	D[3]	51	20	Hospital Bldg	70	70	71	
R110	D[3]	51	8	Rehab Facility Bldg	69	70	70	
Agriculture (Figure 4, Exhibit 4)								
R111	F	--	1	Agriculture	69	69	70	No
R112	F	--	1	Agriculture	71	71	71	
R113	F	--	1	Agriculture	71	71	71	
R114	F	--	1	Agriculture	70	71	71	
R115	F	--	1	Agriculture	71	72	72	

Receiver No.	Activity Category	NAC[1]	No. of Receptors	Description	Existing (2022)	No Build (2050)	Build Alt. (2050)[2]	Mitigation Considered
Hilton Garden/Residence Inn (Figure 4, Exhibit 4)								
R116	E	71	2	Hotel (pool)	59	58	59	No
R117	E	71	2	Hotel (pool)	63	63	64	
R118	E	71	1	Hotel (pool)	58	59	59	
Culver's and Ruby Tuesday (Figure 4, Exhibit 4)								
R117a	E	71	12	Outdoor Seating	65	66	65	No
R118a	E	71	8	Outdoor Seating	66	66	67	
Christ's Church of the Valley (Figure 4, Exhibit 4)								
R119	D[3]	51	16	Church Building	74	74	74	Yes
R120	D[3]	51	16	Church Building	69	69	69	
R121	C	66	1	Outdoor seating area/pool	66	67	67	
R122	C	66	1	Outdoor seating area	60	61	61	
R123	D[3]	51	16	Church Building	74	74	74	
R124	D[3]	51	16	Church Building	70	70	70	
R125	D[3]	51	16	Church Building	74	74	74	
R126	C	66	23	Sports field	73	73	73	
Agriculture (Figure 4, Exhibit 4)								
R127	F	--	1	Agriculture	71	71	71	No
Arizona Arthritis and Rheumatology and other office space (Figure 4, Exhibit 5)								
R128	D[3]	51	2	Medical Office Bldg	74	74	74	Yes
R129	D[3]	51	2	Medical Office Bldg	76	76	75	
R130	D[3]	51	2	Medical Office Bldg	75	75	75	
R131	D[3]	51	2	Medical Office Bldg	76	76	76	
R132	D[3]	51	2	Medical Office Bldg	72	73	73	
R133	D[3]	51	2	Medical Office Bldg	75	75	75	

Receiver No.	Activity Category	NAC[1]	No. of Receptors	Description	Existing (2022)	No Build (2050)	Build Alt. (2050)[2]	Mitigation Considered
Sheely Farms 5 (Figure 4, Exhibit 5)								
R134	B	66	1	SFH	64	65	63	No
R135	B	66	1	SFH	60	60	59	
R136	B	66	1	SFH	54	54	54	
R137	B	66	3	SFH	64	64	64	
R138	B	66	1	SFH	56	57	57	
R139	B	66	2	SFH	59	59	60	
R140	B	66	1	SFH	62	62	63	
R141	B	66	3	SFH	63	63	64	
R142	B	66	1	SFH	59	60	60	
R143	B	66	1	SFH	61	62	61	
Hub Sports & Entertainment/Fear Farm Racing Complex (Figure 4, Exhibit 5)								
R144	F	--	1	Retail (event track)	63	64	66	No
R176	F	--	1	Retail (event track)	68	68	67	
Park McDowell (Figure 4, Exhibit 5)								
R145	B	66	3	SFH	64	64	64	No
R146	B	66	3	SFH	64	64	64	
R147	B	66	2	SFH	64	65	65	
R148	B	66	2	SFH	64	64	65	
R149	B	66	2	SFH	64	64	65	
R150	B	66	3	SFH	63	63	63	
R151	B	66	3	SFH	64	64	64	
R152	B	66	3	SFH	64	64	64	
R153	B	66	2	SFH	64	64	64	
R154	B	66	2	SFH	64	65	65	
Sheely Farms Elementary (Figure 4, Exhibit 5)								
R155	C	66	7	Recreation (baseball field)	63	64	64	Yes

Receiver No.	Activity Category	NAC[1]	No. of Receptors	Description	Existing (2022)	No Build (2050)	Build Alt. (2050)[2]	Mitigation Considered
Sheely Farms Elementary (Figure 4, Exhibit 5)								
R156	D[3]	66	14	School Building	62	62	62	Yes
R157	D[3]	66	14	School Building	66	66	66	
R158	C	66	1	Recreation (basketball court)	63	63	63	
R159	D[3]	51	14	School Building	65	65	65	
R160	D[3]	51	14	School Building	68	68	68	
R161	C	66	1	Recreation (basketball court)	62	62	62	
R162	D[3]	51	14	School Building	61	61	61	
R163	D[3]	51	14	School Building	65	66	66	
R164	C	66	15	Recreation (soccer field)	67	67	67	
Providence at Sheely Farms (Figure 4, Exhibits 5 & 6)								
R165	B	66	3	SFH	63	63	63	No
R166	B	66	6	SFH	63	63	63	
R167	B	66	5	SFH	63	64	64	
R168	B	66	2	SFH	63	64	64	
R169	B	66	5	SFH	61	61	61	
R170	B	66	5	SFH	57	57	57	
R171	B	66	2	SFH	61	61	61	
R172	B	66	1	SFH	59	59	59	
R173	B	66	2	SFH	56	56	56	
R174	B	66	3	SFH	59	59	59	
R175	B	66	1	SFH	60	60	60	
R177	B	66	3	SFH	59	59	62	
R178	B	66	3	SFH	59	59	62	
R179	B	66	1	SFH	60	60	62	

Receiver No.	Activity Category	NAC[1]	No. of Receptors	Description	Existing (2022)	No Build (2050)	Build Alt. (2050)[2]	Mitigation Considered
Arizona Centers for Digestive Health (Figure 4, Exhibit 6)								
R180	D[3]	51	3	Medical Office	66	66	67	No
R181	D[3]	51	3	Medical Office	68	69	69	
R182	D[3]	51	3	Medical Office	65	65	66	
R183	D[3]	51	3	Medical Office	68	68	68	
R184	D[3]	51	3	Medical Office	67	67	68	
R185	D[3]	51	3	Medical Office	70	70	70	
R186	D[3]	51	3	Medical Office	65	65	66	No
R187	D[3]	51	3	Medical Office	67	68	68	
Algodon Medical Office Park [Plat] (Figure 4, Exhibits 6 & 7)								
R188	F	--	1	Agriculture	67	67	68	No
R189	F	--	1	Agriculture	67	68	68	
R190	F	--	1	Agriculture	66	67	67	
R191	F	--	1	Agriculture	68	68	69	
R192	F	--	1	Agriculture	61	61	62	
R193	F	--	1	Agriculture	63	64	64	
R194	B	--	1	Agriculture	57	58	59	

Notes: Bold noise levels indicate exceedance of the relevant NAC. SFH – Single Family Home.

1. ADOT approach of FHWA Noise Abatement Criteria in hourly A-weighted decibels (dBA).
2. Recommended Build Alternative as identified in the DCR (ADOT, 2023).
3. Interior noise levels are established at the building façade and assume a 20 dBA insertion loss across the building's shell or exterior walls. Predicted noise levels that are 20+ dBA above the ADOT NAR approach of the Category D NAC (71 dBA or more) indicate a noise impact.

I-10, East of 83rd Avenue

A total of 37 receivers (R1 to R26a, R33 to R35) were modeled representing 150 Activity Category B and G receptors including the Daravante single family homes (SFH) and condominiums, Residence at McDowell Apartments and undeveloped parcels. As shown in Table 4, existing, No-Build and Build Alternative peak hour noise levels at the modeled receivers would range from:

- Existing: 53 dBA to 73 dBA
- No-Build: 53 dBA to 73 dBA
- Recommended Build Alternative: 53 dBA to 74 dBA

For the Recommended Build Alternative, an approach or exceedance of the Category B NAC are predicted to occur at 10 receivers representing 28 second story apartments in the Residence at McDowell complex. A mitigation evaluation is required. Increases above existing peak hour noise levels would not trigger additional impacts per the ADOT NAR 15 dBA substantial increase criterion. Figure 4, Exhibit 1 shows the location of the modeled receivers.

I-10, 83rd Avenue to North 91st Avenue

A total of 58 receivers (R27 to R32, R36 to R87) were modeled representing 140 Activity Category B, E and G receptors including the Inn at Tolleson hotel, Best Western hotel, Victory Inn hotel, Parc Tolleson apartments, Fairfield Inn and Suites hotel, and undeveloped parcels. As shown in the Table 4, existing, No-Build and Build Alternative peak hour noise levels at the modeled receivers would range from:

- Existing: 55 dBA to 73 dBA
- No-Build: 56 dBA to 73 dBA
- Recommended Build Alternative: 66 dBA to 73 dBA

For the Recommended Build Alternative, an approach or exceedance of the Category B NAC is predicted at 19 receivers representing 61 first or second story apartments in the Parc Tolleson apartment complex that is currently under construction; therefore, mitigation evaluation is required. Increases above existing peak hour noise levels would not trigger additional impacts per the ADOT NAR 15 dBA substantial increase criterion. Figure 4, Exhibit 2 shows the location of the modeled receivers.

I-10, North 91st Avenue to North 107th Avenue

A total of 17 receivers (R88 to R100, R104 to R107) were modeled representing 50 Activity Category B, E, F and G receptors including the Residence Inn at Tolleson Apartments, Courtyard by Marriot hotel, Home2Suites hotel and undeveloped parcels. As shown in Table 4, existing, No-Build and Build Alternative modeled peak hour noise levels would range from:

- Existing: 62 dBA to 74 dBA
- No-Build: 63 dBA to 74 dBA
- Recommended Build Alternative: 63 dBA to 75 dBA

For the Recommended Build Alternative, an approach or exceedance of the Category B NAC is predicted at 25 first and second story apartments and an approach of the Category C NAC is predicted at one pool area in the Residence Inn complex. An exceedance of the Category C NAC is also predicted at the Home2Suites hotel; therefore, a mitigation evaluation is required.

Increases above existing peak hour noise levels would not trigger additional impacts per the ADOT NAR 15 dBA substantial increase criterion. Figure 4, Exhibit 3 shows the location of the modeled receivers.

I-10, North 107th Avenue to Avondale Boulevard

A total of 22 receivers (R108 to R127) were modeled representing 139 Activity Category C, D, E, F and G receptors including Christ's Church of the Valley (CCOV), the Hilton Garden Inn and Residence Inn by Marriot hotels, Culver's and Ruby Tuesday restaurants, active agriculture and undeveloped parcels. As shown in Table 4, existing, No-Build and Build Alternative modeled peak hour noise levels would range from:

- Existing: 58 dBA to 74 dBA
- No-Build: 58 dBA to 74 dBA
- Recommended Build Alternative: 59 dBA to 74 dBA

For the Recommended Build Alternative, an exceedance of the Category C NAC is predicted at five receivers representing an outdoor recreation (soccer field) and seating areas on the CCOV property. In addition, the Category D NAC for the CCOV building interior is also predicted to be exceeded. A mitigation evaluation is required. Per the ADOT NAR, Category D land uses do not require mitigation consideration if there are outdoor use areas in the vicinity of the affected building; however, receivers located on the CCOV building façade were included in the benefited receiver count.

Increases above existing peak hour noise levels would not trigger additional impacts per the ADOT NAR 15 dBA substantial increase criterion. Figure 4, Exhibit 4 shows the location of the modeled receivers.

SR 101L, West McDowell Road to Sheely Farms Elementary property line

A total of 31 receivers (R101 to R103, R128 to R154, R176) were modeled representing 87 Activity Category B, E, F and G receptors including the Courtyard by Marriot hotel, Arizona Arthritis and Rheumatology (AAR) medical building, Providence at Sheely Farms 5 neighborhood, Park McDowell neighborhood, the Hammers Park and Hub Sports & Entertainment (retail sport club), Fear Farm Racing Complex (events track) and undeveloped parcels. As shown in Table 4, existing, No-Build and Build Alternative modeled peak hour noise levels would range from:

- Existing: 54 dBA to 76 dBA
- No-Build: 54 dBA to 76 dBA
- Recommended Build Alternative: 54 dBA to 76 dBA

For the Recommended Build Alternative, an approach or exceedance of the Category D NAC at the façade of the AAR medical building is exceeded; therefore, a mitigation evaluation is required.

Increases above existing peak hour noise levels would not trigger additional impacts per the ADOT NAR 15 dBA substantial increase criterion. Figure 4, Exhibit 5 shows the location of the modeled receivers.

SR 101L, Sheely Farms Elementary property line to West Thomas Road

A total of 32 receivers (R155 to R175, R177 to R187) were modeled representing 175 Activity Category B, D, E and F receptors including Sheely Farms Elementary, the Providence at Sheely Farms neighborhood, Arizona Centers for Digestive Health, and active agriculture. As shown in Table 4, existing, No-Build and Build Alternative modeled peak hour noise levels would range from:

- Existing: 56 dBA to 70 dBA
- No-Build: 56 dBA to 70 dBA
- Recommended Build Alternative: 56 dBA to 67 dBA

For the Recommended Build Alternative, an exceedance of the Category C NAC is predicted at a recreational (soccer) field on the Sheely Farms Elementary grounds; therefore, a mitigation evaluation is required.

Increases above existing peak hour noise levels would not trigger additional impacts per the ADOT NAR 15 dBA substantial increase criterion. Figure 4, Exhibit 6 shows the location of the modeled receivers.

SR 101L, West Thomas Road to West Indian School Road

A total of seven receivers (R188 to R194) were modeled representing seven Activity Category F active agriculture receptors and one Category B single-family home. As shown in Table 4, existing, No-Build and Build Alternative modeled peak hour noise levels would range from:

- Existing: 57 dBA to 68 dBA
- No-Build: 58 dBA to 68 dBA
- Build Alternative: 59 dBA to 68 dBA

For the Recommended Build Alternative, an exceedance of the Category B NAC is not predicted for the home located on Indian School Road westbound, west of SR 101L. There is no federal or ADOT NAC for establishing impacts to Category F land uses; therefore, a mitigation evaluation is not required.

Increases above existing peak hour noise levels would not trigger additional impacts per the ADOT NAR 15 dBA substantial increase criterion. Figure 4, Exhibit 7 shows the location of the modeled receivers.

CONSIDERATION OF ABATEMENT

ADOT considers mitigation for receptors predicted to be impacted by traffic noise associated with a proposed transportation improvement project. Abatement considerations include acquisition of right-of-way, change in the horizontal or vertical alignment, insulation of Category D land use facilities, traffic management measures and noise barriers. Based on the purpose and need for this project and the design elements that take advantage of separating future freeway segments from existing noise-sensitive land uses, noise barriers are the mitigation measure evaluated in detail for this study.

For a mitigation measure, such as a noise barrier, to be proposed in the project it must meet both feasibility and reasonableness criteria. Pursuant to the 23 CFR 772.13(d)(1), the initial consideration for each abatement measure should be both the engineering and acoustic feasibility factors that determine whether it is possible to design and construct the measure.

As per Chapter 5.1 of ADOT NAR, engineering feasibility factors are:

- Safety, Barrier height, Curvature, and Breaks in barriers
- Topography, Drainage, Utilities
- Maintenance requirements, Access to adjacent properties
- Overall project purpose

As per Chapter 5.2 of ADOT NAR, for a noise abatement measure to be acoustically feasible ADOT requires achievement of at least a 5 dBA highway traffic noise reduction at 50% of impacted receptors. In some instances, the noise level at a particular location may be affected by an alternate noise source such as other roadways/streets, railroads, industrial facilities, and airplane flight paths. In such locations, noise abatement for the proposed transportation project may not be acoustically feasible, since a substantial overall noise reduction cannot be achieved due to other noise sources.

As per Chapter 6 of ADOT NAR, there are three reasonableness factors or "tests" that must collectively be achieved for a noise abatement measure to be deemed reasonable.
These are:

- Viewpoints or Preferences of Property Owners and Residents
- Noise Reduction Design Goal, and
- Cost-effectiveness

Noise walls should be designed to reduce projected unmitigated noise levels by at least seven dBA for benefited Receptors closest to the transportation facility. To be considered reasonable, at least half of the benefited Receptors in the first row shall achieve this level of noise reduction. The maximum reasonable cost of abatement is $49,000 per benefited Receptor (cost-per-benefited- Receptor) with barrier costs calculated at $35 per square foot, $85 per square foot if constructed on a structure. Any cost of removal of previously built walls, drainage, and other similar construction work shall be included in the cost assessment.

Figure 5, Exhibits 1 – 7 show the proposed location of eight noise walls that have been designed to mitigate peak hour noise impacts associated with the Recommended Build Alternative. Tables 5 through 11 summarize the effectiveness of the proposed walls to reduce noise levels (insertion loss) for impacted receptors in the noise study area. Only receivers representing impacted noise receptors and those closest to them that would potentially benefit from noise walls are listed in the tables.

Figure 5. Noise Wall Locations

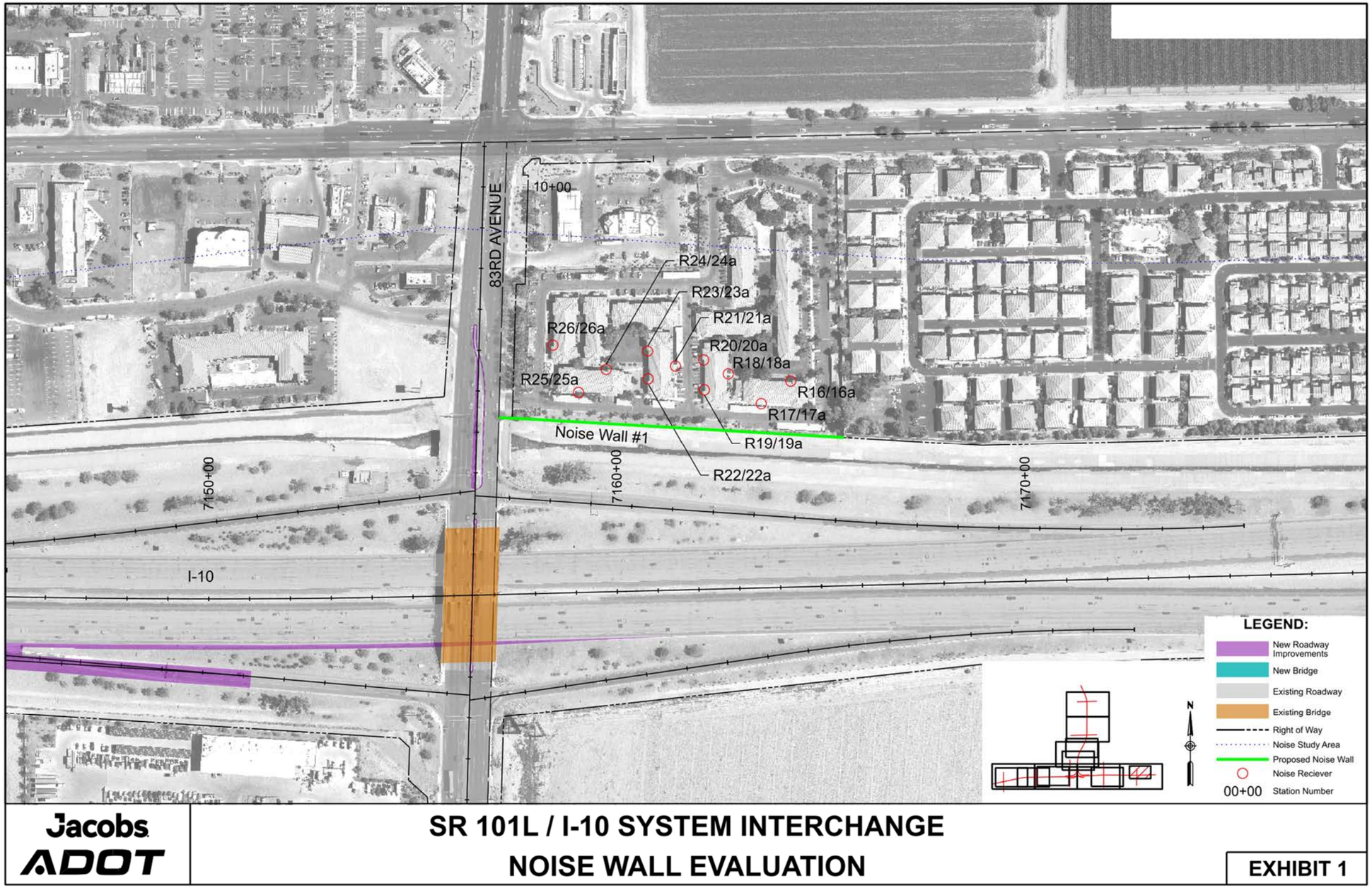


Figure 5. Noise Wall Locations

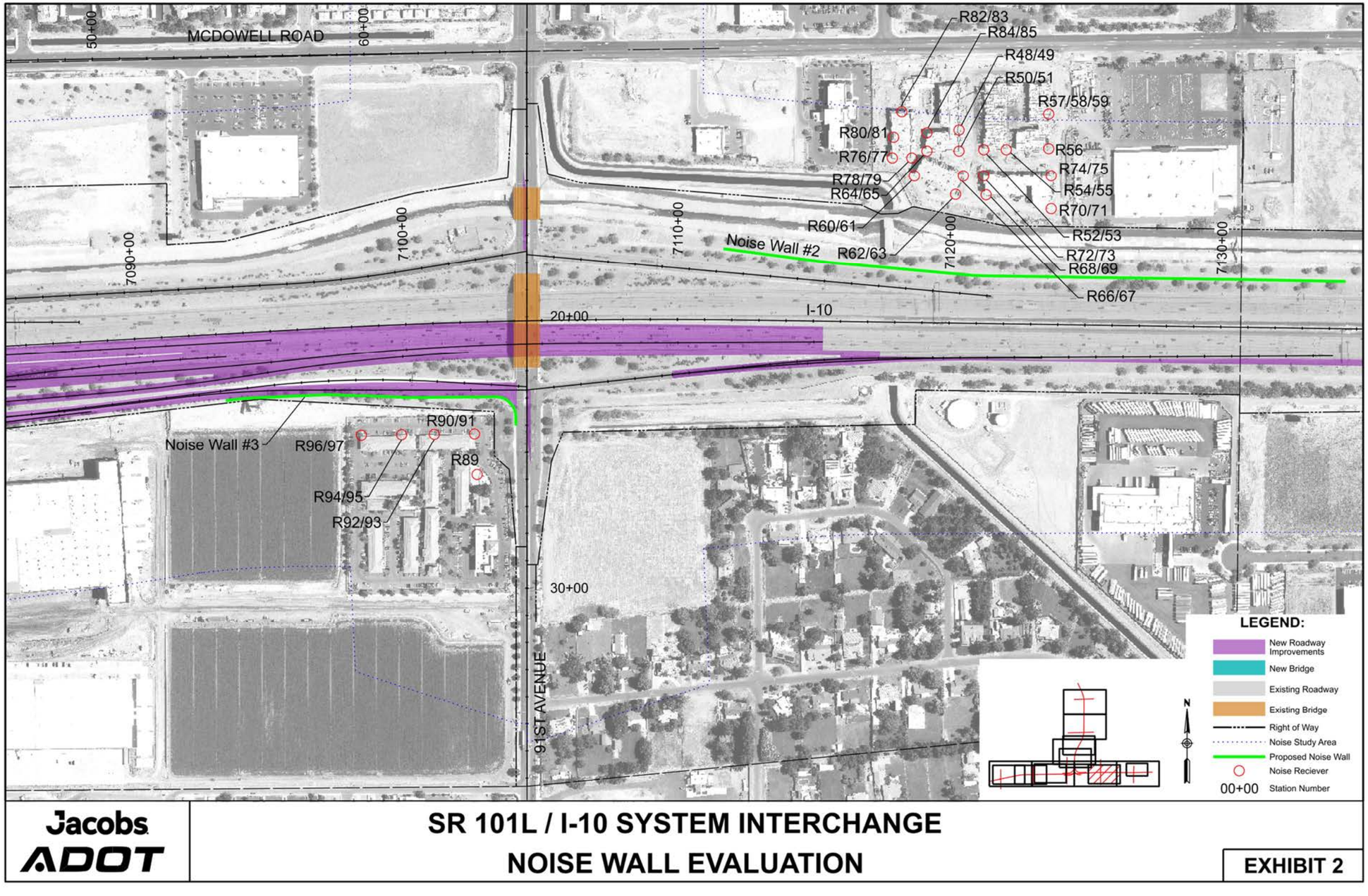


Figure 5. Noise Wall Locations

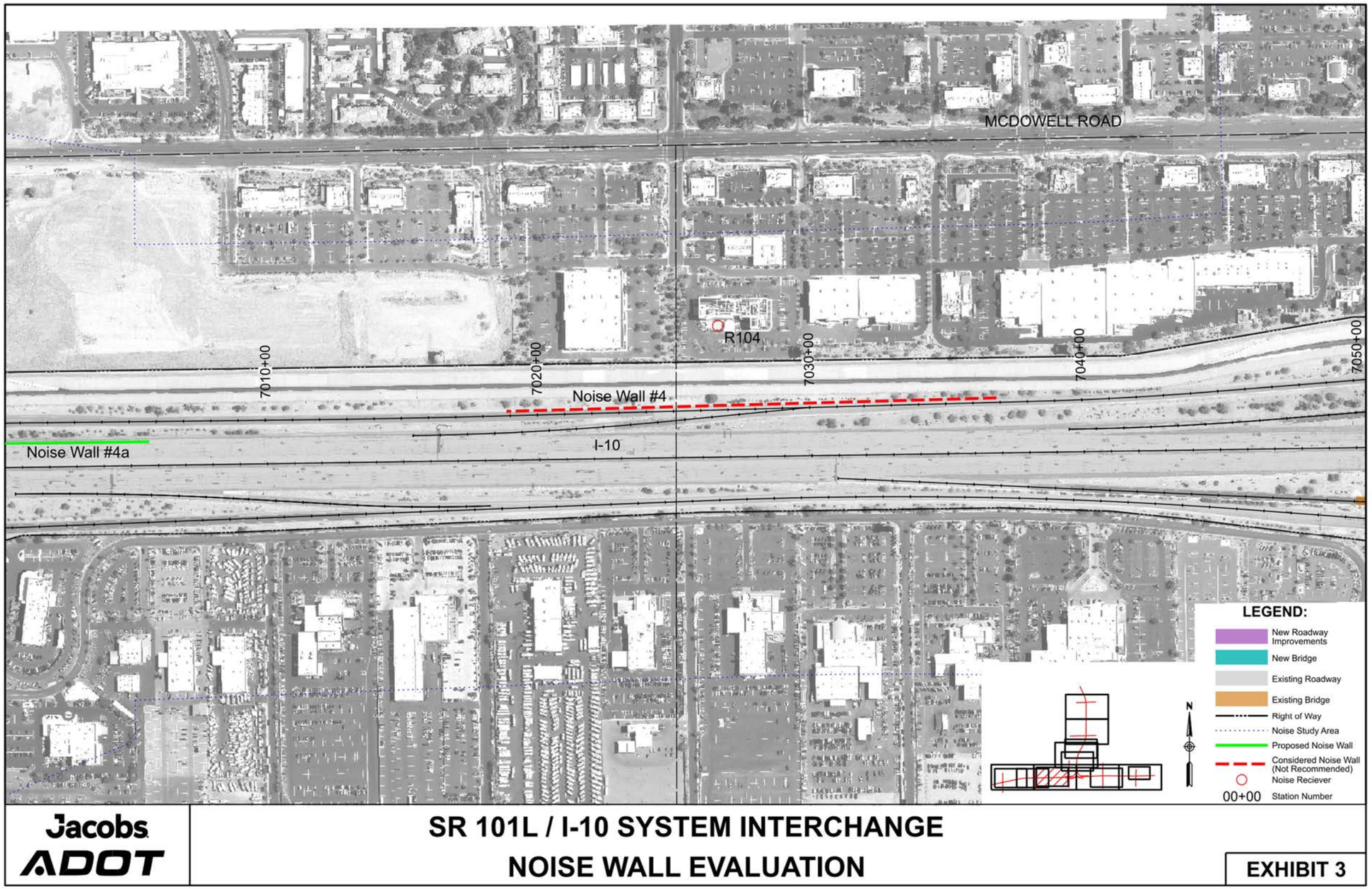


Figure 5. Noise Wall Locations

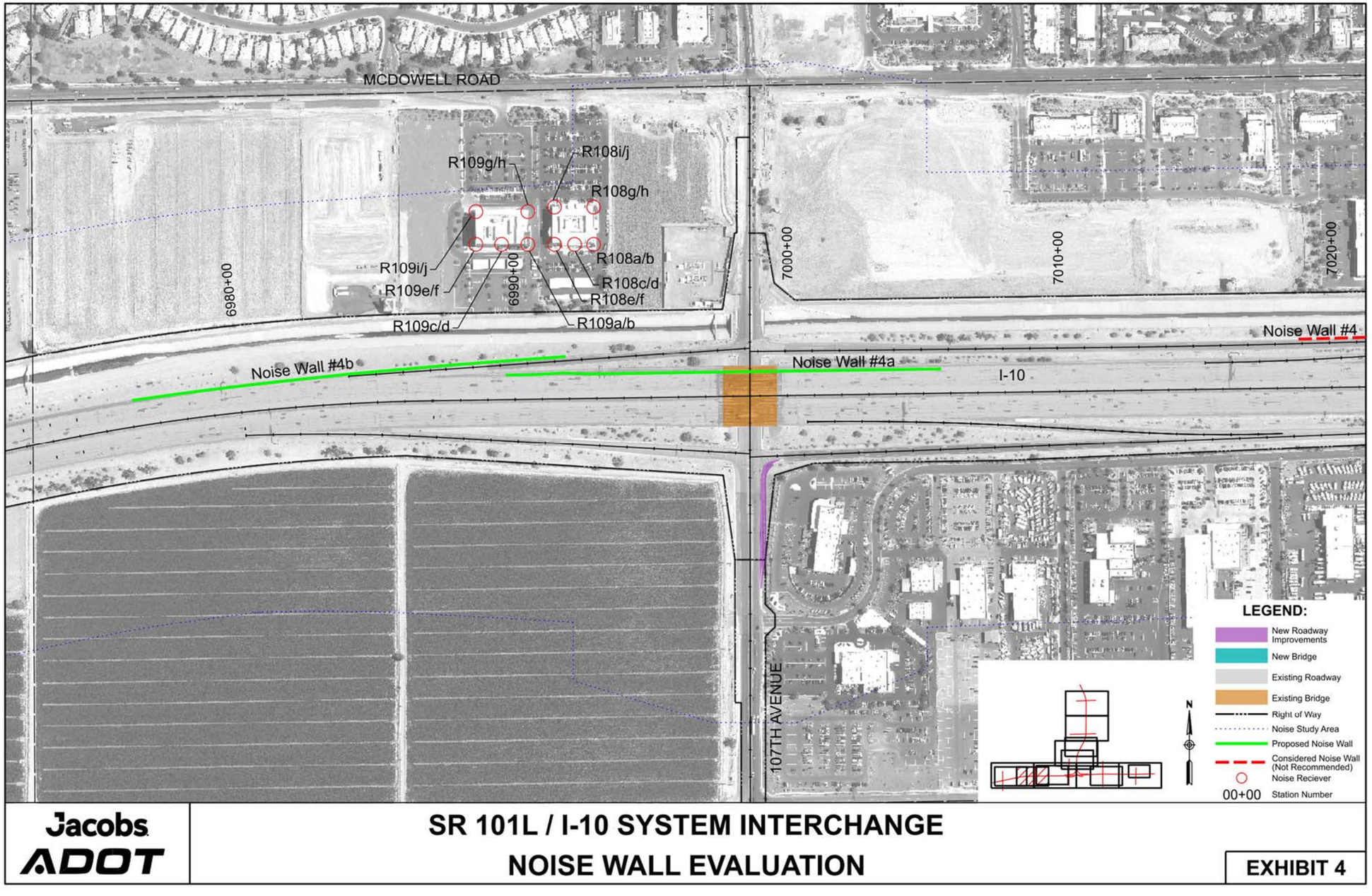


Figure 5. Noise Wall Locations

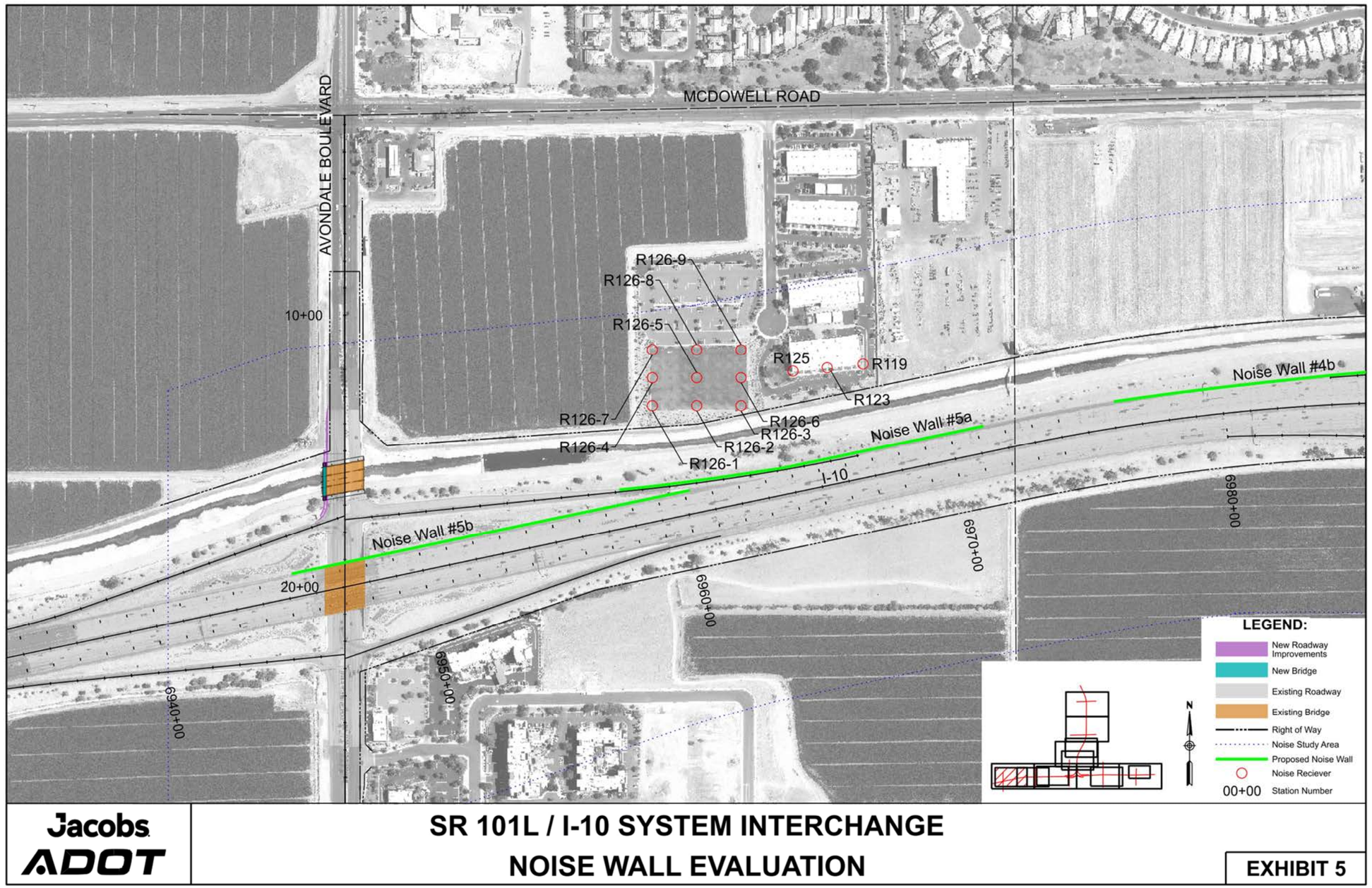


Figure 5. Noise Wall Locations

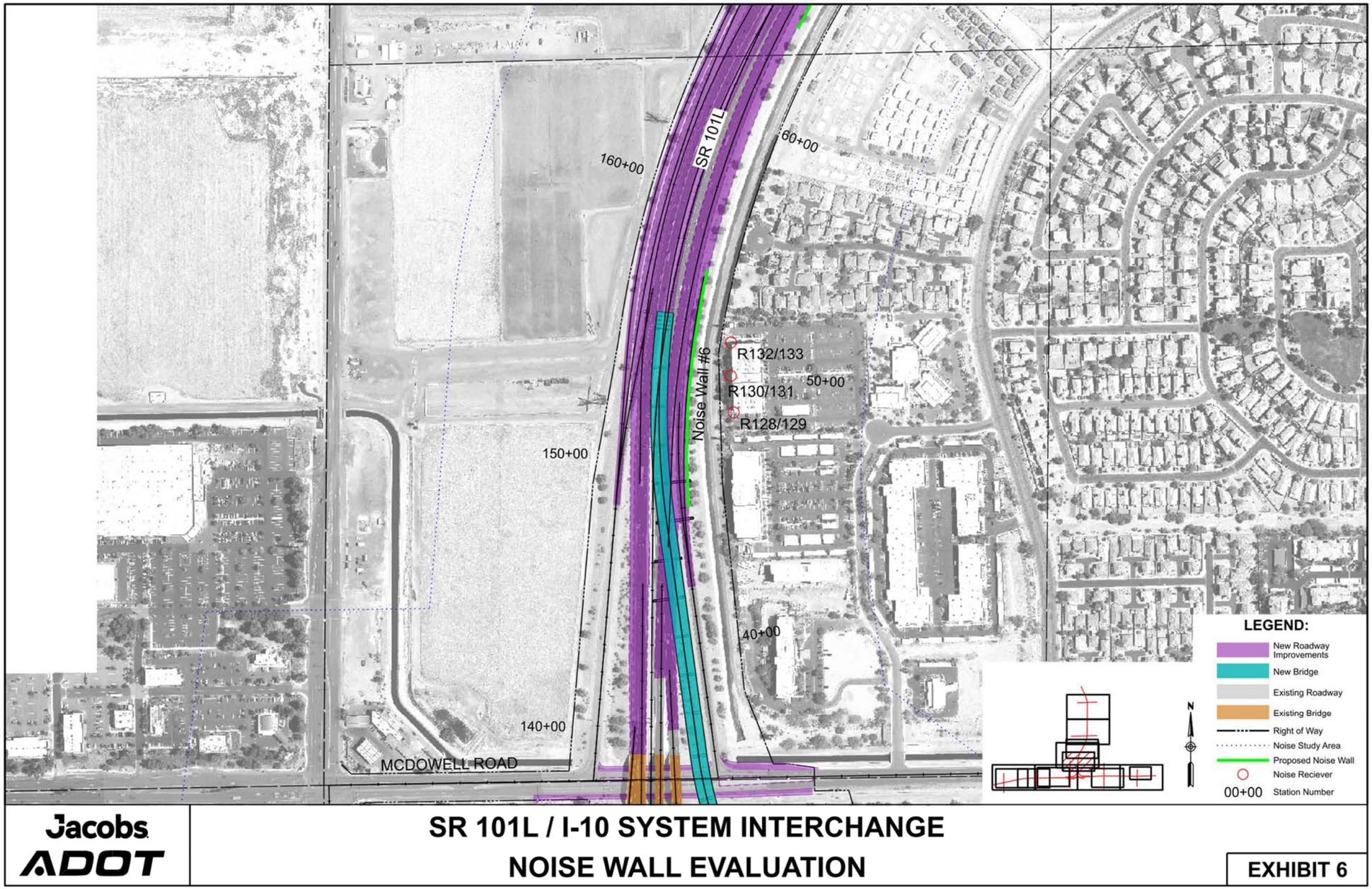
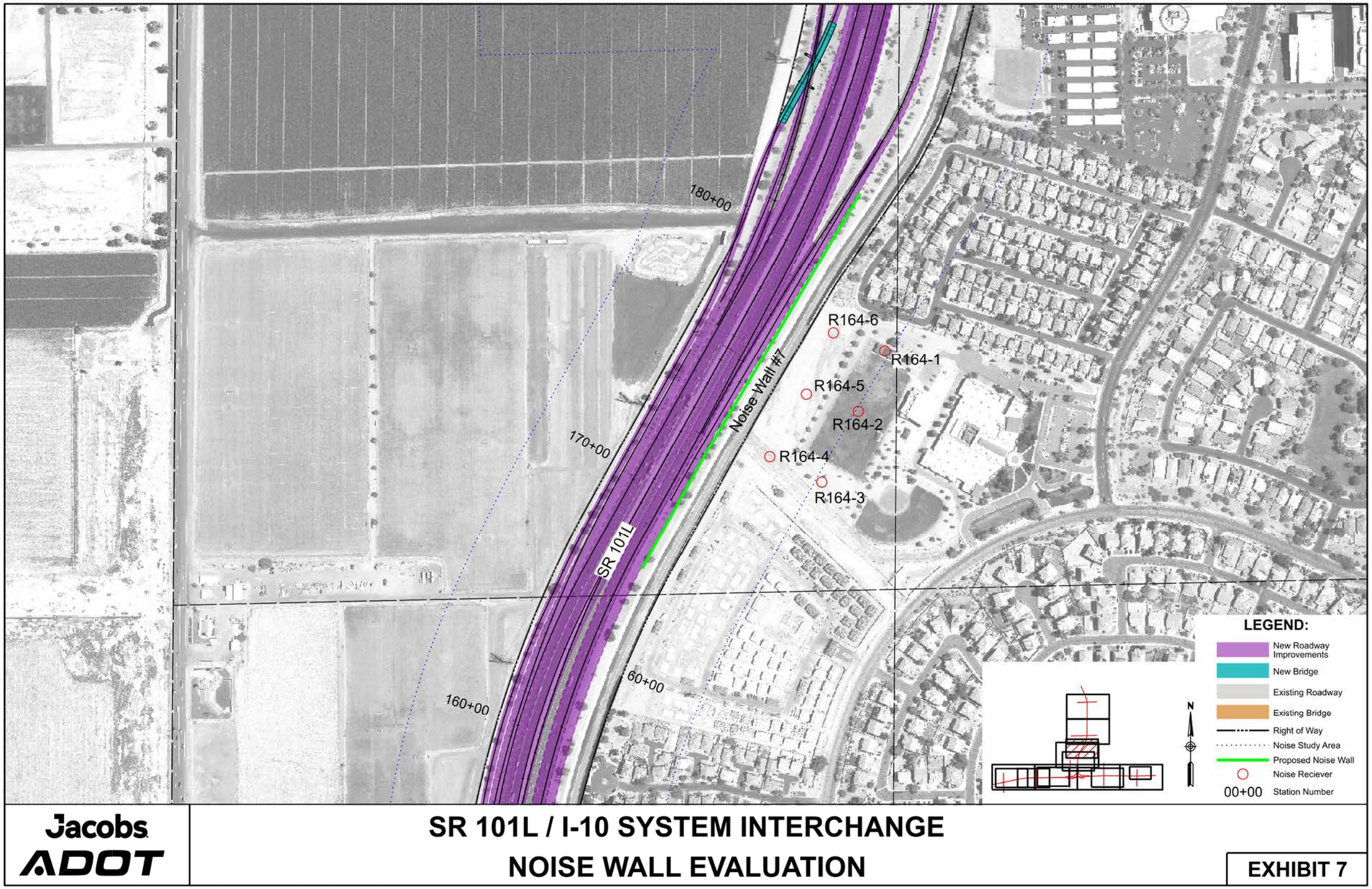


Figure 5. Noise Wall Locations



I-10, East of 83rd Avenue

Noise Wall #1 was evaluated to mitigate Recommended Build Alternative peak hour noise levels for the Residence at McDowell apartment complex. Figure 5, Exhibit 1 shows the proposed wall location at the ADOT ROW. It is recommended to remove the existing 6-foot privacy and replace it with this noise wall.

Table 5 provides an assessment of the effectiveness of this wall in providing noise benefits (5 dBA or greater noise reduction) and the ADOT NAR design goal of a 7 dBA noise reduction for benefited first row receptors. Table 12 provides additional design details and a mitigation recommendation.

Table 5. Noise Mitigation Evaluation for the Recommended Build Alternative: Noise Wall #1

Receiver ID	NO. of Dwelling Units	Build Alt. Unmitigated Noise Level (dB)		Mitigated Noise Level (dBA)	Insertion Loss (dBA)	Benefited Receiver (5 dBA) [Y/N]	1st Row Design Goal (7 dBA) [Y/N]	Mitigation
		A	B	C	D			
Residence at McDowell Apartments (Figure 5, Exhibit 1) NAC B (66 dBA)[1]								
R16	8	57	57	57	0	N	N	Noise Wall #1 See Noise Recommendation Summary Table 12
R16a	8	61	61	61	0	N	N	
R17	8	65	68	60	*8*	Y	Y	
R17a	8	74	74	64	*10*	Y	Y	
R18	8	61	63	58	5	Y	N	
R18a	8	69	69	61	8	Y	N	
R19	4	62	65	59	*6*	Y	N	
R19a	4	71	71	62	*9*	Y	Y	
R20	4	60	62	59	3	N	N	
R20a	4	67	67	62	5	Y	N	
R21	8	60	61	58	3	N	N	
R21a	8	68	68	61	*7*	Y	Y	
R22	4	62	65	59	6	Y	N	
R22a	4	69	69	62	7	Y	Y	
R23	4	61	62	60	2	N	N	
R23a	4	66	66	63	3	N	N	
R24	8	56	56	56	0	N	N	
R24a	8	60	60	59	1	N	N	
R25	8	66	68	63	5	Y	N	
R25a	8	72	72	66	*6*	Y	N	
R26	4	68	68	67	1	N	N	
R26a	4	70	70	69	1	N	N	

Notes:

- *Italicized* receiver IDs represent 1st row receptors.

- Bolded noise levels indicate exceedance of the relevant NAC.
- Underlined insertion loss value indicates benefited receptor (5 dBA or more).
- Italicized bolded insertion loss indicates noise reduction design goal met in 1st row.

A: Unmitigated noise level with existing 6-foot privacy wall.

B: Unmitigated noise level with 0-foot privacy wall (no wall).

C: Mitigated noise level with Noise Wall #1 installed.

D: (Insertion Loss) = C- B

1. ADOT NAR 1-decibel approach of FHWA Category B NAC.

I-10, 83rd Avenue to North 91st Avenue

Noise Wall #2 was evaluated to mitigate the Recommended Build Alternative peak hour noise levels for the Parc Tolleson apartments, currently under construction, north of I-10 and east of 91st Avenue. Figure 5, Exhibit 2 shows the proposed wall location on an existing berm inside the ADOT ROW.

Table 6 provides an assessment of the effectiveness of this wall and Table 12 provides additional design details and a mitigation recommendation.

Table 6. Noise Mitigation Evaluation for Recommended Build Alternative: Noise Wall #2

Receiver ID	NO. of Dwelling Units	Unmitigated Noise Level (dBA)	Mitigated Noise Level (dBA)	Insertion Loss (dBA)	Benefited Receiver (5 dBA) [Y/N]	1st Row Design Goal (7 dBA) [Y/N]	Mitigation
Parc Tolleson Apartments (Figure 5, Exhibit 2) NAC B (66 dBA)[1]							
R48	5	60	58	2	N	N	Noise Wall #2 See Noise Recommendation Summary Table 12
R49	5	57	57	1	N	N	
R50	2	61	58	3	N	N	
R51	2	56	55	1	N	N	
R52	3	62	57	5	Y	N	
R53	5	65	63	3	N	N	
R54	5	61	57	4	N	N	
R55	2	64	63	2	N	N	
R56	3	64	60	4	Y	N	
R57	3	67	64	3	N	N	
R58	4	63	61	3	N	N	
R59	4	66	65	1	N	N	

Receiver ID	NO. of Dwelling Units	Unmitigated Noise Level (dBA)	Mitigated Noise Level (dBA)	Insertion Loss (dBA)	Benefited Receiver (5 dBA) [Y/N]	1st Row Design Goal (7 dBA) [Y/N]	Mitigation
Parc Tolleson Apartments (Figure 5, Exhibit 2) NAC B (66 dBA)[1]							
R60	2	66	60	6	Y	N	Noise Wall #2 See Noise Recommendation Summary Table 12
R61	2	71	64	7	Y	Y	
R62	2	67	62	5	Y	N	
R63	2	72	65	7	Y	Y	
R64	2	62	58	5	Y	N	
R65	2	68	64	4	N	N	
R66	4	64	60	4	N	N	
R67	4	70	64	6	Y	N	
R68	6	67	62	5	Y	N	
R69	6	72	65	7	Y	Y	
R70	3	68	61	7	Y	Y	
R71	3	73	66	7	Y	Y	
R72	4	64	59	5	Y	N	
R73	4	69	64	5	Y	N	
R74	4	65	60	5	Y	N	
R75	4	70	65	5	Y	N	
R76	1	66	61	5	Y	N	
R77	1	69	64	5	Y	N	
R78	3	63	58	5	Y	N	
R79	3	68	64	5	Y	N	
R80	2	63	60	4	N	N	
R81	2	68	63	5	N	N	
R82	3	62	62	0	N	N	
R83	3	67	65	2	N	N	
R84	3	60	60	1	N	N	
R85	3	65	64	1	N	N	

Notes:

- *Italicized* receiver IDs represent 1st row receptors.
- Bolded noise levels indicate exceedance of the relevant NAC.
- Underlined insertion loss value indicates benefited receptor (5 dBA or more).

- Italicized bolded insertion loss indicates noise reduction design goal met in 1st row.

1. ADOT NAR 1-decibel approach of FHWA Category B NAC.

I-10, North 91st Avenue to North 99th Avenue

Noise Wall #3 was evaluated to mitigate the Recommended Build Alternative peak hour noise levels for the Residence Inn at Tolleson apartments. Figure 5, Exhibit 2 shows the proposed wall location at the outside shoulder of the I-10 eastbound off-ramp to 91st Avenue.

Table 7 provides an assessment of the effectiveness of this wall and Table 12 provides additional design details and a mitigation recommendation.

Table 7. Noise Mitigation Evaluation for Recommended Build Alternative: Noise Wall #3

Receiver ID	NO. of Dwelling Units	Unmitigated Noise Level (dB)	Mitigated Noise Level (dBA)	Insertion Loss (dBA)	Benefited Receiver (5 dBA) [Y/N]	1st Row Design Goal (7 dBA) [Y/N]	Mitigation
Residence Inn at Tolleson (Figure 5, Exhibit 2) NAC B/C (66 dBA)[1]							Noise Wall #3 See Noise Recommendation Summary Table 12
R89	2	66	66	1	N	N	
R90	5	66	64	3	N	N	
R91	5	74	68	6	Y	N	
R92	5	65	63	2	N	N	
R93	5	74	67	*7*	Y	Y	
R94	5	64	63	2	N	N	
R95	5	75	67	*8*	Y	Y	
R96	5	65	62	3	N	N	
R97	5	75	68	*7*	Y	Y	
R98	1	63	62	1	N	N	

Notes:

- *Italicized* receiver IDs represent 1st row receptors.
- Bolded noise levels indicate exceedance of the relevant NAC.
- Underlined insertion loss value indicates benefited receptor (5 dBA or more).
- Italicized bolded insertion loss indicates noise reduction design goal met in 1st row.

1. ADOT NAR 1-decibel approach of FHWA Category B and Category C NAC.

I-10, North 99th Avenue to North 107th Avenue

Noise Wall #4 was evaluated to mitigate the Recommended Build Alternative peak hour noise levels at impacted one Category E receptor, the Home2Suites outdoor pool area located north of I-10 midway between 99th Avenue and 107th Avenue. Figure 5, Exhibit 3 shows the proposed location of Noise Wall #4 at the I-10 westbound frontage road shoulder.

Table 8 provides an assessment of the effectiveness of this wall and Table 12 provides additional design details and a mitigation recommendation.

Table 8. Noise Mitigation Evaluation for Recommended Build Alternative: Noise Wall #4

Receiver ID	NO. of Dwelling Units	Unmitigated Noise Level (dB)	Mitigated Noise Level (dBA)	Insertion Loss (dBA)	Benefited Receiver (5 dBA) [Y/N]	1st Row Design Goal (7 dBA) [Y/N]	Mitigation
Home2Suites Hotel (Figure 5, Exhibit 3) NAC E (71 dBA)[1]							Noise Wall #4
R104	1	*72*	65	*7*	Y	Y	See Noise Recommendation Summary Table 12

Notes:

- *Italicized* receiver IDs represent 1st row receptors.
- Bolded noise levels indicate exceedance of the relevant NAC.
- Underlined insertion loss value indicates benefited receptor (5 dBA or more).
- Italicized bolded insertion loss indicates noise reduction design goal met in 1st row.

1. ADOT NAR 1-decibel approach of FHWA Category E NAC.

I-10, North 107th Avenue to Avondale Boulevard

Noise Walls #4a and 4b were evaluated to mitigate the Recommended Build Alternative peak hour noise levels for two medical facilities, the IMS Family Medicine building and the Akos MD Urgent Care building. Figure 5, Exhibit 4 shows the proposed location of this combination two-wall design. Noise Wall #4a would be located at the outside shoulder of the I-10 westbound overpass at 107th Avenue. Noise Wall #5b would be located at the I-10 westbound on-ramp from 107th Avenue to the westbound mainline shoulder.

Noise Walls #5a and 5b were evaluated to mitigate the Recommended Build Alternative peak hour noise levels for the CCOV recreational fields located north of I-10 and east of Avondale Boulevard. Figure 5, Exhibit 4 shows the proposed location of this combination two-wall design. Noise Wall #5a would be located at the outside shoulder of the I-10 westbound mainline and off-ramp to Avondale Boulevard. Noise wall #5b would be located at the I-10 westbound mainline and extend to the I-10 Avondale Boulevard overpass.

Table 9 provides an assessment of the effectiveness of both pairs of walls and Table 12 provides additional design details and mitigation recommendations.

Table 9. Noise Mitigation Evaluation for Recommended Build Alternative: Noise Walls #4a/b, #5a/5b

Receiver ID	NO. of Dwelling Units	Unmitigated Noise Level (dB)	Mitigated Noise Level (dBA)	Insertion Loss (dBA)	Benefited Receiver (5 dBA) [Y/N]	1st Row Design Goal (7 dBA) [Y/N]	Mitigation
IMS Family Medicine/Akos MD Urgent Care NAC D (51 dBA)[2]							Noise Walls #4a & 4b See Noise Recommendation Summary Table 12
R108a	2	70	65	5	Y	N	
R108b	2	73	66	*7*	Y	Y	
R108c	2	69	64	6	Y	N	
R108d	2	73	66	*8*	Y	Y	
R108e	2	70	64	6	Y	N	
R108f	2	73	66	*8*	Y	Y	
R108g	2	67	63	4	N	N	
R108h	2	70	65	5	Y	N	
R108i	2	64	60	5	Y	N	
R108j	2	67	62	5	Y	N	
R109a	2	69	64	6	Y	N	
R109b	2	73	66	*7*	Y	Y	
R109c	2	69	64	6	Y	N	
R109d	2	73	66	*8*	Y	Y	
R109e	2	69	64	6	Y	N	
R109f	2	73	66	*7*	Y	Y	
R109g	2	65	60	5	Y	N	
R109h	2	68	62	6	Y	N	
R109i	2	64	62	3	N	N	
R109j	2	68	65	3	N	N	
Christ's Church of the Valley (Figure 5, Exhibit 4) NAC C (66 dBA)[1] and NAC D (51 dBA)[2]							Noise Walls #5a & 5b See Noise Recommendation Summary Table 12
R119	16	75	67	*8*	Y	Y	
R123	16	75	66	*9*	Y	Y	
R125	3	75	66	*9*	Y	Y	
R126-1	3	75	66	*9*	Y	Y	
R126-2	3	75	67	*8*	Y	Y	
R126-3	3	76	66	*10*	Y	Y	
R126-4	3	73	66	7	Y	N	
R126-5	3	74	66	7	Y	N	
R126-6	3	74	65	9	Y	N	
R126-7	2	72	66	6	Y	N	
R126-8	1	72	65	7	Y	N	
R126-9	2	73	64	9	Y	N	

Notes:
- *Italicized* receiver IDs represent 1st row receptors.

- Noise levels in bold indicate exceedance of the relevant NAC.
- Underlined insertion loss value indicates benefited receptor (5 dBA or more).
- Italicized bolded insertion loss indicates noise reduction design goal met in 1st row.

1. ADOT NAR 1-decibel approach of FHWA Category C NAC.
2. ADOT NAR 1-decibel approach of FHWA Category D NAC, which is an interior noise standard. Interior noise levels assume a 20 dBA IL across a typical building shell with windows and doors closed; therefore, exterior noise levels in the table that are below 71 dBA for this land use category were not identified as an impact.

SR 101L, West McDowell Road to Sheely Farms Elementary property line

Noise Wall #6 was evaluated to mitigate the Recommended Build Alternative peak hour noise levels for the AAR medical building located east of SR 101L and north of McDowell Road. Figure 5, Exhibit 5 shows the location of this wall, which would be located at the outside shoulder of SR 101L northbound on-ramp from McDowell Road.

Table 10 provides an assessment of the effectiveness of this wall and Table 12 provides additional design details and a mitigation recommendation.

Table 10. Noise Mitigation Evaluation for Recommended Build Alternative: Noise Wall #6

Receiver ID	NO. of Dwelling Units	Unmitigated Noise Level (dB)	Mitigated Noise Level (dBA)	Insertion Loss (dBA)	Benefited Receiver (5 dBA) [Y/N]	1st Row Design Goal (7 dBA) [Y/N]	Mitigation
AAR Medical Building (Figure 5, Exhibit 5) NAC D (71 dBA)[1]							Noise Wall #6 See Noise Recommendation Summary Table 12
R128	2	74	66	*8*	Y	Y	
R129	2	75	67	*8*	Y	Y	
R130	2	75	66	*9*	Y	Y	
R131	2	76	68	*8*	Y	Y	
R132	2	73	64	*9*	Y	Y	
R133	2	75	67	*8*	Y	Y	

Notes:

- *Italicized* receiver IDs represent 1st row receptors.
- Noise levels in bold indicate exceedance of the relevant NAC.
- Italicized bolded insertion loss indicates noise reduction design goal met in 1st row.

1. ADOT NAR 1-decibel approach of FHWA Category D NAC, which is an interior noise standard. Interior noise levels assume a 20 dBA IL across a typical building shell with windows and doors closed; therefore, exterior noise levels in the table that are below 71 dBA for this land use category were not identified as an impact.

SR 101L, Sheely Farms Elementary property line to West Thomas Road

Noise Wall #7 was evaluated to mitigate the Recommended Build Alternative peak hour noise levels for the Sheely Farms Elementary recreation fields located east of SR 101L on West Encanto Boulevard. Figure 5, Exhibit 6 shows the location of this wall, which would be located at the outside shoulder of SR 101L northbound off-ramp to Thomas Road.

Table 11 provides an assessment of the effectiveness of this wall and Table 12 provides additional design details and a mitigation recommendation.

Table 11. Noise Mitigation Evaluation for Recommended Build Alternative: Noise Wall #7

Receiver ID	NO. of Dwelling Units	Unmitigated Noise Level (dB)	Mitigated Noise Level (dBA)	Insertion Loss (dBA)	Benefited Receiver (5 dBA) [Y/N]	1st Row Design Goal (7 dBA) [Y/N]	Mitigation
Sheely Farms Elementary (Figure 5, Exhibit 5) NAC C (66 dBA)[1]							
R164-1	2	66	63	4	N	N	
R164-2	2	67	65	5	Y	N	Noise Wall #7
R164-3	2	66	63	4	N	N	See Noise Recommendation Summary Table 12
R164-4	3	70	65	*7*	Y	Y	
R164-5	3	71	63	*8*	Y	Y	
R164-6	3	68	66	6	Y	N	

Notes:

- *Italicized* receiver IDs represent 1st row receptors.
- Noise levels in bold indicate exceedance of the relevant NAC.

1. ADOT NAR 1-decibel approach of FHWA Category C NAC.

Summary of Noise Barrier Recommendations

A total of eight noise walls were evaluated to provide mitigation of future (2050) peak hour noise levels associated with the Recommended Build Alternative. Table 12 summarizes the recommendation for each wall or wall combination. Of the eight noise walls evaluated for the Recommended Build Alternative, seven satisfy the ADOT NAR reasonable requirements for a 7 dBA noise reduction design goal for 50% of 1st row benefited receptors at a $49,000 maximum cost per benefited receptor. The walls also satisfy the ADOT NAR acoustic feasibility factor of a 5 dBA noise reduction benefit at 50% of impacted receptors. One of the eight walls, Noise Wall #4 does not satisfy the ADOT NAR reasonable cost-per-benefit criterion.

The feasibility of construction for all recommended walls would be evaluated at a later stage of design to address utility relocation drainage and constructability issues. In addition, viewpoints of owners and residents for properties identified for mitigation can be gathered if the design and public involvement process continue beyond the approval of the NEPA document. Therefore, the mitigation recommendations identified in the noise report are preliminary and subject to revision even after approval of the noise study by ADOT.

Table 12. Summary of Noise Mitigation Recommendations

Noise Wall	Barrier Height (ft.)	Barrier Length (ft.)	Barrier Area (ft^2)	Total Barrier Cost	No. of Benefited Receptors	Cost Per Benefit	No. of Impacted Receptors (Benefited)	Feasible Ratio	First Row Benefited (7 dBA)	Design Goal Ratio	Noise Wall Recommended [Y/N]
Residence at McDowell Apartments: Noise Wall #1 (Figure 5, Exhibit 1)											
ADOT ROW	18 – 20	730	14,141	$777,774[1]	76	$10,233	64 (52)	81%	48 (28)	58%	Y
Parc Tolleson Apartments: Noise Wall #2 (Figure 5, Exhibit 2)											
Inside ADOT ROW on top of existing berm	8 - 10	2,297	21,369	$747,907	50	$14,958	41 (57)	72%	30 (16)	53%	Y
Residence Inn Apartments: Noise Wall #3 (Figure 5, Exhibit 2)											
Inside ADOT ROW on top of existing berm	12 - 14	1,103	13,894	$486,298	20	$24,315	27 (20)	74%	20 (15)	75%	Y
Home2Suites Hotel: Noise Barrier #4 (Figure 5, Exhibit 3)											
I-10 Westbound Frontage shoulder	14 - 16	1,800	28,202	$987,054	1	$987,054	1 (1)	100%	1 (1)	100%	N[2]
IMS Medical/Akos Urgent Care: Noise Wall #4a/b (Figure 5, Exhibit 4)											
I-10 Westbound 107th Avenue overpass/mainline	8 - 16	2,900	32,600	$1,241,022	34	$41,030	12 (12)	100%	24 (12)	50%	Y
CCOV: Noise Wall #5a/b (Figure 5, Exhibit 5)											
I-10 WB mainline to Avondale Blvd off-ramp/overpass	8 - 12	1,997	25,161	$880,613	56	$15,725	56 (56)	100%	44 (44)	100%	Y

Noise Wall	Barrier Height (ft.)	Barrier Length (ft.)	Barrier Area (ft^2)	Total Barrier Cost	No. of Benefited Receptors	Cost Per Benefit	No. of Impacted Receptors (Benefited)	Feasible Ratio	First Row Benefited (7 dBA)	Design Goal Ratio	Noise Wall Recommended [Y/N]
AAR: Noise Wall #6 (Figure 5, Exhibit 6)											
SR 101L NB mainline	12 - 16	1,108	16,656	$582,972	12	$48,581	12 (12)	100%	12 (12)	100%	Y
Sheely Farms Elementary: Noise Wall #7 (Figure 5, Exhibit 7)											
SR 101L NB Thomas off-ramp	10 - 12	1,392	15,303	$535,600	11	$48,691	11 (15)	73%	9 (9)	100%	Y

1. Includes cost of removing existing noise wall @ $20/sq. ft.
2. Barrier does not meet the ADOT NAR Reasonable $49,000 cost-benefit ratio.

CONSTRUCTION NOISE AND VIBRATION

Depending on the nature of construction operations, the duration of the noise could last from seconds (e.g. a truck passing a customer) to months (e.g. constructing a bridge). Construction noise is also intermittent and depends on the type of operation, location, and function of the equipment and the equipment usage cycle. Construction equipment is typically considered as a point source, as opposed to traffic which is considered as a line source; therefore, the noise level decreases, theoretically, by 6 dBA per doubling the distance from it, as opposed to 3 dBA for line source. Noise levels, at various distances, using listed equipment, are shown in Table 11. ADOT has set forth guidelines for construction noise in the *Standard Specifications for Road and Bridge Construction*, 2008. Per ADOT specifications 104.08 Prevention of Air and Noise Pollution:

"The contractor shall comply with all local sound control and noise rules, regulations and ordinances which apply to any work pursuant to the contract. Each internal combustion engine used for any purpose on the work or related to the work shall be equipped with a muffler or a type recommended by the manufacturer. No internal combustion engine shall be operated on the work without its muffler being in good working condition."

Table 13. Construction Noise Levels at Various Distances from Equipment

Equipment	L_{10}				
	R_300 ft	R_600 ft	R_900 ft	R_1200 ft	R_1500 ft
Auger Drill Rig	64.8	58.8	55.3	52.8	50.8
Boring Jack Power Unit	67.4	61.4	57.9	55.4	53.4
Compactor (ground)	63.7	57.7	54.1	51.6	49.7
Concrete Mixer Truck	62.3	56.2	52.7	50.2	48.3
Dump Truck	59.9	53.9	50.4	47.9	45.9
Excavator	64.2	58.1	54.6	52.1	50.2
Generator	65.1	59.0	55.5	53.0	51.1
Compressor (air)	61.1	55.1	51.6	49.1	47.1
Grader	68.5	62.4	58.9	56.4	54.5
Warning Horn	57.6	51.6	48.1	45.6	43.6
All Other Equipment > 5 HP	69.4	63.4	59.9	57.4	55.4
Bar Bender	60.4	54.4	50.9	48.4	46.5
Concrete Pump Truck	61.8	55.8	52.3	49.8	47.9
Soil Mix Drill Rig	64.4	58.4	54.9	52.4	50.4
Concrete Saw	70.0	64.0	60.5	58.0	56.0
Auger Drill Rig	64.8	58.8	55.3	52.8	50.8
Roller	60.4	54.4	50.9	48.4	46.5

Source: FHWA Roadway Construction Noise Model (FHWA, 2008).
L_{10} – noise level exceeded 10 percent of the time during the noise measurement interval and due to sporadic or intermittent events, such as noise from construction equipment.

Ground vibration and ground-born noise can also be a source of annoyance to individuals who live or work close to vibration-generating activities. Pile driving, demolition activity, blasting, and crack-and-seat operations are the primary sources of vibration, while the impact pile driving can be the most significant source of vibration at construction sites. It is recommended to apply methods that may be practical and appropriate in specific situations, to reduce vibration to an acceptable level. Such measures may be:

- Jetting,
- Predrilling
- Cast-in-place or auger cast piles
- Non-displacement piles
- Pile cushioning
- Using alternative non-impact drivers
- Scheduling activities to minimize disturbance at near-construction sites

COORDINATION WITH LOCAL OFFICIALS

The results of this analysis, including preliminary mitigation recommendations were presented to local officials and the public at the public information meeting held on February 23, 2023. Upon request of the local land use planning agency or local public agency, noise contour lines may be produced during the noise analysis process for project alternative screening and planning purposes only, as per ADOT NAR, Section 2.9.6 Noise Contours.

STATEMENT OF LIKELIHOOD

As per 23 CFR 772.13(g)(3), the noise analysis was completed to the extent of design information that is available at this time. This statement of likelihood about the study recommendations is included since feasibility and reasonableness determinations may change due to changes in project design after approval. Furthermore, the noise walls recommended for the Christ's Church of the Valley, Residence at McDowell and Residence Inn apartment complexes, the Arizona Arthritis and Rheumatology medical facility, the IMS Family Medicine medical facility and the Akos MD Urgent Care facility will be presented to the property owner and residents during a later phase of design per the ADOT NAR *6.1 Viewpoints or Preferences of Property Owners and Residents* requirements.

REFERENCES

1. Arizona Department of Transportation (ADOT), *SR 101L at I-10 System Traffic Interchange Improvements Design Concept Report*, January 2023.
2. Arizona Department of Transportation, *Instruction on Determination of Existing Noise Levels and Noise Measurement Data Form*, May 2017.
3. Arizona Department of Transportation, *Noise Abatement Requirement, May 2017.*
4. *Arizona Department of Transportation, Standard Specifications for Road and Bridge Construction*, ADOT, 2008.
5. AECOM, *e-mail RE: SR 101_I-10 existing and 2050 volume data*, January 2023.
6. Federal Highway Administration, *FHWA Traffic Noise Model, Version 1.0: Technical Manual and Addendums (FHWA PD-96-010)*, February 1998.
7. Federal Highway Administration, *Highway Traffic Noise: Analysis and Abatement Guidance*, December 2011.
8. Federal Highway Administration, *Measurement of Highway Related Noise (FHWA PD-96-010)*, May 1996.
9. Federal Highway Administration, *Roadway Construction Noise Model V. 1.1.* December 8, 2008.
10. Federal Highway Administration, *Recommended Best Practices for the Use of the FHWA Traffic Noise Model (TNM)*, FHWA-HEP-16-018, December 2015.
11. Federal Highway Administration, *FHWA Construction Noise Handbook*, FHWA-HEP-06-015, August 2006.
12. Transportation Research Board (TRB), *Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis*, 2016.
13. Transportation Research Board, *National Cooperative Highway Research Program: Final Report on Project 25-34 Supplemental Guidance on the Application of FHWA's TNM – Appendix B Signalized Interchanges, Intersections and Roundabouts*, 2014.
14. Webpage, *OpenStreetMap, Phoenix Subdivision* available at https://www.openstreetmap.org/relation/9097925#map=14/33.4497/-112.2606. Access February 23, 2023.
15. Webpage, *Phoenix Goodyear Airport Master Plan 2018 Update* available at https://apps.azdot.gov/files/Airports/MP_PDF/PHX_Goodyear/GYR-Final-MP-May-2018.pdf. Accessed February 23, 2023.
16. Webpage, *Western Maricopa County/ Luke AFB Regional Compatibility Plan* available at https://dema.az.gov/sites/default/files/MAC-RCP_JLUS-Luke-AFB-WMC_2003-March.pdf. Accessed February 23, 2023.

APPENDIX A – NOISE MEASUREMENT DATA SHEETS

Noise Measurement Data Sheet

Noise Meter Model LD 820
Calibrator Model CAL 200
Weighting A X, C ____, Other ____
Site M1
Calibration @ 114 dBA
Start +/-____ dBA End +/-____ dBA
Response Fast ____ or Slow X
Battery > 50%* ✓
*replace if <50%
Weather Data Temp 90°F Humidity 26.2% Wind Spd 8.6 mph S
Date 10/13/22

Measurement Data						Traffic Data (Speed = 65 mph)									
Sample	Begin Time	End Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	EB Autos	WB Autos	EB MT	WB MT	EB HT	WB HT	EB Motocyc.	WB Motocyc.	EB Buses	WB Buses
1	12:15	12:30	58.5	55.2	67.9										
2	12:30	12:45	58.0	55.7	64.2										
3	12:45	1:00 p	58.2	55.1	65.4										

SITE SKETCH

NOTES

Sample	Major Sources	Background Noise	Unusual Events
1	I-10	neighborhood	
2	"	dogs, planes	
3	"	dogs barking, more freq.	

* check to see if freeway is rubberized

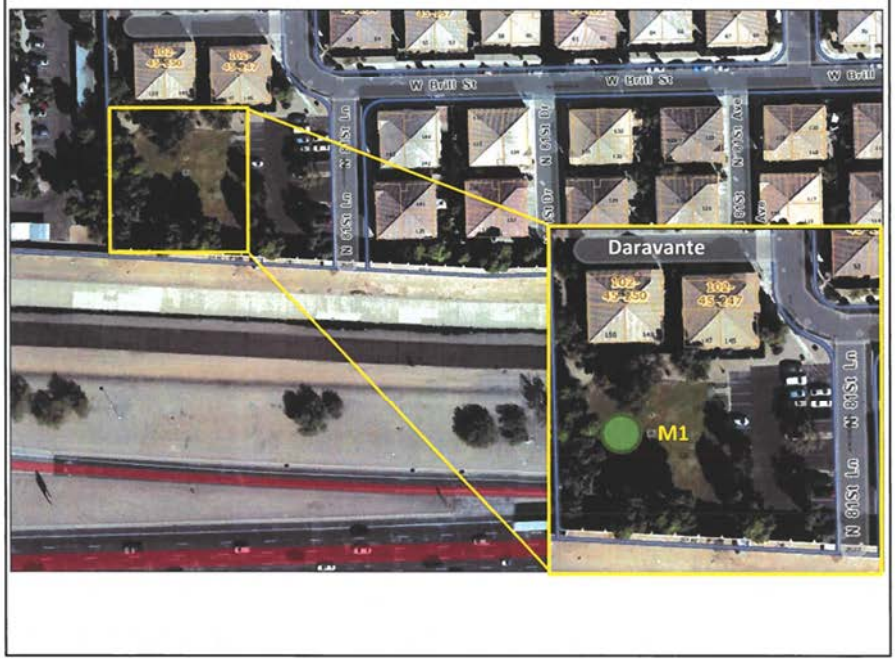
pin drop: 33.4635571, -112.2351486

Noise Measurement Data Sheet

Noise Meter Model LD 820
Calibrator Model CAL 200
Weighting A X, C ____, Other ____
Site M1
Calibration @ 114 dBA
Start +/-____ dBA End +/-____ dBA
Response Fast ____ or Slow X
Battery > 50%* V
*replace if <50%
Weather Data Temp 90° F Humidity 26.2 % Wind Spd 0.6 mph S
Date 10/13/2022

Measurement Data						Traffic Data (Speed = _____ mph)									
Sample	Begin Time	End Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	EB Autos	WB Autos	EB MT	WB MT	EB HT	WB HT	EB Motocyc.	WB Motocyc.	EB Buses	WB Buses
1	12:15	12:30	58.5	55.2	67.9										
2	12:30	12:45	58.0	55.7	64.2										
3	12:45	1:00	58.2	55.1	65.4										

SITE SKETCH

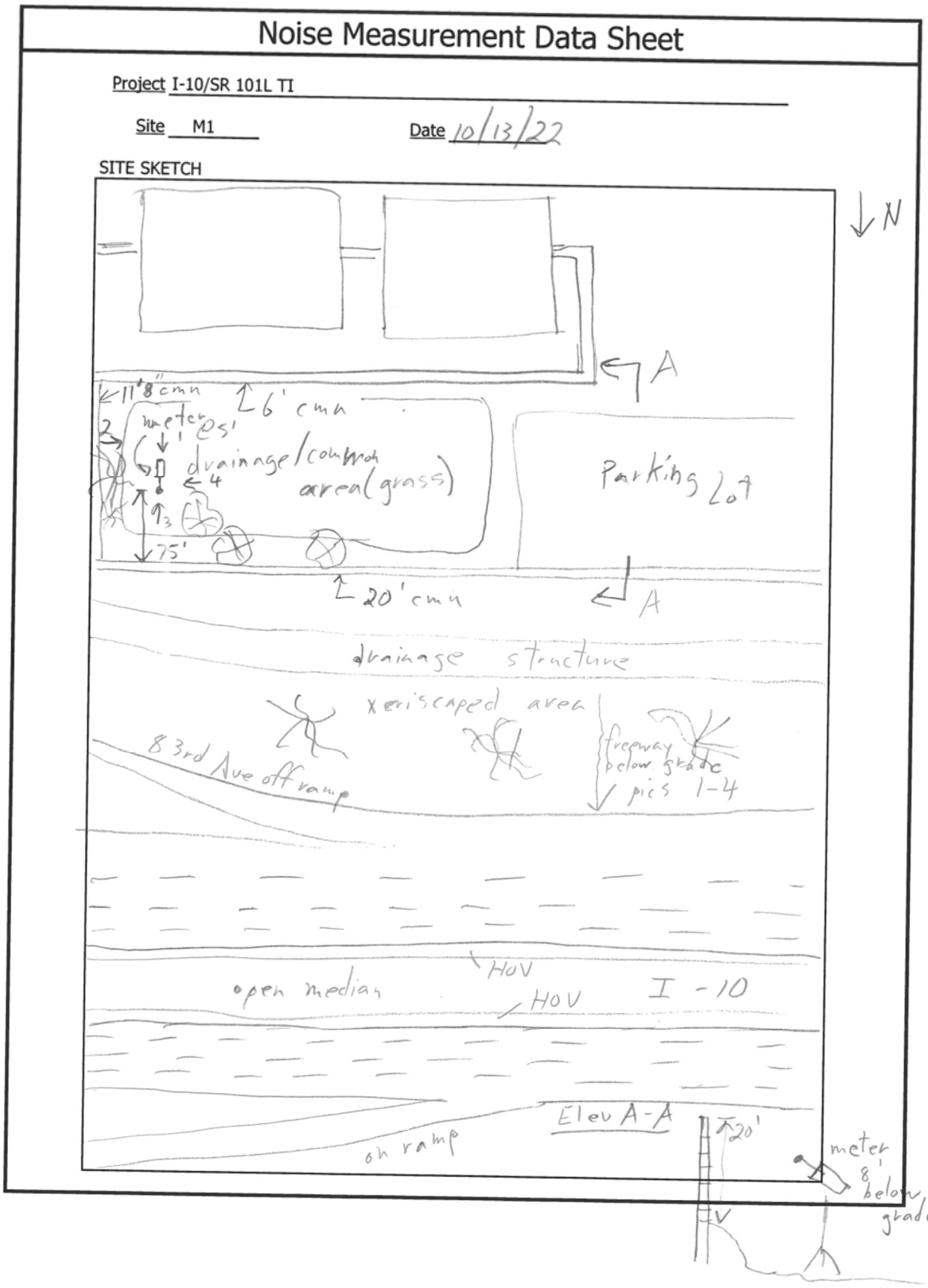


NOTES

Sample	Major Sources	Background Noise	Unusual Events
1	I-10	neighborhood	
2	" "	" dogs, planes	
3	" "	dogs barking more freq.	

* Check to see if freeway is rubberized

pin drop: 33.9635571, -112.2351486


Noise Measurement Data Sheet
Project I-10/SR 101L TI
Site M1
Date 10/13/22
SITE SKETCH
N
A
11'8" cmn
6' cmn
meter @5'
drainage/common area (grass)
Parking Lot
75'
20' cmn
A
drainage structure
xeriscaped area
freeway below grade pics 1-4
83rd Ave off ramp
HOV
open median
HOV
I-10
Elev A-A
20'
meter 8' below grade
on ramp

Noise Measurement Data Sheet

Noise Meter Model LD 820 Calibrator Model CAL 200 Weighting A X, C, Other Site M2

Calibration @ 114 dBA Start +/-____ dBA End +/-____ dBA

Response Fast ____ or Slow X

Weather Data Temp 92.6°F Humidity 21.5% Wind Spd 0.6 mph S

Battery > 50%* ✓ *replace if <50%

Date 10/13/22

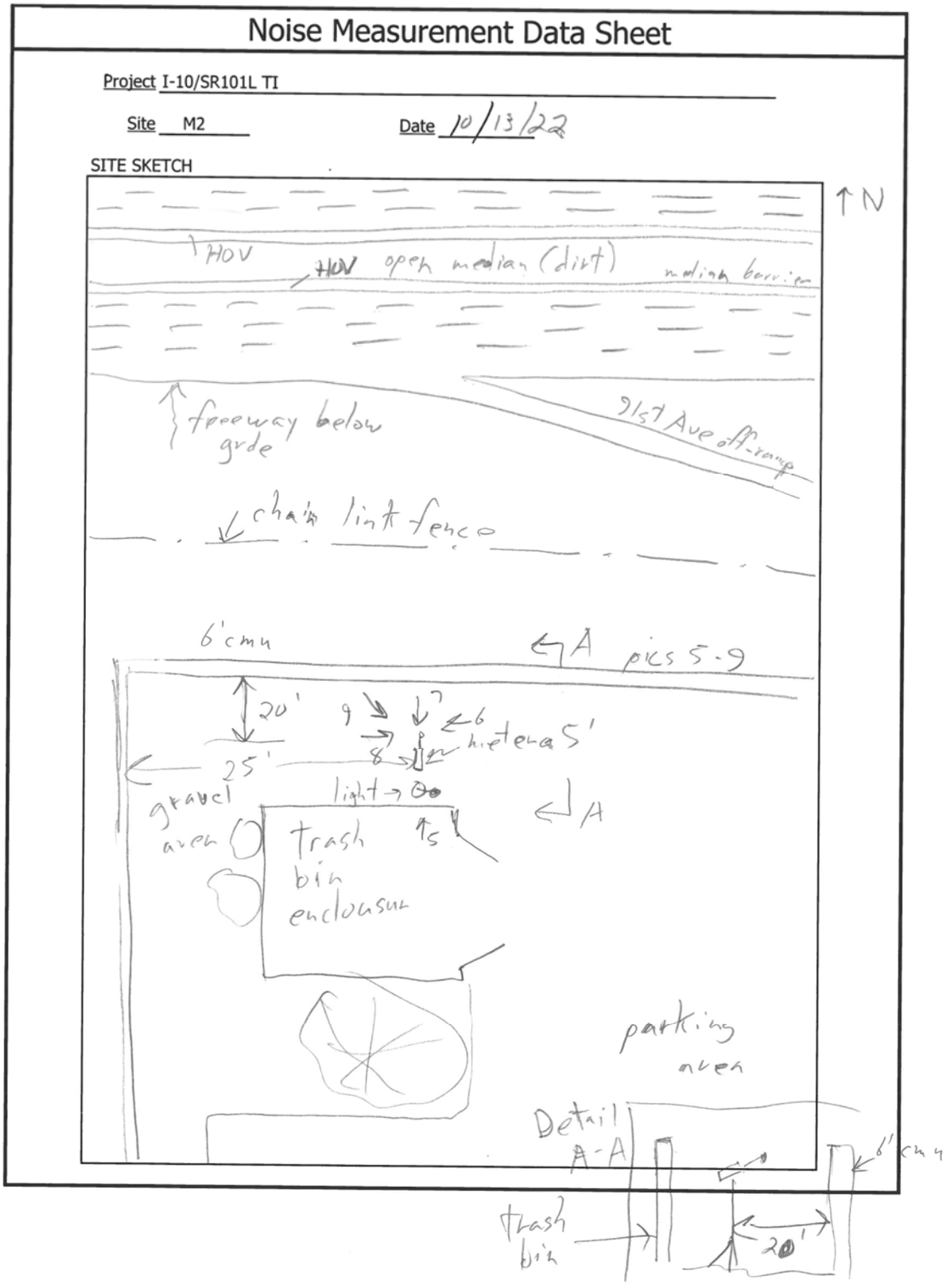
Measurement Data						Traffic Data (Speed = 65 mph)									
Sample	Begin Time	End Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	EB WB Autos		MT		HT		Motocyc.		Buses	
1	1:23p	1:38p	61.1	57.8	75.9										
2	1:38p	1:53p	61.8	57.9	73.5										
3	1:53p	2:08p	62.0	58.9	69.1										

SITE SKETCH

NOTES

Sample	Major Sources	Background Noise	Unusual Events
1	I-10	residential activity	
2	"		
3	"		

PIN: 33.4613186, -112.573556


Noise Measurement Data Sheet
Project I-10/SR101L TI
Site M2
Date 10/13/22
SITE SKETCH
↑N
HOV
HOV
open median (dirt)
median barrier
freeway below grde
91st Ave off-ramp
chain link fence
6' cmu
A
pics 5-9
20'
25'
6 heters 5'
gravel area
light
A
trash bin enclosure
parking area
Detail A-A
6' cmu
trash bin
20'

Noise Measurement Data Sheet

Noise Meter
Model LD 820
Calibration @ 114 dBA
Start +/- 0 dBA End +/- 0 dBA
Response
Fast ____ or Slow X
Weather Data Temp 98°F Humidity 16% Wind Spd 1.2 mph SW

Calibrator
Model CAL 200

Weighting
A X
C ____
Other ____
Battery
> 50%* ✓
*replace if <50%

Site M3
Date 10/11/22

Measurement Data

Sample	Begin Time	End Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)
1	2:44p		65.5	60.3	74.1
2			63.4	58.0	67.9
3		2:59p	63.8	58.9	68.5

Traffic Data (Speed = 65 mph) SB ~~30~~ 40 m.p.h. SB

Sample	Autos NB	Autos SB	MT NB	MT SB	HT NB	HT SB	Motocyc. NB	Motocyc. SB	Buses NB	Buses SB
1	452		23		16		—		—	
2	437		27		30		—		—	
3	400		10		25		—		—	

SITE SKETCH

NOTES

Sample	Major Sources	Background Noise	Unusual Events
1	SR101L	jake breaking	
2			
3			

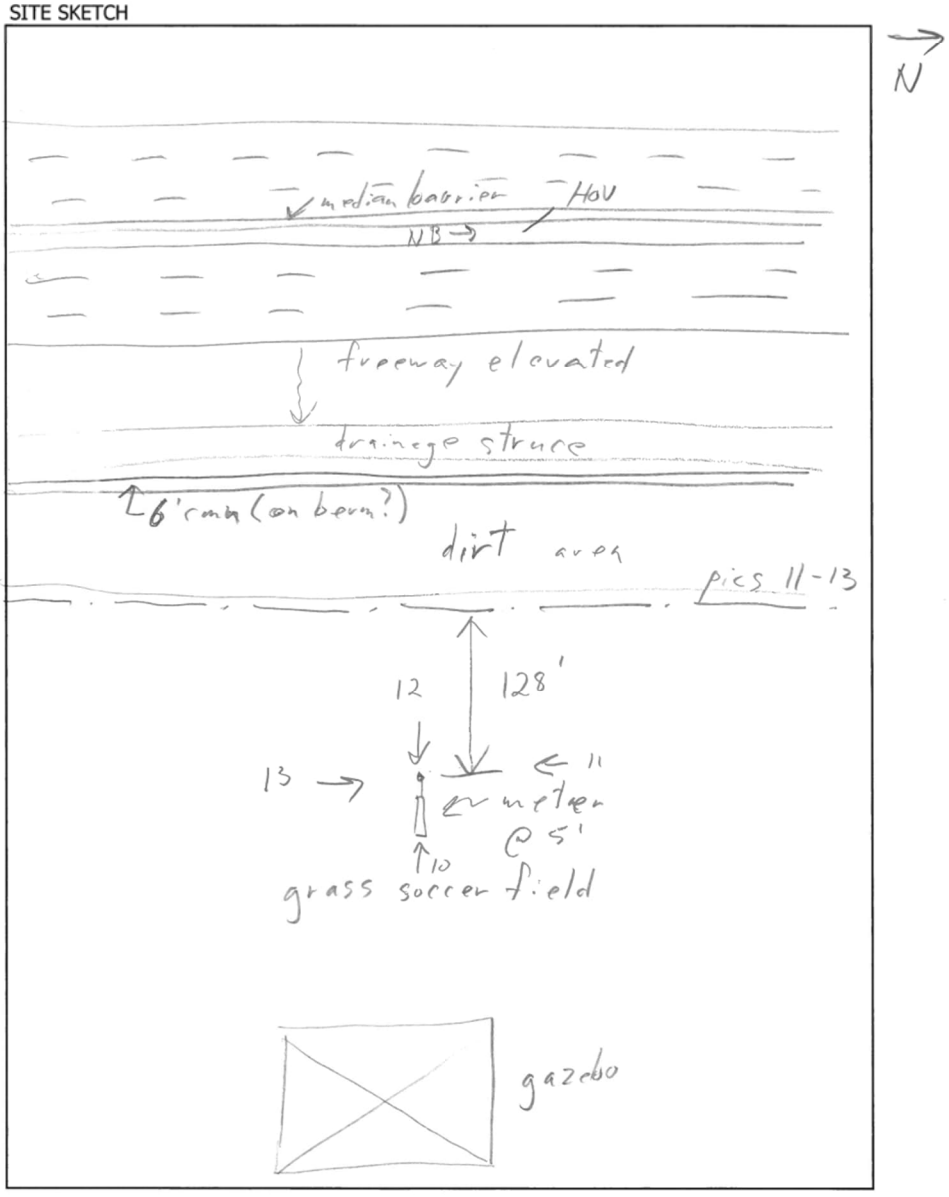
PIN: 33.4739384, -112.2643096

Noise Measurement Data Sheet

Project I-10/SR 101L TI

Site M3 Date 10/13/22

SITE SKETCH



Noise Measurement Data Sheet

Noise Meter Model LD 820
Calibration @ 114 dBA
Start +/-____ dBA End +/-____ dBA
Response
Fast ____ or Slow X
Weather Data Temp 94.3°F Humidity 18.8% Wind Spd 0.8 mph NW

Calibrator Model CAL 200

Weighting: A X; C ____; Other ____
Battery > 50%* ✓
*replace if <50%
Date 10/13/22

Site M3a

Measurement Data / Traffic Data (Speed = 65 mph)

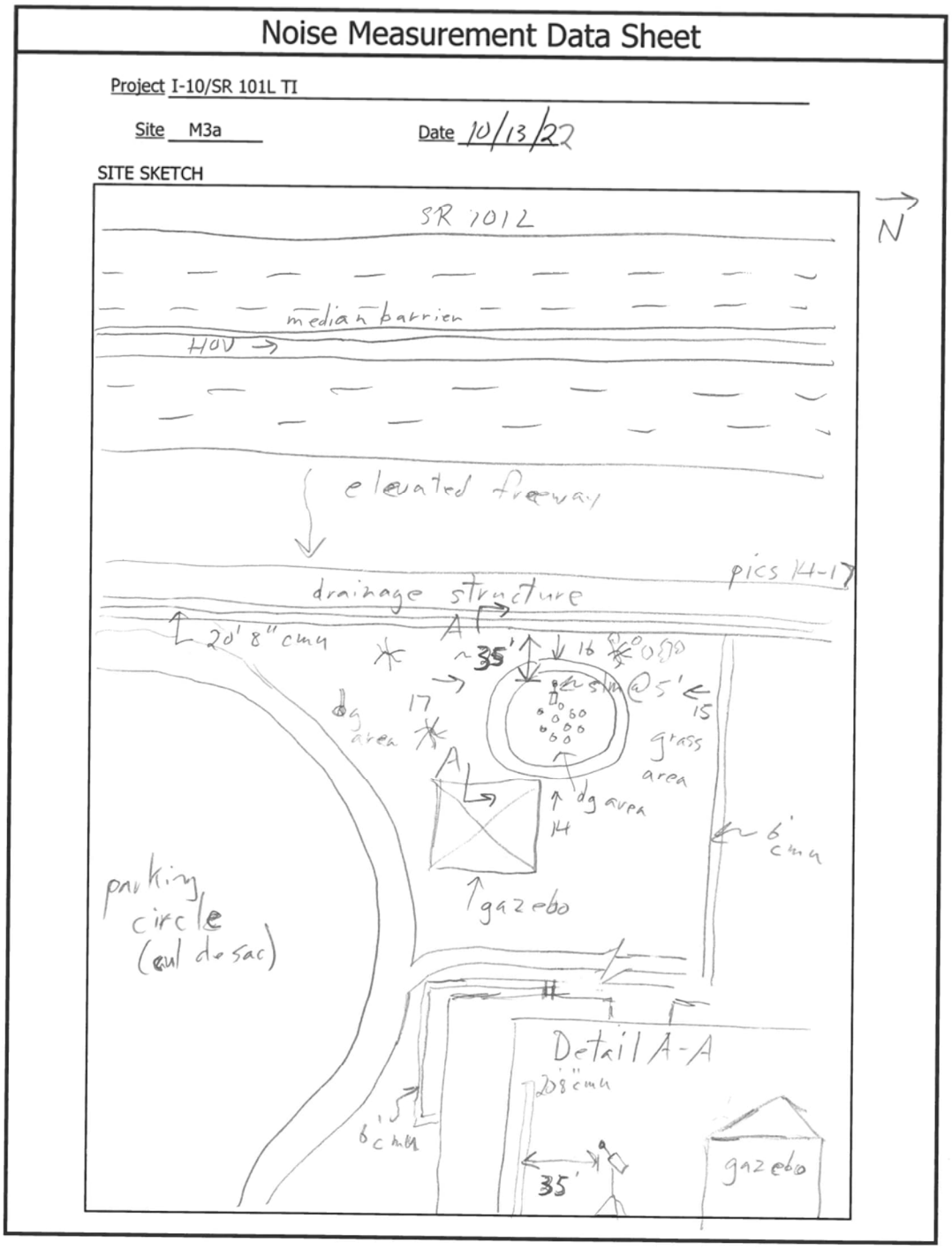
Sample	Begin Time	End Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	NB Autos	SB Autos	NB MT	SB MT	NB HT	SB HT	NB Motocyc.	SB Motocyc.	NB Buses	SB Buses
1	4:08p	4:23p	61.4	57.0	69.8										
2	4:23p	4:38p	61.7	57.9	72.5										
3	4:38p	4:53p	60.7	56.4	67.3										

SITE SKETCH

NOTES

Sample	Major Sources	Background Noise	Unusual Events
1	SR 101L	birds	
2	"		
3	"	local truck pass	

PIN: 33.4706735, -112.2673992


Noise Measurement Data Sheet
Project I-10/SR 101L TI
Site M3a
Date 10/13/22
SITE SKETCH
SR 101L
N
median barrier
HOV
elevated freeway
drainage structure
pics 14-17
20' 8" cmu
35'
16
@5'
15
17
dg area
grass area
A
A
dg area
14
6' cmu
gazebo
parking circle (cul de sac)
Detail A-A
6' cmu
35'
gazebo

Noise Measurement Data Sheet

Noise Meter Model LD 820 | Calibrator Model CAL 200 | Weighting A X, C, Other | Site M6

Calibration @ 114 dBA
Start +/-____ dBA End +/-____ dBA

Response Fast ____ or Slow X

Battery > 50%* ✓ *replace if <50%

Weather Data Temp 95.2°F Humidity 21% Wind Spd 0.8 mph SE Date 10/13/22

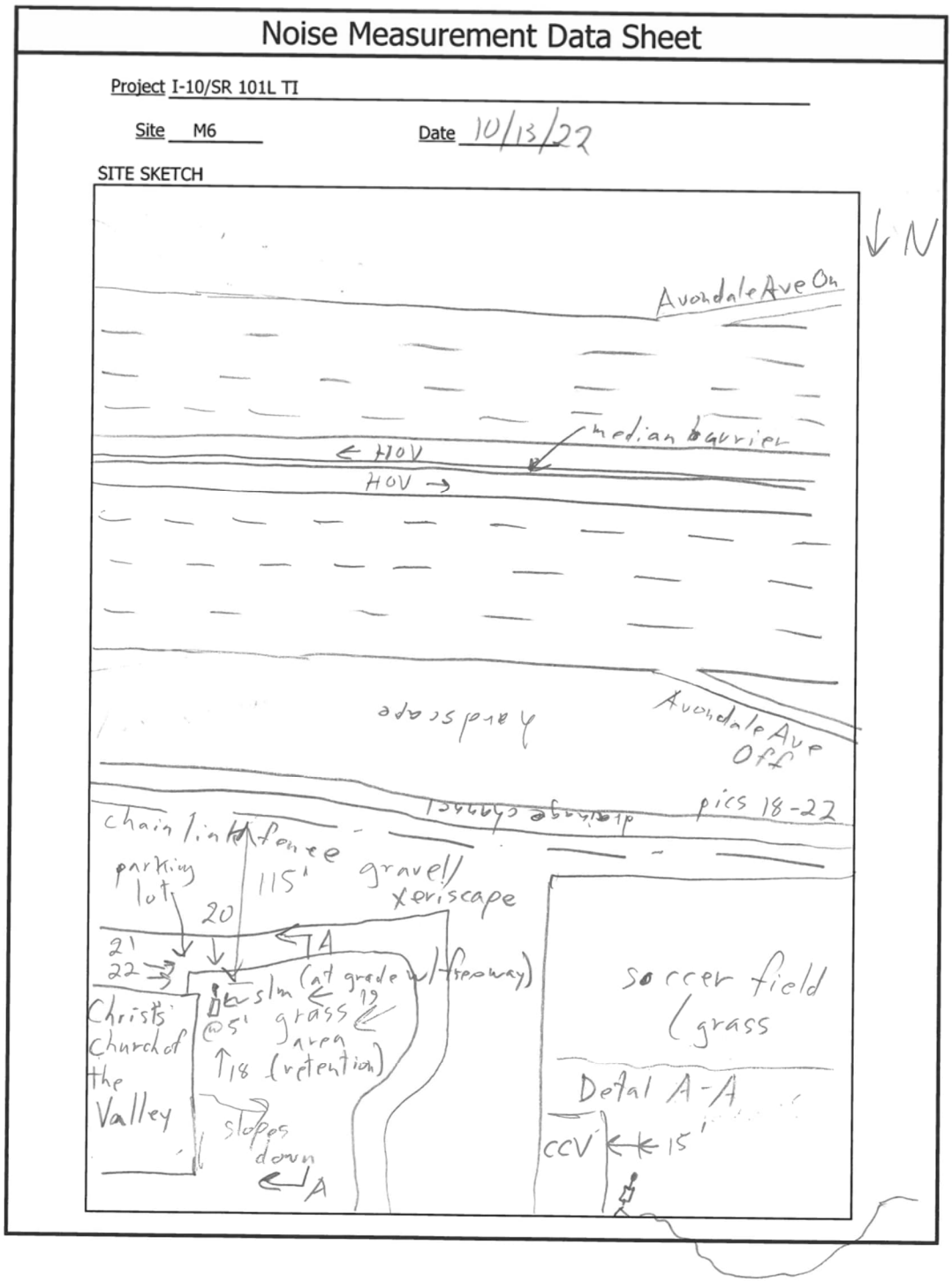
Measurement Data						Traffic Data (Speed = 65 mph) 480-45... EB NB									
Sample	Begin Time	End Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	EB Autos	WB Autos	EB MT	WB MT	EB HT	WB HT	EB Motocyc.	WB Motocyc.	EB Buses	WB Buses
1	5:23P	5:38P	64.4	60.9	68.9										
2	5:38P	5:53P	65.4	61.8	75.9										
3	5:53P	6:08P	66.2	62.6	76.8										

SITE SKETCH

NOTES

Sample	Major Sources	Background Noise	Unusual Events
1	I-10	some traffic	
2			
3		Kids playing screaming	

PIN: 33.4614870, -112.3012252


Noise Measurement Data Sheet
Project I-10/SR 101L TI
Site M6
Date 10/13/22
SITE SKETCH
N
Avondale Ave On
median barrier
HOV
HOV
Avondale Ave Off
pics 18-22
chain link fence
parking lot
115'
gravel/ xeriscape
20
21'
22'
A
slm (at grade w/ freeway)
@5' grass area
18' (retention)
soccer field (grass
Christs Church of the Valley
slopes down
A
Detal A-A
CCV
15'

Noise Measurement Data Sheet

Noise Meter Model LD 820
Calibrator Model CAL 200
Weighting A X, C, Other
Site M2a
Calibration @ 114 dBA
Start +/- 0 dBA End +/- 0 dBA
Response Fast ____ or Slow X
Battery > 50%* ____ *replace if <50%
Weather Data Temp 55.9°F Humidity 51.8% Wind Spd 0.6 mph NW
Date 11/30/22

Measurement Data						Traffic Data (Speed = 65 mph)									
Sample	Begin Time	End Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Autos		MT		HT		Motocyc.		Buses	
1	9:06a	9:21a	65.1	62.2	74.8										
2	9:21a	9:36a	65.4	62.3	75.9										
3															

SITE SKETCH

NOTES

Sample	Major Sources	Background Noise	Unusual Events
1	I-10		
2	"		
3			

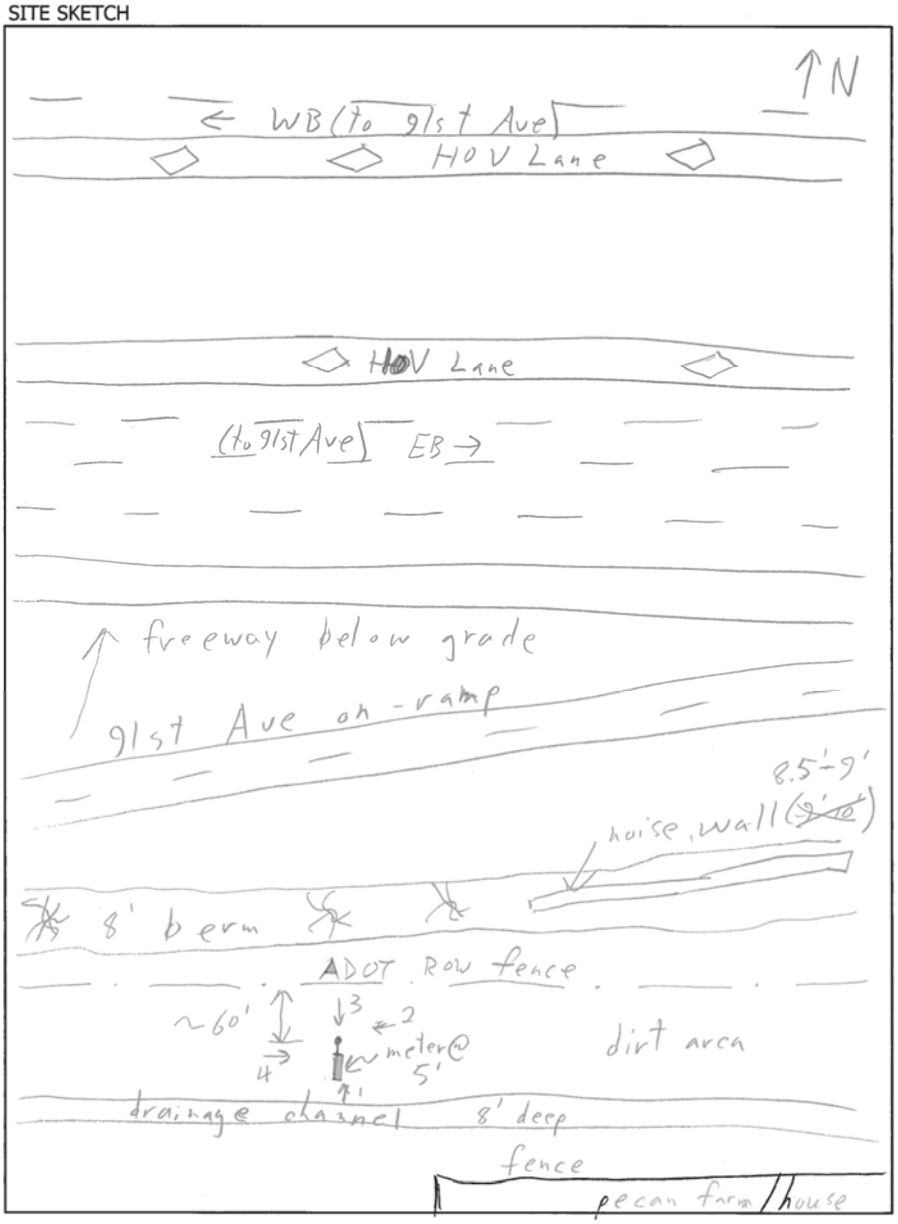
PIN: 33.4613628, -112.2531379

Noise Measurement Data Sheet

Project I-10/SR 101L TI

Site M2a Date 11/30/22

SITE SKETCH



Noise Measurement Data Sheet

Noise Meter
Model LD 820
Calibration @ 114 dBA
Start +/- 0 dBA End +/- 0 dBA
Response
Fast ____ or Slow X
Weather Data
Temp 61.8°F Humidity 43.3% Wind Spd 1.8mph W

Calibrator
Model CAL 200

Weighting
A X
C ____
Other ____
Battery
> 50%* ____
*replace if <50%

Site M5
Date 11/30/22

Measurement Data						Traffic Data (Speed = 65 mph)									
						WB Autos	EB Autos	WB MT	EB MT	WB HT	EB HT	WB Motocyc.	EB Motocyc.	WB Buses	EB Buses
Sample	Begin Time	End Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)										
1	10:17a	10:32a	72.3	68.9	77.2		830		55		130		0		2
2	10:32a	10:47a	73.2	69.9	77.3	1186		50		198		0		4	
3															

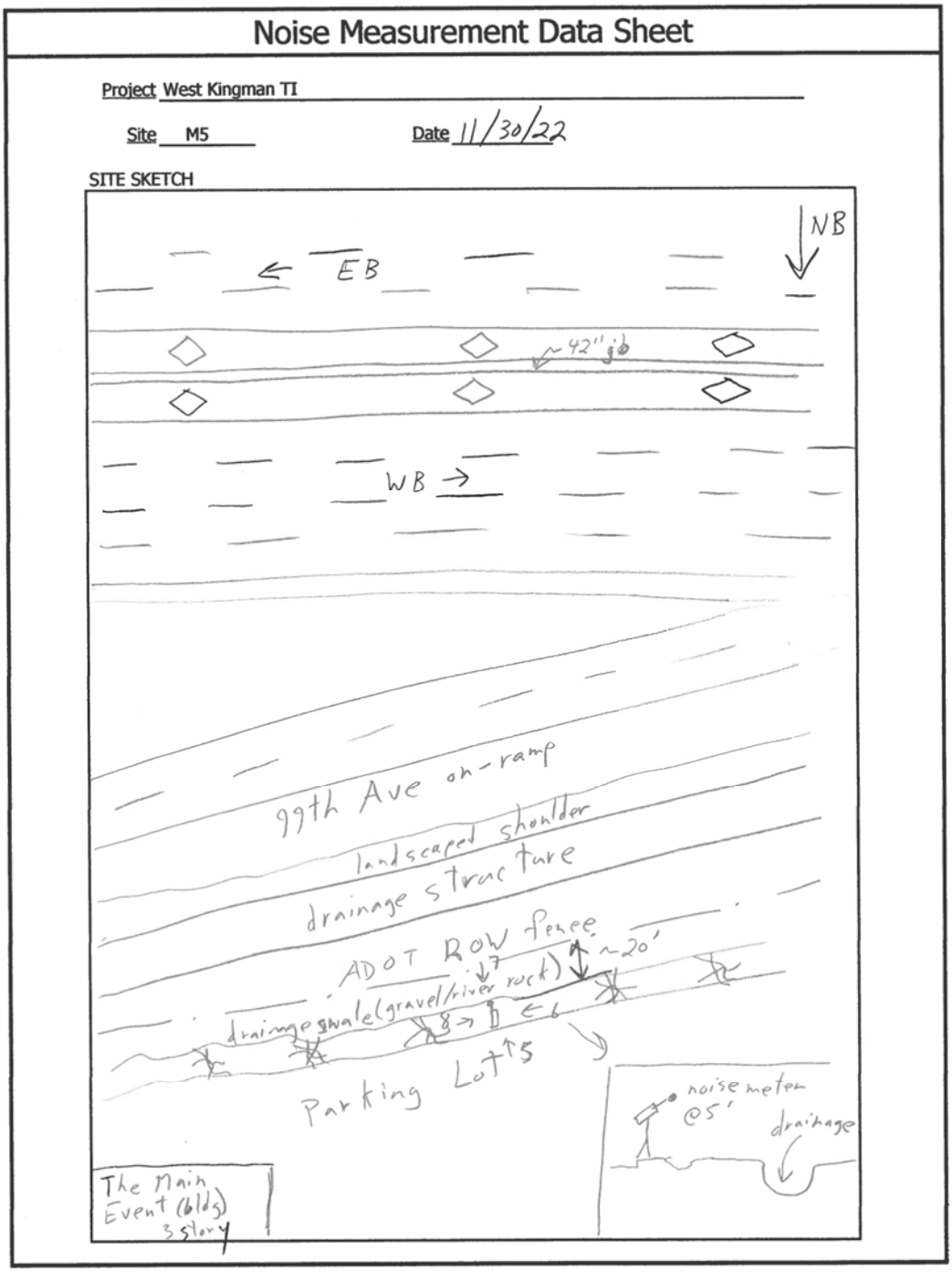
SITE SKETCH

1 - video
2 - video

NOTES

Sample	Major Sources	Background Noise	Unusual Events
1	I-10	planes	
2			
3			

PIN: 33.4624383, -112.2828591


Noise Measurement Data Sheet
Project West Kingman TI
Site M5
Date 11/30/22
SITE SKETCH
NB
EB
~42" gb
WB
99th Ave on-ramp
landscaped shoulder
drainage structure
ADOT ROW fence
~20'
drainage swale (gravel/river rock)
Parking Lot
noise meter @5'
drainage
The Main Event (bldg) 3 story

Noise Measurement Data Sheet

Noise Meter Model LD 820 | Calibrator Model CAL 200 | Weighting A X, C, Other | Site M6a

Calibration @ 114 dBA
Start +/-____ dBA End +/-____ dBA

Response Fast ____ or Slow X

Battery > 50%* ✓
*replace if <50%

Weather Data Temp 70.5°F Humidity 31.3% Wind Spd 2.4 mph NE

Date 11/30/22

Measurement Data | Traffic Data (Speed = 45 mph)

Sample	Begin Time	End Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	EB Autos	WB Autos	EB MT	WB MT	EB HT	WB HT	EB Motocyc.	WB Motocyc.	EB Buses	WB Buses
1	12:05p	12:20p	61.4	54.8	77.3		157		2		0		0		0
2	12:20p	12:35p	62.6	57.3	57.7	66		1		1		1		1	
3															

1 - 157 cars
2 - 2-4 cars

SITE SKETCH

NOTES

Sample	Major Sources	Background Noise	Unusual Events
1	McDowell Rd	constr. (voices)	
2	"	"	
3			

PIN: 33.4649400, -112.2940302

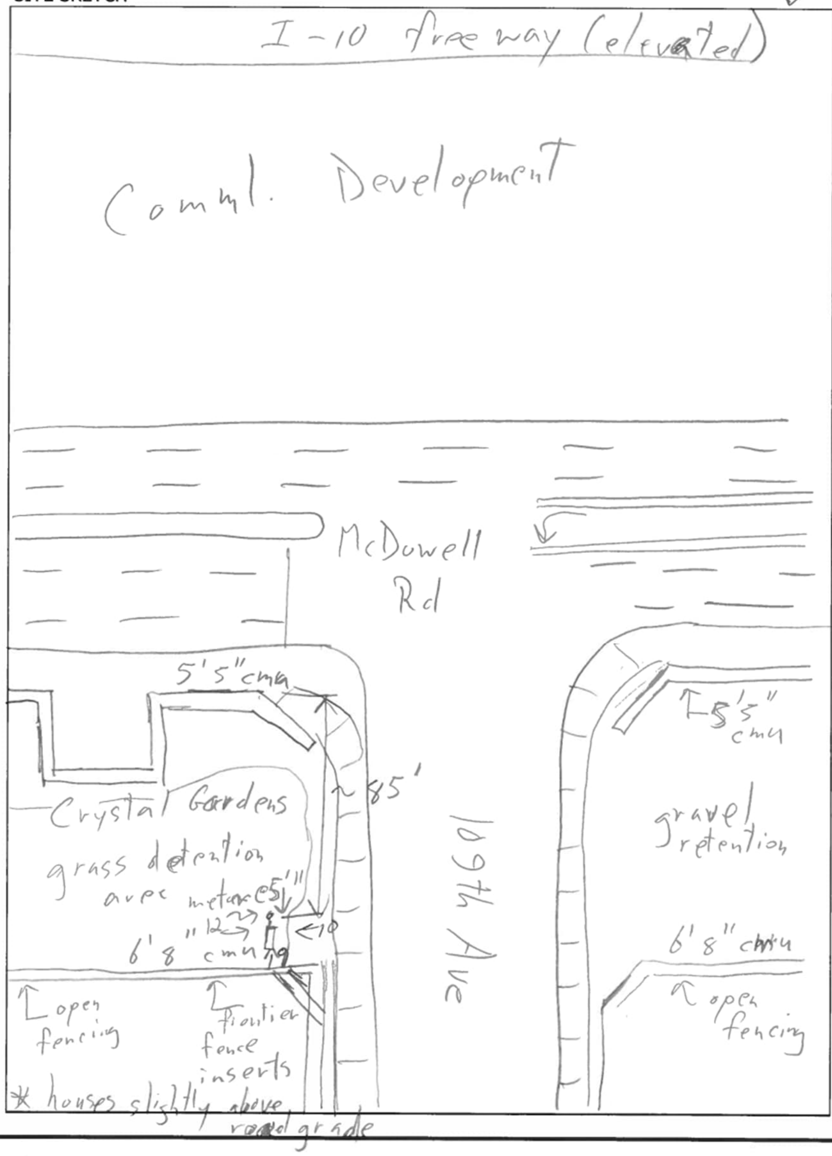
Noise Measurement Data Sheet

Project I-10/SR 101L TI

Site M6a Date 11/30/22

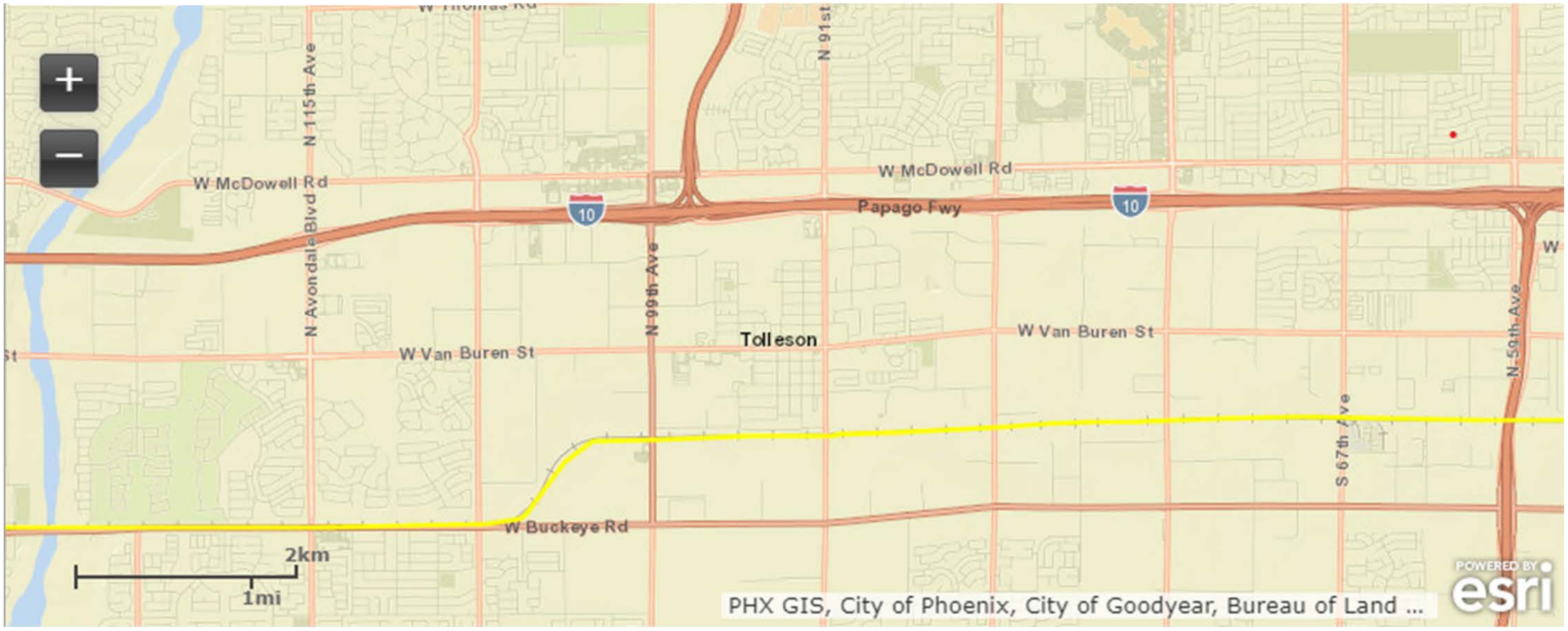
↓NB

SITE SKETCH

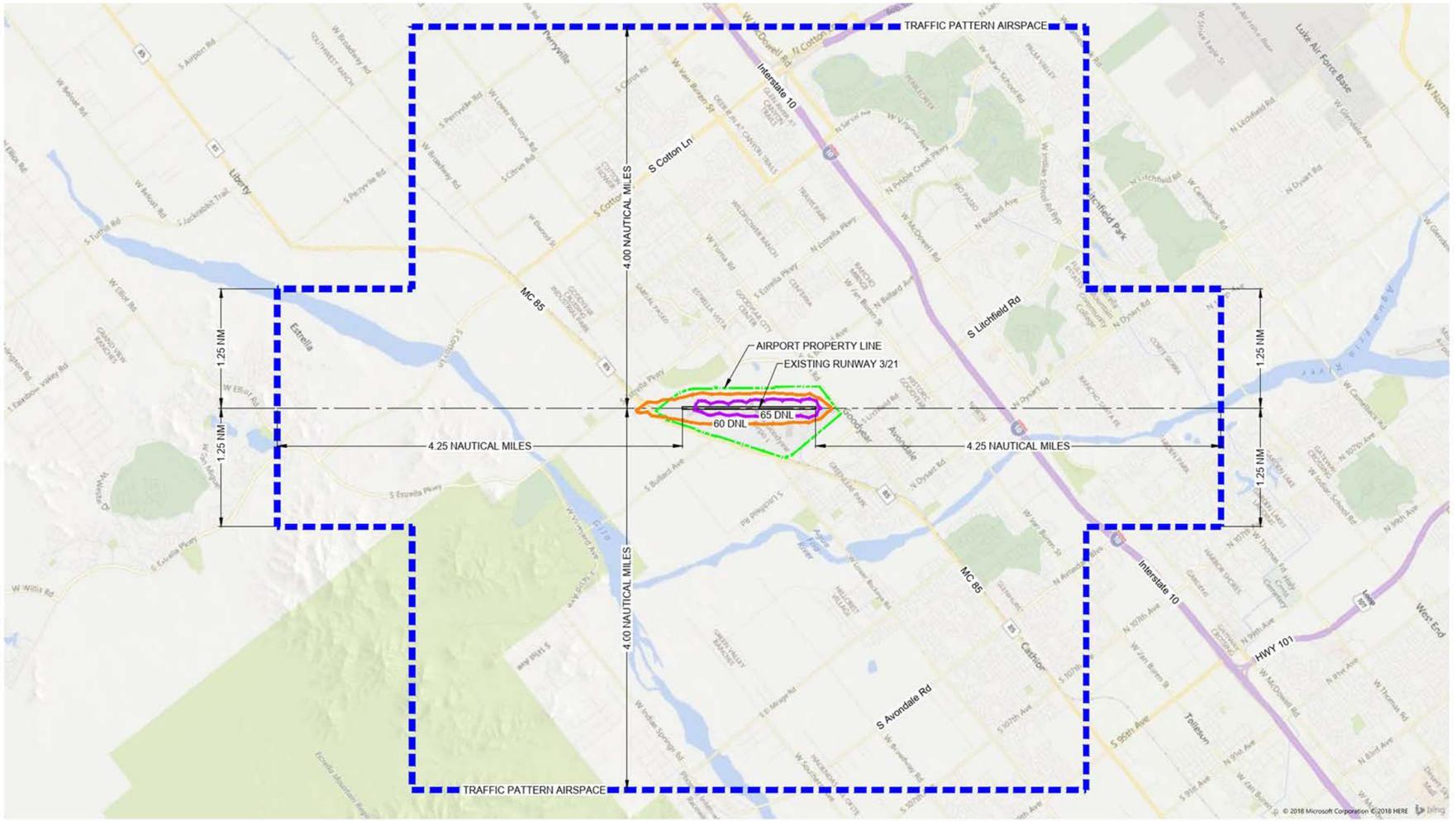


APPENDIX B – UPRR PHOENIX SUBDIVISION, PHOENIX GOODYEAR AIRPORT NOISE CONTOUR, LUKE AFB NOISE CONTOUR

UPRR Phoenix Subdivision



Phoenix Goodyear Airport Noise Contour



Noise Disclosure Map

PHOENIX GOODYEAR AIRPORT

NOTES:

1. This map has been prepared in accordance with A.R.S., Section 28-8486, relating to public airport disclosure.
2. The Traffic Pattern Boundaries have been established in accordance with the guidelines provided in FAA Order 7400.2D.
3. The Airport Noise Contours were developed with the FAA AEDT 2c software and are based on Total Annual Operations (Take-off and Landings) of 200,360.

LEGEND

- 60 DNL Contour
- 65 DNL Contour
- Traffic Pattern Airspace
- Airport Property Line
- Runway 3/21
- Extended Runway Centerline

1500 0 1500 3000
SCALE IN FEET

ARMSTRONG

Phoenix Goodyear Airport Noise Contour

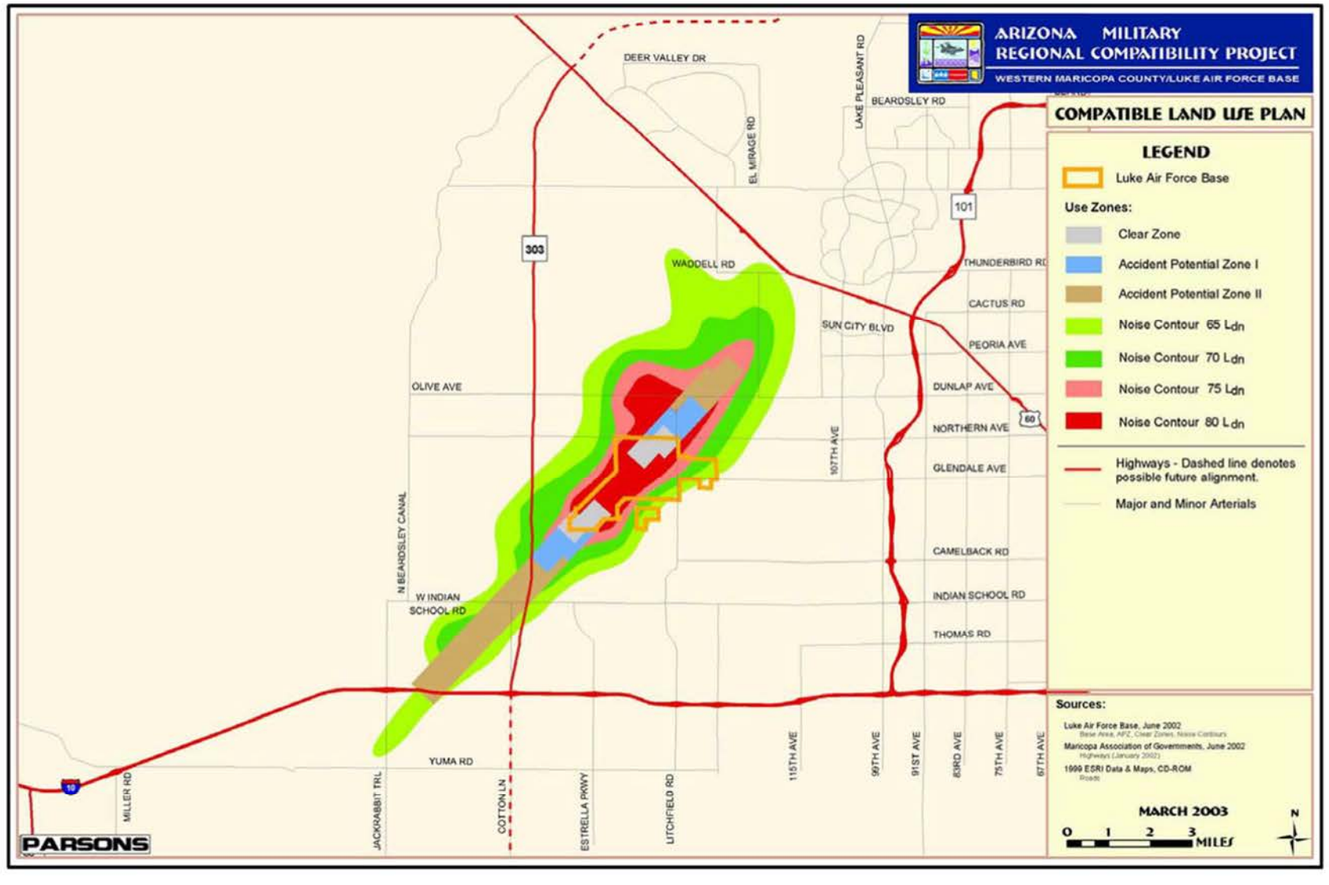
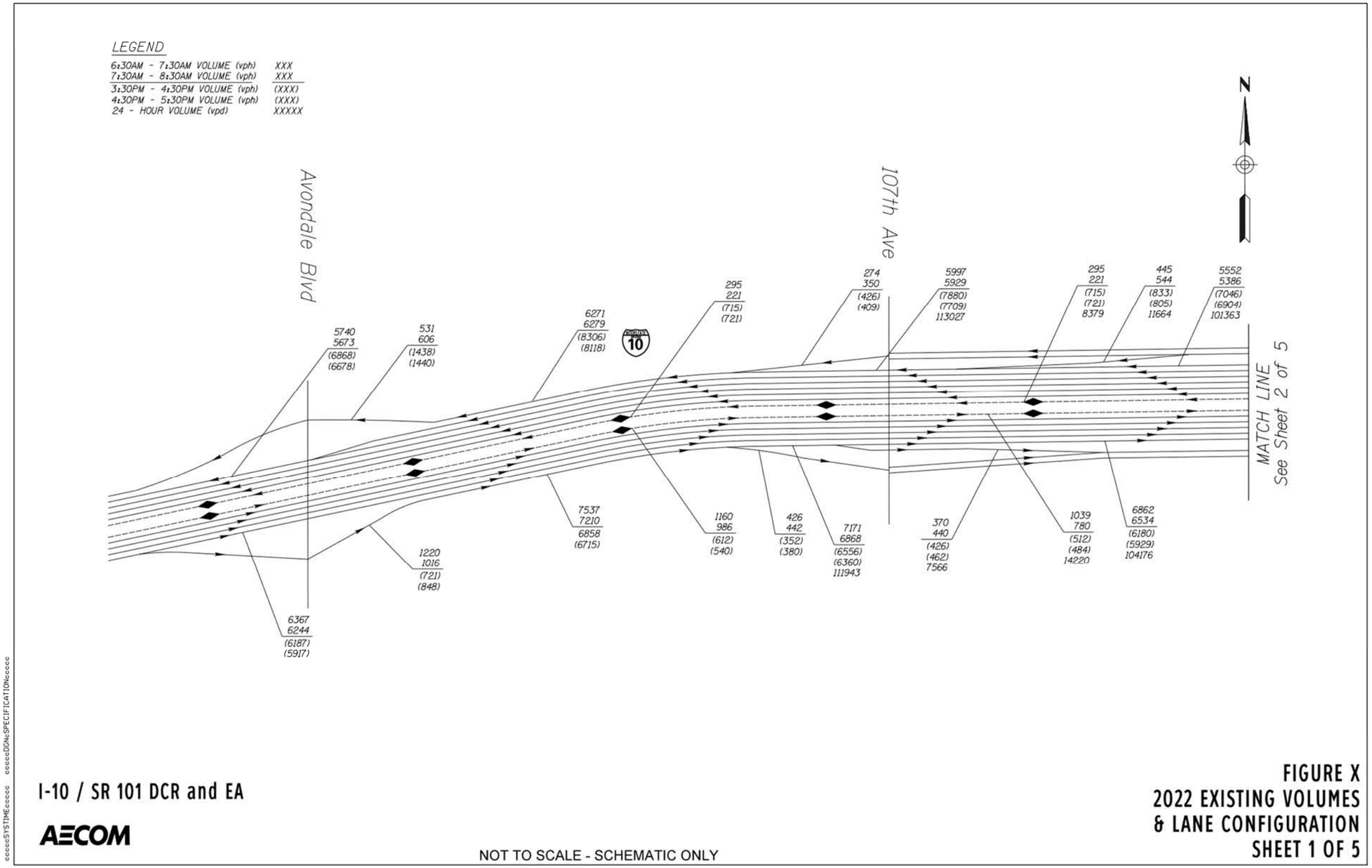


Figure 5-1: Compatible Land Use Plan

APPENDIX C – TRAFFIC DATA

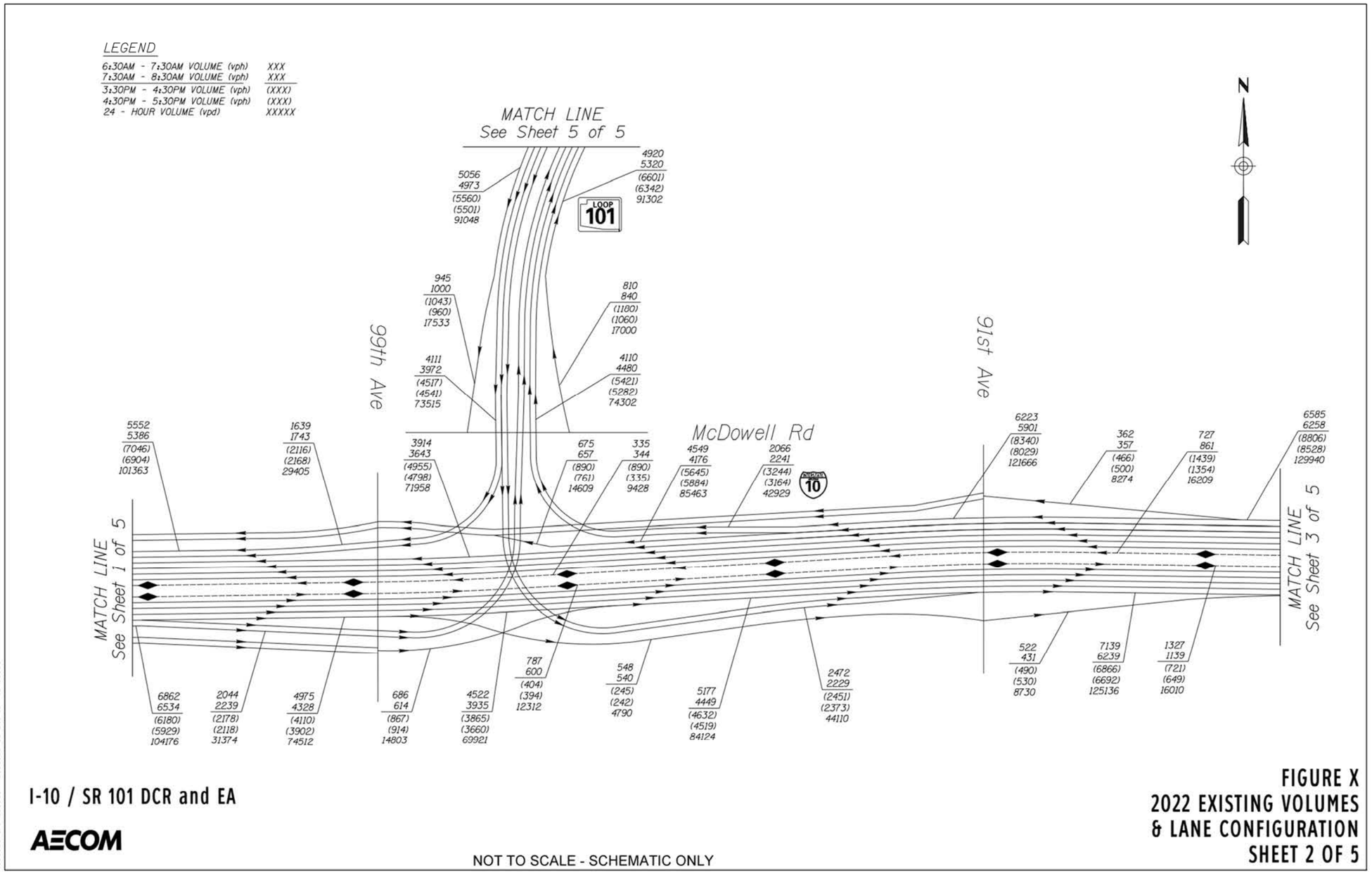


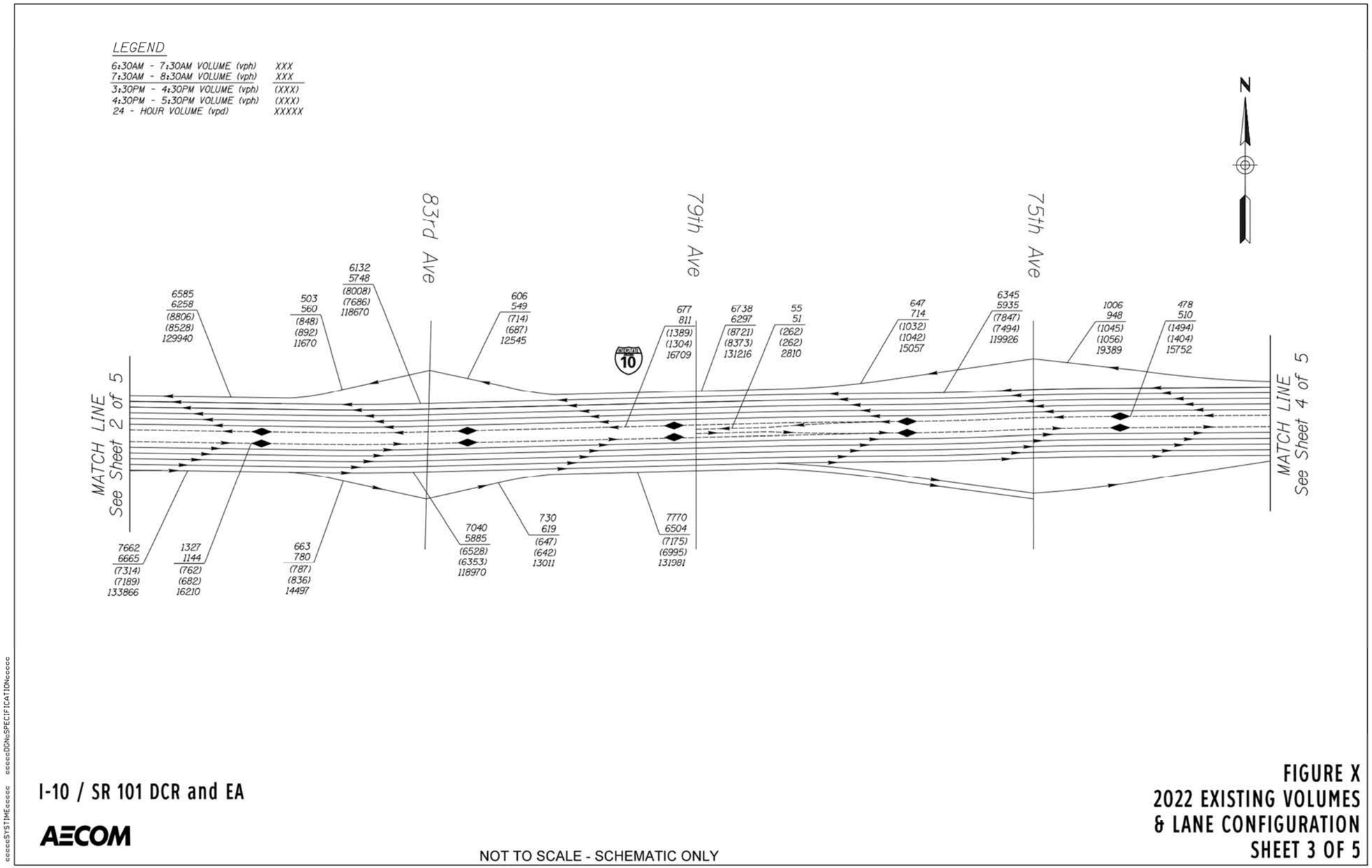
I-10 / SR 101 DCR and EA

AECOM

NOT TO SCALE - SCHEMATIC ONLY

FIGURE X
2022 EXISTING VOLUMES & LANE CONFIGURATION
SHEET 1 OF 5


LEGEND
6:30AM - 7:30AM VOLUME (vph) XXX
7:30AM - 8:30AM VOLUME (vph) XXX
3:30PM - 4:30PM VOLUME (vph) (XXX)
4:30PM - 5:30PM VOLUME (vph) (XXX)
24 - HOUR VOLUME (vpd) XXXXX
MATCH LINE
See Sheet 5 of 5
99th Ave
91st Ave
McDowell Rd
LOOP 101
INTERSTATE 10
5056 4973 (5560) (5501) 91048
4920 5320 (6601) (6342) 91302
945 1000 (1043) (960) 17533
810 840 (1180) (1060) 17000
4111 3972 (4517) (4541) 73515
4110 4480 (5421) (5282) 74302
5552 5386 (7046) (6904) 101363
1639 1743 (2116) (2168) 29405
3914 3643 (4955) (4798) 71958
675 657 (890) (761) 14609
335 344 (890) (335) 9428
4549 4176 (5645) (5884) 85463
2066 2241 (3244) (3164) 42929
6223 5901 (8340) (8029) 121666
362 357 (466) (500) 8274
727 861 (1439) (1354) 16209
6585 6258 (8806) (8528) 129940
MATCH LINE
See Sheet 1 of 5
MATCH LINE
See Sheet 3 of 5
6862 6534 (6180) (5929) 104176
2044 2239 (2178) (2118) 31374
4975 4328 (4110) (3902) 74512
686 614 (867) (914) 14803
4522 3935 (3865) (3660) 69921
787 600 (404) (394) 12312
548 540 (245) (242) 4790
5177 4449 (4632) (4519) 84124
2472 2229 (2451) (2373) 44110
522 431 (490) (530) 8730
7139 6239 (6866) (6692) 125136
1327 1139 (721) (649) 16010
N
I-10 / SR 101 DCR and EA
AECOM
NOT TO SCALE - SCHEMATIC ONLY
FIGURE X
2022 EXISTING VOLUMES
& LANE CONFIGURATION
SHEET 2 OF 5

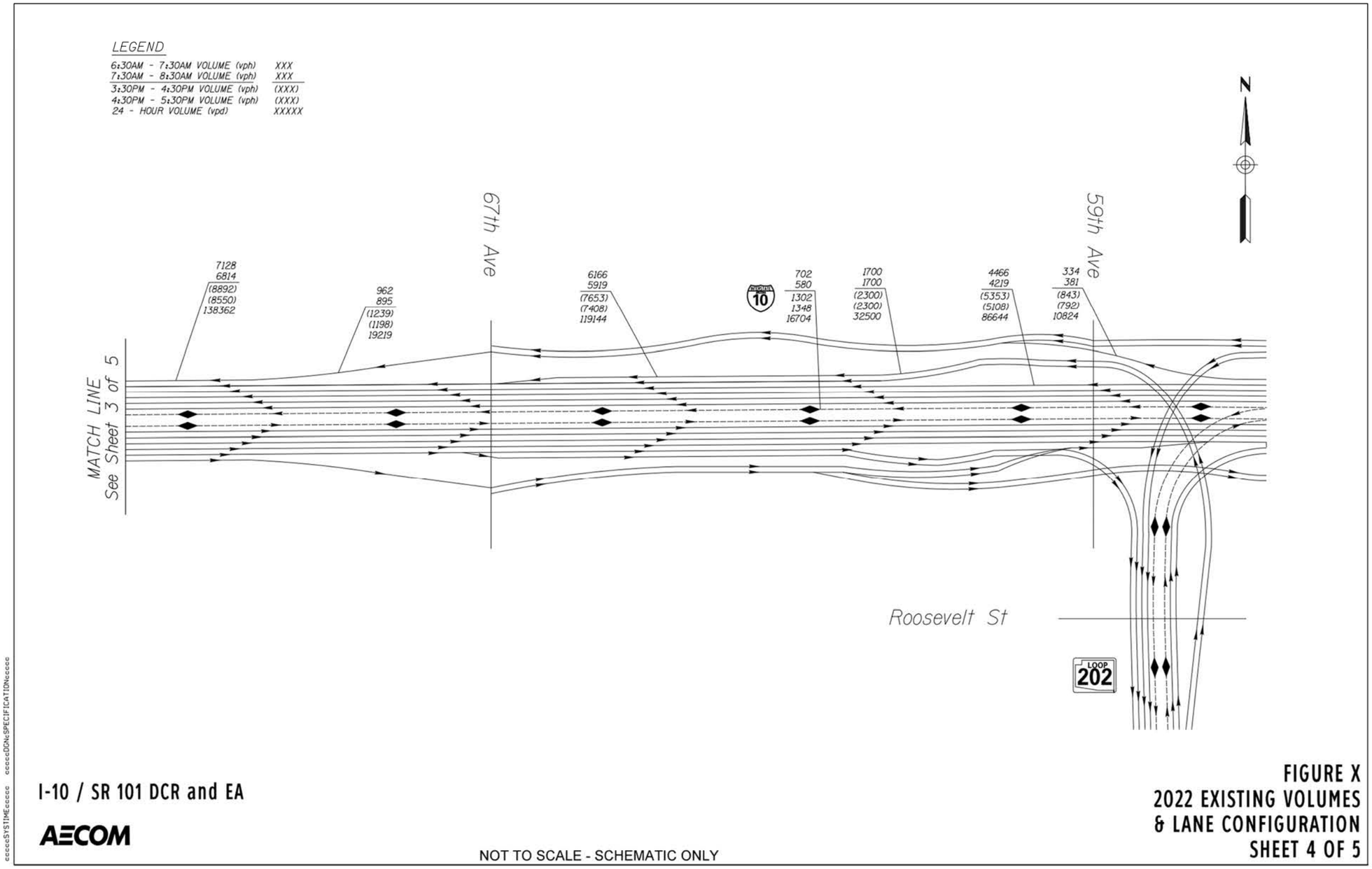


I-10 / SR 101 DCR and EA

AECOM

NOT TO SCALE - SCHEMATIC ONLY

FIGURE X
2022 EXISTING VOLUMES & LANE CONFIGURATION
SHEET 3 OF 5


LEGEND
6:30AM - 7:30AM VOLUME (vph) XXX
7:30AM - 8:30AM VOLUME (vph) XXX
3:30PM - 4:30PM VOLUME (vph) (XXX)
4:30PM - 5:30PM VOLUME (vph) (XXX)
24 - HOUR VOLUME (vpd) XXXXX
N
67th Ave
59th Ave
7128
6814
(8892)
(8550)
138362
962
895
(1239)
(1198)
19219
6166
5919
(7653)
(7408)
119144
10
702
580
1302
1346
16704
1700
1700
(2300)
(2300)
32500
4466
4219
(5353)
(5108)
86644
334
381
(843)
(792)
10824
MATCH LINE
See Sheet 3 of 5
Roosevelt St
LOOP
202
I-10 / SR 101 DCR and EA
AECOM
NOT TO SCALE - SCHEMATIC ONLY
FIGURE X
2022 EXISTING VOLUMES
& LANE CONFIGURATION
SHEET 4 OF 5

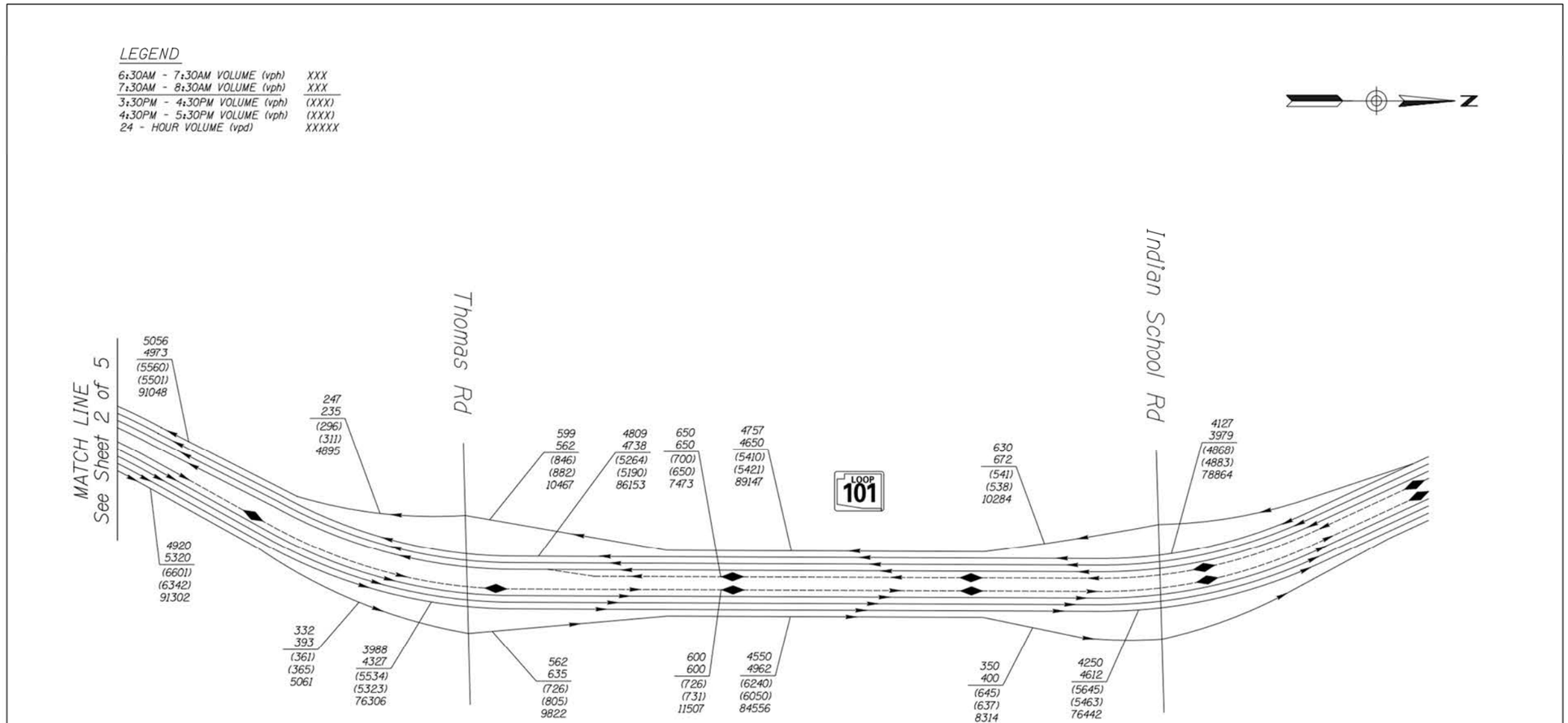
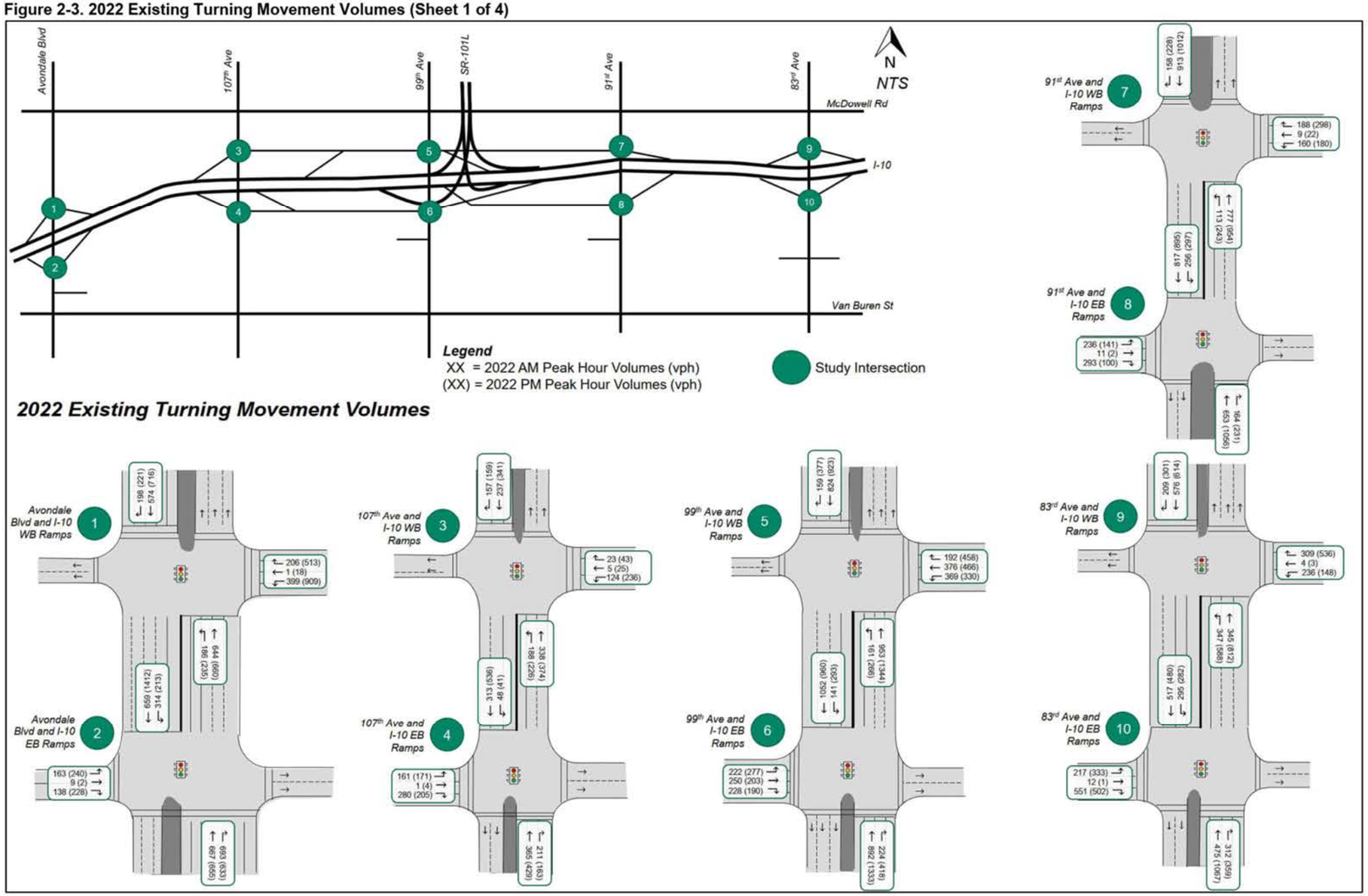

LEGEND
6:30AM - 7:30AM VOLUME (vph) XXX
7:30AM - 8:30AM VOLUME (vph) XXX
3:30PM - 4:30PM VOLUME (vph) (XXX)
4:30PM - 5:30PM VOLUME (vph) (XXX)
24 - HOUR VOLUME (vpd) XXXXX
N
MATCH LINE
See Sheet 2 of 5
Thomas Rd
Indian School Rd
LOOP
101
5056
4973
(5560)
(5501)
91048
247
235
(296)
(311)
4895
599
562
(846)
(882)
10467
4809
4738
(5264)
(5190)
86153
650
650
(700)
(650)
7473
4757
4650
(5410)
(5421)
89147
630
672
(541)
(538)
10284
4127
3979
(4868)
(4883)
78864
4920
5320
(6601)
(6342)
91302
332
393
(361)
(365)
5061
3988
4327
(5534)
(5323)
76306
562
635
(726)
(805)
9822
600
600
(726)
(731)
11507
4550
4962
(6240)
(6050)
84556
350
400
(645)
(637)
8314
4250
4612
(5645)
(5463)
76442
cccccSYST:MEccccc ccccDGN:cSPECIFICATIONcccccc
I-10 / SR 101 DCR and EA
AECOM
NOT TO SCALE - SCHEMATIC ONLY
FIGURE X
2022 EXISTING VOLUMES
& LANE CONFIGURATION
SHEET 5 OF 5

Figure 2-3. 2022 Existing Turning Movement Volumes (Sheet 1 of 4)



28

Figure 2-3. 2022 Existing Turning Movement Volumes (Sheet 2 of 4)

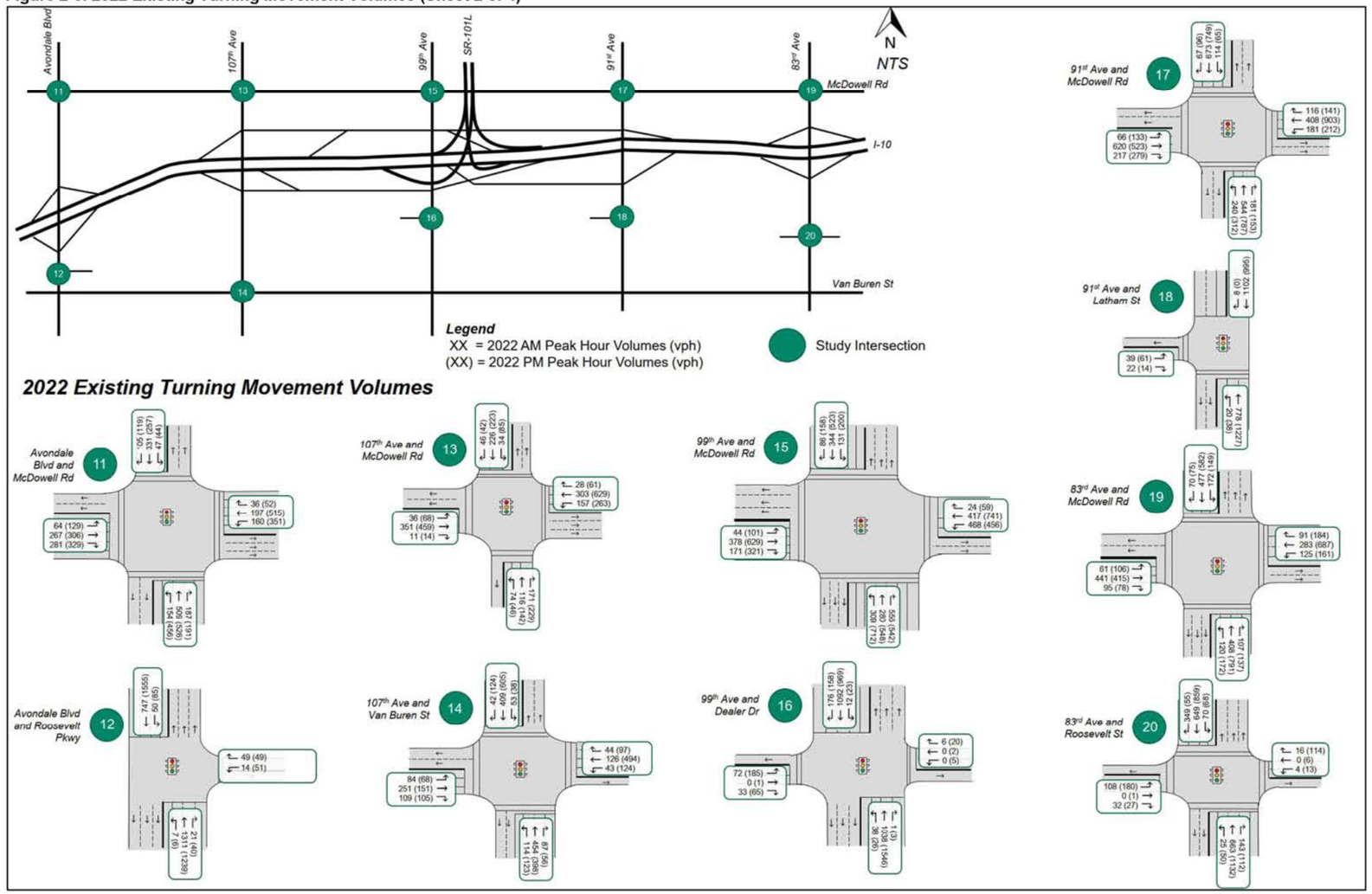
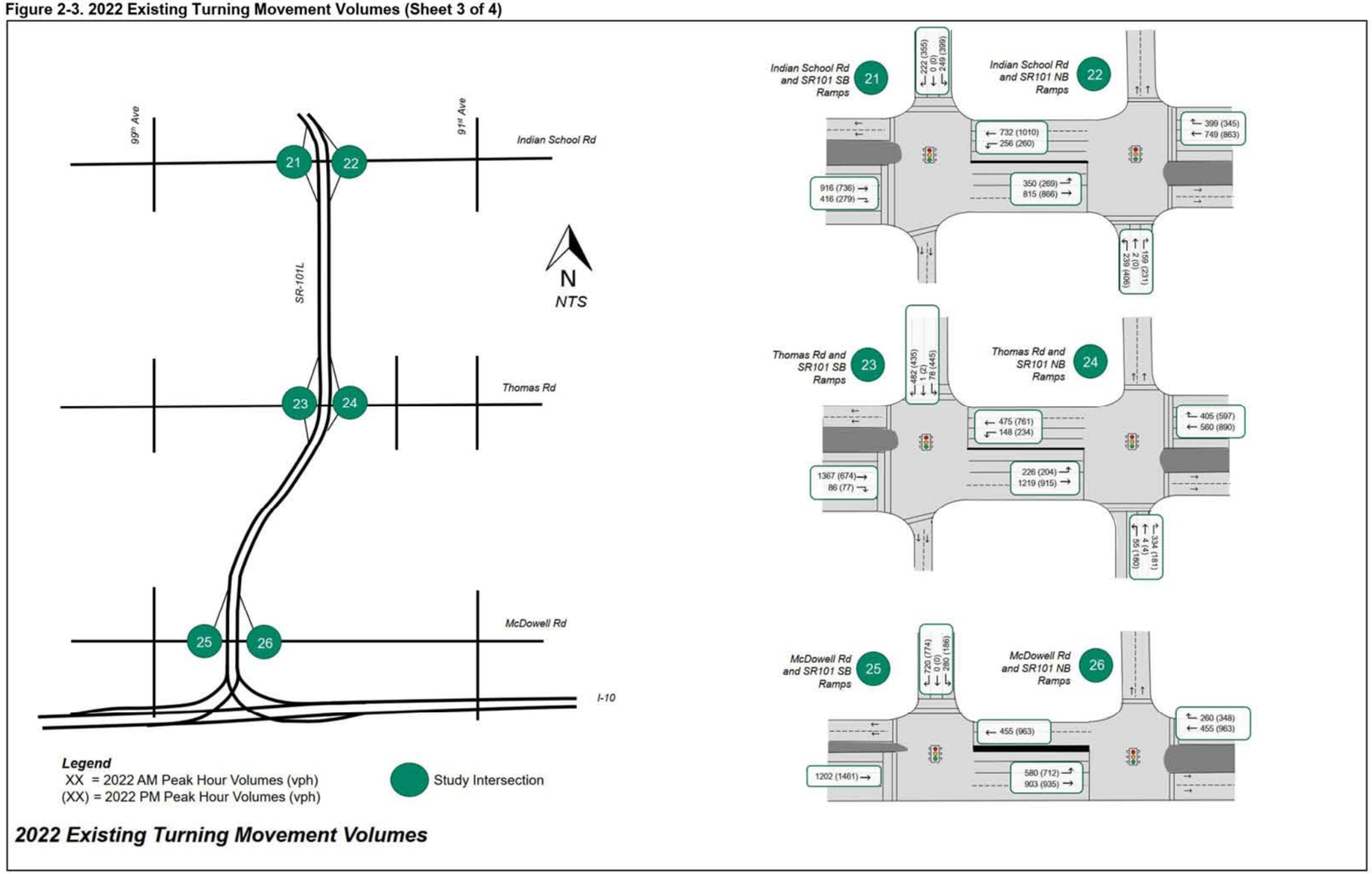
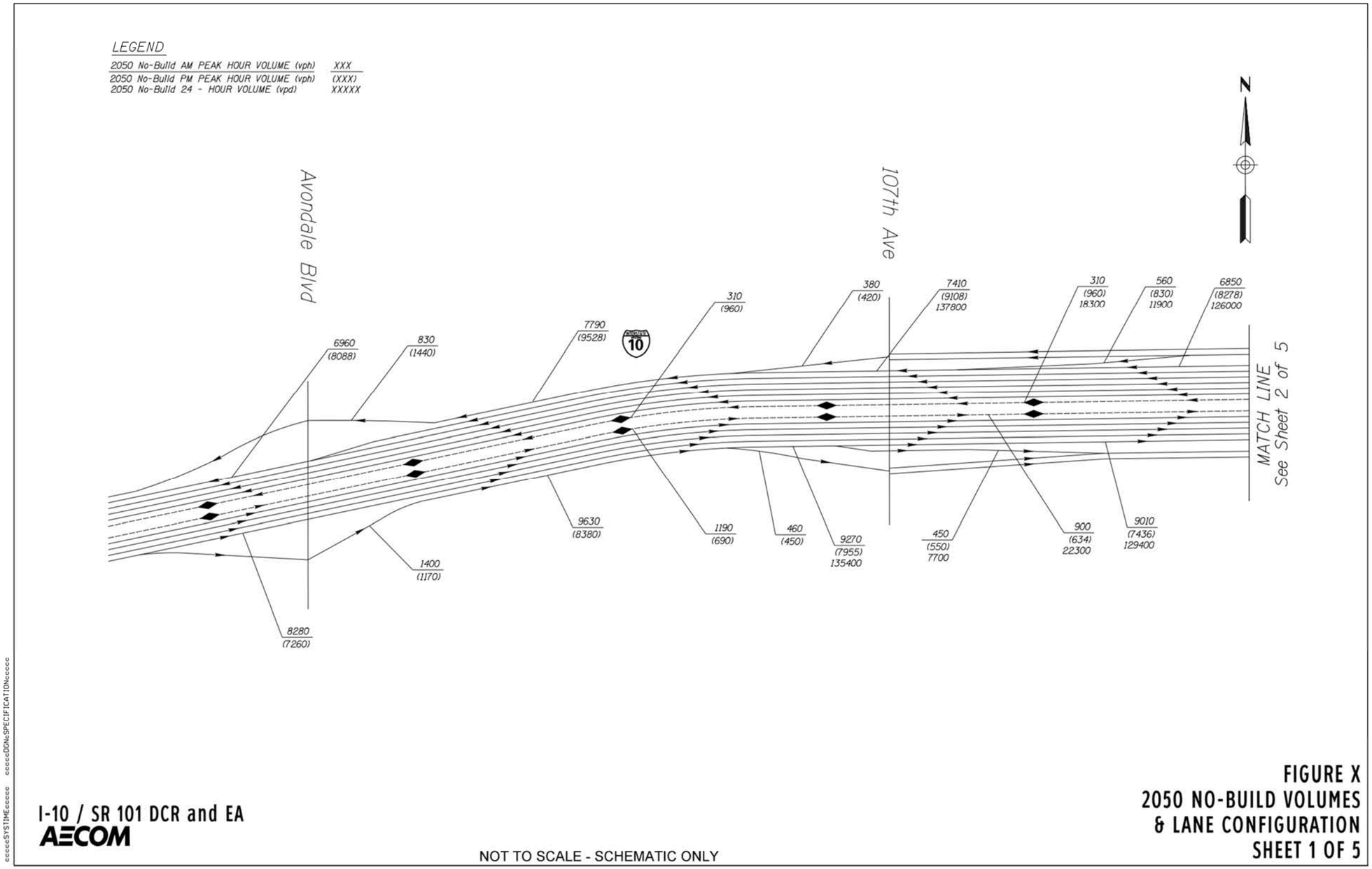
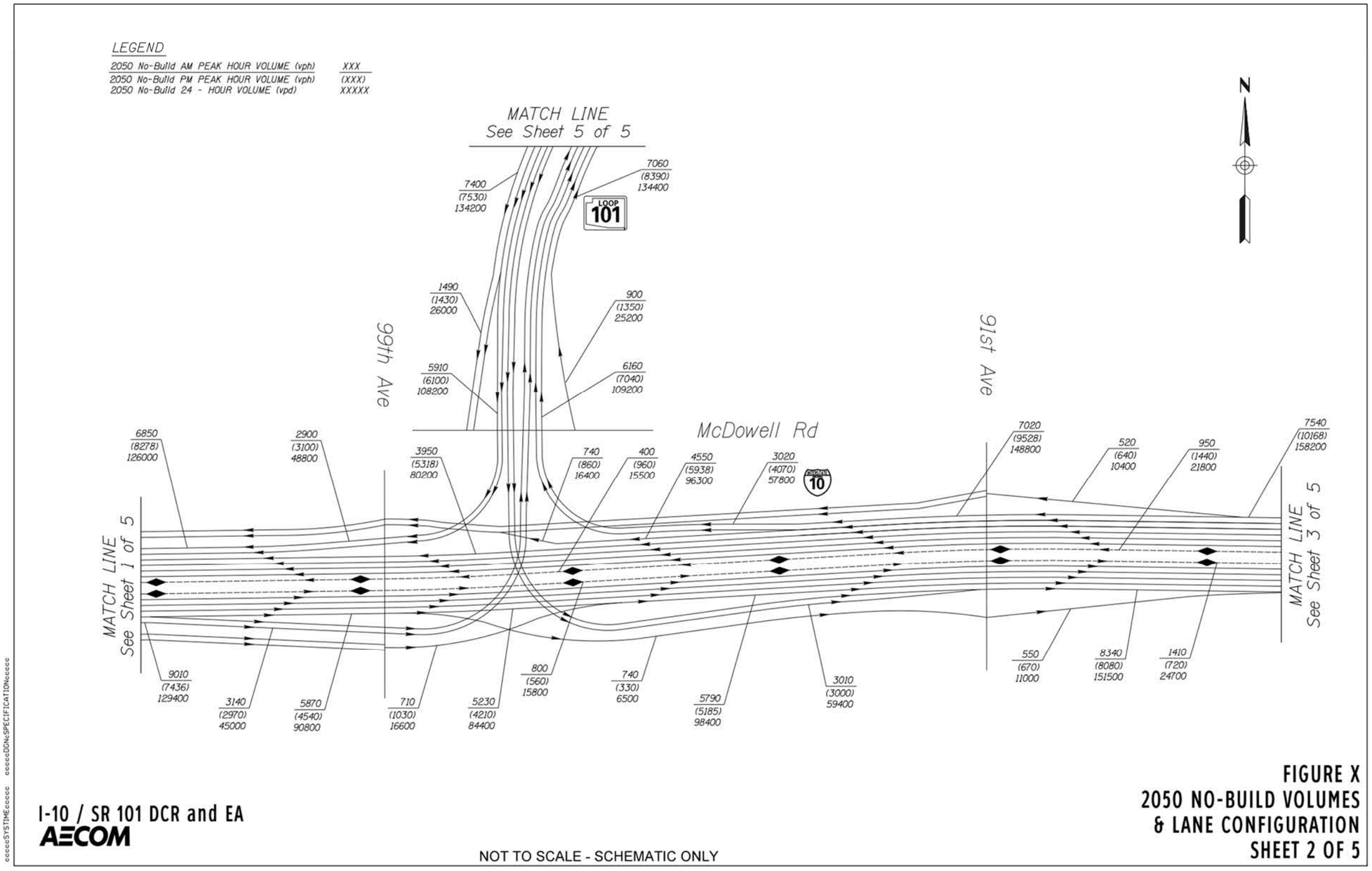


Figure 2-3. 2022 Existing Turning Movement Volumes (Sheet 3 of 4)




LEGEND
2050 No-Build AM PEAK HOUR VOLUME (vph) XXX
2050 No-Build PM PEAK HOUR VOLUME (vph) (XXX)
2050 No-Build 24 - HOUR VOLUME (vpd) XXXXX
Avondale Blvd
107th Ave
N
6960 (8088)
830 (1440)
7790 (9528)
310 (960)
380 (420)
7410 (9108) 137800
310 (960) 18300
560 (830) 11900
6850 (8278) 126000
MATCH LINE See Sheet 2 of 5
8280 (7260)
1400 (1170)
9630 (8380)
1190 (690)
460 (450)
9270 (7955) 135400
450 (550) 7700
900 (634) 22300
9010 (7436) 129400
eeeeeSYSTIMEeeeee eeeeeDGNeSPECIFICATIONeeeee
I-10 / SR 101 DCR and EA
AECOM
NOT TO SCALE - SCHEMATIC ONLY
FIGURE X
2050 NO-BUILD VOLUMES
& LANE CONFIGURATION
SHEET 1 OF 5

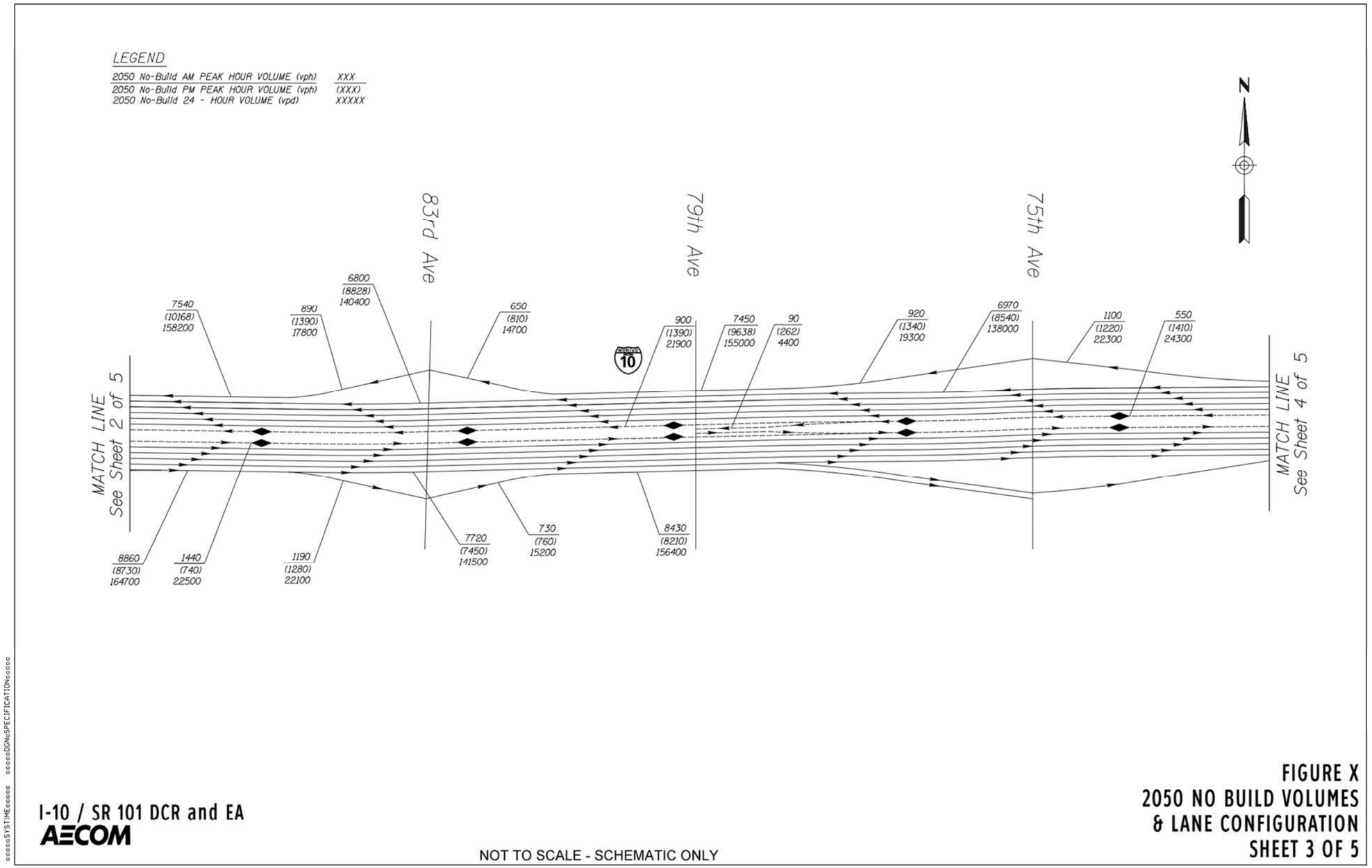


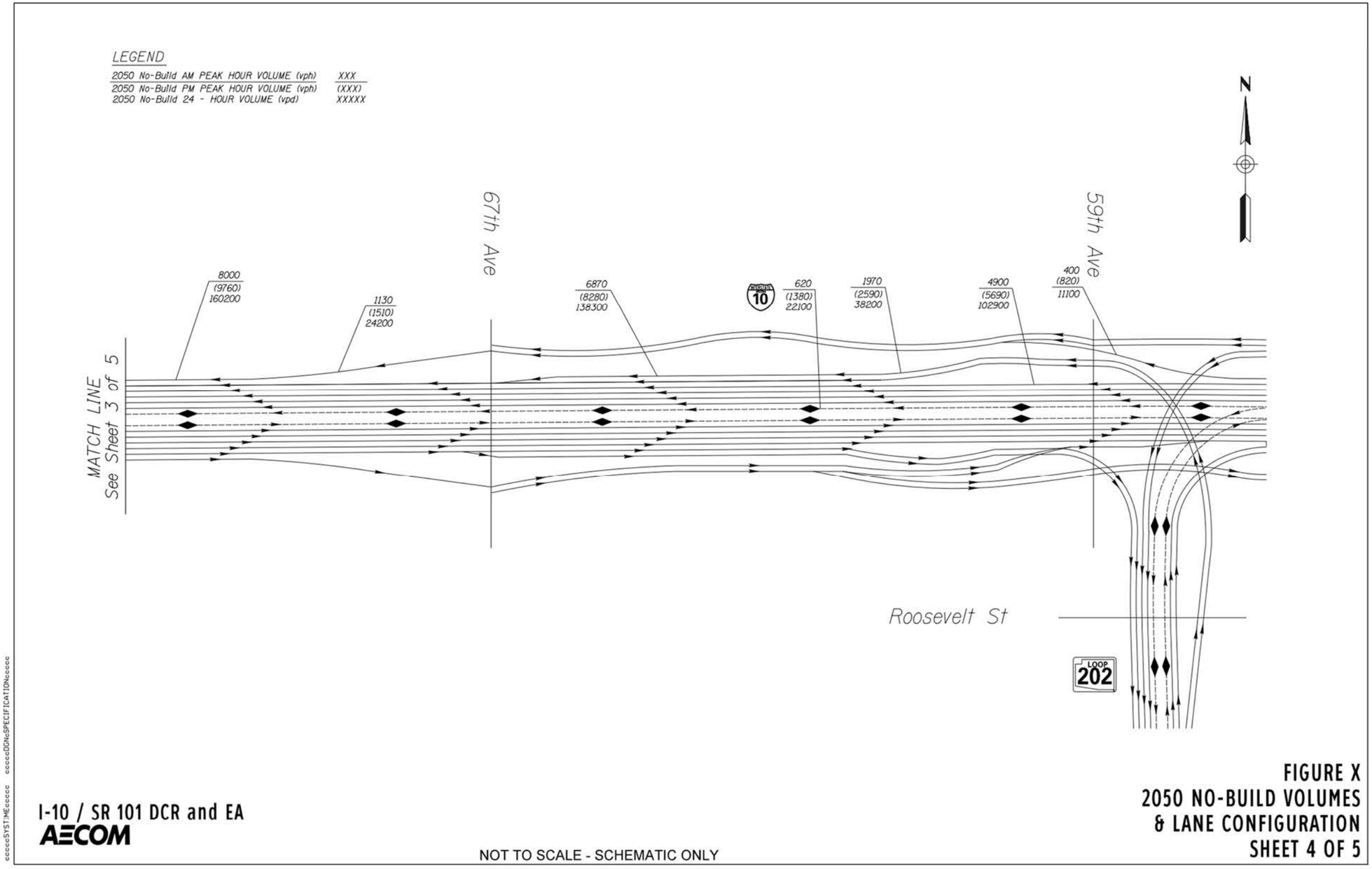
I-10 / SR 101 DCR and EA

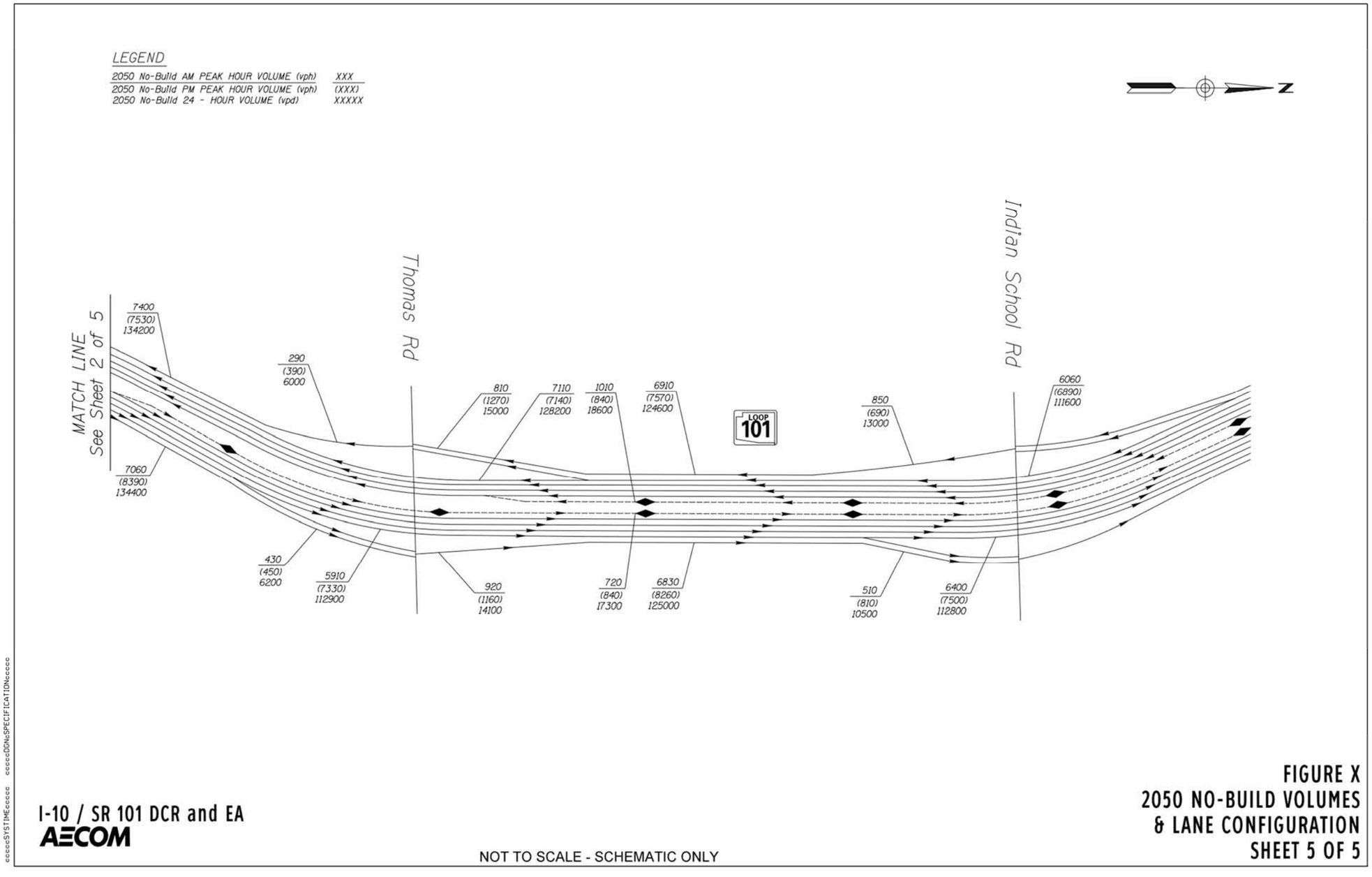
AECOM

NOT TO SCALE - SCHEMATIC ONLY

FIGURE X
2050 NO-BUILD VOLUMES & LANE CONFIGURATION
SHEET 2 OF 5


LEGEND
2050 No-Build AM PEAK HOUR VOLUME (vph) XXX
2050 No-Build PM PEAK HOUR VOLUME (vph) (XXX)
2050 No-Build 24 - HOUR VOLUME (vpd) XXXXX
N
83rd Ave
79th Ave
75th Ave
10
MATCH LINE
See Sheet 2 of 5
MATCH LINE
See Sheet 4 of 5
7540 (10168) 158200
890 (1390) 17800
6800 (8828) 140400
650 (810) 14700
900 (1390) 21900
7450 (9638) 155000
90 (262) 4400
920 (1340) 19300
6970 (8540) 138000
1100 (1220) 22300
550 (1410) 24300
8860 (8730) 164700
1440 (740) 22500
1190 (1280) 22100
7720 (7450) 141500
730 (760) 15200
8430 (8210) 156400
I-10 / SR 101 DCR and EA
AECOM
NOT TO SCALE - SCHEMATIC ONLY
FIGURE X
2050 NO BUILD VOLUMES
& LANE CONFIGURATION
SHEET 3 OF 5


LEGEND
2050 No-Build AM PEAK HOUR VOLUME (vph) XXX
2050 No-Build PM PEAK HOUR VOLUME (vph) (XXX)
2050 No-Build 24 - HOUR VOLUME (vpd) XXXXX
N
67th Ave
59th Ave
8000
(9760)
160200
1130
(1510)
24200
6870
(8280)
138300
10
620
(1380)
22100
1970
(2590)
38200
4900
(5690)
102900
400
(820)
11100
MATCH LINE
See Sheet 3 of 5
Roosevelt St
LOOP
202
I-10 / SR 101 DCR and EA
AECOM
NOT TO SCALE - SCHEMATIC ONLY
FIGURE X
2050 NO-BUILD VOLUMES
& LANE CONFIGURATION
SHEET 4 OF 5


LEGEND
2050 No-Build AM PEAK HOUR VOLUME (vph) XXX
2050 No-Build PM PEAK HOUR VOLUME (vph) (XXX)
2050 No-Build 24 - HOUR VOLUME (vpd) XXXXX
N
MATCH LINE
See Sheet 2 of 5
Thomas Rd
Indian School Rd
LOOP 101
7400 (7530) 134200
7060 (8390) 134400
290 (390) 6000
430 (450) 6200
5910 (7330) 112900
810 (1270) 15000
7110 (7140) 128200
1010 (840) 18600
6910 (7570) 124600
920 (1160) 14100
720 (840) 17300
6830 (8260) 125000
850 (690) 13000
510 (810) 10500
6060 (6890) 111600
6400 (7500) 112800
I-10 / SR 101 DCR and EA
AECOM
NOT TO SCALE - SCHEMATIC ONLY
FIGURE X
2050 NO-BUILD VOLUMES
& LANE CONFIGURATION
SHEET 5 OF 5

SR101L at I-10 System Traffic Interchange Improvements Draft Initial DCR

Figure 2-6. 2050 No-Build Turning Movement Volumes (Sheet 2 of 4)

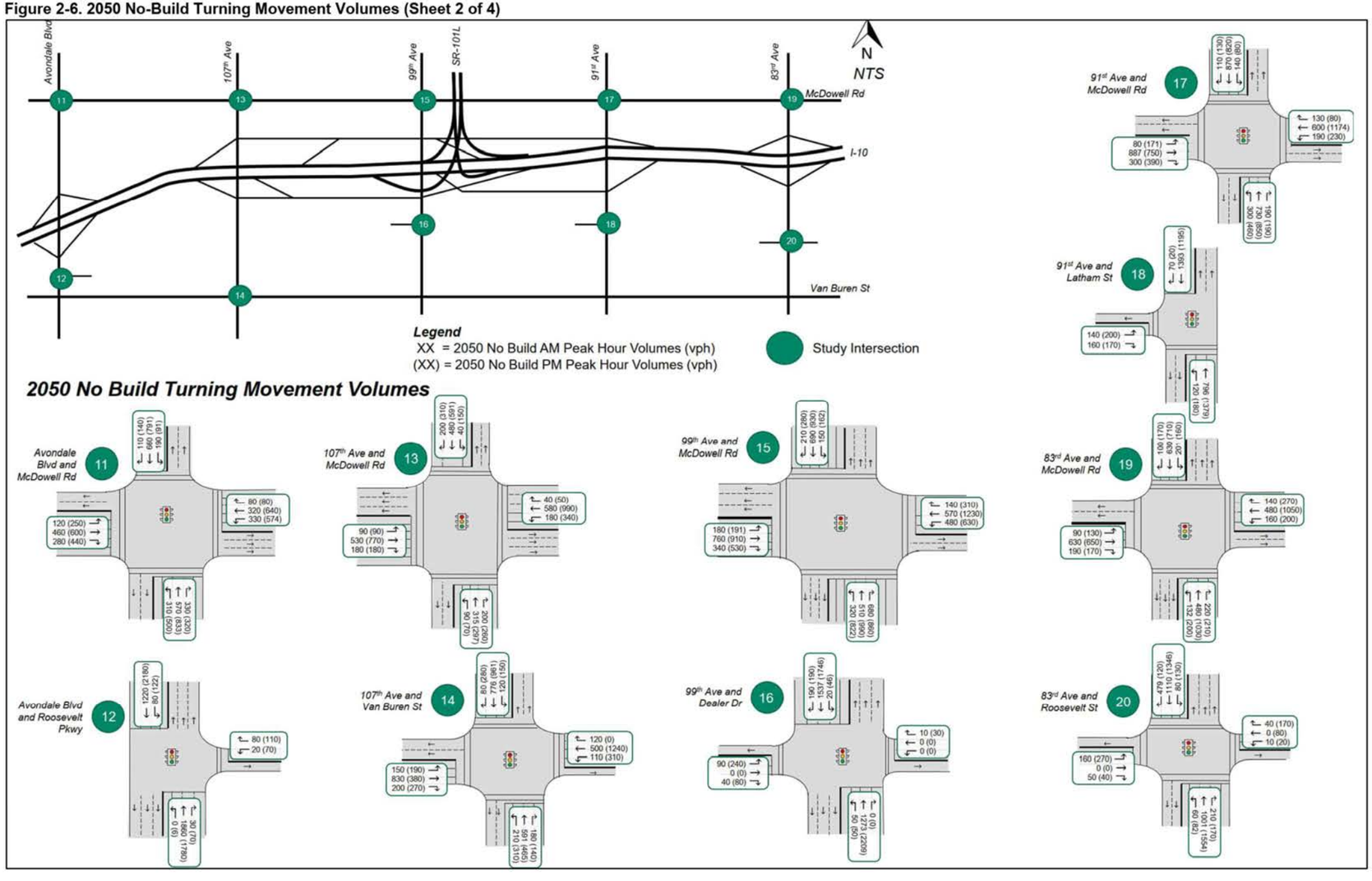


Figure 2-6. 2050 No-Build Turning Movement Volumes (Sheet 2 of 4)

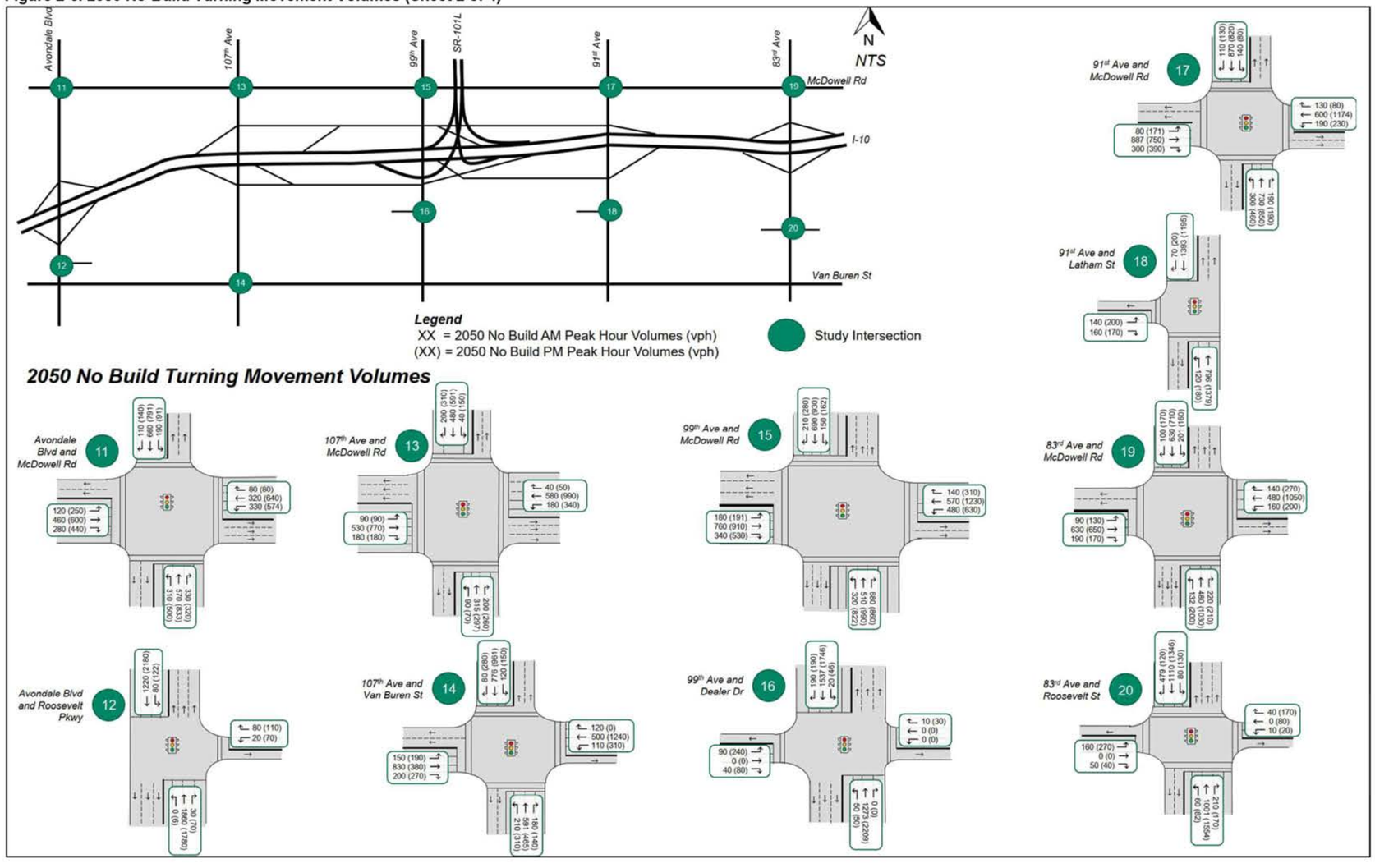
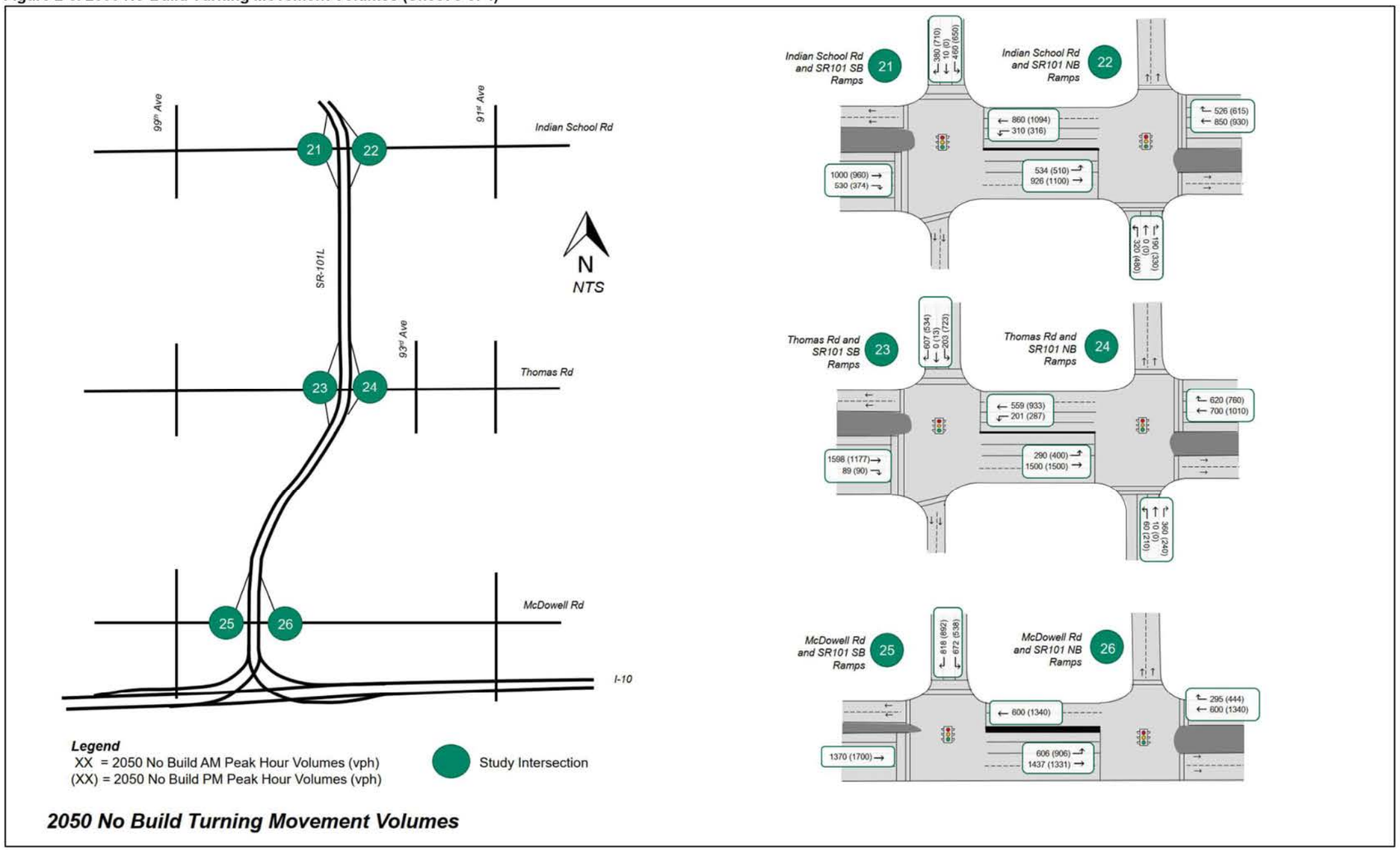
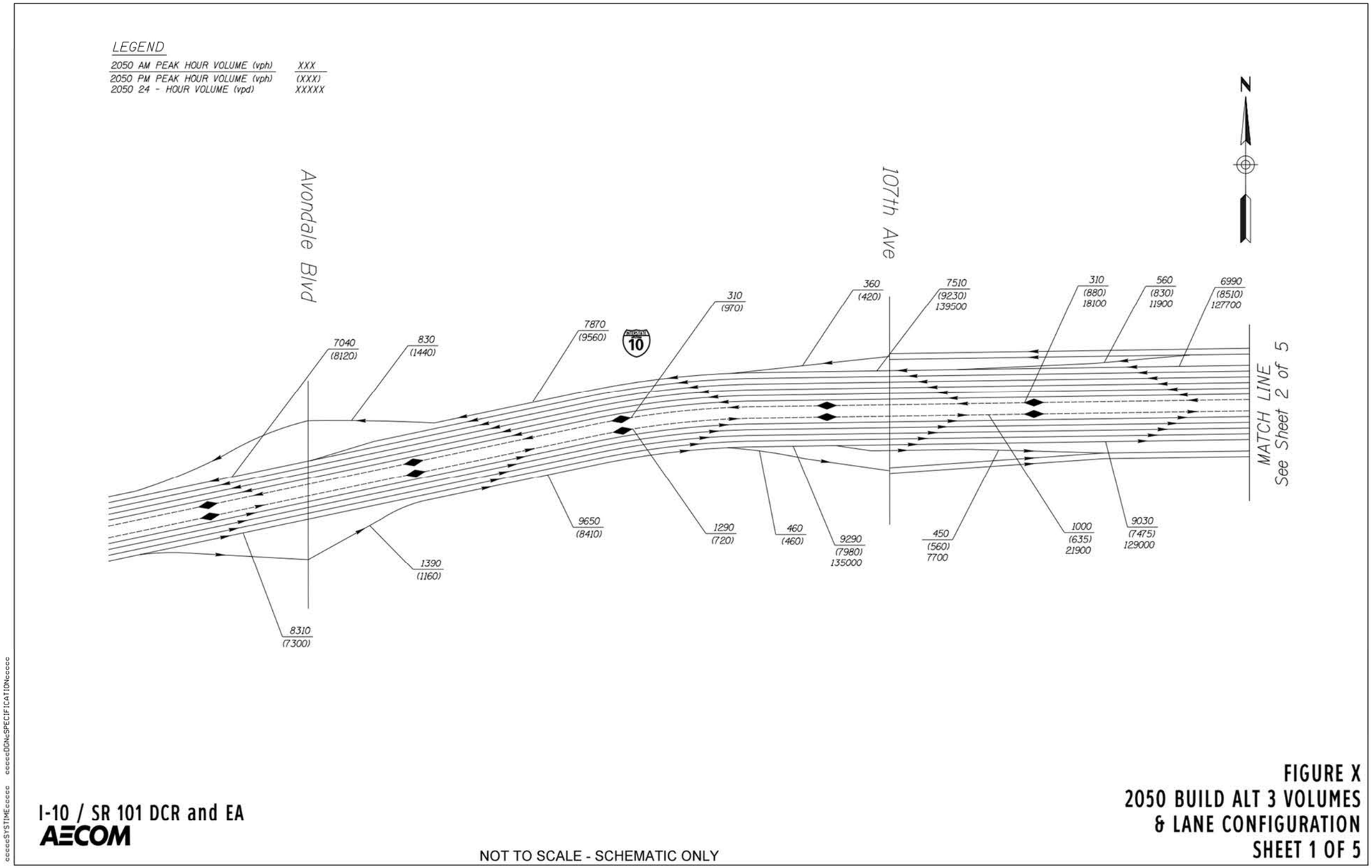


Figure 2-6. 2050 No-Build Turning Movement Volumes (Sheet 3 of 4)



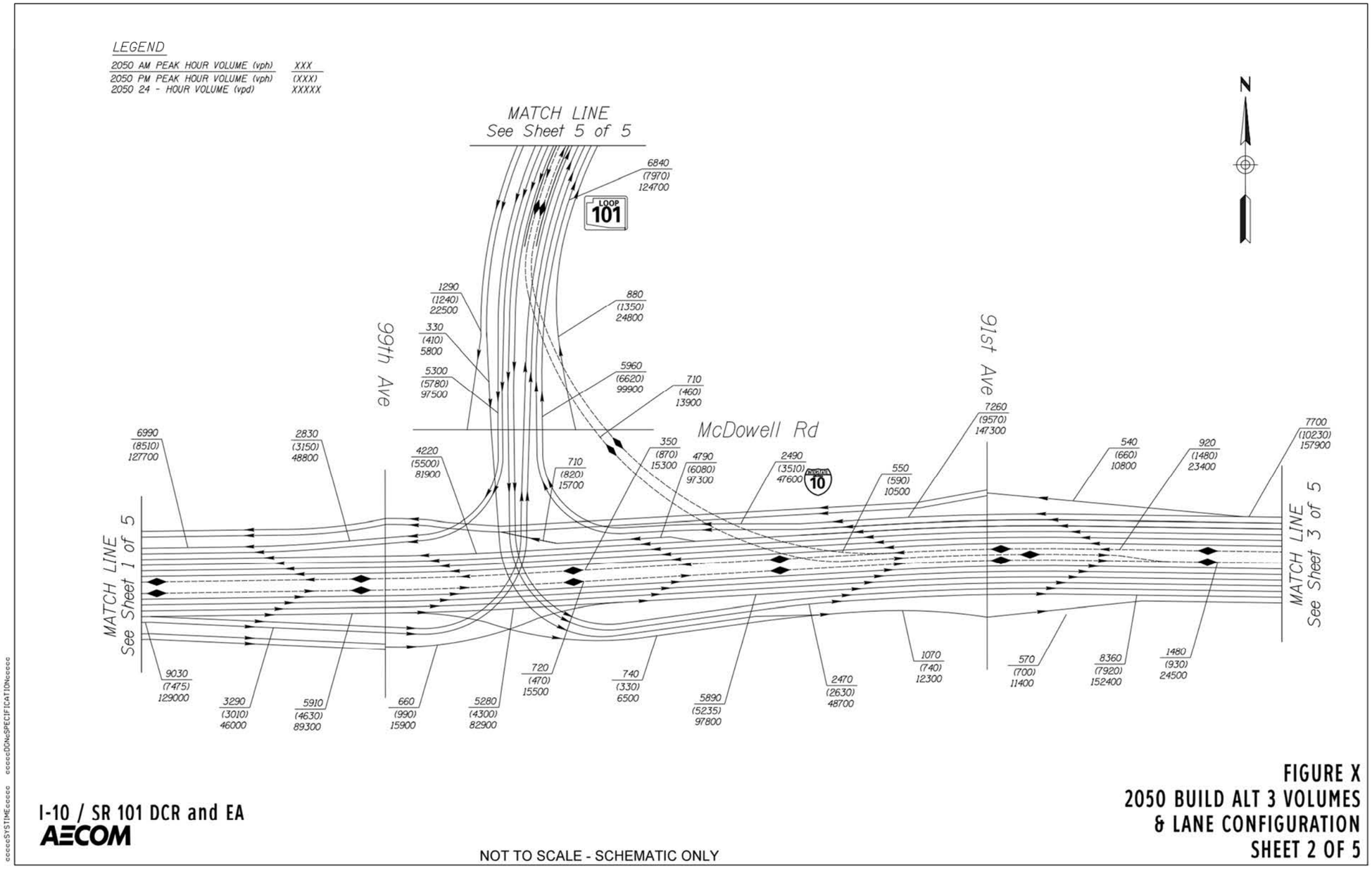


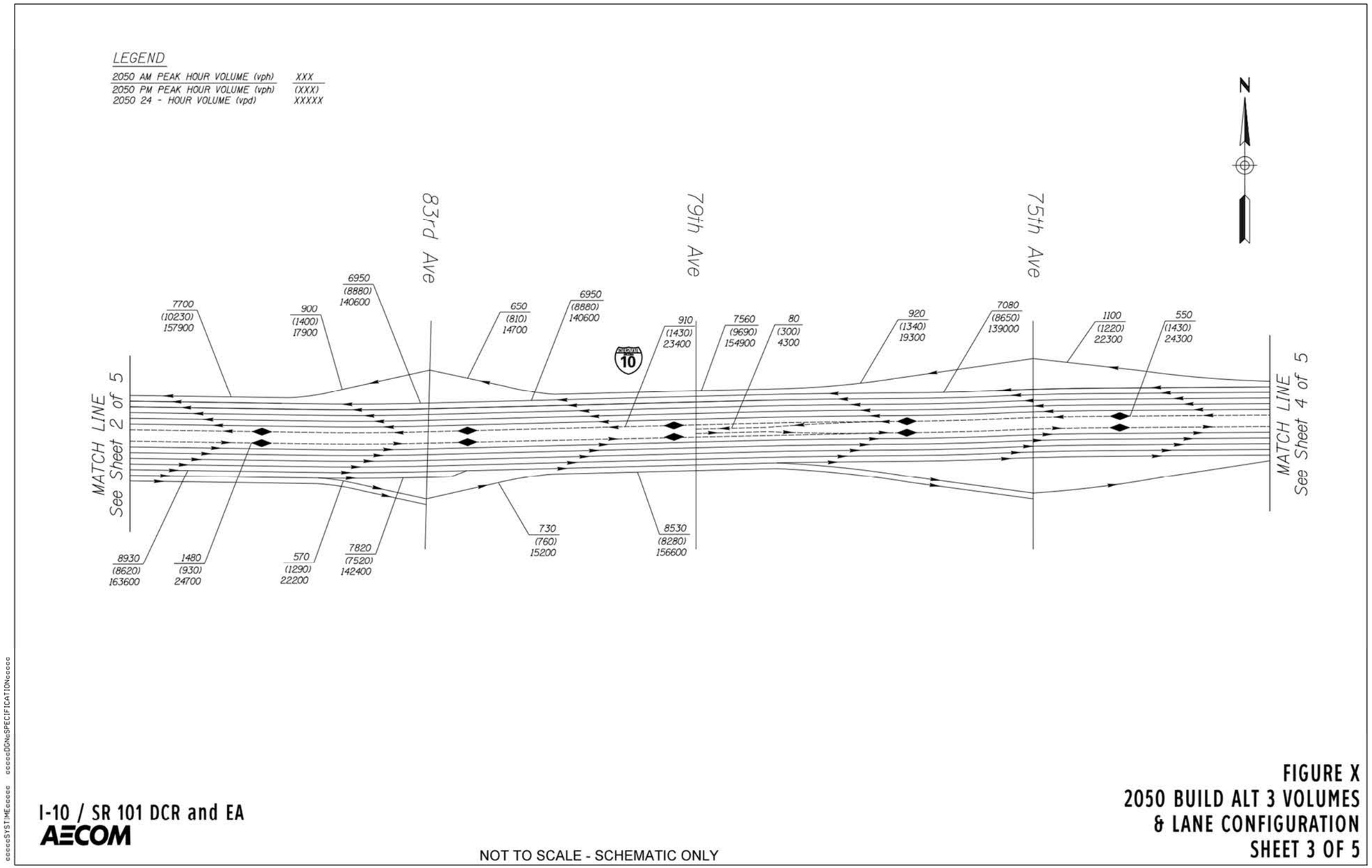
I-10 / SR 101 DCR and EA

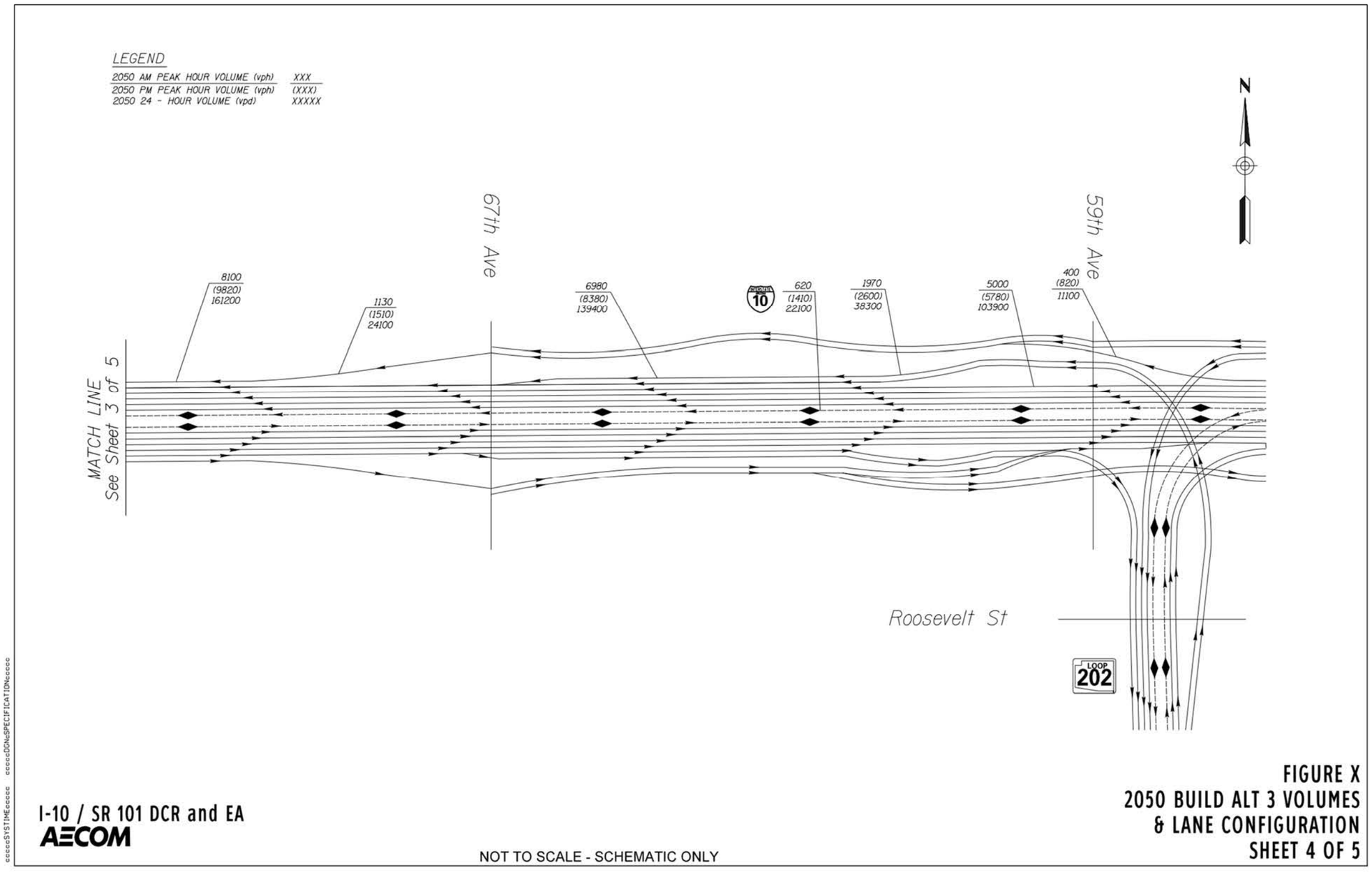
AECOM

NOT TO SCALE - SCHEMATIC ONLY

FIGURE X
2050 BUILD ALT 3 VOLUMES & LANE CONFIGURATION
SHEET 1 OF 5


LEGEND
2050 AM PEAK HOUR VOLUME (vph) XXX
2050 PM PEAK HOUR VOLUME (vph) (XXX)
2050 24 - HOUR VOLUME (vpd) XXXXX
MATCH LINE
See Sheet 5 of 5
LOOP 101
99th Ave
91st Ave
McDowell Rd
6840 (7970) 124700
1290 (1240) 22500
330 (410) 5800
5300 (5780) 97500
880 (1350) 24800
5960 (6620) 99900
710 (460) 13900
6990 (8510) 127700
2830 (3150) 48800
4220 (5500) 81900
710 (820) 15700
350 (870) 15300
4790 (6080) 97300
2490 (3510) 47600
10
550 (590) 10500
7260 (9570) 147300
540 (660) 10800
920 (1480) 23400
7700 (10230) 157900
MATCH LINE
See Sheet 1 of 5
MATCH LINE
See Sheet 3 of 5
9030 (7475) 129000
3290 (3010) 46000
5910 (4630) 89300
660 (990) 15900
5280 (4300) 82900
720 (470) 15500
740 (330) 6500
5890 (5235) 97800
2470 (2630) 48700
1070 (740) 12300
570 (700) 11400
8360 (7920) 152400
1480 (930) 24500
N
I-10 / SR 101 DCR and EA
AECOM
NOT TO SCALE - SCHEMATIC ONLY
FIGURE X
2050 BUILD ALT 3 VOLUMES
& LANE CONFIGURATION
SHEET 2 OF 5


LEGEND
2050 AM PEAK HOUR VOLUME (vph) XXX
2050 PM PEAK HOUR VOLUME (vph) (XXX)
2050 24 - HOUR VOLUME (vpd) XXXXX
N
83rd Ave
79th Ave
75th Ave
10
MATCH LINE
See Sheet 2 of 5
MATCH LINE
See Sheet 4 of 5
7700
(10230)
157900
900
(1400)
17900
6950
(8880)
140600
650
(810)
14700
6950
(8880)
140600
910
(1430)
23400
7560
(9690)
154900
80
(300)
4300
920
(1340)
19300
7080
(8650)
139000
1100
(1220)
22300
550
(1430)
24300
8930
(8620)
163600
1480
(930)
24700
570
(1290)
22200
7820
(7520)
142400
730
(760)
15200
8530
(8280)
156600
I-10 / SR 101 DCR and EA
AECOM
NOT TO SCALE - SCHEMATIC ONLY
FIGURE X
2050 BUILD ALT 3 VOLUMES
& LANE CONFIGURATION
SHEET 3 OF 5



I-10 / SR 101 DCR and EA

AECOM

NOT TO SCALE - SCHEMATIC ONLY

FIGURE X
2050 BUILD ALT 3 VOLUMES
& LANE CONFIGURATION
SHEET 4 OF 5

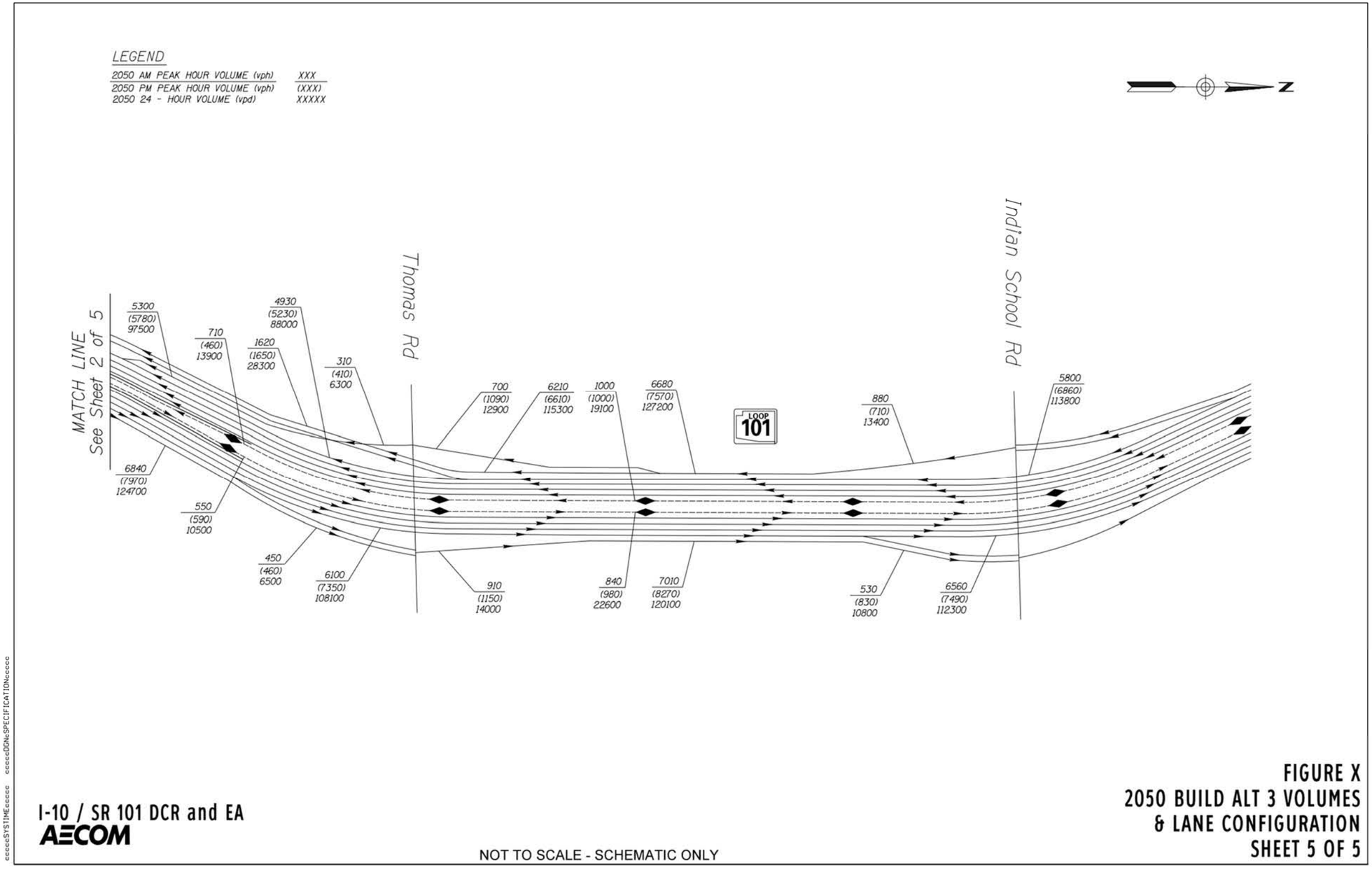

LEGEND
2050 AM PEAK HOUR VOLUME (vph) XXX
2050 PM PEAK HOUR VOLUME (vph) (XXX)
2050 24 - HOUR VOLUME (vpd) XXXXX
N
MATCH LINE See Sheet 2 of 5
Thomas Rd
Indian School Rd
LOOP 101
5300 (5780) 97500
710 (460) 13900
1620 (1650) 28300
4930 (5230) 88000
310 (410) 6300
700 (1090) 12900
6210 (6610) 115300
1000 (1000) 19100
6680 (7570) 127200
880 (710) 13400
5800 (6860) 113800
6840 (7970) 124700
550 (590) 10500
450 (460) 6500
6100 (7350) 108100
910 (1150) 14000
840 (980) 22600
7010 (8270) 120100
530 (830) 10800
6560 (7490) 112300
eeeeeSYSTIMEeeeee eeeeeDGNsSPECIFICATIONeeeee
I-10 / SR 101 DCR and EA
AECOM
NOT TO SCALE - SCHEMATIC ONLY
FIGURE X
2050 BUILD ALT 3 VOLUMES
& LANE CONFIGURATION
SHEET 5 OF 5

Figure 2-19. 2050 Build Alternative 2 and 3 Turning Movement Volumes (Sheet 1 of 4)

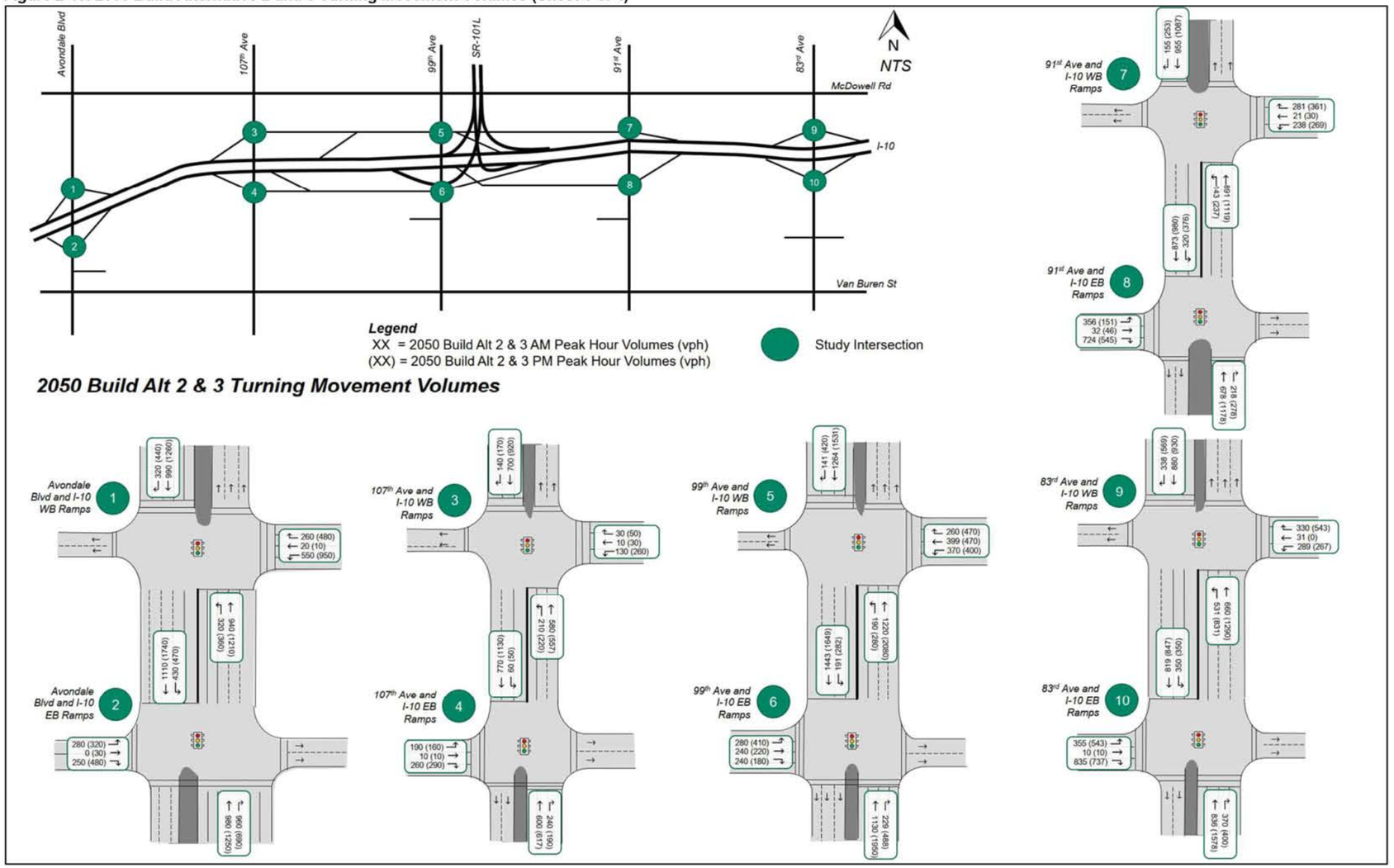


Figure 2-19. 2050 Build Alternative 2 and 3 Turning Movement Volumes (Sheet 2 of 4)

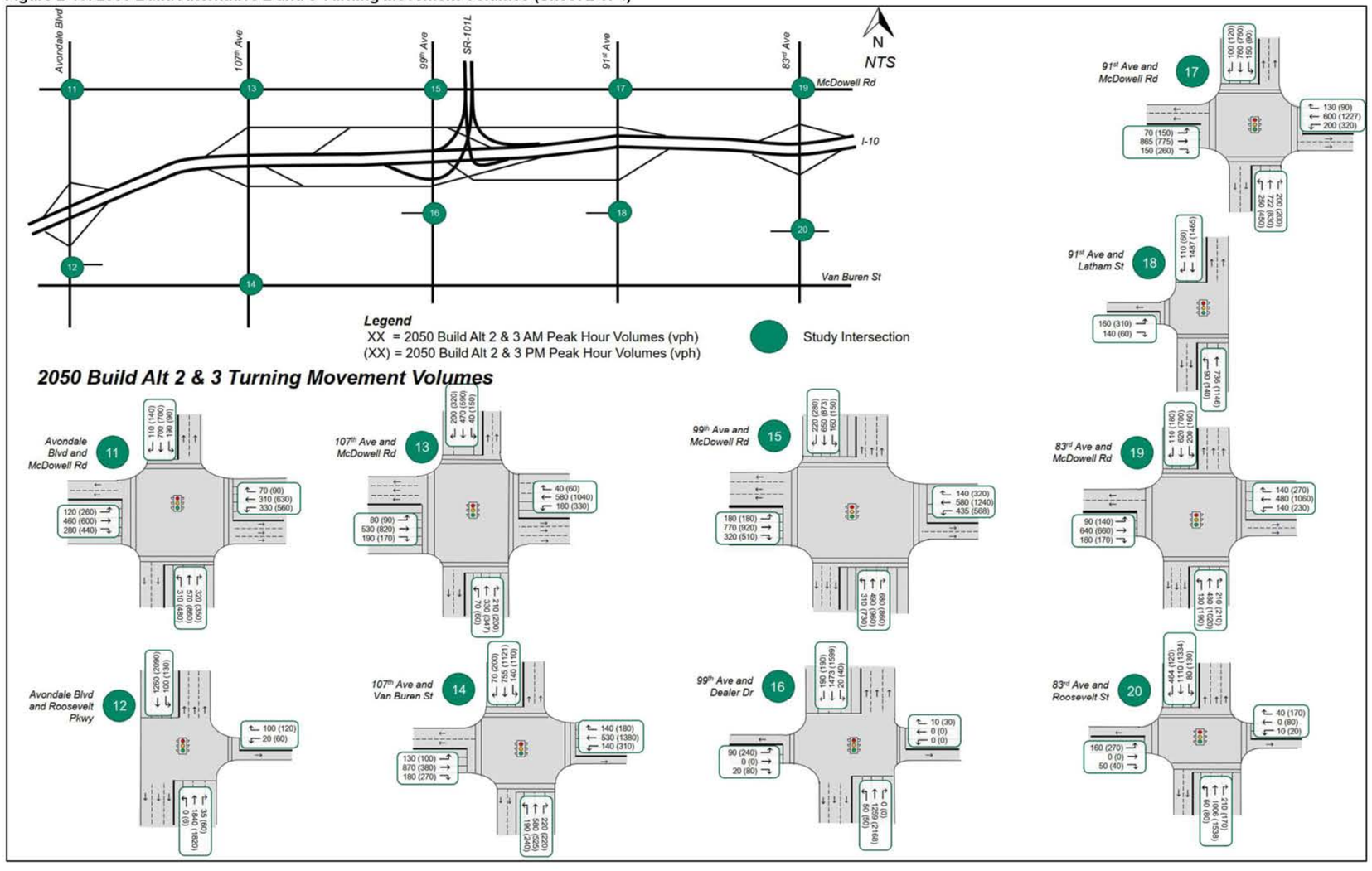
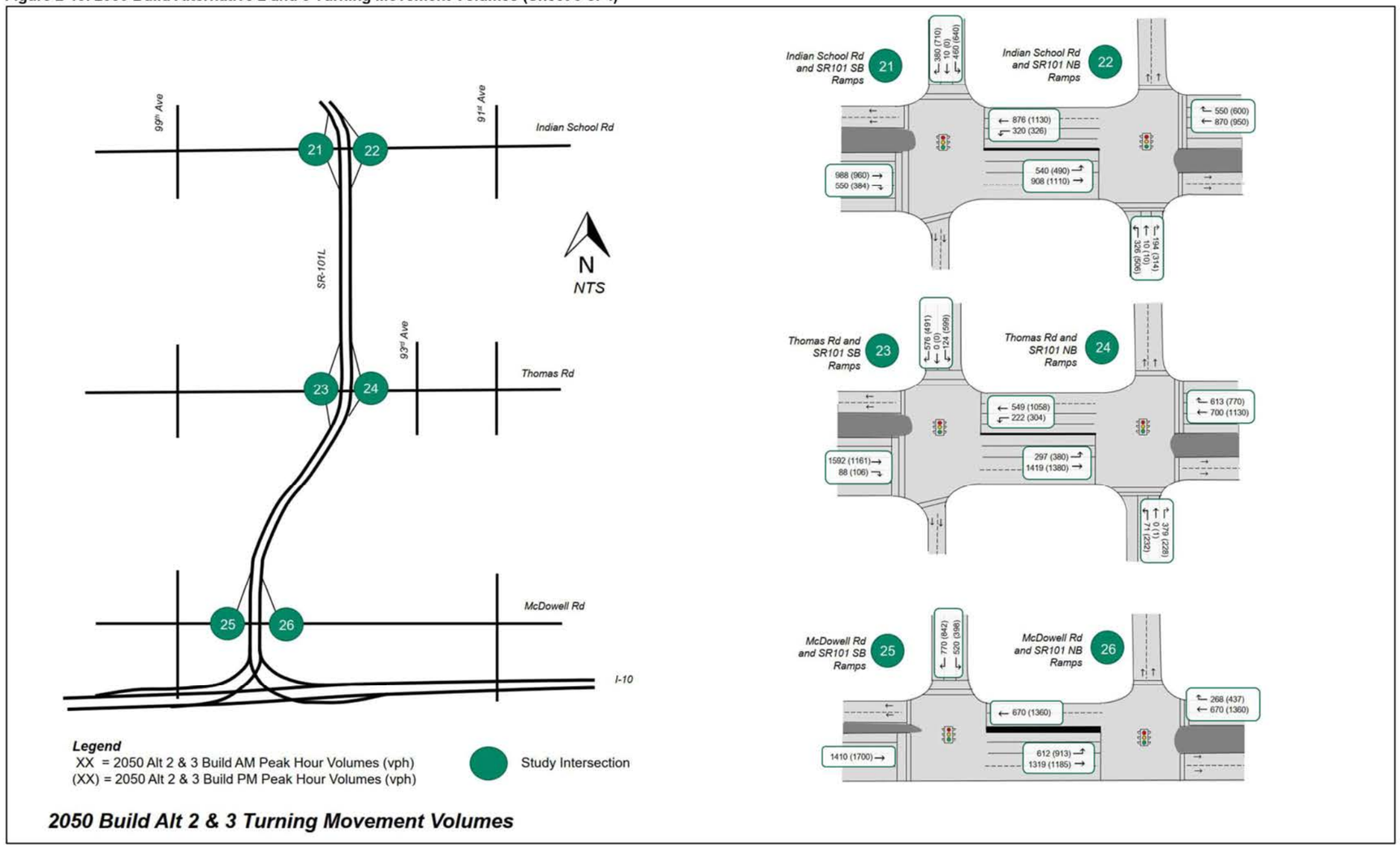


Figure 2-19. 2050 Build Alternative 2 and 3 Turning Movement Volumes (Sheet 3 of 4)



D'onofrio, Joe

From: Bondy, Kate <Kate.Bondy@aecom.com>
Sent: Monday, January 23, 2023 1:12 PM
To: D'onofrio, Joe; Keith Dahlen
Cc: Sieglitz, Troy; Okamoto, Michael
Subject: [EXTERNAL] RE: SR 101_I-10 existing and 2050 volume data

Truck percentage info (All rounded to nearest percentage)

I-10:
Daily: 10% trucks both directions
AM: 12% trucks both directions
PM: 8% EB, 5% WB

SR 101:
Daily: 5% trucks both directions
AM: 6% trucks both directions
PM: 3% trucks both directions

Current system ramps:
West to North
Daily: 7%
AM: 9%
PM: 2%

South to East
Daily: 6%
AM: 7%
PM: 4%

Let me know if you need any other percentages.

Thanks!
Kate

Kate E. Bondy, PE, PTOE
Associate Vice President
Traffic Department Manager
US Transportation, Greater West and West Regions
M 602.738.1651
kate.bondy@aecom.com

AECOM
7720 N. 16th St, Suite 100, Phoenix, AZ 85020
T 602.371.1100
www.aecom.com

From: D'onofrio, Joe <joe.donofrio@jacobs.com>
Sent: Friday, January 20, 2023 8:28 AM

APPENDIX D – TNM 2.5 NOISE MODEL RUN FILE KEY

Note: files to be uploaded to ADOT EP Noise Specialist via ftp

H0475: SR 101L System TI Improvements with I-10 – TNM FILE KEY			
Design Scenario	File Folder	Run Name	Contents
Model Validation	Validation	M1 hard	hard soil condition where indicated
		M1 loose	loose soil condition where indicated
		M2 hard	
		M2 loose	
		M3 hard	
		M3 loose	
		M5 hard	
		M5 loose	
		M6	
		M6a hard	
		M6a loose	
2022 Existing Condition	Existing East	Exst E of 83 red*	noise receivers located along I-10, E of 83rd Avenue
		Exst 83 to 91 red*	noise receivers located along I-10, between 83rd Avenue and 91st Avenue
		Exst Parc add run	additional run to include Parc Tolleson neighborhood, which was evaluated for mitigation
		Exst Siegel add run	additional run to include Siegel Suites Apts, which was evaluated for mitigation
		Exst Tolsun add run	additional run to include Tolsun Farms neighborhood, which was evaluated for mitigation
		PT R49 & R51	Parc Tolleson R49 & R51 elevation correction
	Existing Central	Exst I-10 to Thom red1*	noise receivers located between I-10 and Thomas Road, E of SR 101L (south half)
		Exst I-10 to Thom red2*	noise receivers located between I-10 and Thomas Road, E of SR 101L (north half)
		Exst Park McD	reran model for the Park McDowell neighborhood with privacy walls eliminated
		Exst Prov at SF	rerun of model for the Providence at Sheely Farms neighborhood with privacy walls eliminated
		Exst RI add run	additional run to include Residence Inn Apts, which was evaluated for mitigation
		Exst SFE add run	additional run to include Sheely Farms Elementary, which was evaluated for mitigation
	Existing West & North	Exst 99 to Avon red	noise receivers located along I-10, between 99th Avenue and Avondale Boulevard

		Exst Thom to IS red	noise receivers located along SR 101L between Thomas Road and Indian School Road
		Exst CCOV add run	additional run to include Christ Church of the Valley, which was evaluated for mitigation
		R117a R118a	Added receivers R117a & R118a
2050 No Build	NB East	NB E of 83 red*	noise receivers located along I-10, E of 83rd Avenue
		NB 83 to 91 red*	noise receivers located along I-10, between 83rd Avenue and 91st Avenue
		NB Parc add run	additional run to include Parc Tolleson neighborhood, which was evaluated for mitigation
		NB Siegel add run	additional run to include Siegel Suites Apts, which was evaluated for mitigation
		NB Tolsun add run	additional run to include Tolsun Farms neighborhood, which was evaluated for mitigation
		PT R49 & R51	Parc Tolleson R49 & R51 elevation correction
	NB Central	NB I-10 to Thom red1*	noise receivers located between I-10 and Thomas Road, E of SR 101L (south half)
		NB I-10 to Thom red2*	noise receivers located between I-10 and Thomas Road, E of SR 101L (north half)
		NB Park McD	reran model for the Park McDowell neighborhood with privacy walls eliminated
		NB Prov at SF	rerun of model for the Providence at Sheely Farms neighborhood with privacy walls eliminated
		NB RI add run	additional run to include Residence Inn Apts, which was evaluated for mitigation
		NB SFE add run	additional run to include Sheely Farms Elementary, which was evaluated for mitigation
	NB West & North	NB 99 to Avon red	noise receivers located along I-10, between 99th Avenue and Avondale Boulevard
		NB Thom to IS red	noise receivers located along SR 101L between Thomas Road and Indian School Road
		NB CCOV add run	additional run to include Christ Church of the Valley, which was evaluated for mitigation
		R117a R118a	Added receivers R117a & R118a
2050 Build	Alt F East	Alt F E of 83 red*	noise receivers located along I-10, E of 83rd Avenue
		Alt F 83 to 91 red*	noise receivers located along I-10, between 83rd Avenue and 91st Avenue

		Alt F Siegel add run	additional run to include Siegel Suites Apts, which was evaluated for mitigation
		Alt F Tolsun add run	additional run to include Tolsun Farms neighborhood, which was evaluated for mitigation
	Mitigation	Parc Tolleson	Parc Tolleson mitigation analysis
		Siegel Suites	Siegel Suites mitigation analysis
		Tolsun Farms	Tolsun Farms mitigation analysis
		PT R49 & R51	Mitigation for Parc Tolleson R49 & R51 elevation correction
	Alt F Central	Alt F I-10 to Thom red1*	noise receivers located between I-10 and Thomas Road, E of SR 101L (south half)
		Alt F I-10 to Thom red2*	noise receivers located between I-10 and Thomas Road, E of SR 101L (north half)
		Alt F Park McD	reran model for the Park McDowell neighborhood with privacy walls eliminated
		Alt F Prov at SF	rerun of model for the Providence at Sheely Farms neighborhood with privacy walls eliminated
		Alt F SFE add run	additional run to include Sheely Farms Elementary, which was evaluated for mitigation
		Alt F PSF R177 - 179	Providence at Sheely Farms (Sheely Farms 5) R177 & R179 elevation corrections
		R147	Parc at Sheely Farms R147 elevation correction
	Mitigation	AAR Medical	AZ Arthritis & Rheumatology building mitigation analysis
		Residence Inn	Residence Inn Apts mitigation analysis
		Sheely Farms Elem	Sheely Farm Elementary mitigation analysis
	Alt F West & North	Alt F 99 to Avon red	noise receivers located along I-10, between 99th Avenue and Avondale Boulevard
		Alt F Thom to IS red	noise receivers located along SR 101L between Thomas Road and Indian School Road
		Alt F COV add run	additional run to include Christ Church of the Valley, which was evaluated for mitigation
		R117a R118a	Added receivers R117a & R118a
	Mitigation	CCOV	Christ's Church of the Valley mitigation analysis
		Home2Suites	Home2Suites Hotel mitigation analysis
		IMS med Bldgs	IMS Family Medicine and Akos Urgent Care building mitigation analysis
* reduced to pare down models to include only critical design inputs to reduce processing time			

DocuSign

Certificate Of Completion

Envelope Id: 3517D78DFEF34283B0D2C73082B8AF0C
Status: Completed
Subject: Complete with DocuSign: I-10 SR 101L TI Noise Analysis Technical Report Final 062123.pdf
Source Envelope:
Document Pages: 115
Signatures: 1
Certificate Pages: 1
Initials: 0
AutoNav: Enabled
EnvelopeId Stamping: Disabled
Time Zone: (UTC-07:00) Arizona

Envelope Originator:
Ivan Racic
206 S 17th Ave
Phoenix, AZ 85007
IRacic@azdot.gov
IP Address: 72.195.240.101

Record Tracking

Status: Original
6/27/2023 11:15:44 AM
Holder: Ivan Racic
IRacic@azdot.gov
Location: DocuSign

Signer Events	Signature	Timestamp
Ivan Racic IRacic@azdot.gov Air and Noise Planner/Environmental planning Arizona Dept of Transportation Security Level: Email, Account Authentication (None)	DocuSigned by: Ivan Racic D00D4A7BCC34420... Signature Adoption: Pre-selected Style Using IP Address: 104.129.198.49	Sent: 6/27/2023 11:19:24 AM Viewed: 6/27/2023 11:20:02 AM Signed: 6/27/2023 11:20:26 AM Freeform Signing

Electronic Record and Signature Disclosure:
Not Offered via DocuSign

In Person Signer Events	Signature	Timestamp

Editor Delivery Events	Status	Timestamp

Agent Delivery Events	Status	Timestamp

Intermediary Delivery Events	Status	Timestamp

Certified Delivery Events	Status	Timestamp

Carbon Copy Events	Status	Timestamp

Witness Events	Signature	Timestamp

Notary Events	Signature	Timestamp

Envelope Summary Events	Status	Timestamps
Envelope Sent	Hashed/Encrypted	6/27/2023 11:19:24 AM
Certified Delivered	Security Checked	6/27/2023 11:20:02 AM
Signing Complete	Security Checked	6/27/2023 11:20:26 AM
Completed	Security Checked	6/27/2023 11:20:26 AM

Payment Events	Status	Timestamps