

# **ENVIRONMENTAL ASSESSMENT** State Street

11400 South to 10600 South

## **US-89, 11400 South to 10600 South**

Environmental Assessment and  
Finding of No Significant Impact

UDOT Project No. F-0089(375)364  
PIN12561

July 2017

Submitted Pursuant to 42 U.S.C. 4332(2)(c) and  
49 U.S.C. 330

**US-89; 11400 South to 10600 South**

Salt Lake County, Utah

**Environmental Assessment**

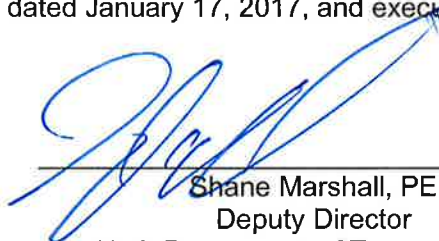
Submitted pursuant to 42 U.S.C. 4332(2)(c) and 49 U.S.C 330  
by

The Utah Department of Transportation (UDOT)

The environmental review, consultation and other actions required by applicable Federal environmental laws for this project are being or have been carried-out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.

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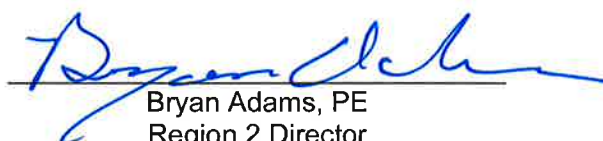
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**Abstract:**

UDOT proposes to improve US-89 (State Street), 11400 South to 10600 South and address traffic congestion. Proposed improvements include widening State Street from five to seven lanes and adding 1) a second southbound to westbound right-turn lane at State Street and 11400 South, 2) a traffic signal at the Scheels driveway (to allow for a protected movement for vehicles turning into the Scheels parking lot (northbound left-turn movement)) as well as vehicles exiting the parking lot (eastbound right-turns), and 3) a raised median on select sections of State Street to limit left-turns. Two alternatives were considered in detail: the No-Build Alternative and the Build Alternative. The Build Alternative was selected as the Preferred Alternative and would minimize right-of-way acquisitions by reducing the existing 12-foot lanes to 11 feet, removing shoulders, and reducing the majority of the east sidewalk from 6 to 5 feet. Environmental impacts and mitigation measures to reduce the levels of the impacts are discussed.



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### **ACRONYMS AND ABBREVIATIONS**

µg/m <sup>3</sup>	Microgram per cubic meter
APE	area of potential effects
cfs	Cubic feet per second
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMAQ	Congestion Management Air Quality
CO	carbon monoxide
dB	decibel
dB(A)	“A-weighted” sound level
DOE	Determination of Eligibility
DOEFOE	Determination of Eligibility and Finding of Effect
DWQ	Division of Water Quality
DWSP	Drinking Water Source Protection
EA	Environmental Assessment
EC	Eligible/Contributing
EPA	U.S. Environmental Protection Agency
ES	Eligible/Significant
F	Fahrenheit
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GOPB	Utah Governor’s Office of Planning and Budget
IPaC	Information for Planning and Consultation
LOS	Level of Service
LUST	leaking underground storage tank
MAG	Mountainland Association of Governments
mg/L	milligrams per liter
mph	miles per hour
MPO	Metropolitan Planning Organization
MSAT	mobile source air toxics
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NC	Ineligible/Non-Contributing
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO <sub>2</sub>	nitrogen dioxide
NRHP	National Register of Historic Places
O <sub>3</sub>	ozone
OP	Ineligible/Out-of-period
Pb	lead
PM <sub>2.5</sub>	particulate matter with a diameter of 2.5 micrometers
PM	particulate matter
PM <sub>10</sub>	Particulate matter with a diameter of 10 micrometers
RCRA	Resource Conservation and Recovery Act
RTP	Regional Transportation Plan
SHPO	Utah State Historic Preservation Office
SIP	State Implementation Plan
SO <sub>2</sub>	sulfur dioxide
SWPPP	Storm Water Pollution Prevention Plan

## **// ACRONYMS AND ABBREVIATIONS**

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TDS	total dissolved solids
TMDL	total maximum daily load
TNM	Traffic Noise Model
UDEQ	Utah Department of Environmental Quality
UDOT	Utah Department of Transportation
UDSH	Utah Division of State History
UDWR	Utah Division of Wildlife Resources
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
VISSIM	A software package used to evaluate traffic
VMT	vehicle miles travelled
WFRC	Wasatch Front Regional Council



## CHAPTER 1: PURPOSE AND NEED

The Utah Department of Transportation (UDOT) is proposing improvements to U.S. Highway 89 (US-89) (State Street) from 11400 South to 10600 South to meet future (2040) travel demand. This section of State Street is in the cities of Sandy and Draper, Salt Lake County, Utah. UDOT is preparing an Environmental Assessment (EA) to analyze any potential impacts that could occur to the natural and built environment as a result of the proposed improvements.

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) and associated Federal Highway Administration (FHWA) regulations and guidance, as well as UDOT requirements.

The environmental review, consultation and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.

### 1.1 Study Area

The logical termini for the State Street EA are 11400 South on the south and 10600 South on the north. Both 11400 South and 10600 South are principal urban arterials west of

#### WHAT ARE LOGICAL TERMINI?

Logical termini are the rational end points for a transportation improvement. Generally they are the points of major traffic generation such as intersecting roadways.

State Street and minor urban arterials to the east. Although 10600 South is the northern terminus for this project from a traffic standpoint, improvements at the intersection are not part of this project. The study area begins south of 10600 South because that intersection has adequate capacity and ends south of 11400 South because that intersection needs improvements by 2040.

The study area is a north–south linear corridor about 1.12 miles long and includes the signalized intersections of State Street and 11400 South, Auto Mall Drive, and 11000 South (Figure 1-1). The study area is about 200 feet wide to allow for evaluation of impacts to any environmental resources that could be affected by the proposed improvements. Wider study areas are considered for some specific environmental resources and are described further in Chapter 3, Affected Environment and Environmental Consequences.

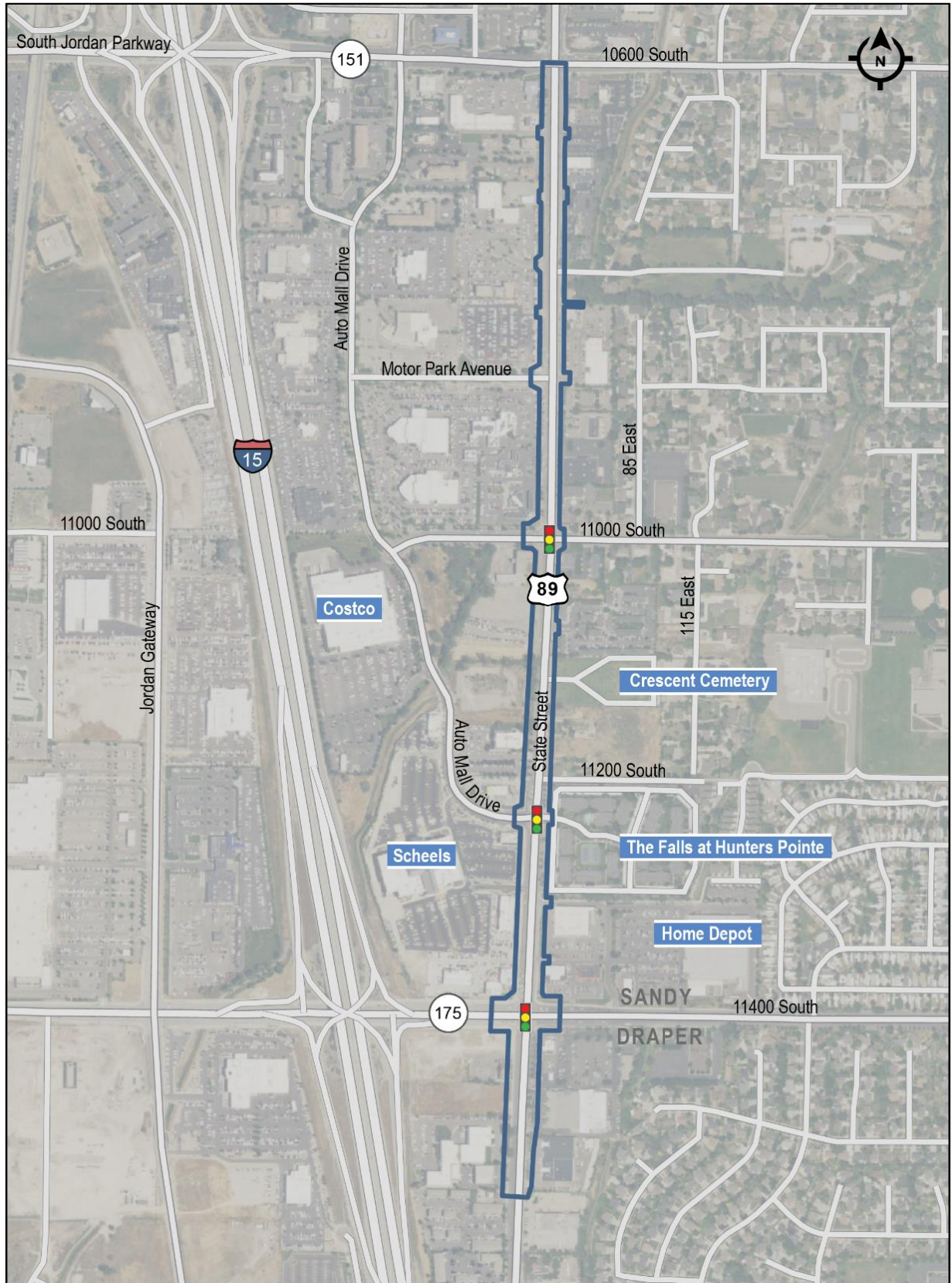
The study area is largely in Sandy City limits. The centerline of 11400 South serves as the boundary between Sandy City and Draper.

#### WHAT ARE ROADWAY ARTERIALS?

*Principal arterials* (includes interstates, freeways, expressways, and “other” types) serve major centers of metropolitan areas, provide a high degree of mobility, and can also provide mobility through rural areas. “Other” principal arterials, like State Street, that are not access-controlled have at-grade intersections to other roadways and driveways.

*Minor arterials* serve trips of moderate length and serve geographic areas that are smaller than those served by principal arterials, and connect to the higher arterial system.

**FIGURE 1-1, US-89 (STATE STREET) 11400 SOUTH TO 10600 SOUTH STUDY AREA**



## 1.2 Existing Conditions

State Street is a major north–south arterial road that runs through nearly the center of the Salt Lake Valley. It is seven lanes wide (three general purpose lanes in each direction and one center turn lane) north of 10600 South and five-lanes wide (two general purpose lanes in each direction and one center turn lane) south of 11400 South. The segment of State Street included in this study consists of a five-lane cross-section (two general purpose and one center turn lane).

This area of State Street and its surrounds are a regional commercial destination area

dominated by several major retailers (e.g., Scheels, Costco, Home Depot) and multiple automobile dealerships (e.g., Larry H. Miller properties and Mark Miller Subaru), as well as other smaller and local businesses (e.g., gas stations, restaurants, office buildings). While State Street from 11400 South to 10600 South is largely commercial, there are several single-family homes, an apartment complex (The Falls at Hunters Pointe), and a cemetery all located on the east side of State Street.

The existing conditions of the study area are described in Table 1-1.

**TABLE 1-1, STATE STREET EXISTING CONDITIONS, 11400 SOUTH TO 10600 SOUTH**

Type	Description
<b>Functional Class</b>	<ul style="list-style-type: none"> <li>▪ State Street: Principal arterial</li> <li>▪ 11400 South: Principal arterial west of State Street/Minor arterial east of State Street</li> <li>▪ 11000 South: Major collector</li> <li>▪ 10600 South: Principal arterial west of State Street/Minor arterial east of State Street</li> </ul>
<b>Number of Lanes</b>	4 travel, 1 center turn lane
<b>Length</b>	About 1.12 miles
<b>Number of Intersections</b>	<ul style="list-style-type: none"> <li>▪ 3 signalized: 11400 South, Auto Mall Drive, and 11000 South</li> <li>▪ 1 unsignalized: Motor Park Avenue</li> </ul>
<b>Existing Saturday Total Peak Hour Delay</b>	206 hours
<b>Posted Speed</b>	40 miles per hour
<b>Pedestrian Facilities</b>	<ul style="list-style-type: none"> <li>▪ Non-continuous sidewalk on the east and west sides</li> <li>▪ Signalized cross walks at 11400 South, Auto Mall Drive, 11000 South and 10600 South</li> </ul>
<b>Bicycle Facilities</b>	None
<b>Transit Facilities</b>	None
<b>Number of Driveways</b>	<ul style="list-style-type: none"> <li>▪ 23 accesses to businesses (13 east/10 west)</li> <li>▪ 8 accesses to residences (east)</li> <li>▪ 1 unpaved access to land with equestrian facilities to the east</li> <li>▪ 1 cemetery access (east)</li> <li>▪ 1 school (vacant) (west)</li> </ul>
<b>Shoulders</b>	<ul style="list-style-type: none"> <li>▪ Variable</li> <li>▪ Generally 9 feet wide, ranges from 0 to 17 feet</li> </ul>



### 1.3 Transportation Planning Efforts

The Wasatch Front Regional Council (WFRC), UDOT, and Sandy City are responsible for transportation planning in the study area. Together they work to identify the transportation needs and identify long-term solutions to meet the demands of the traveling public.

#### 1.3.1 Metropolitan Planning

The WFRC is the Metropolitan Planning Organization (MPO) for the Wasatch Front and is responsible for coordinating transportation planning in the region. The WFRC prepares future land use projections in consultation with the region's cities. These land use projections are used to develop the *Regional Transportation Plan (RTP) 2015–2040*, which is the plan of development for the future transportation system. The *RTP 2015–2040* includes a list of projects that are planned to meet future transportation needs for the next 20-plus years.

All of the projects in the *RTP* are designed to work together to meet the existing and anticipated transportation (highway, transit, pedestrian and bicycle, freight, and air) needs through the year 2040.

The WFRC *RTP 2015–2040* has identified widening State Street from 11400 South to 10600 South as a Phase I (2015–2024) project (Project S-189). There are no other currently planned roadway improvements in the project study area. Several other widening projects in the general vicinity are planned to meet area transportation needs:

- Project S-100: Lone Peak Parkway from 12650 South to 11400 South; widening from two to four lanes (Phase 1 2015–2024 [needed]); Phase 2: 2025–2034 [funded])
- Project S-113: 700 East from 12300 South to 11400 South; widening from

two to four lanes (Phase 1: 2015–2040 [needed]/Phase 2: 2025–2034 [funded])

- Project S-197: 12300 South from Interstate 15 (I-15) to 700 East; widening from four to six travel lanes (Phase 1: 2015–2024 [needed/ funded])
- Project S-199: 10600/10400 South State Route 151 (SR-151) from Redwood Road to I-15; widening from four to six travel lanes (Phase 1: 2015–2024 [needed/funded])

### 1.4 Purpose of and Need for the Project

The purpose of this project is to 1) accommodate existing and future (2040) travel demand on State Street from 11400 South to 10600 South and at 11400 South, the Scheels driveway, Auto Mall Drive, and 11000 South intersections; and 2) improve the functionality and safety of State Street.

The need for the project is current and future projected traffic congestion on State Street between 11400 South and 10600 South, and historic traffic accident data. Currently several northbound segments of State Street operate at failing conditions. By the year 2040, traffic demand will exceed the roadway and intersection capacity and will result in severe congestion. Accident data collected by UDOT shows 100 angle, head-on, and opposite direction side-swipe crashes have occurred since January 2010. These accidents could have been prevented with the installation of a raised median.

### 1.5 Description of Transportation Needs

For the State Street EA, the needs are reducing current and future arterial delay on State Street as well as reducing current and future intersection and turning movement delay. The specific needs are determined by measuring existing arterial and intersection operations and comparing the results to

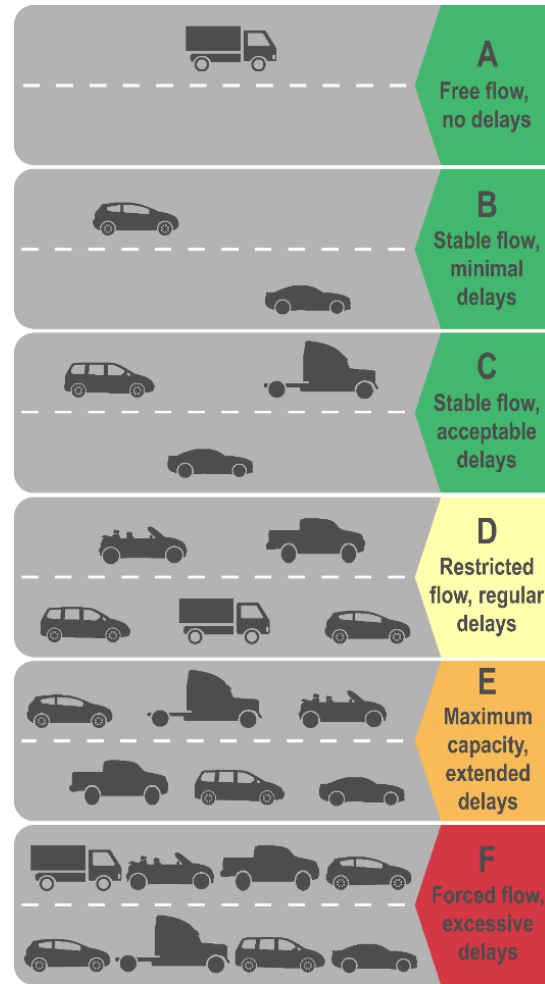
future operations with and without improvements.

**1.5.1 Current and Future Traffic Congestion**

**1.5.1.1 Level of Service**

The operational performance of a road or an intersection is reported in terms of “level of service” (LOS). LOS is measured quantitatively and is reported on a scale from A to F, with A representing the best performance and F the worst. The term LOS is used to describe how well an intersection or road operates, with LOS A representing free-flow conditions and LOS F representing severe congestion and delay (Figure 1-2). Intersection LOS is based on average delay per vehicle while road LOS is based on congested travel speed as a percentage of free-flow travel speed. Table 1-2 provides a brief explanation of arterial LOS and the associated criteria.

**FIGURE 1-2, ARTERIAL LEVEL OF SERVICE**



**TABLE 1-2, ARTERIAL LEVEL OF SERVICE DESCRIPTIONS**

LOS	Description of Operations	Travel Speed as a Percentage of Base Free-Flow Speed (percent)
A	Primarily free-flow operations	> 85
B	Reasonably unimpeded operations	> 67 and ≤ 85
C	Stable operations	> 50 and ≤ 67
D	Less than stable condition	> 40 and ≤ 50
E	Unstable operations	> 30 and ≤ 40
F	Flow at extremely low speed	≤ 30

Source: National Research Council Transportation Research Board 2010.



The criteria and scale for intersection LOS differs depending on whether or not the intersection is signalized. For signalized intersections, all turning movements are included in calculating the average delay for the entire intersection, which is then used to determine LOS. For unsignalized intersections where there are free movements (e.g., Scheels driveway), only delay for the movement or approach with the most delay is used to determine LOS. Table 1-3 provides a brief explanation for each LOS and the associated average delay per vehicle for signalized and unsignalized intersections.

**1.5.1.2 Modeling**

**Travel Demand Model**

The travel demand model jointly owned and maintained by the WFRC and the Mountainland Association of Governments (MAG) was used to predict future traffic volume and travel demand for this EA. The travel demand model has two primary data inputs—land use data, such as residential and employment data for the entire region, and transportation system data. Using the land use and transportation system inputs, the travel demand model predicts how many person trips will be generated in the region, their destination, the mode of travel (e.g., car,

bus, train), and the roads or routes that will be used to get there.

For the State Street EA the travel demand model assumed a current analysis year of 2016 and a 2040 model year for future conditions using MPO model inputs such as the transportation system and land use data. Future conditions assume that all other projects in the WFRC RTP 2015–2040 are built.

**VISSIM**

VISSIM is a software package used to evaluate traffic operations. VISSIM, a micro-simulation tool, was selected for use in this EA because it allows for the evaluation of closely spaced intersections and the interaction between them.

**Peak Hour Determination**

An initial review of the existing conditions determined that the Saturday peak hour was the worst case for intersection delay. This is due to commercial shopping nature of the study area and to larger turning volumes for some of the key movements on Saturday. These movements include the northbound left-turns onto the Scheels driveway and Auto Mall Drive, in addition to the eastbound left-turn (northbound) and southbound right-turn (westbound) at 11400 South.

**TABLE 1-3, INTERSECTION LEVEL OF SERVICE DESCRIPTIONS**

LOS	Traffic Conditions	Signalized Intersection Average Delay (seconds/vehicle)	Unsignalized Intersection Average Delay (seconds/vehicle)
A	Free-Flow Operations/Insignificant Delay	$0 \leq 10.0$	$0 \leq 10.0$
B	Smooth Operations/Short Delays	$> 10.0$ and $\leq 20.0$	$> 10.0$ and $\leq 15.0$
C	Stable Operations/Acceptable Delays	$> 20.0$ and $\leq 35.0$	$> 15.0$ and $\leq 25.0$
D	Approaching Unstable Operations/Tolerable Delays	$> 35.0$ and $\leq 55.0$	$> 25.0$ and $\leq 35.0$
E	Unstable Operations/Significant Delays Begin	$> 55.0$ and $\leq 80.0$	$> 35.0$ and $\leq 50.0$
F	Very Poor Operations/Excessive Delays Occur	$> 80.0$	$> 50.0$

Source: National Research Council Transportation Research Board 2010.

**1.5.1.3 Arterial Performance**

For the arterial LOS evaluation along State Street, travel times were derived from the VISSIM model along the study area and then converted to vehicle speeds.

Based on an evaluation of the existing conditions traffic on State Street during the Saturday peak hour, the northbound State Street segments operate at a LOS of D or better (Table 1-4, Figure 1-3). In the southbound direction, the two segments between Auto Mall Drive and 11400 South both function at LOS F with vehicles traveling 10 miles per hour (mph) (compared to a posted speed limit of 40 mph), while the other segments north of Auto Mall Drive are at LOS C or better.

Arterial performance was also considered for a future (2040) scenario assuming no improvements except those defined in the RTP 2015–2040 were made. This is called the 2040 No-Build. Results from the 2040 No-Build evaluation indicate the northbound traffic on State Street during the Saturday peak hour, function at a LOS E between 11400 South and Auto Mall Drive and a LOS C or better in the other two sections. The southbound segments all function at a LOS F with vehicle speeds ranging between 3 and 7 mph. This is caused by queuing from the 11400 South intersection, where the traffic demand exceeds the capacity of the intersection, particularly for the southbound right-turn (westbound) movement.

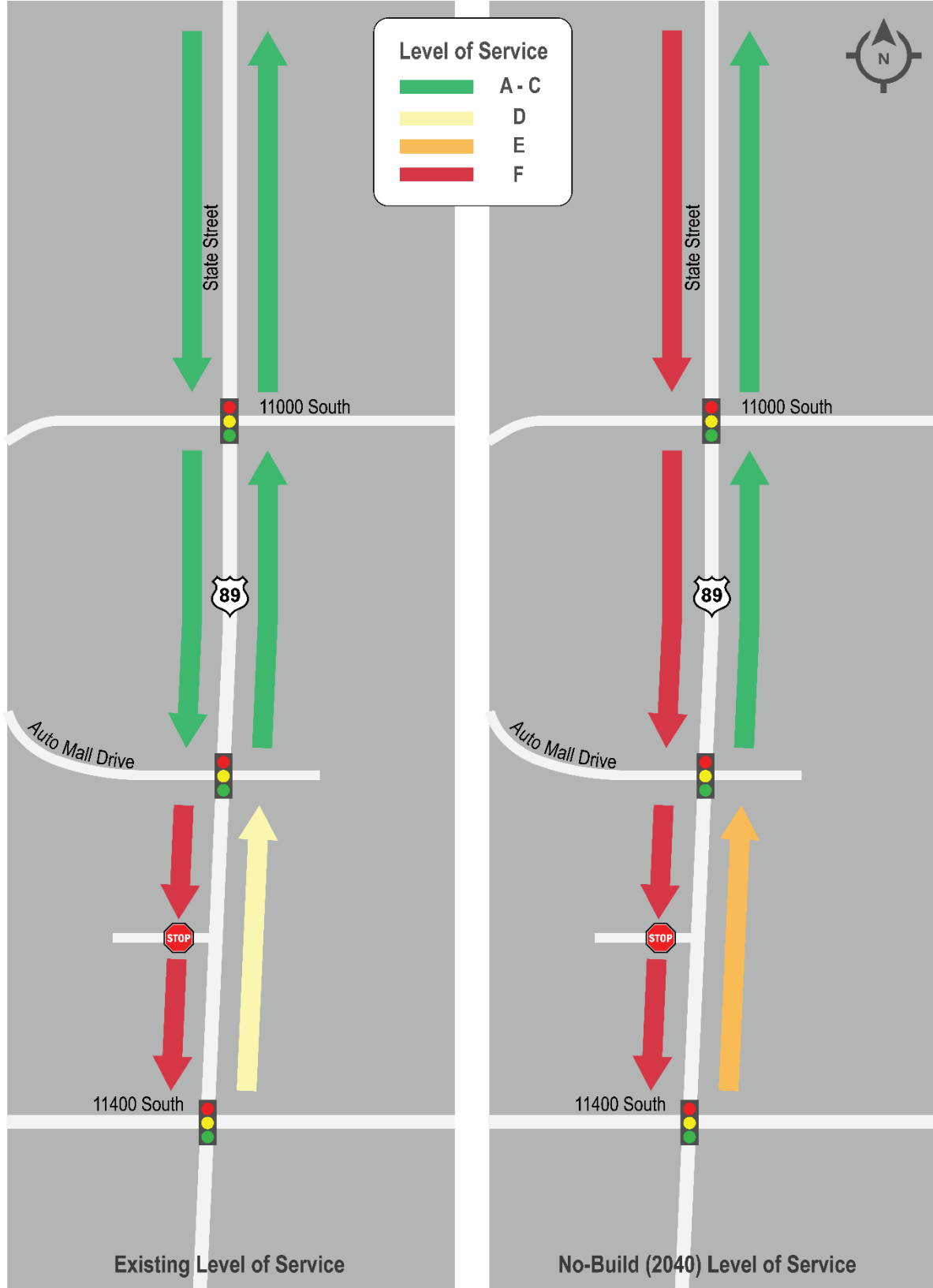
**TABLE 1-4, EXISTING AND FUTURE STATE STREET ARTERIAL LEVEL OF SERVICE**

From	To	2016 Existing	2040 No-Build
<b>Northbound</b>		<b>LOS/speed (mph)</b>	<b>LOS/speed (mph)</b>
11000 South	10600 South	A/37	A/37
Auto Mall Drive	11000 South	B/29	B/27
11400 South	Auto Mall Drive	D/17	E/13
<b>Southbound</b>		<b>LOS/speed (mph)</b>	<b>LOS/speed (mph)</b>
10600 South	11000 South	B/32	F/5
11000 South	Auto Mall Drive	C/23	F/3
Auto Mall Drive	Scheels Driveway	F/10	F/7
Scheels Driveway	11400 South	F/10	F/7

Source: Appendix B, Avenue 2017a.

Note: LOS reported for Saturday p.m. peak hour (representing worst-case scenario).

**FIGURE 1-3, 2016 EXISTING AND 2040 NO-BUILD STATE STREET ARTERIAL LEVEL OF SERVICE BY ROAD SEGMENT**



**1.5.1.4 Intersection Performance**

For the intersection evaluation, vehicle delay data was collected at each of the signalized intersections along the corridor and at the unsignalized Scheels driveway. Under existing conditions, each of the intersections perform at a LOS D or better, although some individual movements operate at LOS F (Table 1-5 and Figure 1-4). The total network delay, which is the total delay collected within the extents of the VISSIM model and includes the study intersections and driveways, is also shown on Figure 1-4. A total of 206 hours of delay occur during the 2016 Saturday peak hour.

Under 2040 No-Build conditions, the intersection of 11400 South and State Street

performs at a LOS F with an average delay of 87 seconds per vehicle. The traffic demand at this intersection exceeds the intersection capacity. In particular, the capacity for both the eastbound and northbound left-turn movements is exceeded by 30 percent and the southbound to westbound right-turn is exceeded by 20 percent (Appendix B, Avenue 2017a). The Scheels driveway also performs at an LOS F under the 2040 No-Build condition. The 2040 No-Build intersection LOS are illustrated on Figure 1-5. The total peak hour network delay of 918 hours, more than four times as much as in the existing conditions, is also shown on Figure 1-5.

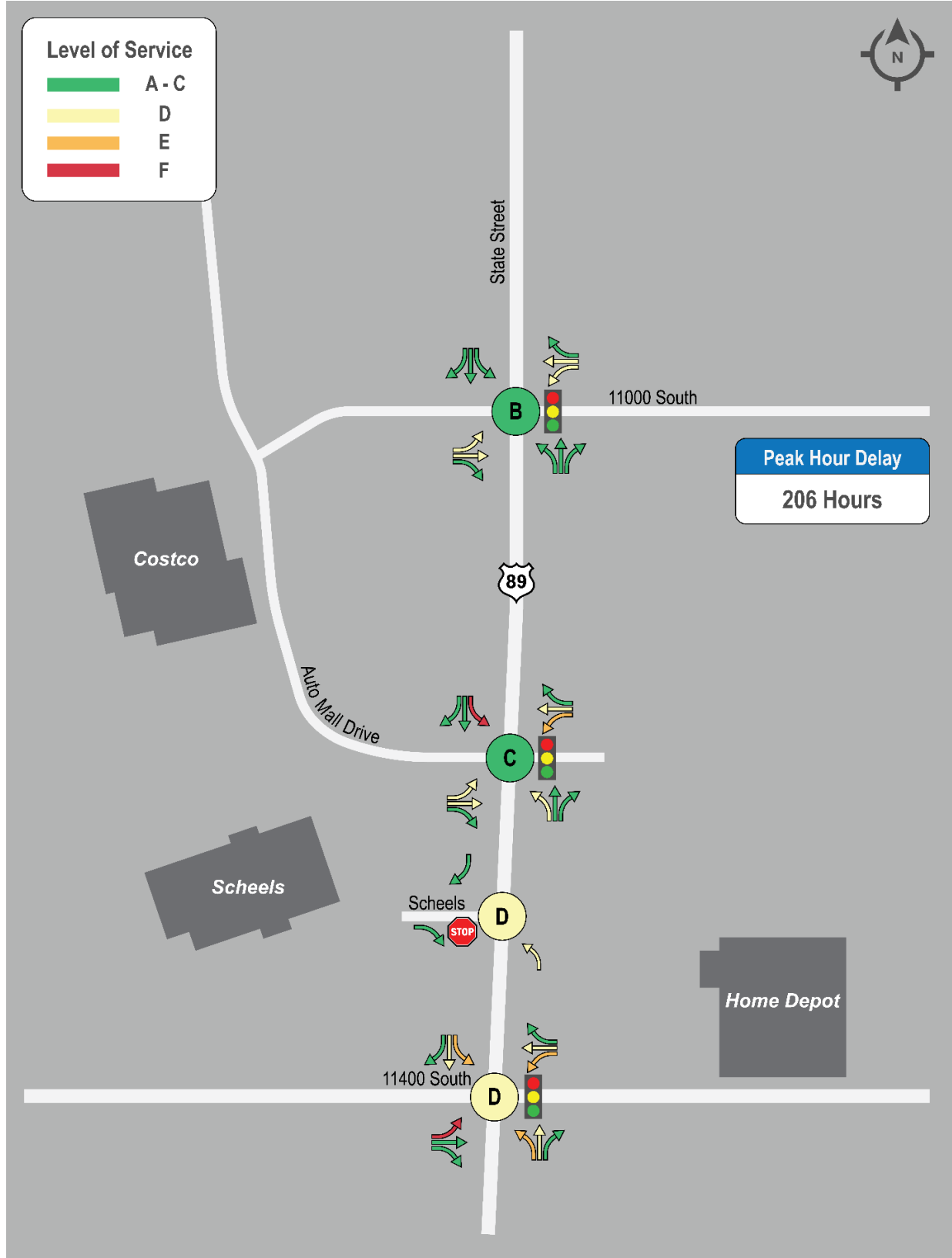
**TABLE 1-5, INTERSECTION LEVEL OF SERVICE AND DELAY FOR 2016 EXISTING AND 2040 NO-BUILD CONDITIONS**

Intersection	Intersection LOS <sup>1</sup> / Delay (seconds/vehicle)	
	2016 Existing	2040 No-Build
11000 South	B/14	C/25
Auto Mall Drive	C/20	D/55
Scheels Driveway <sup>2</sup>	D/30	F/170
11400 South	D/45	F/87

<sup>1</sup> LOS reported for p.m. peak hour (representing worst-case scenario).

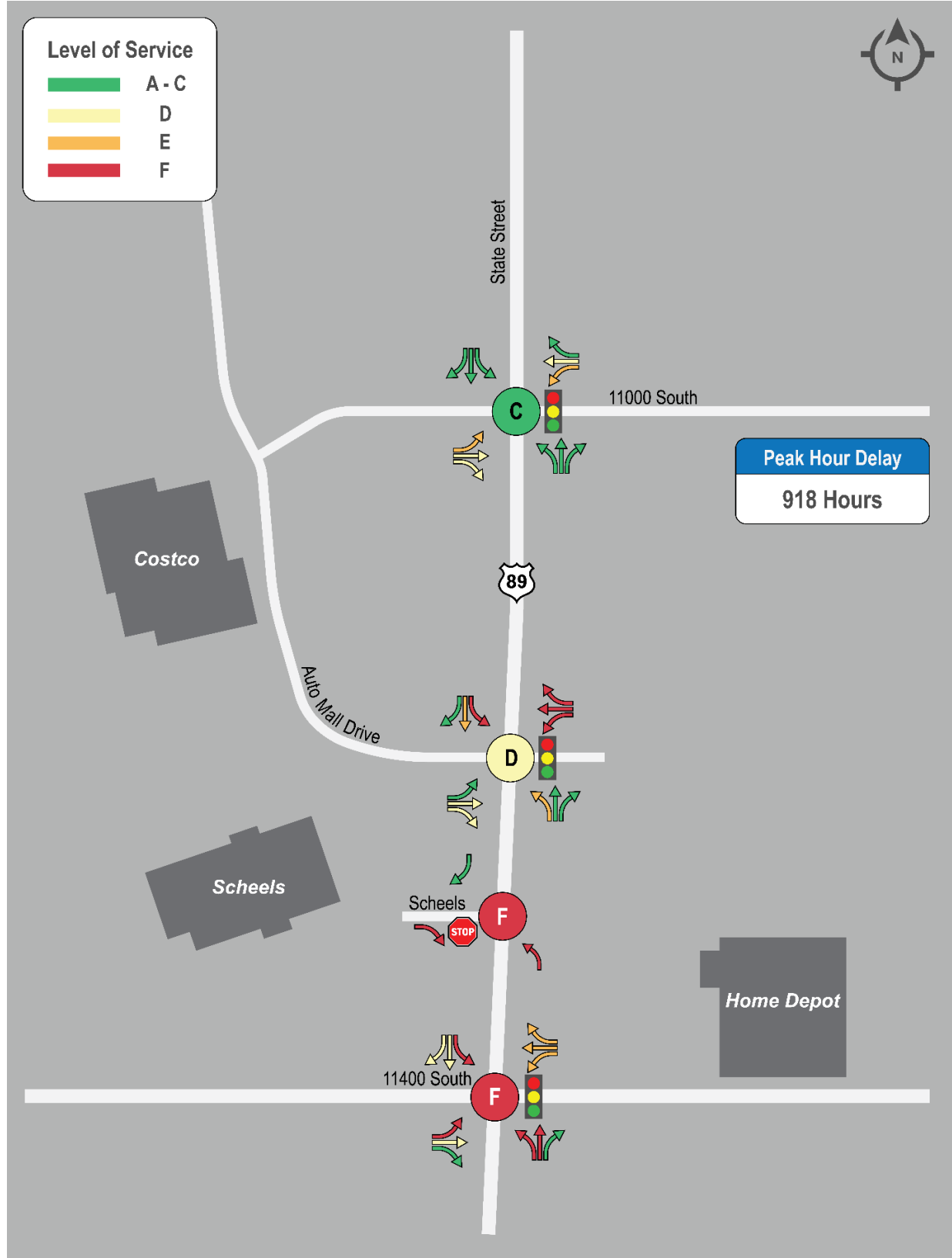
<sup>2</sup> In 2016 Existing and 2040 No-Build Conditions this intersection is unsignalized; the reported value is for the northbound left-turn.

**FIGURE 1-4, 2016 EXISTING SATURDAY PEAK HOUR INTERSECTION LEVEL OF SERVICE**





**FIGURE 1-5, 2040 NO-BUILD SATURDAY PEAK HOUR INTERSECTION LEVEL OF SERVICE**



## **1.6 Agency Coordination**

### **1.6.1 Cooperating Agency**

A cooperating agency is identified as any federal agency, other than the lead agency, that has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposed project or project alternative (40 CFR 1508.5).

No cooperating agencies have been identified for this EA.

## **1.7 Conclusion**

The purpose of this project is to accommodate existing and future travel demand on State Street at 11400 South, Auto Mall Drive, and 11000 South, and improve the functionality and safety of State Street.

The need for the project is based on current and projected 2040 traffic congestion which results in motorist delay. Currently, State Street operates under failing conditions (LOS F) in the southbound direction between Auto Mall Drive and 11400 South. By the year 2040 increasing travel demand will lead to failing traffic operations (LOS E or F) northbound between 11400 South and Auto Mall Drive and southbound between 11400 South and 10600 South. Similarly, overall performance at the intersections with 11400 South and the Scheels driveway will deteriorate to failing by 2040 unless improvements are made. Since 2010, 100 angle, head-on, and opposite direction side-swipe crashes have occurred.

## CHAPTER 2: ALTERNATIVES

This chapter summarizes the alternatives that were considered and carried forward for detailed evaluation, and also includes a determination on whether or not the alternatives meet the purpose and need (see Chapter 1, Purpose and Need).

### 2.1 Alternatives Development

The alternatives developed include the No-Build Alternative and the Build Alternative. The alternatives were developed and evaluated using 2040 traffic volumes. This section describes both alternatives.

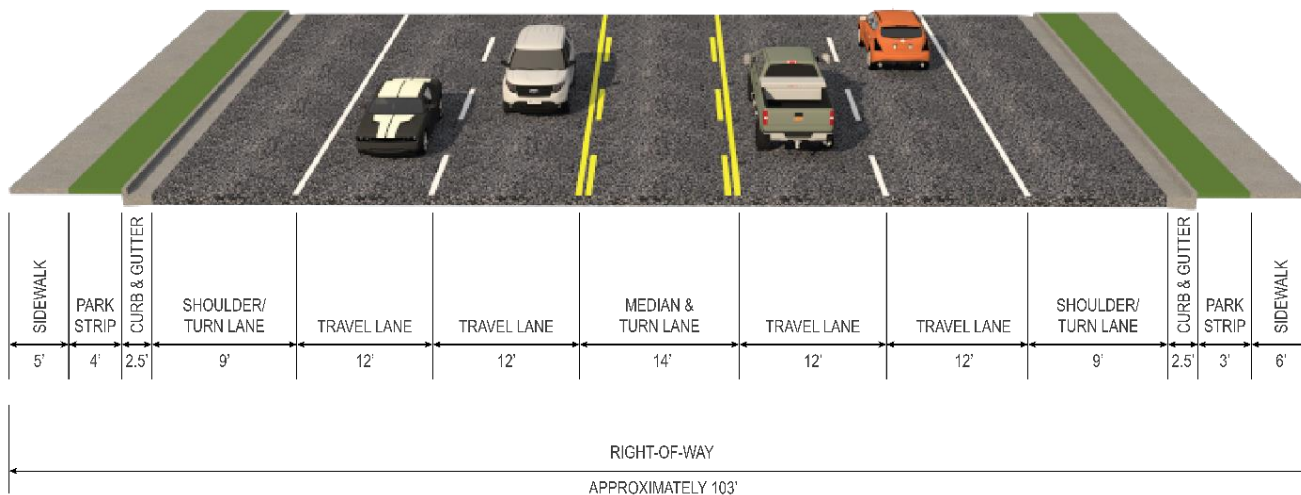
Additional preliminary design concepts, which included improvements to the 11400 South intersection and its operation in the east-west direction, were considered as part of the alternatives development process. However, traffic analysis results indicate

none of the preliminary design concepts would result in improved arterial or intersection LOS on State Street. As a result, these concepts were eliminated from further evaluation. In addition, improvements to the 11400 South arterial were determined to be outside of the scope of this EA.

#### 2.1.1 No-Build Alternative

Under the No-Build Alternative, no improvements would be made. State Street would maintain the current lane configuration between 11400 South and 10600 South (see Figure 2-1); maintain existing intersection configurations at 11400 South, Auto Mall Drive, 11000 South, and 10600 South; and the Scheels driveway would remain unsignalized. The No-Build Alternative assumes all other projects identified on the WFRC RTP 2015-2040 would be built.

**FIGURE 2-1, NO-BUILD ALTERNATIVE TYPICAL SECTION**



### 2.1.2 Build Alternative

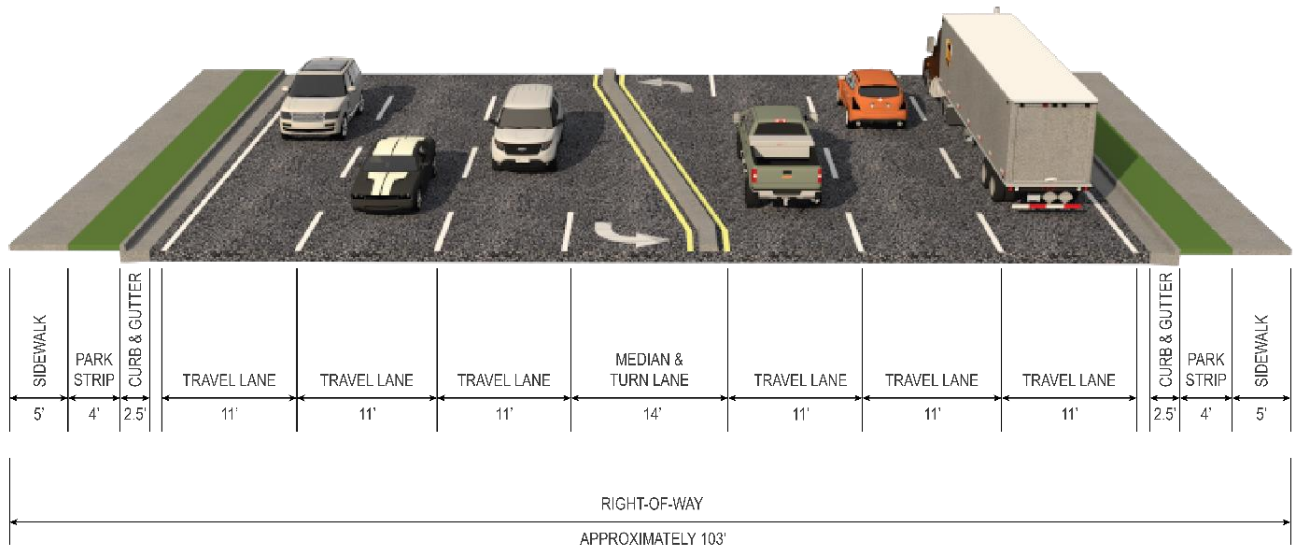
There was one Build Alternative developed to address traffic congestion on State Street in the study area. The Build Alternative includes the following design elements:

- Widening State Street to add capacity from five to seven lanes, with three travel lanes in each direction (see Figures 2-2 and 2-3) from 11400 South to the current three-lane section just south of 10600 South. This would include:
  - Reducing existing travel lane widths from 12 to 11 feet;
  - Removing the existing shoulders (where present);
  - Installing continuous 2½-foot-wide curb and gutter throughout the study area; and
  - Installing park strips and sidewalks (where not currently present).
- Adding a second southbound to westbound right-turn lane at the State Street and 11400 South intersection (see Figure 2-3, Inset 1). The lane configuration on State Street south of 11400 South would need to be shifted to the east to match the improvements on the north leg of this intersection.
- Adding a traffic signal at the Scheels driveway. Signal operations would stop the southbound travel lanes to allow for a protected movement for vehicles turning into the Scheels parking lot (northbound left-turn movement) as well as vehicles exiting the parking lot (eastbound right-turns) (see Figure 2-3, Inset 2). Left-turns out of Scheels would not be allowed. Northbound through traffic on State Street would not be controlled by the signal.

- Adding a raised median (i.e., a physical barrier in the roadway that safely separates traffic traveling in opposite directions) on select sections of State Street (see Figure 2-3) to limit left-turns. Some vehicles entering and exiting driveways would have to make U-turns to complete their desired movement. U-turns would be permitted where left-turns are allowed. Medians are commonly used to enhance traffic efficiency and safety in high volume areas on multi-lane roads. Under the Build Alternative, State Street would be converted from a five-lane to a seven-lane cross-section. This would make the left-turn movements across three lanes of traffic more difficult and add more conflict points for drivers to navigate compared to the current two-lane cross-section. The additional lane would increase the risk of angle collisions throughout the corridor, which has a potential for higher accident severity. To mitigate these safety issues and minimize the frequency of accidents, UDOT has strategically placed left-turn lanes between signalized intersections. Portions of State Street without the raised curb median would have a standard 14-foot center turn lane (see Figure 2-3, Inset 3).

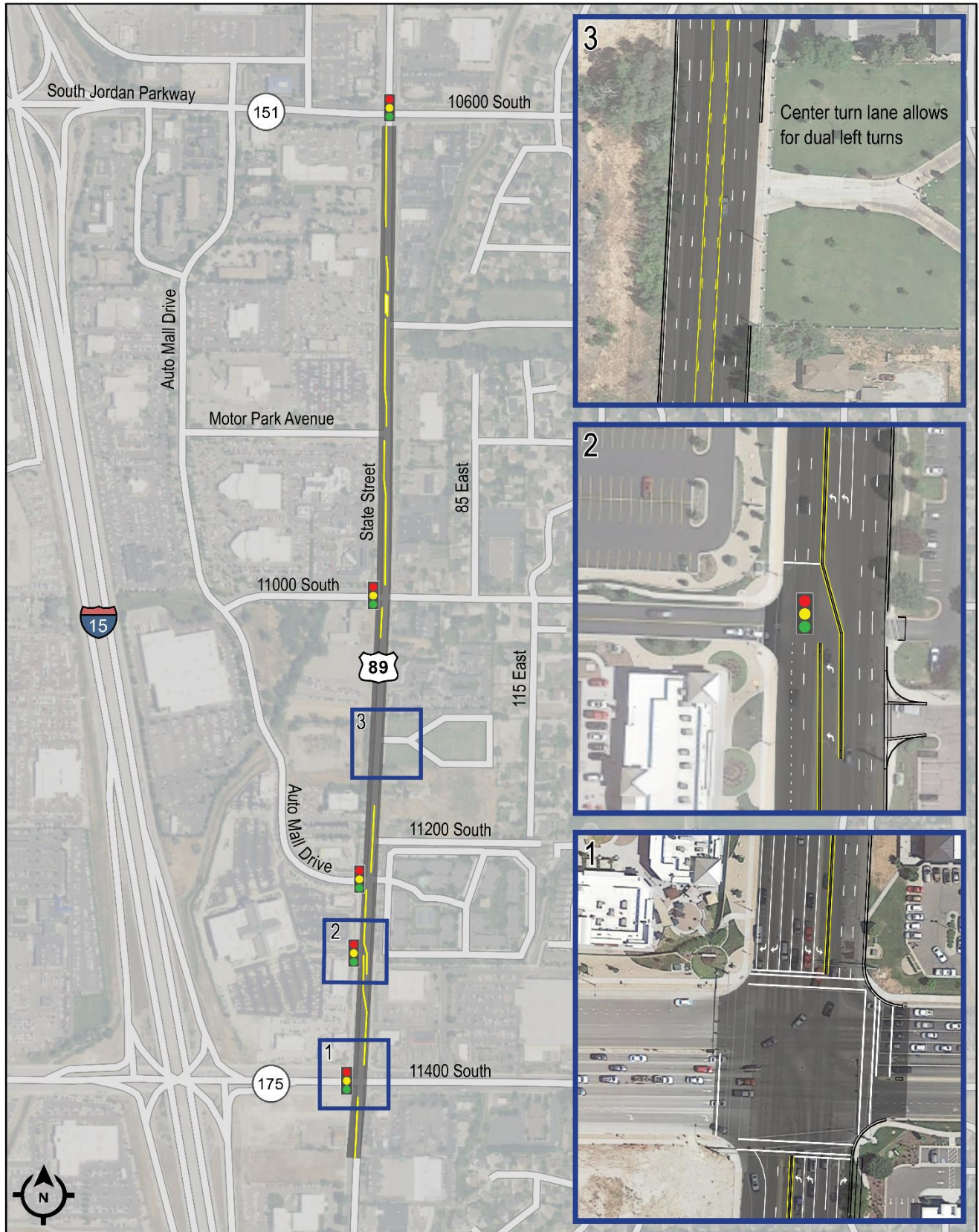
The Build Alternative would minimize right-of-way acquisitions by reducing the existing 12-foot lanes to 11 feet, removing shoulders, and reducing the east sidewalk from 6 to 5 feet, with the exception of the trail located between 11400 South and 11200 South which would remain 8-feet-wide.

**FIGURE 2-2, BUILD ALTERNATIVE TYPICAL SECTION**





**FIGURE 2-3, BUILD ALTERNATIVE OVERVIEW**





## 2.2 Alternatives Purpose and Need Screening

The alternatives were evaluated to determine their ability to meet the project purpose and need, specifically their ability to minimize delay along State Street and at the intersections of 11400 South, Auto Mall Drive, and 11100 South.

### 2.2.1 No-Build Alternative

The No-Build Alternative does not meet the purpose and need because it would not minimize future travel delay as compared to existing conditions. As shown on Figure 2-4, the projected increase in travel demand by 2040 is expected to result in a decreased LOS for northbound traffic between 11400 South and Auto Mall Drive (LOS E) compared to the existing conditions and a failure (LOS F) of southbound traffic operations. Table 2-1 compares the intersection-specific LOS between the 2016 existing condition and the alternatives, which in all cases is expected to be worse in 2040 when compared to existing conditions. Specifically, the Scheels driveway and 11400 South locations deteriorate to LOS F (see Figure 2-4 and Table 2-1). As a result, 2040 peak hour travel delay would be

918 hours, a 712 hour increase more than the existing conditions (Appendix B, Avenue 2017a).

### 2.2.2 Build Alternative

The Build Alternative meets the purpose and need because it would minimize future travel delay compared to the No-Build Alternative. Under the Build Alternative, State Street LOS is expected to operate at LOS C or better in the northbound direction and LOS E or better in the southbound direction (see Figure 2-4). All intersections are expected to operate better (less delay) when compared to the No-Build Alternative; all intersections, with the exception of 11400 South, will perform at LOS C or better (see Figure 2-5, Table 2-1, and Figure 1-5 for the No-Build Alternative performance). At the 11400 South intersection, delay would decrease from 87 (No-Build Alternative [LOS F]) to 61 seconds (Build Alternative [LOS E]). At the Scheels driveway the intersection delay would decrease substantially from 170 (No-Build Alternative) to 16 seconds per vehicle (Build Alternative). As a result, the 2040 Build Alternative total peak hour travel delay is expected to be 480 hours, a decrease of 438 hours when compared to the No-Build Alternative (Appendix B, Avenue 2017a).

**TABLE 2-1, INTERSECTION DELAY AND LEVEL OF SERVICE<sup>1</sup>**

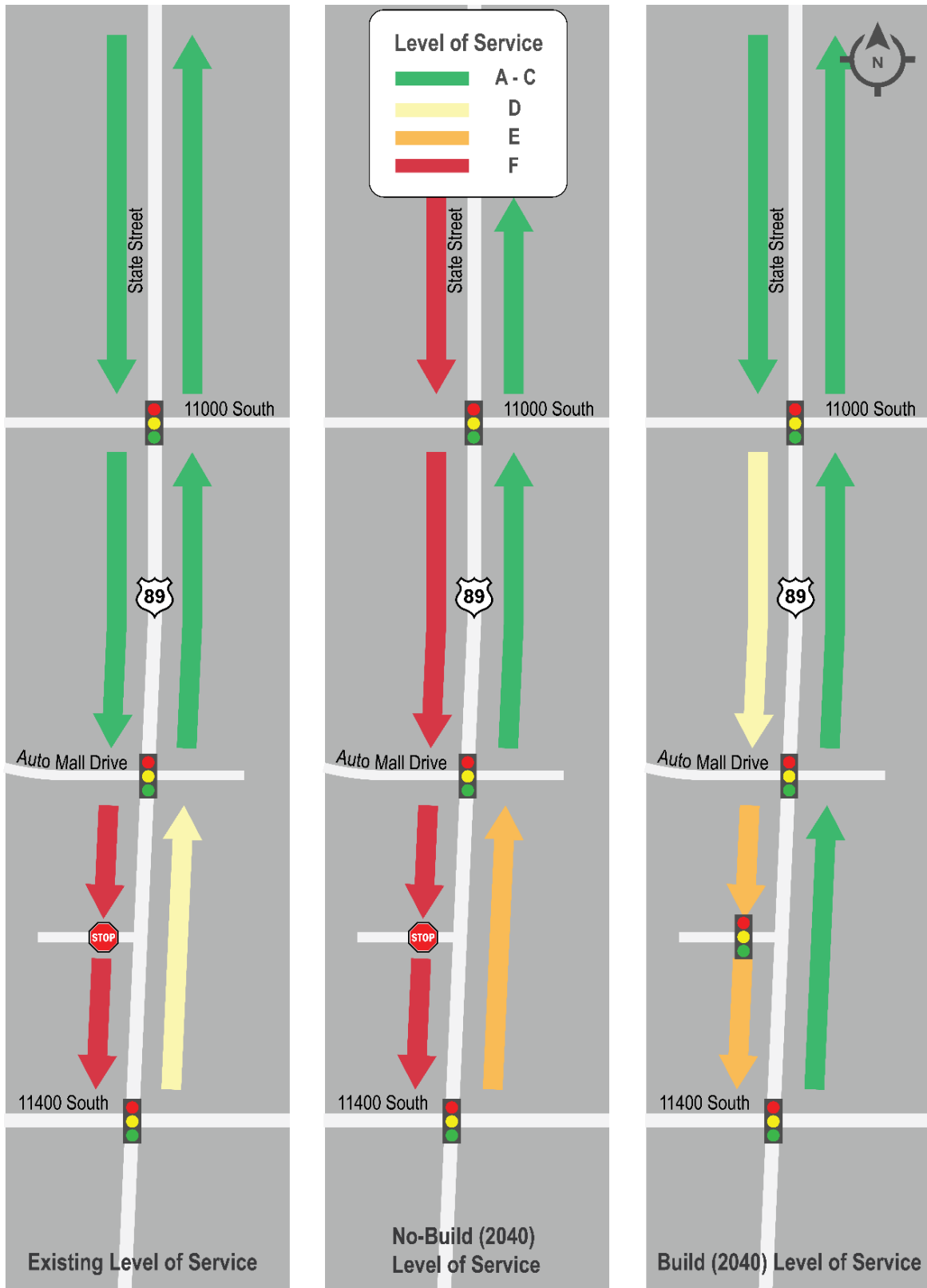
Intersection	Intersection LOS/Delay (seconds per vehicle)		
	2016 Existing	2040 No-Build Alternative	2040 Build Alternative
11000 South	B/14	C/25	B/15
Auto Mall Drive	C/20	D/55	C/24
Scheels Driveway <sup>2</sup>	D/30	F/170	B/16
11400 South	D/45	F/87	E/61

Source: Appendix B, Avenue 2017a; National Research Council Transportation Research Board 2010.

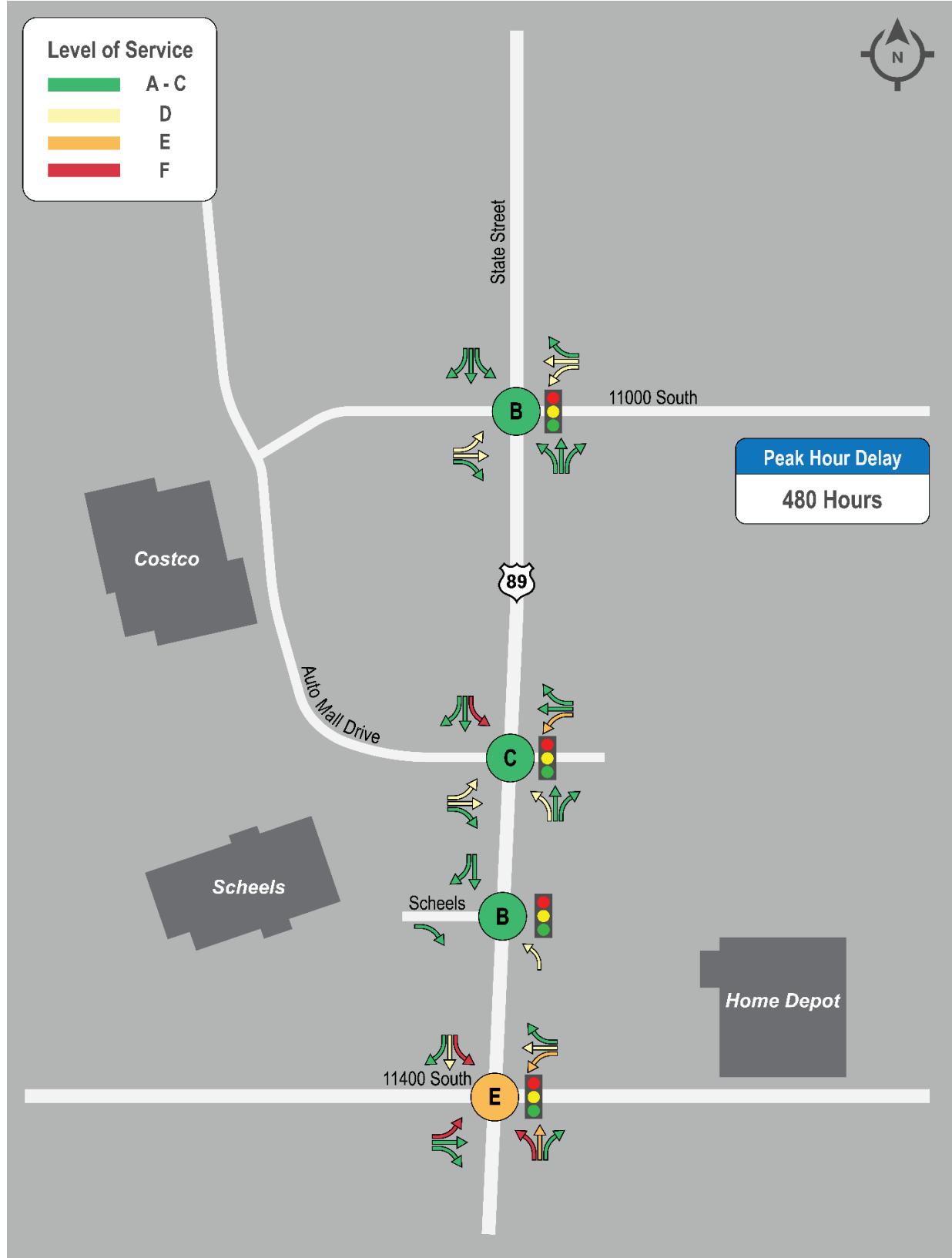
<sup>1</sup> LOS reported for p.m. peak hour (representing worst-case scenario).

<sup>2</sup> In Existing and 2040 No-Build Alternative conditions this intersection is unsignalized; the reported value is for the northbound left-turn.

**FIGURE 2-4, ARTERIAL LEVEL OF SERVICE—EXISTING, NO-BUILD ALTERNATIVE, AND BUILD ALTERNATIVE—CONDITIONS BY ROAD SEGMENT**



**FIGURE 2-5, 2040 BUILD ALTERNATIVE SATURDAY PEAK HOUR INTERSECTION LEVEL OF SERVICE**



### **2.3 Alternatives Selected for Detailed Study**

Alternatives to be carried forward for detailed evaluation include the No-Build Alternative and the Build Alternative. NEPA requires the No-Build Alternative to be carried forward for detailed study to provide a baseline for comparing impacts associated with the Build Alternative (see Chapter 3, Affected Environment and Environmental

Consequences). The Build Alternative is carried forward for detailed study because it minimizes future travel delay.

### **2.4 Identification of the Preferred Alternative**

UDOT selected the Build Alternative as the Preferred Alternative because it meets the purpose and need of the project.

## CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter discusses environmental resources within the project study area, potential impacts to environmental resources as a result of the project, and required mitigation for impacted resources. The project corridor is comprised of US-89, also known as State Street, from 11400 South to 10600 South. The study area is approximately 200 feet wide for evaluation of impacts to any environmental resources of the proposed improvements. The study area varied from the 200-foot-wide footprint for the following resources: environmental justice, economic conditions, air quality, noise, cultural, hazardous materials, and energy. These variations to the study area are described in the relevant resource sections in this chapter.

As part of the project scoping and environmental analysis, multiple environmental resources were considered,

some of which were found not to exist within the study area. Consequently, there is no further discussion regarding the following resources:

- **Prime and Important Statewide Farmland:** This resource is not present in the study area.
- **Joint Development:** There are no major projects in the study area that would allow for joint development.
- **Paleontological Resources:** This resource is not present in the study area (see clearance memo in Appendix C).
- **Section 6(f) Properties:** This resource is not present in the study area.
- **Soils and Geology:** The study area is within an urban setting and geologic hazards are not a concern.
- **Wild and Scenic Rivers:** This resource is not present in the study area.

**FIGURE 3.0-1 REPRESENTATIVE VIEW OF THE STUDY AREA**



### 3.1 Land Use and Zoning

The FHWA Technical Advisory T6640.8A states that environmental documents should assess the consistency of project alternatives with adopted land use and transportation plans for the area.

#### 3.1.1 Affected Environment

##### 3.1.1.1 Current Land Use

The study area is primarily in Sandy City and extends south of 11400 South approximately 0.2 mile into Draper City. Current land use generally follows city zoning ordinances and future land use is guided by General Plans of Sandy City and Draper City. The *Sandy City General Plan* is an “official collection of the Sandy City Council’s major policies concerning future physical development” (Sandy City n.d.). The *Draper City General Plan* and accompanying land use map are an “expression of long-term community intentions regarding the future development and physical form of the community” (Draper City n.d.).

Current land uses were identified through aerial photography interpretation and field verification. The study area is highly developed with commercial and residential land uses as well as a few vacant parcels. Properties on the west side of the study area are primarily commercial uses—multiple auto dealerships, “big box” retailers, office buildings, and restaurants. Properties on the east side of the study area include various commercial, public/quasi-public, and residential land uses. Buildings on developed parcels consist of restaurants, retail stores, multi-family residences, single-family residential homes, a cemetery, and strip malls. Current land use is shown on Figure 3.1-1.

##### 3.1.1.2 Future Land Use

The study area is mostly developed with few vacant lots available for future development. According to the *Sandy City General Plan*, a primary goal with respect to land use is to

provide orderly and efficient development that will be compatible with the natural and built environment (Sandy City n.d.). The zoning ordinance and accompanying zoning map implement the goals of the general plan. On the Sandy City zoning map, vacant lots on the west side of State Street between Auto Mall Drive and 11000 South are in a commercial zoning district called the Central Business District and vacant parcels on the east side of State Street are in a residential zone called R-1-40A (Sandy City n.d.). The *Draper City General Plan* and accompanying land use map covers the study area south of 11400 South. Similar to Sandy City, the Draper City zoning ordinance implements the goals of the general plan and identifies vacant lots south of 11400 South and west of State Street as a commercial zoning district called C1.

#### 3.1.2 Environmental Consequences

##### 3.1.2.1 No-Build Alternative

###### Direct Impacts

The No-Build Alternative would not directly affect land use. State Street would remain a predominantly commercial corridor. Although congestion would make it more difficult to access properties on State Street, it is likely that undeveloped properties would still be developed consistent with the currently adopted zoning ordinances.

###### Indirect Impacts

The No-Build Alternative would not indirectly affect land use.

##### 3.1.2.2 Preferred Alternative

###### Direct Impacts

The Preferred Alternative would not directly affect land use. While some right-of-way would be acquired under the Preferred Alternative (see Section 3.4, Land Acquisitions and Relocations), State Street would remain a predominantly commercial corridor. The minor acquisition of property and the change in access (i.e., restricted left-turns) are not likely to affect the planned



development of undeveloped parcels as specified in the applicable zoning ordinances. Therefore, the Preferred Alternative would be consistent with current general plans and zoning ordinances adopted by Sandy City and Draper City.

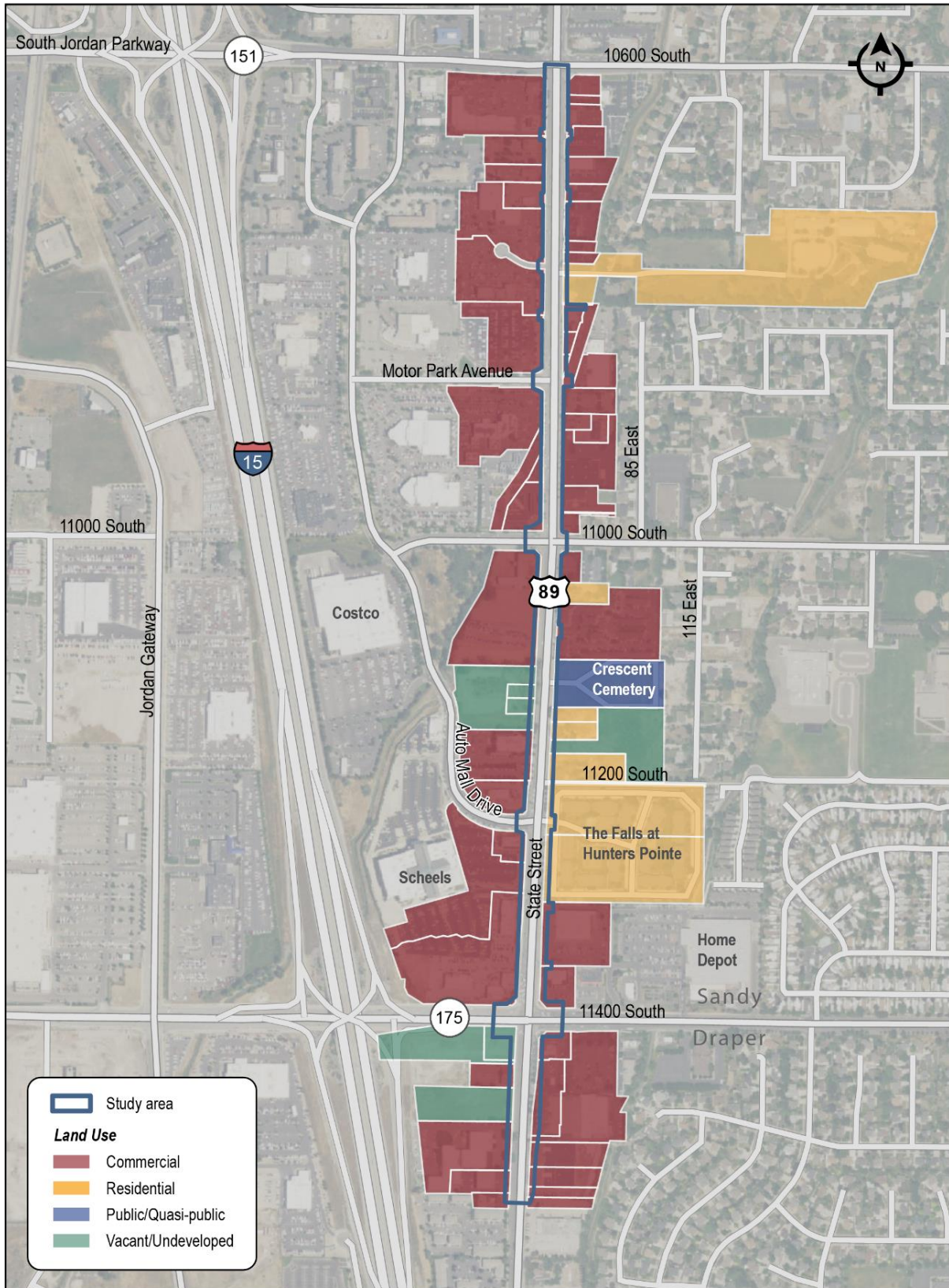
**Indirect Impacts**

The Preferred Alternative would not indirectly affect land use.

**3.1.3 Mitigation**

No mitigation is proposed.

**FIGURE 3.1-1, LAND USE IN THE STUDY AREA ALONG US-89 (STATE STREET)**



## 3.2 Social Impacts

This section describes the social environment and discusses how the project alternatives would affect community character and cohesion, travel patterns and accessibility, and the availability of public facilities and utilities. Social environment is often discussed in terms of community cohesion or the degree to which individuals have a sense of belonging to their community. A person's sense of belonging to a community is highly variable and difficult to measure, which makes defining community cohesion subjective and difficult. This analysis focuses on elements commonly associated with community cohesion, which forms the basis for establishing the current cohesion in the study area, and helps determine the potential beneficial or adverse effects the project would have on the cohesion of the community. Title 23 USC Section 109(h) requires UDOT to identify potential effects on the social environment, specifically destruction or disruption of community cohesion and the availability of public facilities and services. FHWA's Technical Advisory T6640.8A further states UDOT should consider changes in travel patterns and accessibility; impacts of alternatives on highway and traffic safety; and beneficial or harmful effects on the elderly, handicapped, non-drivers, transit-dependent, and minority and ethnic groups.

### 3.2.1 Community Character

Information regarding community character and cohesion was collected from the *Sandy City General Plan*, *Draper City General Plan*, and a field review conducted on February 15, 2017.

#### 3.2.1.1 Affected Environment

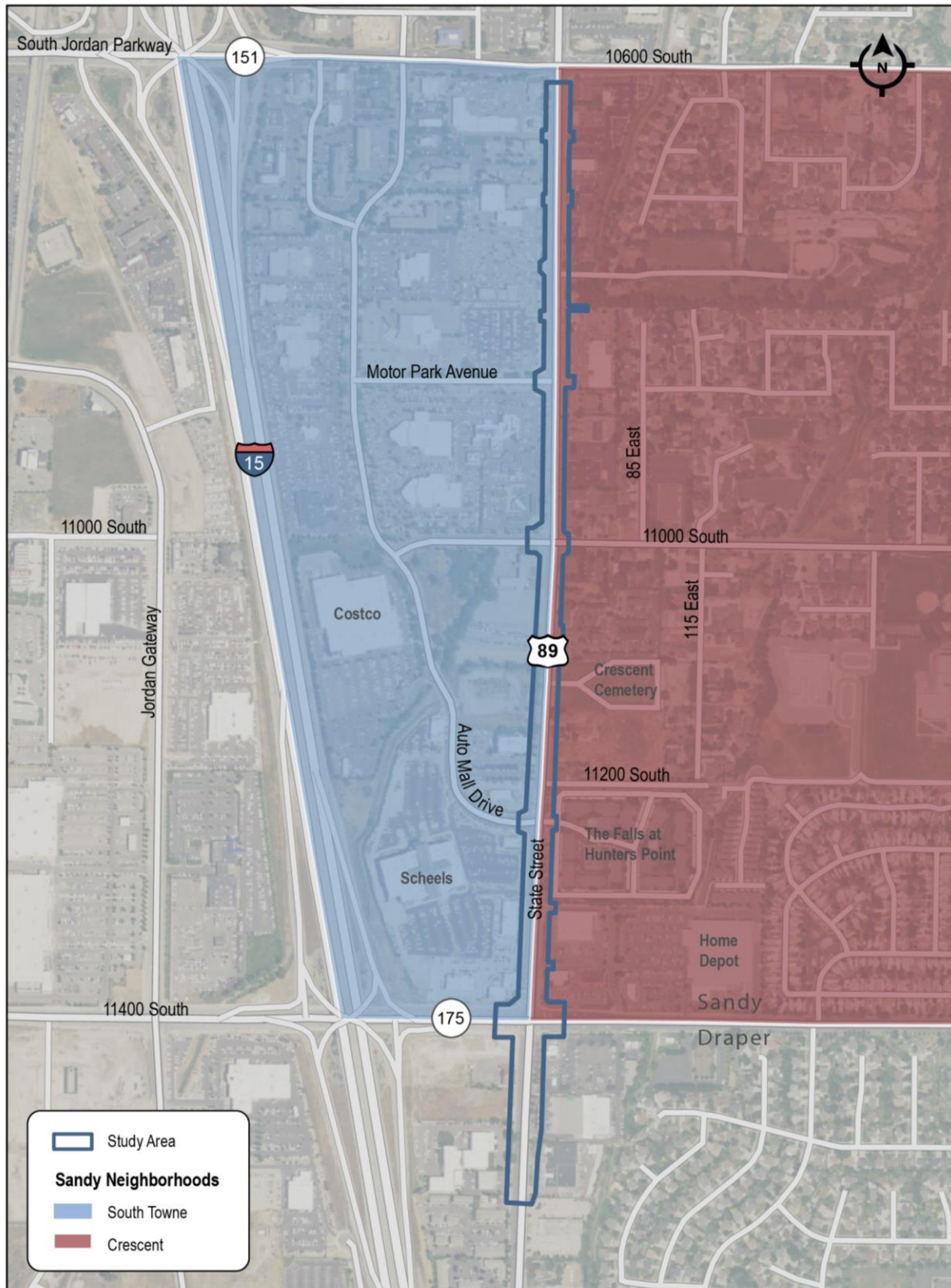
State Street is a major north–south arterial road through the commercial center of Sandy and Draper cities. The character of the study area is primarily commercial, with pockets of vacant land and residences. Commercial

uses consist of car dealerships, professional office buildings, restaurants, and small- and large-scale retail. The Crescent Cemetery, east of State Street between Auto Mall Drive and 11000 South, is the only community facility in the study area.

Sandy City is divided into 30 neighborhoods (Sandy City 2015). The South Towne and Crescent neighborhoods are the only neighborhoods intersecting the study area; State Street divides both neighborhoods. The South Towne neighborhood, west of State Street, is a commercial area. The Crescent neighborhood east of State Street is primarily residential; however, most parcels fronting State Street are commercial (see Figure 3.2-1). The Falls at Hunters Pointe is a large apartment complex east of the intersection of State Street and Auto Mall Drive.



**FIGURE 3.2-1, NEIGHBORHOODS IN THE STUDY AREA**



The *Sandy City General Plan* has several policies regarding the relationship of major arterial roads, including State Street, and the character of the community. The following policy statements relate to the project (Sandy City n.d.):

- *Discourage the bisection or isolation of neighborhoods, communities, and farms by major highways and arterial roads.*
- *State Street as a major north south corridor should be a gateway both at the north and south city limits.*
- *Landscape medians along State Street as it passes through Sandy City, to distinguish this very prominent street from other sections of State Street along the Wasatch Front.*
- *Develop “gateways” or other dramatic treatment of entrances, so drivers along major arterials know they are some place different when they enter Sandy.*

The *Draper City General Plan* does not contain specific goals or policies relating to the relationship between State Street and the character of the community (Draper City n.d.).

### 3.2.1.2 Environmental Consequences

Impacts were assessed based on whether or not the proposed project would divide (either physically or perceived) established neighborhoods, thus negatively impacting its desirability to current and future residents.

#### No-Build Alternative

##### Direct Impacts

The No-Build Alternative would not directly affect community character or cohesion.

##### Indirect Impacts

The No-Build Alternative would not indirectly affect community character or cohesion.

#### Preferred Alternative

##### Direct Impacts

The general character of State Street as described above and the cohesion of the

study area would not be impacted as a result of the Preferred Alternative. Access from State Street to the Crescent Cemetery (the only public facility in the study area) would remain as is, and existing neighborhoods would not be divided by proposed corridor improvements.

Although the purpose of the project is to improve travel demand, the proposed improvements under the Preferred Alternative would not preclude the City of Sandy from implementing policies to turn State Street into a gateway to the city. In addition, the project would add park strips and sidewalks where they do not currently exist, thereby improving the quality and appearance of the corridor. If the City of Sandy desires to construct any gateway improvements, in the future coordination with the UDOT would be required.

##### Indirect Impacts

The Preferred Alternative would not indirectly affect community character and cohesion.

### 3.2.1.3 Mitigation

No mitigation is proposed.

## 3.2.2 Travel Patterns and Accessibility

### 3.2.2.1 Affected Environment

State Street is a major north–south arterial that runs through nearly the center of the Salt Lake Valley and the commercial center of Sandy City. State Street north of 10600 South consists of seven lanes, whereas the segment of State Street considered in this study consists of five lanes. There are no bus routes along this segment of State Street (Utah Transit Authority 2016) and there are no designated bike lanes.

There are 34 accesses (driveways) in the project corridor that lead directly into shopping centers, businesses, homes, and the cemetery—23 access points are on the east side of State Street and 11 access points are on the west side. A center turn

lane allows vehicles to turn left into accesses along most of the corridor; however, left-turns are restricted for southbound drivers between 11400 South and Auto Mall Drive, and in both directions between approximately 10800 South and 10600 South.

### **3.2.2.2 Environmental Consequences**

#### **No-Build Alternative**

##### Direct Impacts

Under the No-Build Alternative, the increase in travel demand would lead to failing traffic operations for mainline State Street, at the Scheels driveway, and at the 11400 South intersection. Mobility along State Street would suffer as congestion would make it more difficult to access properties on State Street and could cause cascading delays south of 11400 South and north of 10600 South (see Section 2.2, Alternatives Purpose and Need Screening, for 2040 LOS under the No-Build Alternative).

##### Indirect Impacts

The congestion on State Street, could increase traffic on parallel arterial roads, including I-15 and 700 East, as drivers attempt to avoid the congestion on State Street.

#### **Preferred Alternative**

##### Direct Impacts

Under the Preferred Alternative, traffic would operate at LOS E or better (see Chapter 2, Alternatives). Travel demand would be accommodated and congestion would be less compared to the No-Build Alternative.

Raised medians would be added as part of the Preferred Alternative. As a result, left-turns would not be allowed into or out of 11 commercial driveways and two residential driveways. U-turns would be permitted where left-turns are allowed. Restricting left-turns could alter travel patterns in two ways: drivers would be forced to drive slightly farther to make a U-turn, and some drivers

may alter their route to avoid making a U-turn.

No driveways would be eliminated under the Preferred Alternative. No impacts to public transit are expected because there are no bus routes within the study area.

##### Indirect Impacts

The restricted left-turns on State Street could increase traffic on parallel arterial roads, including I-15 and 700 East, as drivers alter their route to avoid making a U-turn. Removing the shoulders to accommodate an additional general purpose travel lane would preclude designated bikes lanes in the future without widening and additional land acquisition.

### **3.2.2.3 Mitigation**

No mitigation is proposed.

## **3.2.3 Public Facilities**

### **3.2.3.1 Affected Environment**

This section discusses public facilities and services that use State Street within the study area, including police services, fire services, hospital and ambulance services, and schools.

#### **Police, Fire, Hospital, and Ambulance Services**

There are no police stations, fire stations or hospitals located within the study area. The Sandy Police Department headquarters are at 10000 South Centennial Parkway, which is also the police station closest to the study area. The Draper Police Department headquarters are at 1020 East Pioneer Road, about two miles southeast of the study area.

The Sandy Fire Department Station at 10765 South 700 East provides the study area with fire services. Draper City currently contracts with Unified Fire Authority to provide fire services. The nearest fire station is at 780 East 12300 South.



Alta View Hospital at 9450 South 1300 East is the only hospital in Sandy City. Lone Peak Hospital at 11800 South State Street is located south of the study area in Draper City. The City of Sandy provides ambulance services and Draper City contracts with Unified Fire Authority.

In general, State Street is considered a key emergency response route because it is a major arterial road through both cities.

#### **Schools, Libraries, Parks, and Churches**

There are no active schools, libraries, parks, or churches within the project study area. Crescent Elementary School, discussed in Section 3.12, Cultural Resources, is no longer used as a school.

#### **3.2.3.2 Environmental Consequences**

##### **No-Build Alternative**

###### Direct Impacts

Under the No-Build Alternative, emergency response times may increase by the year 2040, because of increased congestion and delay along State Street, particularly for southbound traffic that would operate at failing conditions (LOS F) in 2040. To avoid the congestion, emergency responders may elect to take a longer route, which may also result in increased response times.

###### Indirect Impacts

The No-Build Alternative would not indirectly affect emergency response times.

##### **Preferred Alternative**

###### Direct Impacts

The Preferred Alternative would improve emergency response times compared to the No-Build Alternative. Widening State Street would improve LOS and reduce delay during peak hours. As a result, traffic would be more free-flowing, which would allow emergency responders to use State Street rather than taking a longer route—as they would under the No-Build Alternative. However, restricted left-turns resulting from the raised medians

could hinder emergency responders as they respond to an incident. Construction impacts to public facilities are addressed in Section 3.17, Construction Impacts.

###### Indirect Impacts

The Preferred Alternative would not indirectly affect emergency response times.

#### **3.2.3.3 Mitigation**

No mitigation is proposed.

#### **3.2.4 Utilities**

##### **3.2.4.1 Affected Environment**

Table 3.2-1 lists each utility identified to date that either crosses or runs parallel to the project corridor according to utility type and owner (i.e., municipality or private company).

##### **3.2.4.2 Environmental Consequences**

###### **No-Build Alternative**

###### Direct Impacts

Under the No-Build Alternative, no construction would take place and there would be no impacts to utilities.

###### Indirect Impacts

The No-Build Alternative would not indirectly affect utilities.

###### **Preferred Alternative**

###### Direct Impacts

As indicated in Table 3.2-1, utilities exist within and outside of the project right-of-way and relocation of several of these utilities could occur under the Preferred Alternative. Specifically, a high concentration of utilities exists at the intersections throughout the study area.

###### Indirect Impacts

The Preferred Alternative would not indirectly affect utilities.

#### **3.2.4.3 Mitigation**

No mitigation would be required for long-term impacts.

**TABLE 3.2-1, UTILITIES WITHIN THE STUDY AREA**

Owner	Utility Type
<b>Municipality</b>	
Sandy City	Culinary Water
	Irrigation Water
	Storm Drain
<b>Private Companies</b>	
American Telephone and Telegraph	Fiber
Comcast	Cable
	Fiber
CenturyLink	Fiber
	Phone
Electric Lightwave Holdings	Fiber
MCI/Verizon Business	Fiber
Questar	Natural Gas
Rocky Mountain Power	Electricity
South Valley Sewer District	Sewer
Syringa Networks	Fiber
	Telephone
XO Communications	Fiber

Source: McNew 2017.

### 3.3 Environmental Justice

Environmental justice impacts were assessed according to Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations), and the U.S. Department of Transportation (USDOT) Order 6640.23A on Environmental Justice. These orders require UDOT to determine if the project would have a disproportionately high and adverse impact on low-income and minority populations.

The study area for environmental justice includes census block groups intersecting the project study area. Ethnicity and income data used to determine the presence of minority and low-income populations were obtained from the U.S. Census Bureau’s 2011–2015 American Community Survey (U.S. Census Bureau 2015a, 2015b). Data obtained from census block groups within the study area were compared to the overall average in Salt Lake County to identify concentrations of minority and low-income populations.

- Black/African American
- Hispanic or Latino
- Asian American
- American Indian and Alaskan Native
- Native Hawaiian and Other Pacific Islander

Although these minority groups are present in the study area, none of the census block groups have a higher minority population concentration (i.e., percentage) than Salt Lake County (27.2 percent). Table 3.3-1 provides a summary of the minority populations in the census block groups.

In addition, a database search for minority-owned businesses within Sandy and Draper cities did not result in the identification of any minority-owned businesses (UDOT 2017).

#### 3.3.1.2 Low-Income Populations

Low-income populations include family units or households with annual incomes below the poverty threshold determined by the Department of Health and Human Services. Table 3.3-2 shows the specific values for the poverty threshold for household units of varying sizes in the year 2017.

#### 3.3.1 Affected Environment

##### 3.3.1.1 Minority Populations

Minority populations in the study area include the following groups defined as minorities in USDOT Order 6640.23A:

**TABLE 3.3-1, POPULATION DATA BY RACE AND ETHNICITY**

Block Group	Total Population	Percent Minority*
Census Tract 1128.17, Block Group 2	2,988	19.6
Census Tract 1128.17, Block Group 1	3,769	18.1
Census Tract 1128.22, Block Group 1	2,744	24.1
Census Tract 1128.23, Block Group 2	1,640	13.3
Salt Lake County	1,078,958	27.2

Source: National Historic Geographic Information System 2015a; U.S. Census Bureau 2015a.

\* Includes Black, Hispanic or Latino, Native American, Asian American, Native Hawaiian/Pacific Islander, and Some Other Race.

Two of the four census block groups in the study area have a higher percentage of low-income individuals compared to Salt Lake County (12.4 percent). Table 3.3-3 provides a summary of the low-income populations in the census block groups. As shown on Figure 3.3-1, one block group is west of State Street between 11400 South and 10600 South and the other block group is east of State Street and south of 11400 South. Overall, 12.2 percent of the population in the study area is below the poverty level.

**TABLE 3.3-2, POVERTY LEVELS BY HOUSEHOLD SIZE**

Family Size	Poverty Threshold
1	\$12,060
2	\$16,240
3	\$20,420
4	\$24,600
5	\$28,780
6	\$32,960
7	\$37,140
8	\$41,320

Source: Department of Health and Human Services 2017.  
 Note: For families/households with more than eight persons, add \$4,180 for each additional person.

### 3.3.2 Environmental Consequences

#### 3.3.2.1 No-Build Alternative

##### Direct Impacts

There would be no direct impacts to minority or low-income populations under the No-Build Alternative.

**TABLE 3.3-3, POPULATION BELOW POVERTY THRESHOLD**

Block Group	Total Population	Population Below Poverty Level (percent)
Census Tract 1128.17, Block Group 2	2,988	20.3 <sup>1</sup>
Census Tract 1128.17, Block Group 1	3,769	6.1
Census Tract 1128.22, Block Group 1	2,744	8.1
Census Tract 1128.23, Block Group 2	1,640	14.3 <sup>1</sup>
Salt Lake County	1,078,958	12.4

Source: National Geographic Information System 2015b; U.S. Census Bureau 2015b.

<sup>1</sup> Block groups with a higher percentage of low-income individuals compared to Salt Lake County.

##### Indirect Impacts

There would be no indirect impacts to minority or low-income populations under the No-Build Alternative.

#### 3.3.2.2 Preferred Alternative

##### Direct Impacts

The Preferred Alternative would not result in disproportionately high and adverse effects to known minority and low-income populations because 1) there are no higher concentrations of minority populations in the study area, 2) residential property would not be acquired in census block groups with a higher percentage of low-income individuals, 3) no minority-owned businesses would be impacted; and 4) adverse impacts to noise and air quality would be similar along the entire corridor and not concentrated in one particular location.

##### Indirect Impacts

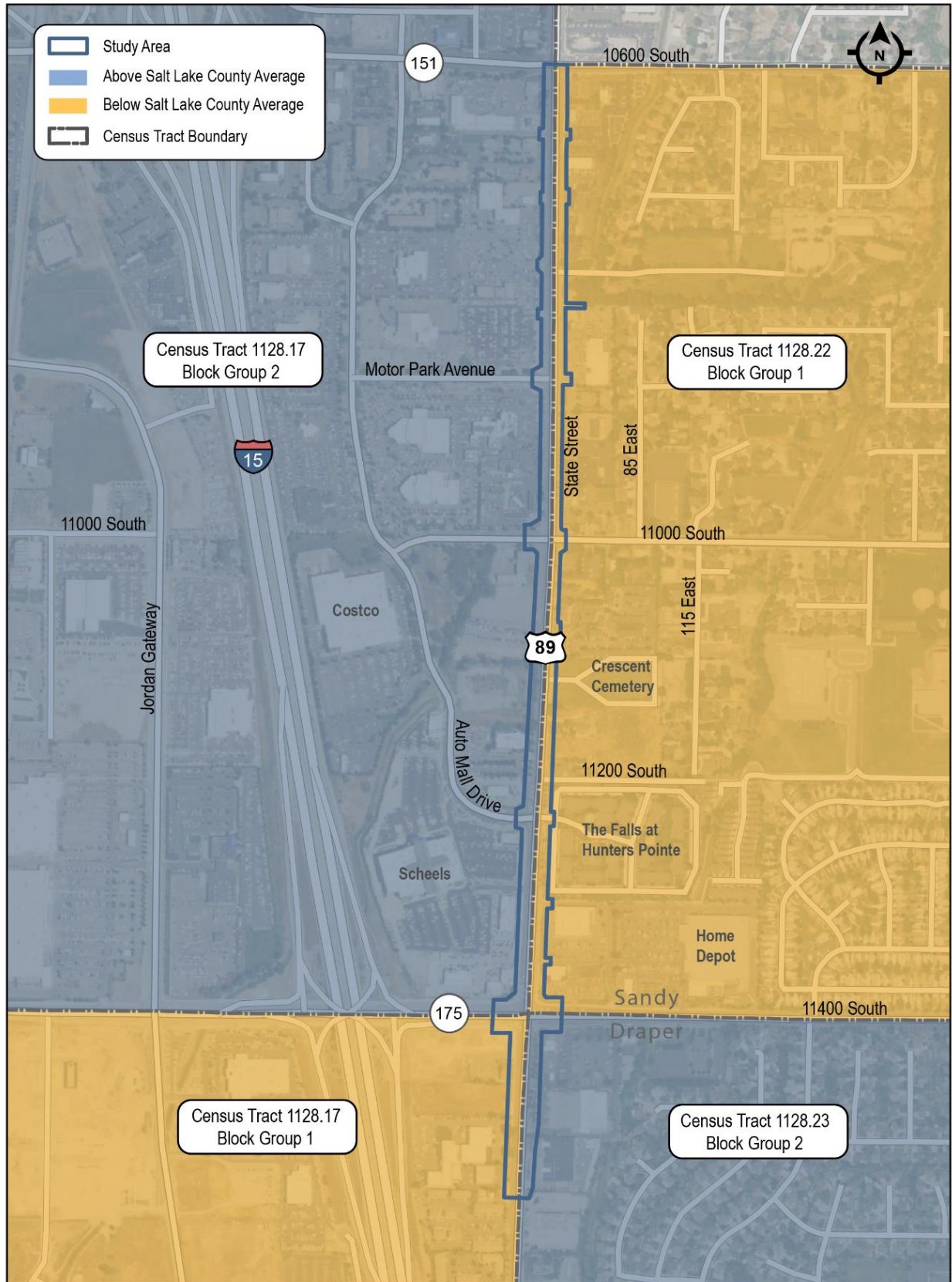
There would be no indirect impacts to minority or low-income populations under the Preferred Alternative.

#### 3.3.3 Mitigation

No mitigation is proposed.



**FIGURE 3.3-1, LOW-INCOME POPULATIONS**





### 3.4 Land Acquisition and Relocations

Land acquisition for federally funded projects is regulated by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Relocation Act). The Utah Relocation Assistance Act (Utah Administrative Code 57-12-2) is implemented by local jurisdictions and UDOT. Both acts provide a uniform policy for the fair and equitable treatment of persons displaced by the acquisition of real property by their respective governing bodies.

#### 3.4.1 Affected Environment

There are 71 parcels adjacent to State Street in the study area. The majority of these parcels are used for various commercial uses. All residential properties are on the east side of State Street. The Crescent Cemetery is also on the east side of State Street at 11105 South.

#### 3.4.2 Environmental Consequences

Impacts were quantified in three ways: 1) full acquisition of the property, 2) relocation of the business or residence, and 3) partial acquisition of the property. For this analysis, it was assumed that commercial buildings within a 10-foot setback and residences with a 20-foot setback from the proposed right-of-way line of the Preferred Alternative would be impacted and would require full acquisition of the property. Properties that overlap the 10- and 20-foot setbacks that do not have a building were quantified as partial land acquisitions.

Because right-of-way acquisitions and relocations were estimated using preliminary engineering, the impacts listed below should be considered a preliminary quantification. Future refinement of the project during final design and negotiations with property owners could result in different impacts for

specific properties than listed in Table 3.4-1; however, the impacts are expected to remain within a similar range.

##### 3.4.2.1 No-Build Alternative

###### Direct Impacts

Under the No-Build Alternative the project would not be built and would not require the full or partial acquisition of any property; therefore, there would be no direct impacts.

###### Indirect Impacts

There would be no indirect impacts under the No-Build Alternative.

##### 3.4.2.2 Preferred Alternative

###### Direct Impacts

The Preferred Alternative would result in the partial acquisition of 19 parcels (totaling approximately 0.5 acres), summarized in Table 3.4-1 and shown on Figure 3.4-1 through Figure 3.4-7. These partial acquisitions are primarily attributable to widening the intersections at 11400 South and 11000 South, and right-of-way needed to connect existing driveways to State Street. Commercial parking spaces would not be removed as the result of the partial acquisitions listed in Table 3.4-1. The Preferred Alternative would not require the full acquisition or relocation of any property.

All property acquisitions will be completed in accordance with the Uniform Relocation Act and other state and federal guidelines. These regulations include fair compensation measures for property owners and qualified renters.

###### Indirect Impacts

Indirect impacts as the result of partial property acquisition are not expected under the Preferred Alternative.

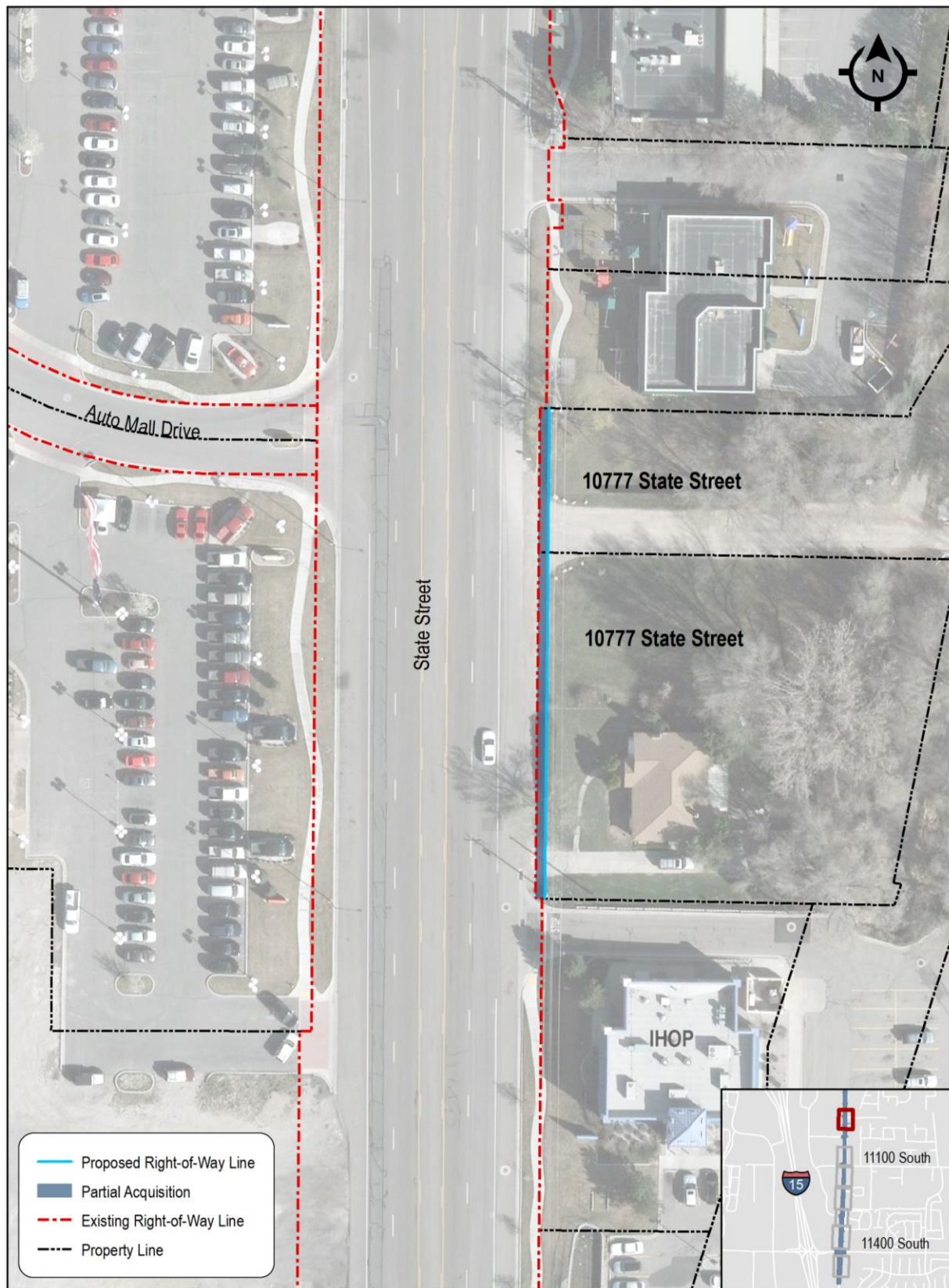
#### 3.4.3 Mitigation

No mitigation is proposed.

**TABLE 3.4-1, SUMMARY OF PARTIAL ACQUISITIONS REQUIRED BY THE PREFERRED ALTERNATIVE**

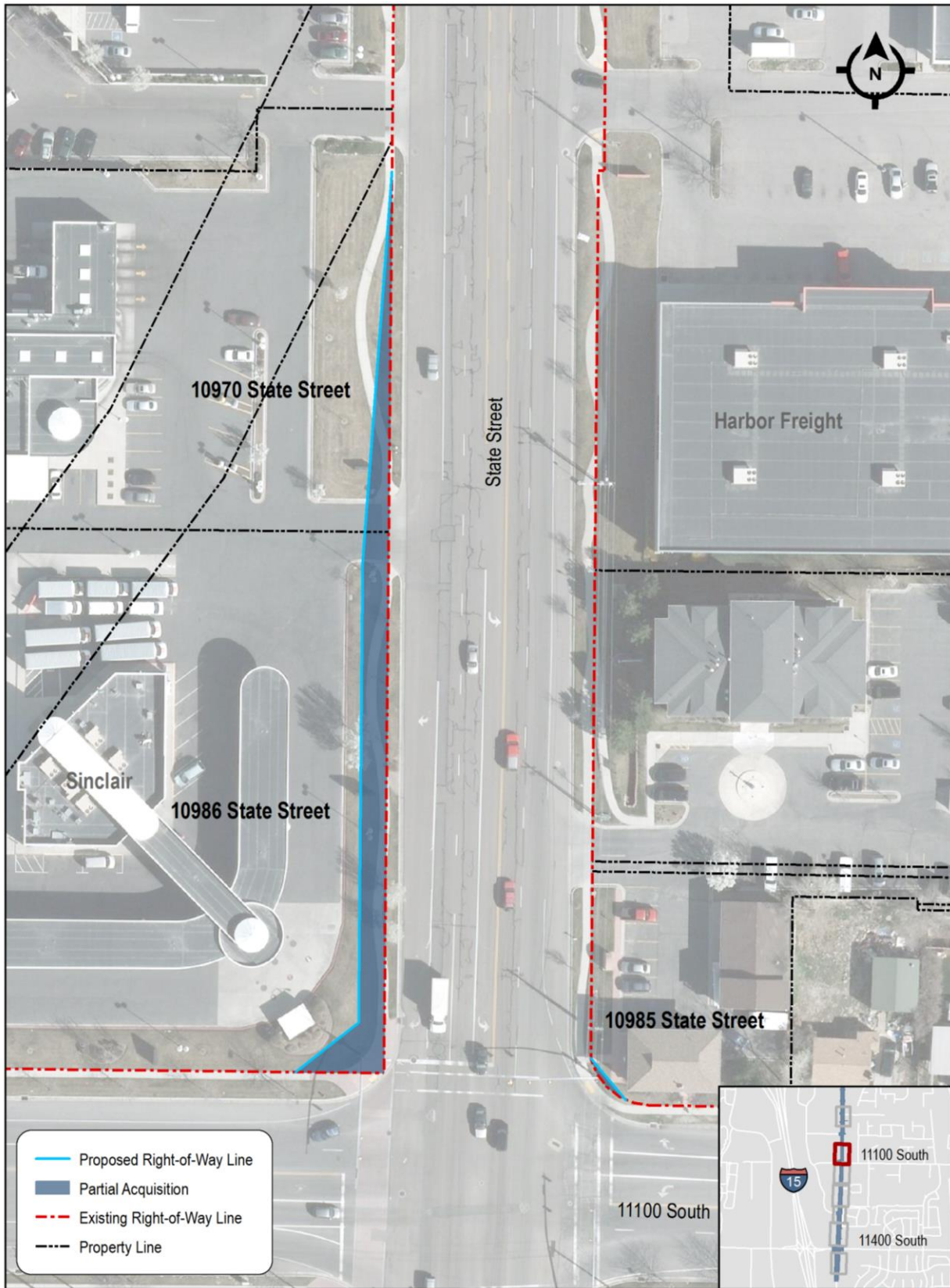
Parcel Number	Parcel Address	Land Use	Parcel Size (acres)	Partial Acquisition (square feet)
2819301019	11441 South State Street	Commercial	1.5	2,568
2819151014	17 East 11400 South	Commercial	3.1	1,949
2819151014	35 East 11400 South	Commercial	3.1	3,764
2724279008	11376 South State Street	Commercial	5.2	785
2724279008	11300 South State Street	Commercial	5.2	787
2819151012	11251 South State Street	Residential	5.8	1,379
2819151014	11251 South State Street	Residential	3.1	703
2819101011	11191 South State Street	Vacant/Undeveloped	3.4	755
2819101010	11191 South State Street	Residential	0.6	333
2819101010	11155 South State Street	Residential	0.6	426
2819101010	11145 South State Street	Residential	0.6	330
2724227006	11114 South State Street	Vacant/Undeveloped	3.0	1,058
2819104037	11075 South State Street	Commercial	4.7	1,443
2819101037	11015 South State Street	Commercial	0.5	127
2818354064	10985 South State Street	Commercial	0.3	57
2713476046	10986 South State Street	Commercial	1.1	3,892
2713476046	10970 South State Street	Commercial	1.1	1,076
2818301020	10777 South State Street	Residential	0.6	946
<b>Total</b>			44.2	22,371 (0.5 acres)

**FIGURE 3.4-1, POTENTIAL RIGHT-OF-WAY ACQUISITIONS (1 OF 7)**

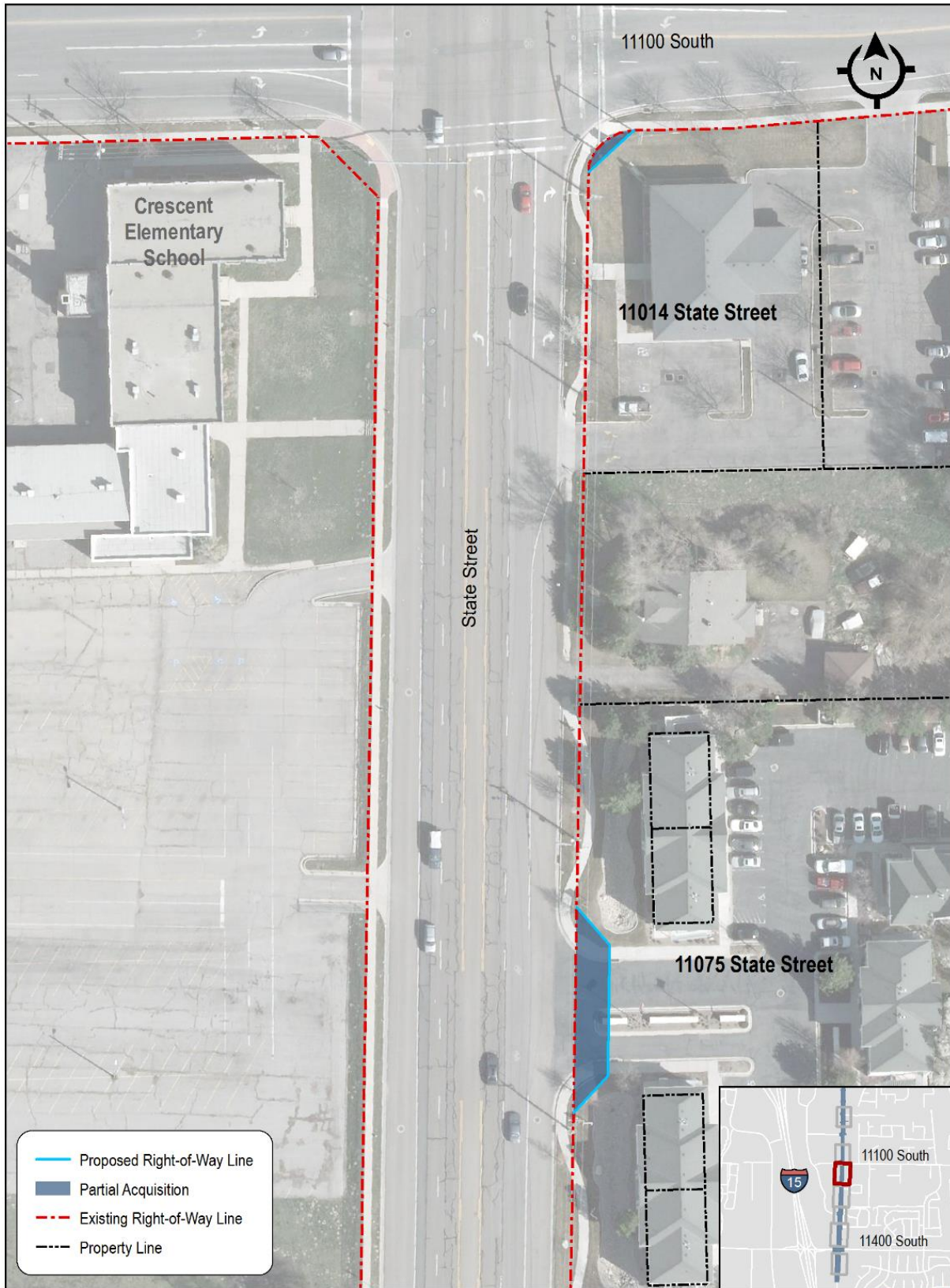




**FIGURE 3.4-2, POTENTIAL RIGHT-OF-WAY ACQUISITIONS (2 OF 7)**

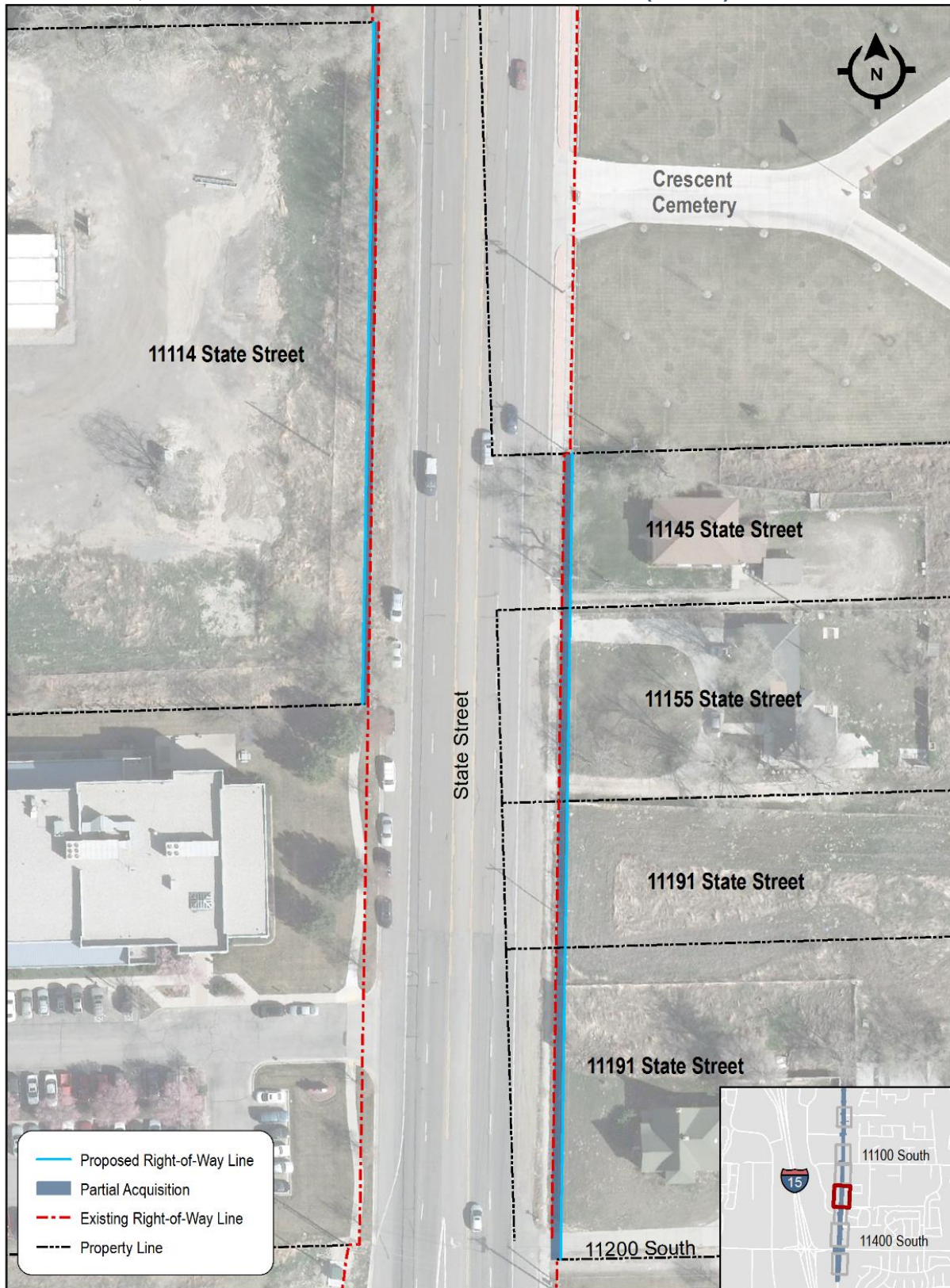


**FIGURE 3.4-3, POTENTIAL RIGHT-OF-WAY ACQUISITIONS (3 OF 7)**

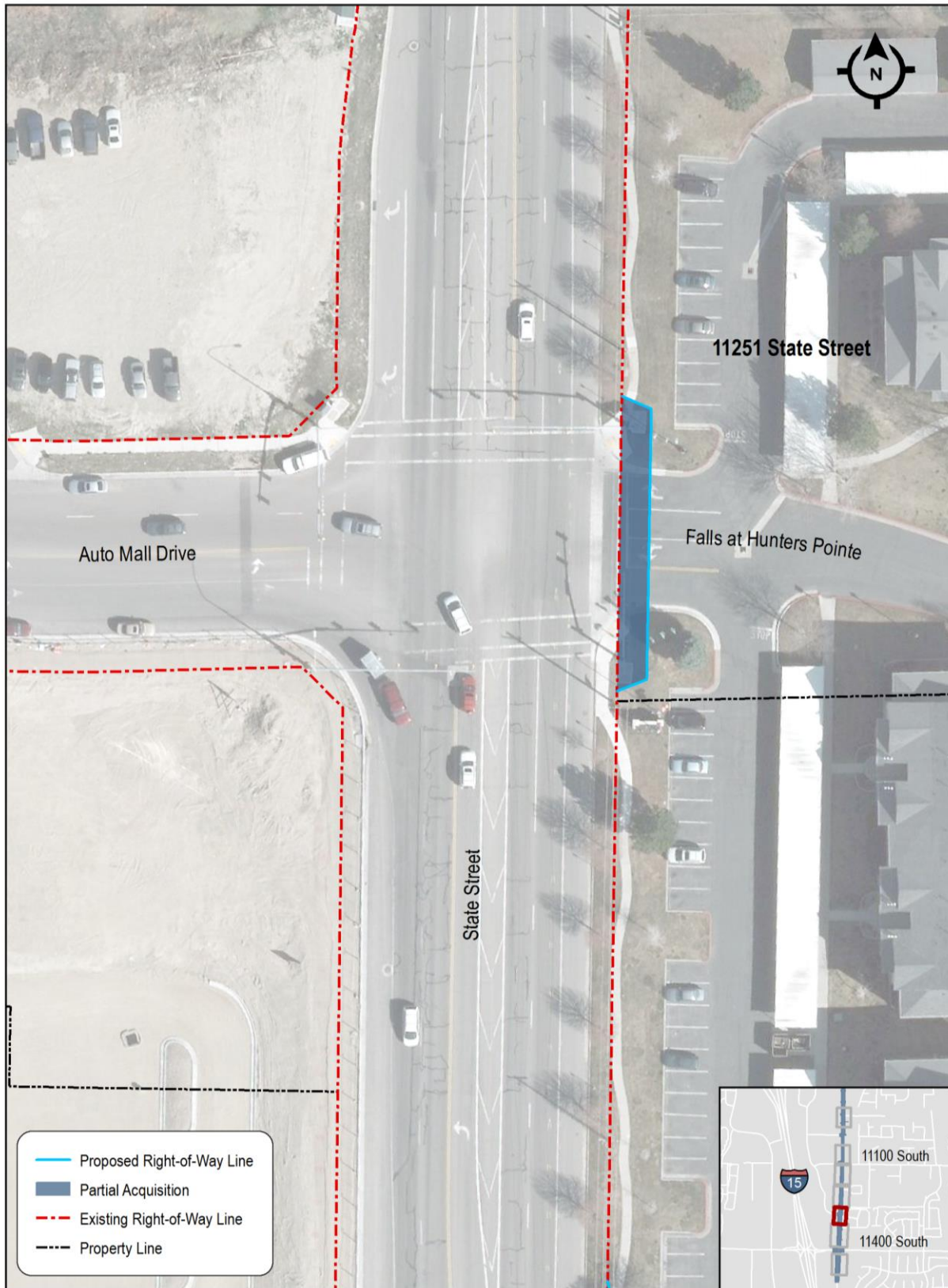




**FIGURE 3.4-4, POTENTIAL RIGHT-OF-WAY ACQUISITIONS (4 OF 7)**

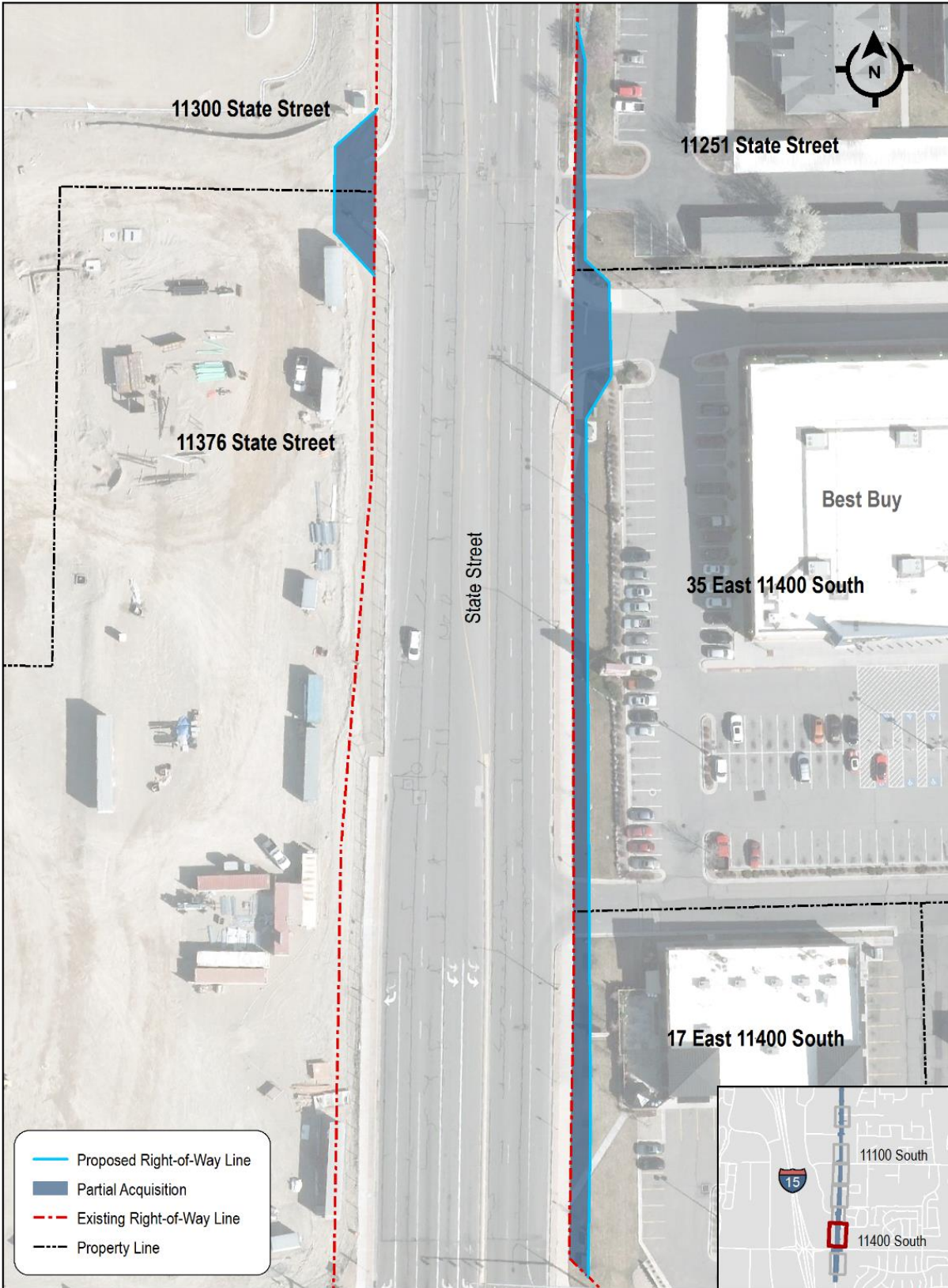


**FIGURE 3.4-5, POTENTIAL RIGHT-OF-WAY ACQUISITIONS (5 OF 7)**

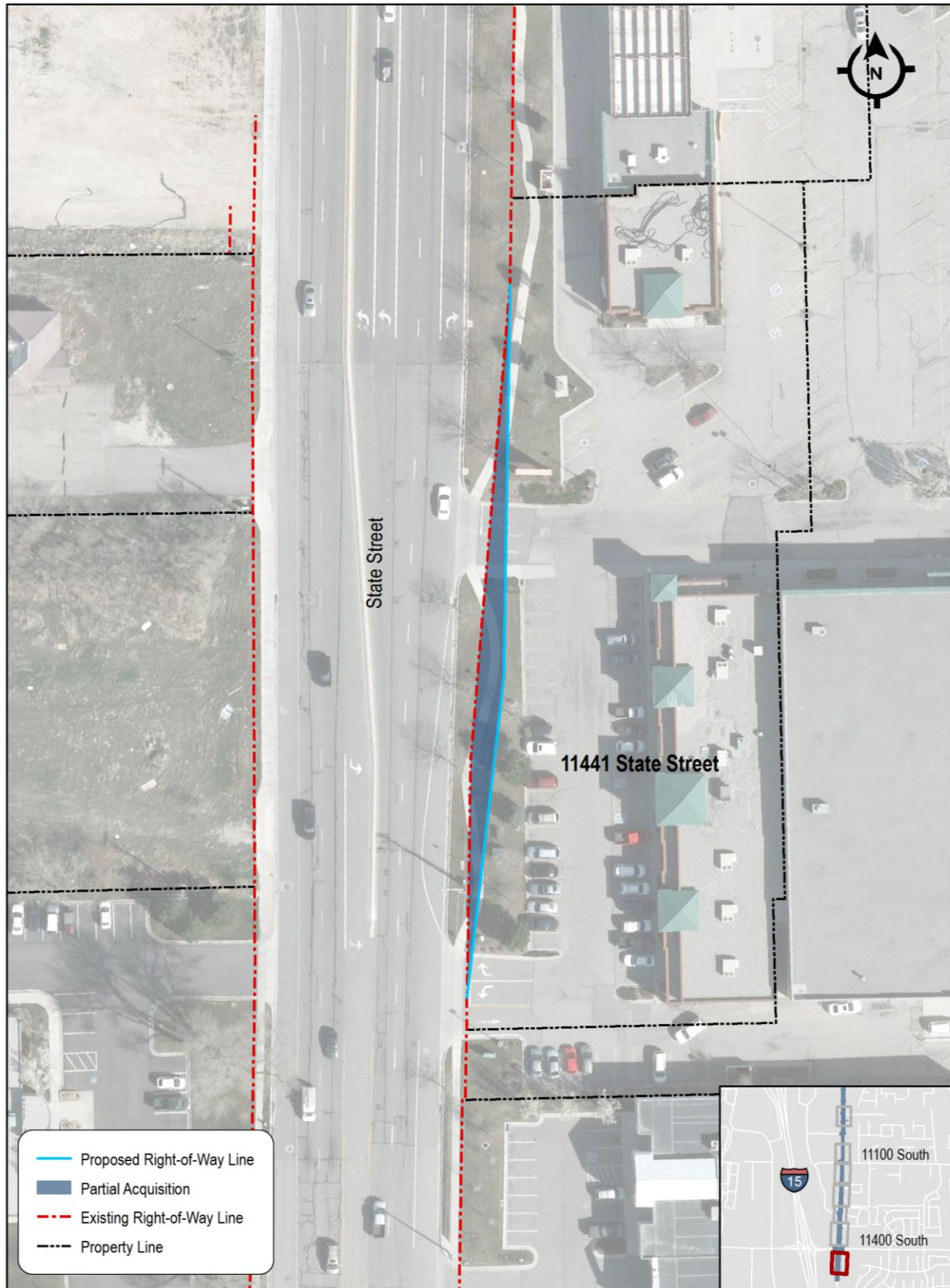




**FIGURE 3.4-6, POTENTIAL RIGHT-OF-WAY ACQUISITIONS (6 OF 7)**



**FIGURE 3.4-7, POTENTIAL RIGHT-OF-WAY ACQUISITIONS (7 OF 7)**





### 3.5 Economic Conditions

This section describes the local and regional economic context and the effects the project alternatives may have on economic indicators such as population growth, employment, and tax revenue. Information regarding economic conditions in the study area was obtained from the Utah Governor’s Office of Planning and Budget (GOPB), Sandy City, Draper City, and the Utah State Tax Commission. Demographic and economic data were collected at both the county and city levels for the purpose of this analysis.

#### 3.5.1 Affected Environment

##### 3.5.1.1 Population

Data from the Utah GOPB forecasted a 46 percent population increase in Salt Lake County from 2010 to 2040 (GOPB 2017). Projections for Sandy City and Draper City suggest a 20 and 40 percent respective increase, comprising about 11 percent of Salt Lake County’s 2040 population.

##### 3.5.1.2 Employment/Businesses

Several large employers in Salt Lake County are located within the Sandy City or Draper City limits. However, none of the five largest employers listed in Table 3.5-1 for either city are located within the study area. Large employers in the study area include Home Depot, Scheels, All Sports, and Costco.

About 100 businesses are located within or adjacent to the study area. There are 34 accesses (driveways) in the project corridor that lead directly into shopping centers, businesses, and the cemetery—15 access points are on the east side of State Street and 11 are on the west side. A center turn lane allows vehicles to turn left into accesses along most of the corridor; however, left-turns are restricted for southbound drivers between 11400 South and Auto Mall Drive, and in both directions between approximately 10800 South and 10600 South.

**TABLE 3.5-1, LARGEST EMPLOYERS IN SANDY AND DRAPER CITIES**

Sandy City Largest Employers			Draper City Largest Employers		
Employer	Employees	Type	Employer	Employees	Type
Canyons School District	4,000–5,000	Education	Utah State Prison	1,000–1,999	Government
General Dynamics Information	1,000–1,999	Call Center	eBay	1,000–1,999	Information Technology
Becton Dickinson	1,000–1,999	Medical Products	EMC Corporation	500–999	Information Technology
Xerox Commercial Solutions	500–999	Data Processing	Progressive Finance	500–999	Finance
Sandy City	500–999	Municipal Government	1-800 Contacts	500–999	Online Retail

Source: Sandy City 2017; Draper City 2016.



Figure 3.5-2 shows the types and percentages of businesses identified within the study area. The retail and hospitality industries (including restaurants and hotels) comprise about 80 percent of the total number of area businesses. While representing only about eight percent of the total businesses, the various automobile dealerships located along State Street and Auto Mall Drive encompass a large portion of the study area.

**TABLE 3.5-2. PERCENT OF COUNTY TAX DISTRIBUTION**

County/ Municipality	Tax Revenue (dollars)	Percent of County
Salt Lake County	356,471,567	100
Sandy City	25,354,082	7.11
Draper City	13,273,635	3.72

From July 2015 through August 2016, the Utah State Tax Commission distributed approximately \$38.6 million to both municipalities (see Table 3.5-2). Payments are generated through various taxable

resources—liquor, telecom, energy, sales, and transient room taxes. Together, Sandy City and Draper City comprised about 11 percent of the total disbursements within Salt Lake County.

**3.5.2 Environmental Consequences**

**3.5.2.1 No-Build Alternative**

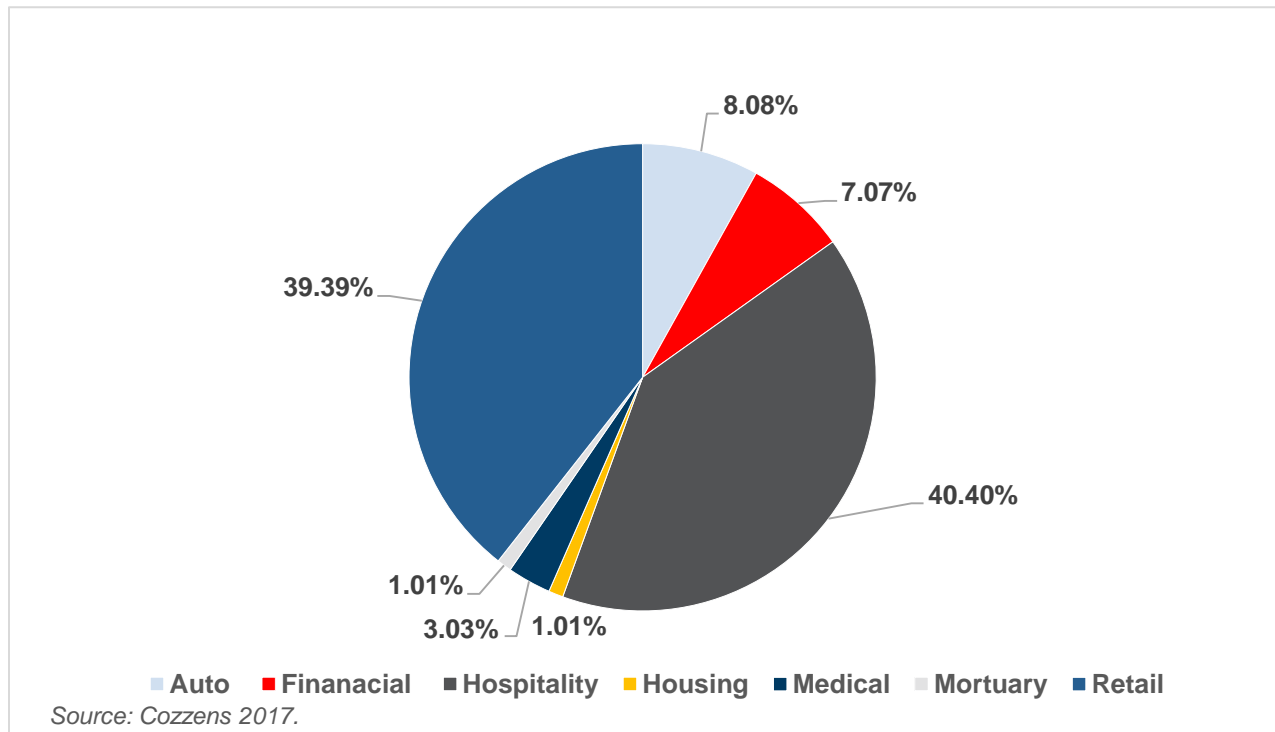
**Direct Impacts**

Under the No-Build Alternative, existing commercial activities and trends would continue to occur. As a result, congestion would continue to increase, potentially making the study area less attractive, resulting in traffic shifting to less congested corridors.

**Indirect Impacts**

Under the No-Build Alternative, increased congestion within the study area could make the corridor less attractive for smaller, non-regional businesses, potentially decreasing or delaying future investment along the corridor.

**FIGURE 3.5-2, BUSINESS TYPES WITHIN THE STUDY AREA**



### 3.5.2.2 Preferred Alternative

#### Direct Impacts

Compared to the No-Build Alternative, the Preferred Alternative would improve traffic operations and would minimize future travel delay. However, access to businesses throughout the corridor would be modified by the addition of raised center medians, converting much of the corridor to right-in and right-out turns along State Street. Some vehicles entering and exiting driveways would have to make U-turns to complete their desired movement. U-turns would be permitted where left-turns are allowed. No business driveways would be closed under the Preferred Alternative. While the proposed improvements may be seen as a minor inconvenience to some drivers, the change in access is not anticipated to adversely affect commercial operations adjacent to the corridor. Overall, a reduction in congestion and improved mobility within the study area would have a positive effect on the corridor's economic viability.

#### Indirect Impacts

Corridor and congestion improvements would maintain the corridor as an attractive destination for a variety of users. As a result, interest in development and redevelopment opportunities adjacent to the corridor could potentially increase.

### 3.5.3 Mitigation

No mitigation is proposed.

## 3.6 Bicycle and Pedestrian Considerations

For the purpose of this analysis, pedestrian and bicycle resources include sidewalks, pathways, bike lanes, bike routes, and trails. Existing and planned pedestrian and bicycle resources were identified through an online data search.

Pedestrian and bicyclist considerations were analyzed in accordance with 23 USC 217 –

*Bicycle and Pedestrian Walkways*, which states that transportation projects shall provide consideration for safety and contiguous routes for bicyclists and pedestrians. FHWA policies, UDOT Policy 7-117, the Americans with Disabilities Act (ADA), and the American Association of State Highway and Transportation Officials provide guidance or requirements for bicycle and pedestrian facilities on transportation projects.

### 3.6.1 Affected Environment

The *Sandy City Trails Master Plan* (2013), was used to identify the existing and planned pedestrian bicycle resources (including multi-use trails) within the study area. These resources are outlined in Table 3.6-1 and shown on Figure 3.6-1. Dedicated north-south bike facilities currently do not exist along State Street. 11400 South and 10600 South are designated as primary east-west pedestrian and bicycle corridors within Sandy City. Signalized pedestrian crossings are currently located at four signalized intersections at State Street and 11400 South, 11000 South, Auto Mall Drive, and 10600 South). There are existing sidewalks on both sides of State Street, with the exception of two gaps, one on the west side of State Street across from Crescent Cemetery and the other on the east side at about 10800 South (Figure 3.6-2).

The East Jordan Canal Multi-purpose Trail is a regional trail, planned to ultimately run from 7800 South to 11400 South. It connects several commercial developments, Rio Tinto Stadium and the Utah Transit Authority's TRAX line. In addition, the trail also connects to several planned or existing trails. In coordination with Sandy City, UDOT has determined that this is a Section 4(f) recreational trail. See Section 3.13, Section 4(f), for additional details.

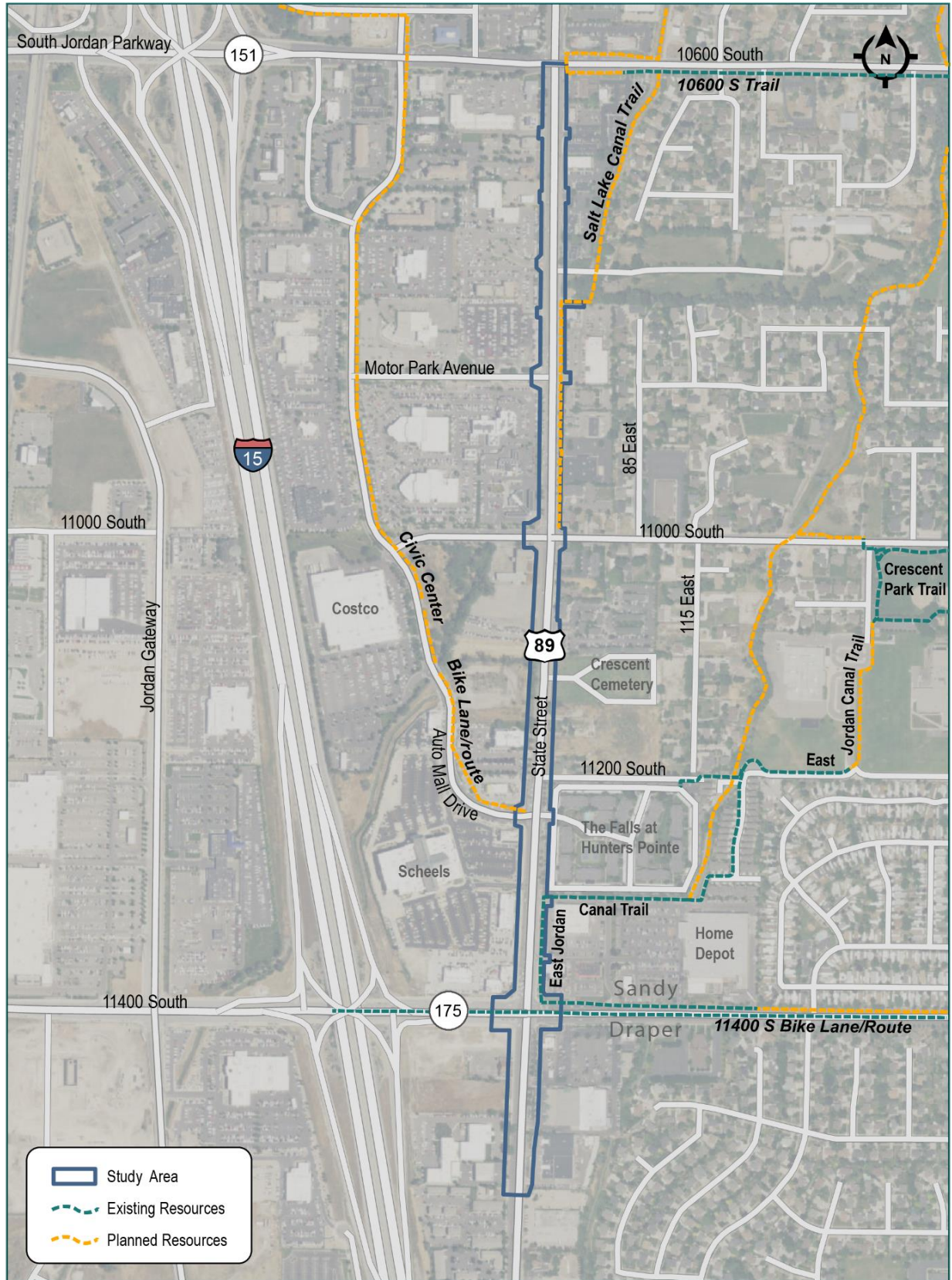
**TABLE 3.6-1, EXISTING AND PLANNED PEDESTRIAN AND BICYCLE RESOURCES**

Facility	Description	
<b>Existing Resources</b>		
<b>Trails</b>	East Jordan Canal Multi-purpose Trail	The portion of the East Jordan Canal Multi-purpose Trail within the project study area begins on 11400 South and runs north along State Street as an 8-foot-wide sidewalk parallel to the roadway for approximately 575 feet, where it connects to the east–west running sidewalk behind Best Buy (at approximately 11300 South). The trail then runs east along a 10-foot multi-use path at 11300 South.
	10600 South Multi-purpose Trail	The 10600 South Multi-purpose Trail connects State Street to Wasatch Boulevard via Dimple Dell Road.
<b>Bike Lanes</b>	11400 South	11400 South is a primary east–west running cycling corridor with bike lanes present from Day Break to 1300 East. Within Sandy and Draper cities, bike lanes begin at State Street and run along 11400 South to 1300 East.
<b>Sidewalks</b>	Sidewalks exist on both sides of State Street along the majority of the corridor. Any deficiencies or discontinuities are noted as follows (see Figure 3.6-2): <ul style="list-style-type: none"> <li>▪ Approximate 350-foot gap north of 11170 South on the west side of State Street.</li> <li>▪ Approximate 170-foot gap at 10800 South on the east side of State Street. The sidewalk turns to a gravel shoulder as it fronts a residential property.</li> </ul>	
<b>Pedestrian Crossing Facilities</b>	11400 South at State Street	Signalized intersection, parallel line crosswalks between signals, pedestrian signal heads, and push buttons.
	Auto Mall Drive at State Street	Signalized intersection, parallel line crosswalk between northeast and northwest corners and southeast and southwest corners, pedestrian signal heads, and push buttons.
	11000 South at State Street	Signalized intersection, parallel line crosswalk between eastbound/westbound/southbound signals and textured pavers westbound, pedestrian signal heads, push buttons
	10600 South at State Street	Signalized intersection, parallel line crosswalk between signals, pedestrian signal heads, push buttons
<b>Planned Resources</b>		
<b>Jordan and Salt Lake Canal Trail</b>	This trail is a proposed 10-foot-wide multi-purpose trail between State Street and the Porter Rockwell Trail from 11000 South to 9000 South.	
<b>Civic Center Bike Lane/Route</b>	A proposed dedicated bike lane/route that will follow Auto Mall Drive, across 10600 South, and around the Sandy Promenade.	
<b>11400 South Bike Route and Trail</b>	This trail is proposed to run from State Street to 1700 East, where it will connect to the Wasatch Multi-purpose Trail.	

Source: Sandy City 2013.



**FIGURE 3.6-1, EXISTING AND PLANNED PEDESTRIAN AND BICYCLE RESOURCES**





**FIGURE 3.6-2, SIDEWALK DEFICIENCIES WITHIN THE STUDY AREA**



### **3.6.2 Environmental Consequences**

#### **3.6.2.1 No-Build Alternative**

##### **Direct Impacts**

While impacts to existing or planned pedestrian and bicycle resources would not occur as result of the No-Build Alternative, existing gaps in the sidewalk along State Street would remain, thus perpetuating the lack of pedestrian connectivity within the study area.

##### **Indirect Impacts**

No indirect impacts to pedestrian or bicycle facilities are anticipated as a result of the No-Build Alternative.

#### **3.6.2.2 Preferred Alternative**

##### **Direct Impacts**

Under the Preferred Alternative, planned improvements such as adding curb and gutter, park strips and five-foot-wide sidewalks will ensure contiguous ADA-compliant pedestrian accommodations throughout the study area. Existing six-foot-wide sidewalks on the east side of State

Street would be reduced to five-feet, however this width still meets ADA standards. The existing portion of the East Jordan Canal Multi-purpose Trail along State Street between 11400 South and approximately 11300 South will be shifted to the east as a result of the Preferred Alternative. In this location, the eight-foot-wide trail will be replaced with a sidewalk of similar width.

##### **Indirect Impacts**

Under the Preferred Alternative, existing shoulders will be removed to accommodate general purpose lanes. As a result, adding future bike lanes on State Street would be impeded due to a lack of right-of way. Should UDOT wish to widen State Street to add bike lanes, additional right-of-way would need to be acquired.

#### **3.6.3 Mitigation**

No mitigation is proposed.

### 3.7 Air Quality

Air quality is assessed on both the regional and project levels. Air pollution originates from various sources, with industry and internal combustion engines being the most prevalent. Changes in traffic patterns are a primary concern when determining the air quality impact of a new highway facility or the improvement of an existing highway facility.

#### 3.7.1 Regulatory Setting

Ambient air quality in the project vicinity is regulated by the Environmental Protection Agency (EPA) and the Utah Department of Environmental Quality (UDEQ) Division of Air Quality (DAQ). These agencies establish and enforce the regulations governing outdoor air pollutant concentrations and contaminant emissions from air pollution sources.

##### 3.7.1.1 National Ambient Air Quality Standards

The Clean Air Act, amended in 1990, requires EPA to set National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) for pollutants considered harmful to public health and the environment. The NAAQS were established as the official ambient air quality standards for Utah. The following six primary, or criteria, pollutants were established to monitor air quality: carbon monoxide (CO), particulate matter (PM), ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), lead (Pb), and sulfur dioxide (SO<sub>2</sub>). PM is broken into two categories: PM with a diameter of 10 micrometers or less (PM<sub>10</sub>) and PM with a diameter of 2.5 micrometers or less (PM<sub>2.5</sub>). Table 3.7-1 lists the NAAQS thresholds in terms of averaging time, level of measurement, and form (i.e., instances when an exceedance of a NAAQS would occur) for the six criterial pollutants. Per the EPA's definitions, primary standards "provide public health protection, including protecting the health of 'sensitive' populations such as asthmatics, children, and the elderly." Secondary

standards "provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings" (EPA 2016).

Areas in which air quality meets (i.e., is below) the NAAQS listed in Table 3.7-1 for a given pollutant are considered "in attainment" for that pollutant, and areas exceeding the NAAQS listed in Table 3.7-1 are "nonattainment" areas. A "maintenance" area is an area that was previously a nonattainment area and has subsequently been re-designated as an attainment area.

##### 3.7.1.2 Greenhouse Gases

Greenhouse gases are both naturally occurring and by-products of human activities. These gases trap reflected heat in the atmosphere that would otherwise pass through. Industrialization and the burning of fossil fuels are the primary reasons for increased emissions of greenhouse gases. Motor vehicles are a large producer of greenhouse gases, as the burning of petroleum fuels is a primary producer of carbon dioxide, a greenhouse gas. Individual projects typically have little effect on regional emission levels of greenhouse gases. There are currently no NAAQS for greenhouse gases and no regional or project-level conformity requirements associated with greenhouse gases.



**3.7.2 Affected Environment**

The UDEQ DAQ operates a network of air quality monitoring stations throughout Utah. Stations are strategically placed to measure

both neighborhood and industrial air quality. The nearest air quality monitoring location to the project area is the Hawthorne station at 1675 South 600 East in Salt Lake City.

**TABLE 3.7-1 NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)**

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		Primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		Primary and Secondary	Rolling 3-month average	0.15 µg/m <sup>3</sup> (1)	Not to be exceeded
Nitrogen Dioxide (NO <sub>2</sub> )		Primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years Annual mean
		Primary and Secondary	1 year	53 ppb (2)	
Ozone (O <sub>3</sub> )		Primary and Secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	PM <sub>2.5</sub>	Primary	1 year	12.0 µg/m <sup>3</sup>	Annual mean, averaged over 3 years
		Secondary	1 year	15.0 µg/m <sup>3</sup>	Annual mean, averaged over 3 years
		Primary and Secondary	24 hours	35 µg/m <sup>3</sup>	98th percentile, averaged over 3 years
	PM <sub>10</sub>	Primary and Secondary	24 hours	150 µg/m <sup>3</sup>	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO <sub>2</sub> )		Primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Source: EPA 2016.

Note: Units of measurement for the NAAQS are represented in parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air (µg/m<sup>3</sup>).

- (1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m<sup>3</sup>) as a calendar quarter average) also remain in effect.
- (2) The level of the annual NO<sub>2</sub> standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.
- (3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O<sub>3</sub> standards additionally remain in effect in some areas. Revocation of the previous (2008) O<sub>3</sub> standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.
- (4) The previous SO<sub>2</sub> standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO<sub>2</sub> standards or is not meeting the requirements of a SIP call under the previous SO<sub>2</sub> standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the required NAAQS.



**3.7.2.1 Climate**

The study area is in the southeast portion of Salt Lake County at an elevation of about 4,450 feet above mean sea level. The coldest months in Sandy City and Draper City are December and January with an average low of 22°Fahrenheit (F). The warmest month is July with an average high of 95°F. Sandy City and Draper City have a yearly average of 16 inches of precipitation, and the larger region of Salt Lake County accumulates up to 47 inches of snow each year (U.S. Climate Data 2017)

The study area is within the Salt Lake Valley, which is between the Oquirrh and the Wasatch mountains. During the winter months, both Salt Lake County and the study area experience inversion, where the topographical differences between the valley and mountain ranges cause cold air and pollution to become “trapped” in the valley. These events have led to a decrease in air quality throughout the region.

**3.7.2.2 Attainment Status**

The project area is located within Salt Lake County and is in attainment or maintenance for all criteria pollutants with the exception of PM<sub>10</sub> and PM<sub>2.5</sub> and SO<sub>2</sub> (UDEQ DAQ 2015). As shown in Table 3.7-2, Salt Lake County is currently designated as a nonattainment area for PM<sub>10</sub>, PM<sub>2.5</sub>, and SO<sub>2</sub>.

**TABLE 3.7-2 AIR QUALITY ATTAINMENT STATUS FOR SALT LAKE COUNTY**

Pollutant	Status in Salt Lake County
Carbon Monoxide (CO)	Attainment
Lead (Pb)	Attainment
Nitrogen Dioxide (NO <sub>2</sub> )	Attainment
Ozone (O <sub>3</sub> )	Maintenance
Particulate Matter (PM <sub>2.5</sub> )	Nonattainment <sup>1</sup>
Particulate Matter (PM <sub>10</sub> )	Nonattainment <sup>1</sup>
Sulfur Dioxide (SO <sub>2</sub> )	Nonattainment

Source: UDEQ DAQ 2015.

<sup>1</sup> Nonattainment is at a “moderate” status.

Regarding PM<sub>10</sub>, on November 14, 1991, Utah submitted its State Implementation Plan (SIP) for the Salt Lake County PM<sub>10</sub> nonattainment area. The SIP showed 10 years of attainment for the PM<sub>10</sub> standard. The EPA published approval of the SIP on July 8, 1994 (59 FR 35036). On December 2, 2015, the Air Quality Board adopted revisions to the SIP in the form of maintenance plans for Salt Lake County. These plans demonstrate attainment through the year 2030. The plans have been submitted to EPA, and Utah is currently awaiting approval for EPA to re-designate the areas as in attainment.

Regarding PM<sub>2.5</sub>, Utah is in compliance with the 1997 standard for PM<sub>2.5</sub>, but is not in compliance with the 2006 24-hour standard of 35 µg/m<sup>3</sup> or the 2012 annual standard 12 µg/m<sup>3</sup>. On December 3, 2014, Utah’s Air Quality Board approved a PM<sub>2.5</sub> SIP “meeting the moderate area planning requirements of both Subparts 1 and 4, of Part D, of Title 1, of the Clean Air Act.” A separate SIP was adopted for Salt Lake County under the Salt Lake City nonattainment area, which is one of three nonattainment areas in Utah. Amendments to SIP Subsections IX.H. 11, 12, and 13 were also adopted as each relates to emission limits and operating practices for large stationary sources in the Salt Lake City nonattainment area.

Salt Lake County has been in compliance with the EPA’s SO<sub>2</sub> NAAQS for over 25 years. However, Salt Lake County is still identified by the EPA as a nonattainment area for SO<sub>2</sub>. SO<sub>2</sub> is primarily produced by sources other than roadway vehicles; therefore, this project is not likely to affect concentrations of this pollutant in the project area. For this reason, SO<sub>2</sub> is not addressed further in this study.

### 3.7.3 Environmental Consequences

#### 3.7.3.1 Transportation Conformity

Federally funded road improvement projects proposed for construction within nonattainment or maintenance areas are subject to the transportation conformity regulations specified under 40 CFR 93, Subpart A. These regulations require projects in nonattainment or maintenance areas to evaluate air quality in terms of mesoscale (regional level) and microscale (road or intersection level) air quality impacts.

A regional air quality analysis reviews the area long range transportation plan—in this case *WFRC RTP 2015–2040*—to verify that all projects, including the improvements proposed in this EA, conform to the control strategies and emission levels established in the SIP. The most recent transportation conformity analyses conducted for the Salt Lake County nonattainment and maintenance areas indicate that in 2040, all regionally significant transportation projects would be within the CO, PM<sub>10</sub> and PM<sub>2.5</sub> emission budgets established in the SIP (WFRC 2016).

This project is listed in the *WFRC RTP 2015–2040 Phase I (2015–2024)* (Project S-189) and includes widening State Street from 11400 South to 10600 South from four to six lanes and is therefore a regionally conforming project. Further, this project is partially funded under the WFRC's Congestion Management Air Quality (CMAQ) Program.

#### 3.7.3.2 No-Build Alternative

##### Direct Impacts

Under the No-Build Alternative, the proposed project would not be built. This would result in increased congestion and increased vehicle idling in the study area which would lead to poorer air quality. In addition, other regionally significant transportation projects

identified in the *WFRC RTP 2015–2040* would be constructed.

##### Indirect Impacts

There would be no indirect impacts to air quality in the study area as a result of the No-Build Alternative.

#### 3.7.3.3 Preferred Alternative

##### Direct Impacts

##### Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>)

A quantitative analysis of local particulate emissions (or PM hot-spot analysis) is only required for proposed projects of a particular type which are in nonattainment or maintenance areas. According to 40 CFR 93.123(b) these project types are:

- New highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of diesel vehicles;
- Projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level-of-Service D, E, or F because of an increase in traffic volumes from a significant number of diesel vehicles related to the project;
- New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and
- Projects in or affecting locations, areas, or categories of sites which are identified in the PM<sub>10</sub> or PM<sub>2.5</sub> applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

If the project matches one of the previously listed project types in 40 CFR 93.123(b)(1), it would be considered a “project of air quality

concern.” This project is in Salt Lake County, which is an EPA-designated nonattainment area for PM<sub>10</sub> and PM<sub>2.5</sub>. However, a review of the proposed improvements to State Street indicate that this project would not be considered any of the project types noted above and is therefore not a project of air quality concern. As such, there would be no direct impacts related to PM<sub>10</sub> and PM<sub>2.5</sub> as a result of the Preferred Alternative. Additional details on PM impacts for this study can be found in the *Project-Level PM Quantitative Hot-Spot Analysis: Project of Air Quality Concern Questionnaire* (Appendix B, Avenue 2017b).

### Carbon Monoxide

This project is in a part of Salt Lake County that is in attainment for CO. No additional project-level analysis is required. Since the Preferred Alternative is predicted to operate in a primarily uncongested condition, it is unlikely that any localized exceedances of the CO standard will occur.

### Urban Air Toxics

For the Preferred Alternative, the amount of MSATs emitted would be proportional to the total vehicle miles traveled (VMT), which would be relatively equal to the No-Build Alternative—the difference in total VMT miles traveled between the Preferred Alternative and the No-Build Alternative would represent less than a 0.03 percent increase in miles. Because the purpose of the project is to reduce congestion, the MSAT emissions for the Preferred Alternative would be expected to be lower than MSAT emissions under the No-Build Alternative.

The changes to State Street as a result of the Preferred Alternative will have the effect of moving some traffic closer to nearby homes and businesses. Therefore, there may be localized areas where ambient concentrations of MSATs could be higher than under the No-Build Alternative. However, the magnitude and the duration of

these potential increases compared to the No-Build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. Additionally, these increased levels could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions).

On a regional basis, the EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

### Greenhouse Gases

At this time, no federal laws or regulations have been enacted and the EPA has not established project-level criteria or thresholds for greenhouse gas emissions. The sources and effects of greenhouse gases are global in nature, and to attempt project-level analysis of negligible increases or decreases of carbon dioxide (the primary greenhouse gas transportation-related emission) is technically infeasible. The reduction of energy consumption and the production of greenhouse gases is better addressed at the regional planning level.

### **Indirect Impacts**

There would be no indirect impacts air quality in the study area as a result of the Preferred Alternative.

### **3.7.4 Mitigation**

The improvements to mobility and resulting reduction in congestion from the project should result in lowered levels of criteria pollutants in the study area and for surrounding areas. Since the project is not predicted to cause a new exceedance of the NAAQS or worsen an existing exceedance, no mitigation is required.

### 3.8 Noise

Noise impacts for the proposed improvements were assessed in accordance with federal regulations (23 CFR 772) and the March 2017 UDOT Noise Abatement Policy (UDOT Policy 08A2-01). Additional details on the methodology and results of the noise report for this study can be found in the *US-89 (State Street) 11400 South to 10600 South Noise Assessment* (Appendix B, Lochner 2017).

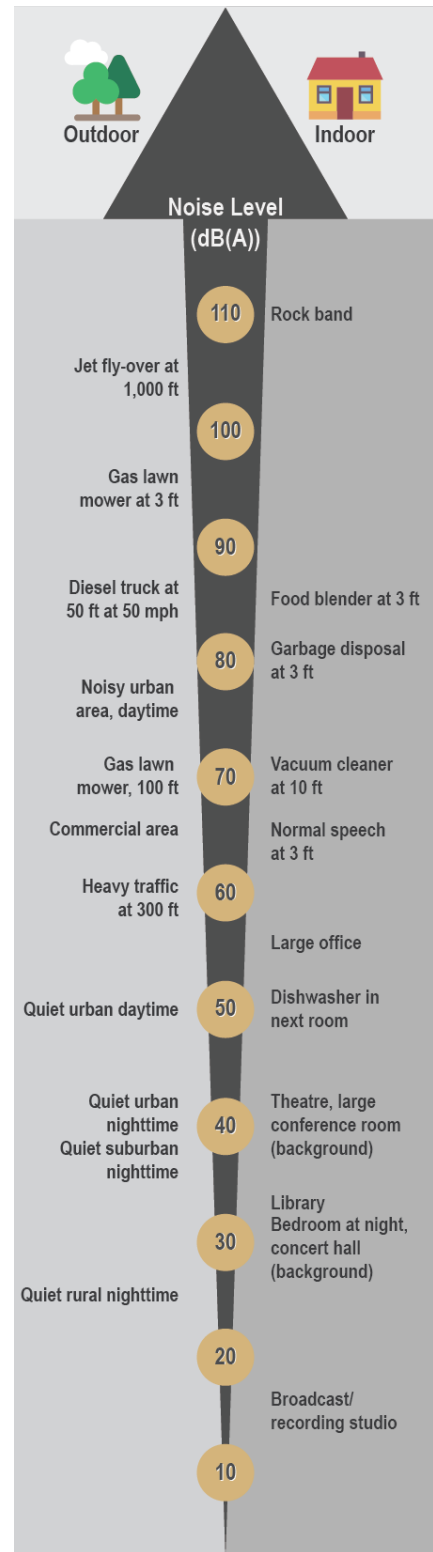
#### 3.8.1 Background

Noise is reported in decibel (dB) units; decibels are logarithmic units and as such they cannot simply be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3 dB increase. For example, if one vehicle produces 70 dB when it passes an observer, two vehicles passing simultaneously would not produce 140 dB. Instead, they would combine to produce 73 dB, the change of which is barely perceptible.

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an “A-weighted” sound level, or dB(A), can be computed based on this information.

Noise levels for traffic noise reports are typically reported in terms of A-weighted decibels or dB(A). Figure 3.8-1 illustrates typical A-weighted noise levels for various noise sources. Changes in noise of 1 to 2 dB(A) are generally not perceptible to the human ear. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB(A) in most environments. Further, a 5 dB(A) increase is

**FIGURE 3.8 1, TYPICAL A-WEIGHTED NOISE LEVELS OF COMMON SOUNDS**





generally perceived as a distinctly noticeable increase, and a 10 dB(A) increase is generally perceived as a doubling of loudness.

**3.8.2 Affected Environment**

Noise impacts for the proposed improvements were assessed in accordance with the UDOT Noise Abatement Policy (08A2-01). The policy was developed to be consistent with 23 CFR 772. Traffic noise impacts occur when the predicted noise level in the design year approaches or exceeds the Noise Abatement Criteria (NAC), or a predicted noise level substantially exceeds

the existing noise level (increase of 10 dB(A)). As listed in Table 3.8-1, the NAC represent noise levels that when approached or exceeded, require consideration of noise abatement. The NAC apply to areas having regular human use and where lowered noise levels would be a benefit.

For the purposes of the noise analysis, the study area was defined to capture the first row of non-impacted properties—about 500 feet from the edge of pavement of State Street.

**TABLE 3.8-1, NOISE ABATEMENT CRITERIA<sup>1</sup>**

Activity Category	FHWA Criteria Leq(h)	UDOT Criteria Leq(h) <sup>2</sup>	Description of Activity
A	57 (Exterior)	56 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	66 (Exterior)	Residential
C	67 (Exterior)	66 (Exterior)	Active sports areas, amphitheatres, auditoriums, campgrounds, cemeteries, daycare 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)	51 (Interior)	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (Exterior)	71 (Exterior)	Hotels, motels, offices, restaurants/bars and other developed lands, properties or activities not included in A–D or F.
F	—	—	Agricultural, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, ship yards, utilities (water resources, water treatment, electrical), and warehousing.
G	—	—	Undeveloped lands that are not permitted.

Source: UDOT Noise Abatement Policy (08A2-01).

<sup>1</sup> Hourly A-weighted sound level decibels (dB(A))

<sup>2</sup> Hourly A-weighted sound level in decibels reflecting a 1 dB(A) “approach” value below 23 CFR 772 values.

**3.8.2.1 Existing Land Uses**

The identification of land uses that could be subject to traffic and construction noise impacts from the proposed improvements is a critical part of evaluating noise impacts. Existing land uses in the study area were categorized by land use type and activity category, as defined in Table 3.8-1, and extent of frequent human use. As stated in the UDOT Noise Abatement Policy, abatement is only considered where frequent human use occurs and where a lowered noise level would be of benefit. This analysis focused on locations with defined outdoor activity areas, such as residential backyards and common use areas at multi-family residences, as well as local parks and outdoor recreation facilities. The following land uses were identified in the study area:

- Single- and Multi-family Residences: Activity Category B
- Recreational Properties/Cemetery: Activity Category C
- Restaurants with Outdoor Seating: Activity Category E

Other commercial land uses in the study area were found to not have any outdoor activities that would be considered noise-sensitive.

There are 68 receptors within the noise study area representing 169 residential properties, three restaurants with outdoor seating, one recreational area and one cemetery. The majority of these receptors are Category B, residential, while other receptor types assessed in the noise analysis were Category C and E, as defined in Table 3.8-1.

**3.8.2.2 Existing Noise Levels**

The existing noise environment in the study area is characterized in Table 3.8-2, and based on a series of field measurements taken at four locations. The measurements taken at the noise monitoring sites were used to validate the use of a noise model to predict existing and future noise levels. For all four measurement locations, model results, indicated as Traffic Noise Model (TNM) Predicted Noise Levels, were 0.6 to 13.7 dB(A) lower than the measured values. The difference can be attributed to background noise from a variety of sources including landscape maintenance (Sites B and C), a helicopter, an airplane, and nearby idling vehicles (Sites B and C). Details of the measurements can be found in the *US-89 (State Street); 11400 South to 10600 South Noise Assessment* (Appendix B, Lochner 2017).

**TABLE 3.8-2, COMPARISON OF RECORDED AND MODELED NOISE LEVELS AT SELECT MONITORING SITES**

Site	Field Measurement Location	Field Measured Noise Level dB(A)	TNM Predicted Noise Level dB(A)	Difference
A	Residence along the east side of State Street near 10800 South	68.0	67.4	-0.6
B	Residence along the north side of 11000 South near State Street	66.2	52.5	-13.7
C	Cemetery along the east side of State Street at 11105 South	64.8	57.2	-7.6
D	The Falls at Hunters Pointe Apartments on the east side of State Street at about 11251 South	54.5	52.1	-2.4

### 3.8.3 Environmental Consequences

The NAC listed in Table 3.8-1 and put forth in the UDOT Noise Abatement Policy were used to determine the degree of impact of highway traffic noise on human activity. Table 3.8-3 summarizes the results of the noise modeling analysis and indicates the number of impacted receptors for each alternative.

#### 3.8.3.1 No-Build Alternative

##### Direct Impacts

There are no direct impacts to noise levels anticipated in the study area as a result of the No-Build Alternative.

##### Indirect Impacts

There could be slight increases in future noise levels due to the increase in traffic and congestion under the No-Build Alternative, however noise levels are not expected to increase substantially (defined as a 10 dB(A) increase) from existing levels.

#### 3.8.3.2 Preferred Alternative

##### Direct Impacts

One restaurant, one isolated residence, and 30 properties located at the Falls at Hunters Pointe apartment complex, all on the east side of State Street, would be directly impacted as a result of the Preferred Alternative.

##### Indirect Impacts

There would be no indirect impacts to noise levels in the study area as a result of the No-Build Alternative.

### 3.8.4 Mitigation

The UDOT Noise Abatement Policy requires that impacted receptors be considered for

#### WHAT IS NOISE FEASIBILITY AND REASONABLENESS?

Acoustic feasibility occurs when at least 50 percent of front-row receptors experience at least a 5 dB(A) reduction in highway noise as a result of abatement. Noise abatement is considered reasonable when at least 35 percent of front-row receptors experience at least a 7 dB(A) reduction in noise and when a noise barrier costs less than \$30,000 per benefitted receptor.

noise abatement, which would be provided if it is determined to be both feasible and reasonable. Initially, noise barriers were considered for all properties that were predicted to be impacted by noise. However, noise barriers were found not to be feasible for an impacted restaurant and an isolated residence due to the location of nearby driveways and side roads. Gaps in the barrier would be required to provide access to adjacent properties and those gaps would render the barriers ineffective.

Two noise barriers were investigated to provide noise abatement to the 30 impacted properties on the east side of State Street at the Falls at Hunters Pointe apartment complex. The barriers are separated by a driveway but act as one system. This barrier system is considered feasible but not reasonable as it only produces a 7 dB(A) or greater reduction in noise for 29 percent of front-row receptors. As a result, no mitigation is proposed.

**TABLE 3.8-3, SUMMARY OF NOISE MODELING RESULTS**

Alternative	No. Impacted Properties <sup>1</sup>	Outdoor				Indoor			
		Noise Level dB(A)		Increase over Existing (dB(A))		Noise Level dB(A)		Increase over Existing (dB(A))	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Existing/ No-Build	0	46	69	N/A	N/A	N/A	N/A	N/A	N/A
Preferred	32	47	70	0	2	N/A	N/A	N/A	N/A

<sup>1</sup> In total, 31 residential properties and one restaurant with an outdoor seating area. See US-89 (State Street) 11400 South to 10600 South Noise Assessment for additional details (Appendix B, Lochner 2017).



### 3.9 Water Quality, Water Resources, and Floodplains

Water quality is regulated through the Federal Clean Water Act and the Safe Drinking Water Act. The EPA has regulatory authority of the Clean Water Act and delegates portions of its enforcement to the UDEQ's Division of Water Quality (DWQ).

Under the Safe Drinking Water Act, each public drinking water supplier must have a Drinking Water Source Protection (DWSP) plan to control potential pollution sources. Proposed projects must be in compliance with applicable total maximum daily load (TMDL) and DWSP plans. The Safe Drinking Water Act also authorizes the Sole Source Aquifer Program. This program enables the EPA to designate an aquifer as a "sole source," meaning it supplies at least 50 percent of the drinking water for its service area.

Groundwater quality is regulated under UAC R317-6. Groundwater in Utah is classified according to concentrations of total dissolved solids (TDS) and contaminants. Class IA groundwater is characterized by a TDS concentration of less than 500 milligrams per liter (mg/L). Class II groundwater is characterized by a TDS concentration between 500 and 3,000 mg/L. Neither Class IA nor Class II groundwater may have contaminant concentrations that exceed the groundwater quality standard. Floodplains are assessed in accordance with 23 CFR 650, FHWA requirements, and Executive Order 11988 Floodplain Management (42 CFR 26951), which requires agencies to reduce the risk of flood loss, to minimize the impact of floods on humans, and to restore and preserve the natural and beneficial values served by floodplains.

#### 3.9.1 Affected Environment

##### 3.9.1.1 Stormwater

Stormwater systems, including curb and gutter, catch basins, and detention ponds,

are designed to capture and collect roadway runoff during precipitation events. These systems serve three purposes: 1) remove water from the roadway surface to maintain safe operating conditions, 2) slow the volume and rate of discharge to the ultimate outfall location (typically a surface water body), and 3) allow for the collection of dissolved and suspended solids (e.g., roadway debris). The primary pollutants of concern in roadway runoff are heavy metals, inorganic salts, aromatic hydrocarbons, and suspended solids from regular highway operation and maintenance activities (FHWA 2016). On roadways which lack stormwater systems, the water sheet flows off of the roadway surface and onto the surrounding land where it infiltrates pervious areas.

The majority of the study area along State Street is lined with curb and gutter which collects and conveys water off of the roadway surface. There are four stormwater collection areas in the study area (Table 3.9-) which outfall to facilities operated by either UDOT or Sandy City. Several smaller areas, such as the vacant lot on the west side of State Street between Auto Mall Drive and 11000 South, lack curb and gutter. In these locations the roadway runoff currently sheet flows off State Street and into the open field where it infiltrates the ground surface. Some runoff also likely discharges into the Jordan and Salt Lake City Canal located on the western edge of this undeveloped parcel.

##### 3.9.1.2 Groundwater

The study area overlies the basin-fill aquifer system which underlies the Salt Lake Valley from the base of the Wasatch Range on the east to the base of the Oquirrh Mountains on the west, and the Traverse Mountains to the southwest. The base of the mountain fronts serve as the primary recharge areas and are outside of the project study area.

There are no public drinking water wells within the study area. The corridor does not

overlap DWSP zones 1, 2, or 3 for any public drinking water sources. DWSP zone 4 for the Sandy City-owned Haun well located at about 10000 South (Sego Lily Drive) and 400 East is more than one mile from the northern limit of the study area and overlaps it according to Utah Division of Drinking Water data (Figure 3.9-1).

There is one domestic groundwater well within the study area based on GIS data obtained from the Utah Division of Water Rights. It is located on the northeast corner of 11400 South and State Street.

The entire study area overlies a Class II drinking water aquifer which covers 62 percent of the Salt Lake Valley (Wallace and Lowe 2009).

**3.9.1.3 Surface Water**

There is one surface water resource within the study area—the Jordan and Salt Lake City Canal. This canal crosses State Street on a northeast-to-southwest alignment at about 10800 South. The entire segment of the canal in the study area has been piped underground and is no longer visible on the ground surface (Figure 3.9-1). The Jordan and Salt Lake City Canal is not regulated for water quality by the DWQ.

**3.9.1.4 Floodplains**

There are no Federal Emergency Management Agency (FEMA) designated floodplains within the study area.

**3.9.2 Environmental Consequences**

**3.9.2.1 No-Build Alternative**

**Direct Impacts**

Under the No-Build Alternative, no construction would take place and there would be no impacts to groundwater, surface water, or floodplains. There would be no increase in impervious area and no corresponding increase in stormwater runoff. Water which currently sheet flows off State Street and into the open field would continue to do so.

**Indirect Impacts**

There would be no indirect impacts to water quality in the study area as a result of the No-Build Alternative.

**3.9.2.2 Preferred Alternative**

**Direct Impacts**

Stormwater

The Preferred Alternative would result in a slight increase in stormwater runoff peak flow (Table 3.9-1) as a result of adding a new impervious area associated with the additional southbound turn lane at 11400 South and including curb and gutter throughout the corridor. Increased loading in TDS from the Preferred Alternative would be minimal because roadway runoff is not a known source of TDS. Under the Preferred Alternative, all runoff would be captured and added to the existing storm drain system. Improved drainage and runoff capture would be a benefit of the Preferred Alternative.

**TABLE 3.9-1, EXISTING AND PREFERRED ALTERNATIVE RUNOFF ASSOCIATED BY DRAINAGE BASINS WITHIN THE STUDY AREA**

Outfall Location	Existing/No-Build Roadway Runoff (cfs)*	Preferred Alternative Roadway Runoff (cfs)*	Increase (cfs)	Percentage Increase
SR-151 (10600 South)	10.9	12.0	1.1	9.6
11000 South	6.0	9.0	3.0	50.6
Auto Mall Drive (11235 South)	1.4	1.9	0.5	34.6
SR-175 (11400 South)	5.5	5.7	0.2	3.7

\* Based on conceptual-level engineering design using a 10-year storm event.



**FIGURE 3.9-1, WATER RESOURCES IN THE STATE STREET STUDY AREA**



Groundwater Resources and Groundwater Quality

The Preferred Alternative would not result in any impacts to aquifers, groundwater recharge, or groundwater quality because the project is not in a groundwater recharge area. The Preferred Alternative would not result in any impacts to drinking water sources because the project does not overlap DWSP zones 1 or 2 for any public drinking water sources, and because the project does not conflict with any DWSP plans.

Surface Water

The addition of a travel lane in each direction of State Street as part of the Preferred Alternative would not require widening the roadway footprint at the location of the Jordan and Salt Lake City Canal. As such there would be no direct impacts to surface water resources as a result of the Preferred Alternative. Further, since stormwater will not discharge to the Jordan and Salt Lake City Canal, no surface water quality impacts to the canal are anticipated as a result of the Preferred Alternative.

Floodplains

Since there are no floodplains within the study area there would be no direct impacts to floodplains as a result of the Preferred Alternative.

**Indirect Impacts**

There would be no indirect impacts to water resources in the study area as a result of the Preferred Alternative.

**3.9.3 Mitigation**

No mitigation is proposed. See Section 3.17, Construction Impacts, for additional details.



### 3.10 Wetlands and Waters of the U.S.

Wetlands and waters of the U.S. are regulated by the U.S. Army Corps of Engineers (USACE) in accordance with Section 404 of the Clean Water Act. Section 404 authorizes USACE to regulate certain activities involving the discharge of dredged or fill material into waters of the U.S. Responsibility for administering and enforcing Section 404 is shared with the EPA.

Executive Order 11990 Protection of Wetlands directs federal agencies to take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. Executive Order 11990 also directs federal agencies to avoid undertaking or providing assistance to new construction in wetlands unless there are no practicable alternatives to such construction and the proposed action includes all practicable measures to minimize adverse impacts.

**WATERS OF THE U.S.**

Waters of the U.S. are rivers, streams, lakes, wetlands, and other special aquatic sites (e.g., mudflats, playas, vegetated shallows, and pool and riffle complexes) that are regulated by the U.S. Army Corps of Engineers (USACE).

#### 3.10.1 Affected Environment

The U.S. Fish and Wildlife Service National Wetlands Inventory (USFWS) GIS dataset and the United States Geological Service National Hydrography Dataset streams layer were reviewed to determine the potential for wetlands and non-wetland waters of the U.S. to exist in the study area (USFWS 2017).

#### 3.10.1.1 Wetlands

There are no wetlands present within the study area (Figure 3.9-1).

#### 3.10.1.2 Waters of the U.S.

There is one non-wetland waters of the U.S. within the study area—the Jordan and Salt Lake City Canal located on a northeast-to-southwest alignment at State Street and about 10800 South. The entire segment of the canal in the study area has been piped underground and is no longer visible on the ground surface (Figure 3.9-1).

### 3.10.2 Environmental Consequences

#### 3.10.2.1 No-Build Alternative

##### Direct Impacts

Under the No-Build Alternative, no construction would take place and therefore there would be no direct impacts to waters of the U.S.

##### Indirect Impacts

There would be no indirect impacts to waters of the U.S. as a result of the No-Build Alternative.

#### 3.10.2.2 Preferred Alternative

##### Direct Impacts

##### Wetlands

Because there are no wetlands in the study area there would be no direct impacts as a result of the Preferred Alternative.

##### Waters of the U.S.

The addition of a travel lane in each direction of State Street as part of the Preferred Alternative does not require widening the roadway footprint at the location of the Jordan and Salt Lake City Canal. Roadway runoff that currently sheet flows to the vacant lot on the west side of State Street between Auto Mall Drive and 11000 South would be captured with proposed curb and gutter. As such there would be no direct impacts to waters of the U.S. as a result of the Preferred Alternative.

**Indirect Impacts**

There are no indirect impacts to wetlands or waters of the U.S as a result of the Preferred Alternative.

**3.10.2.3 Mitigation**

No mitigation is proposed.

### 3.11 Threatened & Endangered Species, Wildlife, & Utah Sensitive Species

Threatened, endangered, proposed, and candidate, and species are protected under the Endangered Species Act of 1973 as amended and administered by the USFWS. The Endangered Species Act prohibits federal agencies from authorizing, funding, or carrying out actions that may “jeopardize the continued existence of” listed endangered or threatened species or cause “adverse modification” to designated critical habitat without a permit.

The Migratory Bird Treaty Act of 1918 prohibits the “take” of any migratory birds, their eggs, feathers, or nests. The following actions constitute a take: capturing, killing, pursuing, hunting, wounding, or transporting any migratory bird, their parts, nests, or eggs in the United States.

The Utah Division of Wildlife Resources (UDWR) of the Utah Department of Natural Resources manages the state’s wildlife population and their habitats. UDWR works to conserve sensitive species to prevent them from becoming listed as threatened or endangered.

#### 3.11.1 Affected Environment

The study area is largely urban and includes ornamental trees and shrubs as well as mixed vegetation typically associated with residential properties. An Information for Planning and Consultation (IPaC) Resources report was prepared using the USFWS IPaC tool to identify what threatened and endangered species and migratory birds may be present in the study area (USFWS 2017).

##### 3.11.1.1 Threatened and Endangered Species

The IPaC report identified four threatened and endangered species that could be present; they are listed in Table 3.11-1.

No designated or proposed critical habitat occurs within the study area.

##### 3.11.1.2 Utah Sensitive Species, Migratory Birds, and Wildlife

An evaluation of the study area for wildlife and Utah Sensitive Species was conducted by the UDOT Wildlife Biologist (West 2017 and Chapter 4, Comments and Coordination). The evaluation included a search of the UDWR Utah Natural Heritage Program database, USFWS IPaC database, GIS shapefile data and recent aerial imagery. No species were identified as occurring within the study area.

**TABLE 3.11-1, USFWS LIST OF THREATENED AND ENDANGERED SPECIES WITH POTENTIAL TO OCCUR IN STUDY AREA**

Common Name	Scientific Name	Status	Critical Habitat Within the Study Area	Potential to Occur in the Project Area
Western yellow-billed cuckoo	<i>Coccyzus americanus</i>	Threatened	No	None; no suitable habitat in the study area
June sucker	<i>Chasmistes liorus</i>	Endangered	No	None; no suitable habitat in the study area
Canada lynx	<i>Lynx canadensis</i>	Threatened	No	None; no suitable habitat in the study area
Ute ladies'-tresses (ULT)	<i>Spiranthes diluvialis</i>	Threatened	No	None; no suitable habitat in the study area

Source: USFWS 2017.

### **3.11.2 Environmental Consequences**

#### **3.11.2.1 No-Build Alternative**

##### **Direct Impacts**

Under the No-Build Alternative, the project would not be constructed and therefore there would be no impacts to threatened, endangered species and their designated critical habitats, or Utah Sensitive Species. There would also be no direct impacts to wildlife or migratory birds as a result of the No-Build Alternative.

##### **Indirect Impacts**

There would be no indirect impacts to threatened and endangered species and their designated critical habitats, Utah Sensitive Species, wildlife, or migratory birds as a result of the No-Build Alternative.

#### **3.11.2.2 Preferred Alternative**

##### **Direct Impacts**

Per a clearance memo prepared by the UDOT Wildlife Biologist (West 2017) the Preferred Alternative would have No Effect on threatened, endangered species and their designated critical habitats, Utah Sensitive Species, wildlife, or migratory birds.

##### **Indirect Impacts**

The Preferred Alternative would have no indirect impacts to threatened and endangered species, critical habitat, Utah Sensitive Species, or other wildlife.

#### **3.11.3 Mitigation**

No mitigation is proposed.



### 3.12 Cultural Resources

The National Historic Preservation Act (NHPA) outlines the national policy and procedures regarding historic properties (i.e., districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places [NRHP]). Section 106 of the NHPA requires federal agencies to consider the effects of their undertakings on such properties by following regulation 36 CFR 800, which is issued by the Advisory Council on Historic Preservation.

Properties are considered historic if they are 50 years or older. However, UDOT guidelines call for a 45-year age cutoff for considering resources historical—an effort to accommodate a time lag between the compilation of the survey data and actual construction associated with the undertaking. As such, a cutoff date of 1970 was used to designate and record structures as historical.

#### WHAT IS AN HISTORIC PROPERTY?

Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the National Register of Historic Places [36 CFR 800.16].

In accordance with 36 CFR 60, cultural resources must be evaluated for their eligibility for the NRHP under four specific criteria and with consideration for seven elements of integrity. A cultural resource site or building may be considered eligible for the NRHP if it meets one or more of the following criteria:

- A. Is associated with events that have made a significant contribution to the broad patterns of our history; or
- B. Is associated with the lives of persons significant in our past; or

- C. Embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction; or
- D. Has yielded, or may be likely to yield, information important in prehistory or history.

Sites and buildings considered potentially eligible under one of the four previous criteria must also be evaluated for integrity of location, design, setting, materials, workmanship, feeling, and association. To be eligible for the NRHP, a site/building must possess integrity of those elements directly related to the criterion or criteria under which it would be determined eligible.

In Utah, historic buildings are further evaluated using a rating system established by the Historic Preservation program at the Utah State Historic Preservation Office (SHPO). This rating system assigns one of the following four ratings to buildings based on the degree to which they retain historical and architectural integrity:

- Eligible/Significant (ES): built within the historic period and retains integrity; excellent example of a style or type; unaltered or only minor alterations or additions; individually eligible for the [NRHP] under criterion “C”; also buildings of known historical significance.
- Eligible/Contributing (EC): built within the historic period and retains integrity; good example of a style or type, but not as well-preserved or well-executed as “ES” buildings; more substantial alterations or additions than “ES” buildings, though overall integrity is retained; eligible for [the NRHP] as part of a potential historic district or primarily

for historical, rather than architectural, reasons.

- Ineligible/Non-Contributing (NC): built during the historic period but has had major alterations or additions; no longer retains integrity.
- Ineligible/Out-of-period (OP): constructed outside the historic period.

In accordance with NHPA's regulation 36 CFR 800.4, the study area for archaeological resources and historic buildings is referred to as the area of potential effects (APE) for direct and indirect impacts. The APE consists of the project footprint and properties adjacent to the project, as shown on Figure 3.12-1.

A file search of cultural resources was conducted in November 2016, including a database search of the Utah Division of State History (UDSH) online Preservation Pro system within the project study area and extending 0.5 mile. Surveys for cultural resources were conducted in November 2016 and January 2017. The file search indicated that 18 previous surveys have been undertaken within 0.5 mile of the current survey area and more than 80 structural properties and nine archaeological sites have had previous surveys and other efforts to document historic structures.

Information regarding cultural resources within the study area can be found in the survey reports dated January 19, 2017 and February 18, 2017 (see Appendix B, Ellis 2017a, 2017b).

### 3.12.1 Affected Environment

#### 3.12.1.1 Archaeological Resources

Two archaeological sites were identified as a result of the cultural resource survey. The Jordan & Salt Lake City Canal (42SL214) is a late-1800s irrigation canal that passes through the project study area at about 10800 South. The entire segment of the canal in the study area has been piped

underground and is no longer visible on the ground surface. The segment of the canal in the project study area appears to have been most recently documented in 2004. At that time, the segment of the canal in the current survey area was documented as being entirely underground. As such, the existing 2004 documentation accurately reflects the nature of the site as encountered during the current survey, and therefore no update to the site record was prepared.

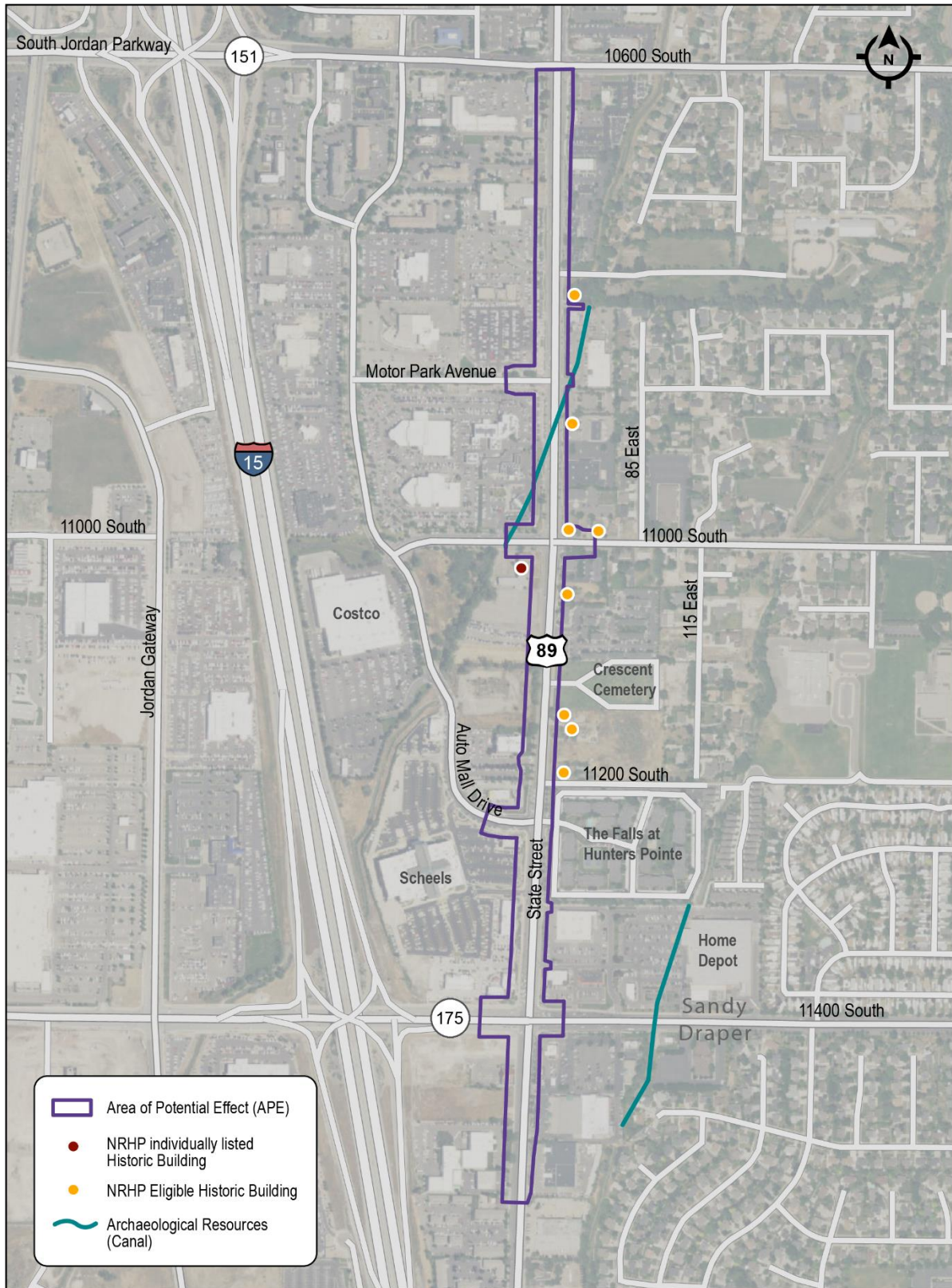
Site 42SL214 as a whole was previously determined to be eligible for the NRHP, though the segment in the current study area no longer contributes to that eligibility as a result of piping the site underground.

The East Jordan Canal (42SL290) is a late-1870s irrigation canal within the survey area, but outside of the study area. The portion south of 11400 South is an open, unlined channel. The channel remains open as the canal trends to the south-southwest until it is piped for a short distance under a commercial property before re-emerging in an open channel north of the commercial property. The canal passes under 11400 South through a modern culvert. The entirety of the canal was previously determined eligible for the NRHP. The segment of the canal south of 11400 South contributes to the overall eligibility of the site; however, the segment north of 11400 South no longer contributes because piping most the canal underground has resulted in the isolation of a 25-foot long open channel.

#### 3.12.1.2 Historic Resources

Eleven historic structures were identified within the APE as a result of the cultural resource survey—eight are eligible for listing and one is listed in the NRHP (Figure 3.12-1). Descriptions of the eligible or listed properties are summarized in Table 3.12-1.

**FIGURE 3.12-1, ELIGIBLE HISTORIC PROPERTIES WITHIN THE AREA OF POTENTIAL EFFECTS**





**3.12.2 Environmental Consequences**

Effects to cultural resources were assessed based on the standards of the NHPA and its implementing regulation, 36 CFR 800. Under these regulations, the three categories for classifying effects to archaeological and historic resources are as follows:

- **No Historic Properties Affected:** the project will have no effect on the property
- **No Adverse Effect:** the project will have no effect upon the property that would alter the characteristics qualifying it for inclusion on or eligibility for the NRHP
- **Adverse Effect:** the project may alter any of the characteristics qualifying the property for inclusion on the NRHP

UDOT prepared and the Utah SHPO concurred with the determination of effects to historic properties in the Determination of Eligibility and Finding of Effect (DOEFOE) on May 11, 2017. This correspondence is available in Appendix C.

**3.12.2.1 No-Build Alternative**

Direct Impacts

Under the No-Build Alternative, no construction would take place and there

would be no direct impacts to archaeological or historic resources.

Indirect Impacts

Under the No-Build Alternative, no construction would take place and there would be no indirect impacts to archaeological or historic resources.

**3.12.2.2 Preferred Alternative**

Direct Impacts

Direct impacts to historic properties resulting from the Preferred Alternative are detailed in Table 3.12-1. Of the nine historic properties eligible for listing on the NRHP, seven would be impacted by the Preferred Alternative, two (11020 South and 11031 South State Street) would be minor impacts in the form of a temporary construction easement. Overall, the Preferred Alternative would result in No Adverse Effect to all seven properties.

The Preferred Alternative would also cross over the Jordan and Salt Lake City Canal; however, the canal is piped in this location and proposed improvements are not expected to impact the canal, resulting a No Historic Properties Affected Section 106 determination.

**TABLE 3.12-1, NRHP-LISTED AND NHRP-ELIGIBLE HISTORIC PROPERTIES WITHIN THE AREA OF POTENTIAL EFFECT**

Property Address	Date Built, Type, Style	NRHP Eligibility	Description of Impact	Section 106 Effect Determination
<b>10831 South State Street</b>	c. 1947, one-story early ranch/minimal traditional single-family dwelling	EC/Eligible	Widening State Street would require the acquisition of 668 square feet from the property and a temporary construction easement of 1,701 square feet. The historic building would not be affected.	No Adverse Effect
<b>10907 South State Street</b>	c. 1931, one-story period cottage single-family dwelling	EC/Eligible	No impact	No Historic Properties Affected



**TABLE 3.12-1, NRHP-LISTED AND NHRP-ELIGIBLE HISTORIC PROPERTIES WITHIN THE AREA OF POTENTIAL EFFECT**

Property Address	Date Built, Type, Style	NRHP Eligibility	Description of Impact	Section 106 Effect Determination
<b>10985 South State Street</b>	c. 1935, two-story Bungalow exhibiting Bungalow style	EC/Eligible	Widening of State Street would require the acquisition of 57 square feet. The historic building would not be affected.	No Adverse Effect
<b>11020 South State Street</b>	c. 1930, Crescent Elementary School, one-story horizontal school exhibiting Art Deco & Post WWII: Other styles, clad in striated brick.	ES/Eligible NRHP-listed	Widening of State Street would require a temporary construction easement of 14,732 square feet. The historic building would not be affected.	No Adverse Effect
<b>11031 South State Street</b>	c. 1912, one-and-a-half-story Bungalow single-family dwelling exhibiting Bungalow and Arts & Crafts styles.	EC/Eligible	Widening of State Street would require a temporary construction easement of 841 square feet. The historic building would not be affected.	No Adverse Effect
<b>11145 South State Street</b>	c. 1912, one-story Bungalow single-family dwelling exhibiting Bungalow and Arts & Crafts styles.	EC/Eligible	Widening of State Street would require the acquisition of 330 square feet and a temporary construction easement of 893 square feet. The historic building would not be affected.	No Adverse Effect
<b>11155 South State Street</b>	c. 1927, One-story Other Residential Type single-family dwelling exhibiting Other style.	EC/Eligible	Widening of State Street would require the acquisition of 426 square feet and a temporary construction easement of 1,261 square feet. The historic building would not be affected.	No Adverse Effect
<b>11191 South State Street</b>	c. 1932, One-and-a-half-story Period Cottage single-family dwelling exhibiting English Tudor Revival style.	EC/Eligible	Widening of State Street would require the acquisition of 755 square feet and a temporary construction easement of 2,794 square feet. The historic building would not be affected.	No Adverse Effect

**TABLE 3.12-1, NRHP-LISTED AND NHRP-ELIGIBLE HISTORIC PROPERTIES WITHIN THE AREA OF POTENTIAL EFFECT**

Property Address	Date Built, Type, Style	NRHP Eligibility	Description of Impact	Section 106 Effect Determination
45 East 11000 South	c. 1956, one-story Early Ranch (with carport); Minimal Traditional single-family dwelling	EC/Eligible	No impact	No Historic Properties Affected

Indirect Impacts

Continued development of properties along the State Street corridor, including the conversion of historic properties to commercial land uses could occur as a result of the Preferred Alternative. This development would be consistent with past development trends for the area.

**3.12.3 Mitigation**

As the project would have no adverse effect, no mitigation is proposed. Efforts to avoid or minimize impacts to historic properties were incorporated into the Preferred Alternative and are outlined in the DOEFOE. As a result of the avoidance and minimization measures, all historic properties present along the project corridor would either not be impacted or would be subject to limited impacts, which warrant a finding of No Adverse Effect under Section 106.

### 3.13 Section 4(f)

Section 4(f) of the USDOT Act of 1966 was enacted to preserve publicly owned parks, recreation lands, wildlife and waterfowl refuges, and any historic properties on or eligible for the NRHP. UDOT, pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17, 2017 executed by FHWA and UDOT, is responsible for implementing Section 4(f) and cannot approve the use of a Section 4(f) property unless there is no feasible and prudent alternative and the project includes all possible planning to minimize harm. UDOT may use a simplified approval process for projects that have only *de minimis* impacts on Section 4(f) properties.

#### 3.13.1 Section 4(f) Properties

Section 4(f) properties in the study area include a recreational trail and historic properties. The Section 4(f) study area coincides with the overall study area.

##### 3.13.1.1 Recreational Properties

To qualify as a Section 4(f) property, a park or recreation area must be significant, publicly owned, and open to the public with its major purpose and function being that of a park or recreation area. There is one existing Section 4(f) recreational trail, the East Jordan Canal Multi-purpose Trail shown on Figure 3.13-1. The City of Sandy owns and manages this trail and is the official with jurisdiction of the trail.

The portion of the East Jordan Canal Multi-purpose Trail within the project study area begins on 11400 South and runs north along State Street as an eight-foot-wide sidewalk (plus adjacent two-foot stamped concrete) parallel to the roadway for approximately 575 feet, where it connects to the east–west running sidewalk behind Best Buy (at about 11200 South). The trail then runs east along a 10-foot-wide multi-use path at 11300

South. According to the *Sandy City Trails Master Plan*, the main purpose of the trail is to provide alternative routes for residents along the trail to access Dimple Dell Regional Park, Dewey Bluth Park, Off Leash Dog Park, Porter Rockwell Trail, and Union Park (Sandy City 2013). Through coordination with Sandy City, UDOT has determined this is a recreational trail and qualifies for protection under Section 4(f). There are no other Section 4(f) recreational properties in the study area.

##### 3.13.1.2 Historic Properties

To qualify as a Section 4(f) property, a historic site must be on or eligible for listing in the NRHP. The nine historic sites that qualify as Section 4(f) properties are discussed in Table 3.12-1.

#### 3.13.2 Use of Section 4(f) Properties

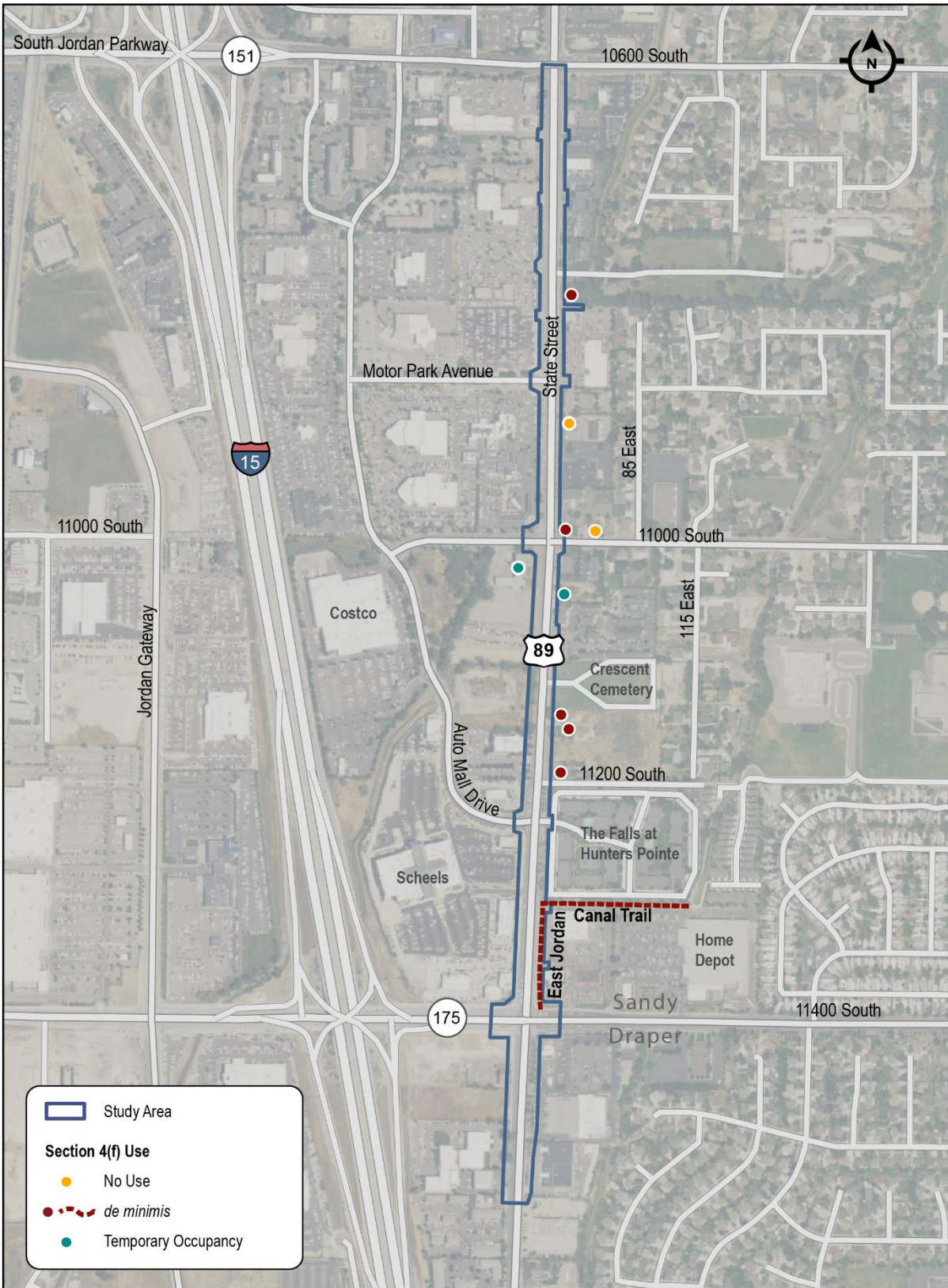
This section evaluates the “use” of Section 4(f) properties by the alternatives under consideration. “Use,” as defined in 23 CFR 774.17 includes the following:

1. When land is permanently incorporated into a transportation facility;
2. When there is a temporary occupancy of land that is adverse in terms of the statute’s preservation purpose as determined by the criteria in 23 CFR 774.13; or
3. When there is a constructive use of Section 4(f) property as determined by the criteria in 23 CFR 774.15.

Pursuant to 23 USC 327 and a Memorandum of Understanding executed by FHWA and UDOT dated January 17, 2017, UDOT can approve a Section 4(f) use except a constructive use, if it determines that the use of the property, including any measures(s) to minimize harm, will have a *de minimis* impact.



**FIGURE 3.13-1, SECTION 4(F) PROPERTIES WITHIN THE STUDY AREA**





Temporary Occupancy is not considered a Section 4(f) use if all of the following criteria from 23 CFR 774.13(d) are met:

1. Duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land;
2. Scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) property are minimal;
3. There are no anticipated permanent adverse physical impacts, nor will there be interference with the protected activities, features, or attributes of the property, on either a temporary or permanent basis;
4. The land being used must be fully restored, i.e., the property must be returned to a condition which is at least as good as that which existed prior to the project; and
5. There must be documented agreement of the official(s) with jurisdiction over the Section 4(f) resource regarding the above conditions.

### 3.13.2.1 Recreational Properties

A greater than *de minimis* impact of a park or recreation area is one that adversely affects the features, attributes, or activities qualifying the property for protection under Section 4(f). A *de minimis* impact is one that will not adversely affect these features, attributes, or activities. To make a *de minimis* impact determination, public notice and an opportunity for public review and comment are required. Additionally, the official with jurisdiction over the property must concur in writing that the project will not adversely affect the activities, features, or attributes that make the property eligible for Section 4(f) protection.

### 3.13.2.2 Historic Properties

A greater than *de minimis* impact of a historic property is defined as impacts that result in the permanent incorporation of the Section 4(f) property into a transportation facility and the determination of an Adverse Effect under Section 106 of the NHPA. A *de minimis* impact means that Section 106 results in a finding of No Historic Properties Affected or No Adverse Effect.

### 3.13.2.3 No-Build Alternative

#### Direct Impacts

Under the No-Build Alternative, no construction would take place and there would be no direct effects to Section 4(f) properties.

#### Indirect Impacts

Under the No-Build Alternative, no construction would take place and there would be no indirect effects to Section 4(f) properties.

### 3.13.2.4 Preferred Alternative

#### Direct Impacts

The Preferred Alternative results in the following impacts listed in Table 3.13-1 and shown on Figure 3.12-1.

#### Indirect Impacts

The Preferred Alternative would not result in any indirect effects to Section 4(f) properties.

### 3.13.3 Measures to Minimize Harm

Measures to avoid or minimize impacts to Section 4(f) properties were considered and incorporated into the Preferred Alternative. The roadway design took into account locations of Section 4(f) properties and minimized the project footprint so as to reduce the permanent impacts. Specifically:

- the shoulder was removed and converted to the additional lane width rather than acquiring additional property to allow for a roadway shoulder,
- lane widths were reduced from 12 to 11 feet, and

- the park strip was removed allowing the sidewalk to be immediately adjacent to the curb thus minimizing impacts to historic properties.

As a result of the minimization measures, Section 4(f) properties present along the project corridor would either not be impacted (no use), require temporary occupancy, or would be subject to limited impacts, resulting in a *de minimis* impact.

**3.13.4 Coordination**

**3.13.4.1 Recreational Properties**

Sandy City has jurisdiction over the East Jordan Canal Multi-purpose Trail. UDOT and the city have coordinated regarding impacts, measures to minimize harm, and mitigation (see Appendix A). Based on this coordination, UDOT has determined that impacts to the trail would not adversely affect the activities, features, or attributes that

make it eligible for Section 4(f) protection and that a *de minimis* impact determination is appropriate. Sandy City concurred with this determination on May 10, 2017. Public notice and an opportunity for public review and comment was provided during the EA public comment period. No comments pertaining to the *de minimis* impact determination were received.

**3.13.4.2 Historic Properties**

The SHPO has jurisdiction over historic properties in the State of Utah. In a letter dated April 13, 2017, UDOT notified the SHPO of its intent to make a Section 4(f) *de minimis* use finding for properties with a “no historic properties affected” or “no adverse effect” determination (see Appendix C). The *de minimis* impact determination became effective when SHPO concurred with the DOEFOE on May 11, 2017 for historic sites in the APE.

**TABLE 3.13-1, USE OF SECTION 4(F) RECREATIONAL AND HISTORIC PROPERTIES BY THE PREFERRED ALTERNATIVE**

Property Address	Eligibility/SHPO Rating	Section 106 Effect Determination	Section 4(f) Use
Recreational Properties			
East Jordan Canal Multi-purpose Trail	N/A	N/A	<i>de minimis</i>
Historic Properties			
10831 South State Street	Eligible/EC	No Adverse Effect	<i>de minimis</i>
10907 South State Street	Eligible/EC	No Historic Properties Affected	No use
10985 South State Street	Eligible/EC	No Adverse Effect	<i>de minimis</i>
11020 South State Street	Eligible/ES Listed on NRHP	No Adverse Effect	No use (temporary occupancy exception)
11031 South State Street	Eligible/EC	No Adverse Effect	No use (temporary occupancy exception)
11145 South State Street	Eligible/EC	No Adverse Effect	<i>de minimis</i>
11155 South State Street	Eligible/EC	No Adverse Effect	<i>de minimis</i>
11191 South State Street	Eligible/EC	No Adverse Effect	<i>de minimis</i>
45 East 11000 South	Eligible/EC	No Historic Properties Affected	No use

### 3.14 Hazardous Waste and Materials

Hazardous waste sites are regulated by the Resource Conservation and Recovery Act (RCRA); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); and UAC Title 19 Environmental Quality. These regulations define statutes for cleanup requirements and designate liability to persons involved in hazardous waste releases. RCRA regulates how waste should be managed to avoid potential threats to human health and the environment, and CERCLA authorizes EPA to act if there is an imminent threat from hazardous waste. The Division of Environmental Response and Remediation, a division of UDEQ, regulates

underground storage tanks (USTs), and leaking underground storage tanks (LUSTs).

Sites with the potential to have hazardous materials were identified by reviewing federal and state databases and by conducting a visual reconnaissance of the study area on March 29, 2017.

#### 3.14.1 Affected Environment

Hazardous materials sites recorded within the study area are listed in Table 3.14-1 and shown on Figure 3.14-1. There is one existing gas station and one former gas station with underground storage tanks within the study area (500 feet east and west of State Street).

**TABLE 3.14-1, HAZARDOUS MATERIALS SITES**

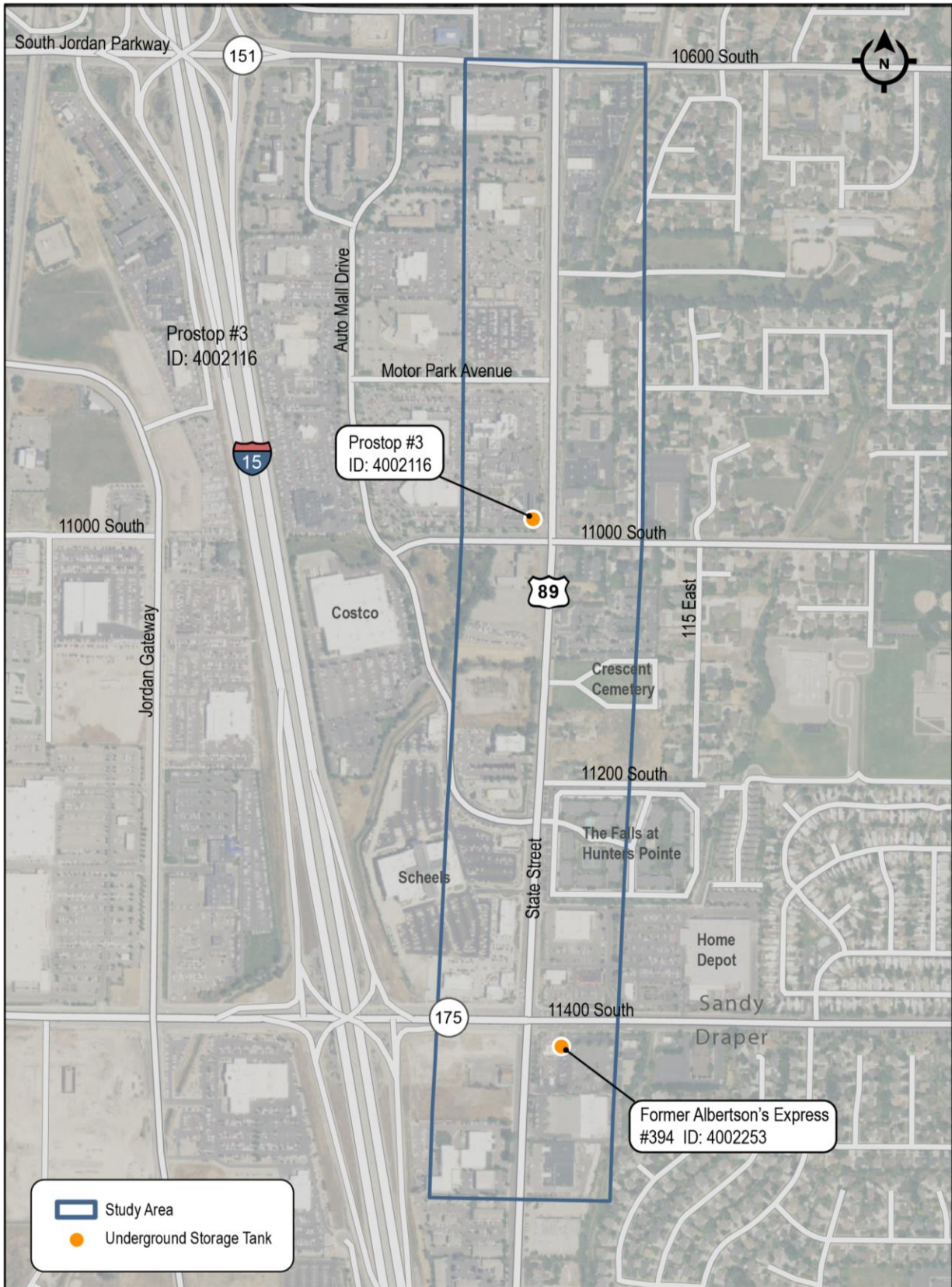
Figure ID	Facility/Property Name	Address	Facility ID	Notes	Distance <sup>1</sup> and Direction from State Street Centerline
<b>Open UST</b>					
1	Prostop #3	10986 South State Street	4002116	Gas Station	100 feet
<b>Closed UST</b>					
2	Former Albertson's Express #394	11479 South State Street	4002253	Former gas station; USTs were removed <sup>2</sup>	200 feet

<sup>1</sup> All measurements from State Street centerline to site are approximate.

<sup>2</sup> On July 31, 2013, the Utah Division of Environmental Response and Remediation recommended no further action was needed because the USTs were removed and contaminant concentrations were below cleanup levels (Utah Division of Environmental Response and Remediation 2013). The site reconnaissance on March 29, 2017, confirmed the tanks have been removed. The property is currently a bank.



**FIGURE 3.14-1, HAZARDOUS MATERIAL SITES**





### **3.14.2 Environmental Consequences**

#### **3.14.2.1 No-Build Alternative**

##### **Direct Impacts**

Under the No-Build Alternative, construction would not take place and there would be no impacts to hazardous materials sites.

##### **Indirect Impacts**

There would be no indirect impacts under the No-Build Alternative.

#### **3.14.2.2 Preferred Alternative**

##### **Direct Impacts**

Under the Preferred Alternative, a partial property acquisition would be required from the Prostop #3 hazardous material site to accommodate a second southbound to westbound right-turn lane at 11000 South.

The USTs at this site are located at the southeast corner of the property, near the existing State Street right-of-way line. Although construction activities would not physically impact the USTs, petroleum could be present in the soil from previous and/or currently undetected fuel releases. See Section 3.17.12, Cultural Resources, for a description of construction impacts.

##### **Indirect Impacts**

There would be no indirect impacts under the Preferred Alternative.

### **3.14.3 Mitigation**

No mitigation is proposed.

### 3.15 Visual Resources

FHWA's Technical Advisory T6640.8A specifies that the EA should state whether or not the project alternatives would potentially affect visual quality. Specifically, the EA should discuss the impacts to the existing visual resources, the relationship of the impacts to potential viewers of and from the project, as well as measures to avoid, minimize, or reduce the adverse impacts.

#### 3.15.1 Affected Environment

Representative photos of the corridor were taken at 11400 South (see Figure 3.15-1), Auto Mall Drive (see Figure 3.15-2), and 11000 South (see Figure 3.15-3). State Street is a five-lane black asphalt road lined with white and yellow striping. A raised concrete median divides north and southbound traffic between 11400 South and Auto Mall Drive. Landscaped park strips with grass and deciduous and coniferous trees line both sides of the street. Some sections of sidewalk meander whereas other sections are straight. Wood and steel utility and light poles complete the streetscape. Overall, these contributing roadway elements present a coherent scene that motorists can easily understand. The roadway is clearly marked with a high contrast between the roadway and shoulders creating an obvious and predictable travel path.

Beyond the roadway, State Street generally has a suburban, commercial appearance. Commercial buildings of varying type, size, height, material, and setback occupy the corridor. In some instances, vast asphalt parking lots surround and separate buildings from State Street.

#### 3.15.2 Environmental Consequences

Impacts to visual resources were assessed based on the degree that the changes under the Preferred and No-Build alternatives

would integrate into the existing landscape and the level of contrast associated with those changes.

##### 3.15.2.1 No-Build Alternative

###### Direct Impacts

Implementation of the No-Build Alternative would not have direct impacts to visual resources. Under the No-Build Alternative, the existing visual character of State Street would remain intact.

###### Indirect Impacts

There would be no indirect impacts to visual resources under the No-Build Alternative.

##### 3.15.2.2 Preferred Alternative

###### Direct Impacts

The Preferred Alternative consists of restriping State Street to add an additional general purpose travel lane in each direction. Raised center median with breaks to allow for left-turns at certain driveways and intersections is proposed along the entire length of the corridor except near Crescent Cemetery. The intersections at 11400 South and 11000 South would be widened to accommodate additional turning lanes. Trees within the existing park strips would be removed or trimmed.

Contrast under the Preferred Alternative would be low because modifications to State Street would be consistent with and similar to the character of the existing corridor. The proposed changes would integrate into the existing suburban landscape and the roadway elements would present a coherent scene that motorists would easily understand.

###### Indirect Impacts

There would be no indirect impacts to visual resources under the Preferred Alternative.

#### 3.15.3 Mitigation

No mitigation is proposed.

**FIGURE 3.15-1, VIEW LOOKING NORTH ON STATE STREET FROM 11400 SOUTH**



**FIGURE 3.15-2, VIEW LOOKING NORTH ON STATE STREET FROM AUTO MALL DRIVE**





**FIGURE 3.15-3, VIEW LOOKING NORTH ON STATE STREET FROM 11000 SOUTH**





### 3.16 Energy

Energy applies to the amount of petroleum products consumed by vehicles traveling within the study area under the No-Build Alternative and Preferred Alternative. Under 40 CFR 1502.16, UDOT is required to consider energy requirements and conservation potential for each alternative.

#### 3.16.1 Affected Environment

The energy study area was expanded to account for out-of-direction travel that may occur as the result of congestion under the No-Build Alternative and restricted left-turns under the Preferred Alternative. The energy study area boundary is comprised of 700 East, I-15, 10600 South, and 11400 South.

To calculate the current estimated fuel consumption in the study area, the *Transportation Energy Data Book Edition 35* was reviewed to identify the current average fuel economy for light-duty vehicles (i.e., cars, motorcycles, and light trucks with two axles and four tires). The *Annual Energy Outlook 2015 with Projections to 2050* was reviewed to identify the projected average fuel economy in 2040. Estimated fuel consumption for the study area was calculated by dividing the average daily VMT by the combined fuel economy for light-duty vehicles (the dominant vehicle type in the study area).

In 2014, the combined fuel economy for all registered light-duty vehicles was 25.4 miles

per gallon (Davis, Williams, and Boundy 2016). It is expected that average fuel economy will improve to 34.6 miles per gallon for all light-duty vehicles on the road in 2040 (U.S. Energy Information Administration 2017).

Light-duty vehicles currently travel 318,000 miles in the study area and consume approximately 12,528 of gallons of gasoline per day (Hooper 2017).

#### 3.16.2 Environmental Consequences

##### 3.16.2.1 No-Build and Preferred Alternatives Direct Impacts

Table 3.16-1 summarizes the differences in fuel consumption between the existing conditions, No-Build Alternative, and Preferred Alternative. Overall, the difference between the No-Build and Preferred alternatives is negligible based on VMT; however, vehicle delay (i.e., the duration vehicles idle or travel below efficient operating speeds) increases fuel consumption. Because the No-Build Alternative would have substantially higher hours of delay per day compared to the Preferred Alternative, it is expected the No-Build Alternative would result in greater fuel consumption. Regardless, both alternatives represent a decrease in fuel consumption compared to existing conditions despite a slight increase in VMT in the study area because the combined fuel economy for all registered light-duty vehicles would be 34.6 miles per gallon in 2040.

**TABLE 3.16-1, VEHICLE MILES TRAVELED AND OPERATION FUEL CONSUMPTION BY ALTERNATIVE**

Alternative	Average Daily Vehicle Delay (hours)	Average Daily VMT	Change in Average Daily VMT	Fuel Consumption (gallons)	Change in Fuel Consumed (gallons)	Change in Fuel Consumed (percent)
Existing	206	318,200	N/A	12,528	N/A	N/A
No-Build (2040)	918	395,700	77,500	11,436	-1,091	-8.7
Preferred (2040)	480	395,800	77,600	11,439	-1,088	-8.7

**3.16.2.2 Preferred Alternative Indirect Impacts**

Construction of the Preferred Alternative would result in the offsite mining, processing, and manufacturing of materials and equipment needed to construct the project. Various forms and amounts of energy would be required to support these activities.

**3.16.3 Mitigation**

No mitigation is proposed.

### **3.17 Construction Impacts**

#### **3.17.1 Land Use**

There would be temporary construction impacts on all properties along the roadway as a result of the Preferred Alternative. To the extent possible, the contractor will coordinate with Sandy City and property owners to maintain access to these properties (refer to Section 3.6, Bicycle and Pedestrian Considerations). Temporary construction easements would be required of several properties within the study area and are discussed in Section 3.4, Land Acquisition and Relocations.

#### **3.17.2 Social Impacts**

##### **3.17.2.1 Community Character**

There would be no construction impacts to community character and cohesion.

##### **3.17.2.2 Travel Patterns and Accessibility**

Area residents and commuters may experience temporary impacts during construction. Traffic impacts would likely include limited business and residential access, traffic delays, rerouting, and temporary lane closures. While all access along affected travel routes would likely be maintained during construction, some accesses to businesses and residences could be altered during construction.

UDOT and the construction contractor would develop and implement a traffic management plan to ensure access to residences, businesses, community facilities and services, and local roads during construction. Construction signs indicating access points and signs indicating that businesses are still open would be used to reduce construction impacts to businesses along the corridor. UDOT would develop a public involvement plan prior to construction to notify area residents and commuters regarding traffic delays, rerouting, and temporary lane closures. Public involvement activities would include door-to-door visits to business owners along the affected routes,

distribution of fliers throughout the study area, development of a project website providing up-to-date construction information, and maintenance of a project hotline.

##### **3.17.2.3 Public Facilities**

Lane closures, increased congestion, and reduced travel speeds in construction zones could increase emergency response times. Construction sequencing and activities would be coordinated with emergency service providers to minimize delays and response times during construction. The public and police, fire, and ambulance services would be notified of potential detours before construction begins, and updated as necessary for road closures.

##### **3.17.2.4 Utilities**

Temporary disruption of utilities and services could occur during construction. UDOT would coordinate with utility providers to minimize disruption of these services.

#### **3.17.3 Environmental Justice**

Construction impacts to low-income and minority populations are not likely to occur under the Preferred Alternative.

#### **3.17.4 Land Acquisition and Relocations**

Temporary construction easements would be required of several properties adjacent to State Street (see Section 3.4, Land Acquisition and Relocations). UDOT would temporarily use these properties during construction and would provide compensation to the landowner for the temporary use. These properties would be returned to the owner, in its original state or better, when construction is complete or when the use of the property is no longer required.

#### **3.17.5 Economic Conditions**

During construction, businesses along the corridor could experience a short-term decrease in sales associated with travel

delay and various construction activities; however, no substantial changes to commerce are anticipated. The negative impacts would be short term. Long-term improved operations and reductions in travel time would compensate for short-term delays.

The businesses in the area would experience temporary construction inconveniences from dust, noise, traffic delays and detours associated with roadway construction. Access to all properties in the area would be maintained; however, there would be some temporary construction impacts to access for some properties.

Construction activities could result in a temporary increase in employment opportunities and local tax revenue.

### **3.17.6 Bicycle and Pedestrian Considerations**

Bicycle and pedestrian access, including access to the East Jordan Canal Multi-purpose Trail, will be maintained during all phases of construction.

### **3.17.7 Air Quality**

Air quality impacts resulting from roadway construction activities are typically not a concern when contractors use appropriate control measures. During construction, all materials resulting from clearing and grubbing, demolition or other operations would be removed from the project or otherwise disposed of by the contractor. Measures would be taken to reduce fugitive dust generated by construction when the control of dust is necessary for the protection and comfort of motorists or area residents. Dust suppression techniques would be applied during construction in accordance with the UDOT 2017 *Standard Specifications for Road and Bridge Construction, Section 01355 Environmental Protection, Part 3.5 Fugitive Dust*.

### **3.17.8 Noise**

Land uses that are sensitive to traffic noise are also sensitive to construction noise. Methods of controlling construction noise include establishing the hours that construction equipment can be operated and permissible sound levels at those times. In view of this, UDOT has developed a specification that establishes construction noise control. This specification can be found in the UDOT 2017 *Standard Specifications for Road and Bridge Construction, Section 01355 Environmental Protection, Part 3.6 Noise Control*. The contractor would be required to conform to this specification to reduce the impact of construction noise on the surrounding community.

### **3.17.9 Water Quality, Water Resources, and Floodplains**

There is potential for temporary construction impacts to surface water quality during the construction phase for the Preferred Alternative. Construction activities—such as clearing and grubbing, grading, stockpiling, and material staging—disturb vegetation and cause erosion. Runoff from disturbed areas could temporarily increase pollutant loading into receiving waters. Pollutant loading largely in the form of discharged sediment can be minimized with the use of best management practices, which keep soil from leaving the construction site. Best management practices for this project may include such measures as silt fences, erosion control fabric, fiber mats, straw bales, silt drains, sediment basins, mulching, and revegetation. Because more than one acre of ground would be disturbed, a UPDES permit and SWPPP, consistent with UDOT *Standard Specifications for Road and Bridge Construction, Section 01355 Environmental Protection, Part 3.3 Water Resource Permits*, are required.

Numerous noxious weeds have been identified in Salt Lake County and may exist in the study area. Construction activities



associated with the Preferred Alternative would alter the existing built and undeveloped environments, potentially spreading noxious weeds. The contractor would be required to follow UDOT *Special Provision 02924S, Invasive Weed Control* to minimize construction impacts.

### **3.17.10 Wetlands and Waters of the U.S.**

There is potential for non-wetland waters of the U.S. to be affected by construction in the same way as discussed in the Water Quality section above. Therefore, the same best management practices that would be employed for overall water quality would also mitigate potential construction impacts to other surface waters.

### **3.17.11 Threatened & Endangered Species, Wildlife & Utah Sensitive Species**

There would be no construction impacts to threatened and endangered species, wildlife, or Utah species.

### **3.17.12 Cultural Resources**

Archaeological and historic sites would not be adversely affected during construction of the Preferred Alternative. Temporary construction easements would be required from several historic sites (see Section 3.12, Cultural Resources). Ground-disturbing activities during construction could potentially result in the discovery of previously unidentified subsurface cultural or paleontological resources. In the case of an inadvertent discovery during construction, activities in the area of discovery would be immediately stopped and procedures outlined in UDOT *Standard Specification for Road and Bridge Construction, Section 01355 Environmental Protection, Part 3.8 Discovery of Historical, Archaeological, or Paleontological Objects, Features, Sites or Human Remains* followed.

### **3.17.13 Section 4(f)**

Temporary construction easements would be required for historic properties (see Section 3.13, Section 4[f]). The East Jordan Canal Multi-purpose Trail would be temporarily closed during construction while the new trail/sidewalk is being constructed.

### **3.17.14 Hazardous Waste and Materials**

Contaminated soil could be encountered during construction on or near properties known to have stored hazardous materials. Coordination with the Department of Environmental Quality may be necessary if a discovery is made. Specific measures described in UDOT's *Standard Specification for Road and Bridge Construction, Section 01355 Environmental Protection, Part 3.1 Hazardous Materials Discovered During Construction* would be followed.

If previously unidentified sites or contamination are encountered during construction, work would stop in the area of the contamination according to UDOT *Standard Specifications 01355 Part 3.1*, and the contractor would consult with UDOT and DERR to determine the appropriate remedial measures. Hazardous waste spills by the construction contractor would be handled according to UDOT *Standard Specifications 01355 Part 3.2, Hazardous Material – Contractor Caused*, and the requirements and regulations of UDEQ and the EPA.

### **3.17.15 Visual Resources**

Construction equipment operating in the roadway, land closures and lane shifts, construction signs, modifications to business access, and potential detours during construction could adversely affect the visual quality of the roadway; however, this impact would be temporary and no mitigation is required.

### 3.17.16 Energy

Roadway projects involve energy consumption during construction. The No-Build Alternative would require minimal construction energy. Periodic roadway maintenance such as resurfacing and patching would occur over time until the condition of the roadway warrants complete reconstruction.

The Preferred Alternative would require greater amounts of energy to reconstruct State Street. Construction activities would be primarily dependent on fossil fuels (gasoline and diesel fuel) to support typical roadway construction activities, including maintenance of traffic, clearing, grading, delivering and spreading fill, excavation of unusable soils and associated disposal, construction of drainage structures, base course and paving operations, and landscaping.

### 3.18 Cumulative

Council on Environmental Quality regulations require the assessment of cumulative impacts in the decision-making process for federally funded projects. Cumulative impacts result from incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of the agency or person(s) that undertakes the other actions (40 CFR 1508.7). Cumulative impacts may also include the effects of natural processes and events.

The geographic scope of the cumulative impacts analysis consisted of Sandy City, Draper City, Cottonwood Heights, and Midvale City, with I-15 serving as the western boundary, I-215 as the northern boundary, the Wasatch Mountains as the eastern boundary, and Salt Lake and Utah County line as the southern boundary. The timeframe for the cumulative impacts analysis consisted of 1960 to 2040.

Only resources affected directly and indirectly by the project and that have regional significance are considered. For this reason, air quality is the only resource of concern addressed in this section.

#### 3.18.1 Past Actions Affecting Resources of Concern

Salt Lake County was created in 1850, shortly after the arrival of the first settlers to the Salt Lake Valley in 1847. At the time of its creation, approximately 11,000 people resided in the county (Ellis n.d.). By 1900, the population had grown to 77,725 people (Forstall 1995). In the 2010 U.S. Census, the population had rapidly grown to 1,029,655 people (U.S. Census Bureau 2015a). This

tremendous growth has led to continuous urban expansion throughout the county, including Sandy and Draper cities, and the loss of farmlands, wetlands, and wildlife habitat and a degradation of air and water quality. The aggregate environmental effects of past actions in the study area are reflected in the current affected environment, as described previously in each section of this chapter.

#### 3.18.2 Present and Reasonably Foreseeable Future Actions Affecting Resources of Concern

The WFRC, UDOT, and Sandy City are responsible for future transportation planning in the study area. Together they work to identify the transportation needs and identify long-term solutions to meet the demands of the traveling public.

The WFRC is the MPO for the Wasatch Front and is responsible for coordinating transportation planning in the region. The WFRC prepares future land use projections in consultation with the region's cities. These land use projections are used to develop the RTP, which is the plan of development for the future transportation system. The RTP includes a list of projects that are planned to meet future transportation needs for the next 20-plus years. All of the projects on the RTP are designed to work together to meet the existing and anticipated transportation (highway, transit, pedestrian and bicycle, freight, and air) needs through the year 2040.

Table 3.18-1, lists the transportation projects from the WFRC *RTP 2015–2040* that were included in the cumulative impacts analysis. The *RTP* divides projects into three phases: Phase 1 (2015 to 2024), Phase 2 (2025 to 2034), and Phase 3 (beyond 2040).

**TABLE 3.18-1, PRESENT AND REASONABLY FORESEEABLE FUTURE ACTIONS**

Facility	Description	Phase
<b>Transportation Projects</b>		
<b>Union Park Boulevard/1300 East</b> Fort Union Boulevard to 7800 South	Operational	1
<b>Fort Union Boulevard</b> Union Park Boulevard to 3000 East	Operational	1
<b>I-15 Improvements</b> SR-201 to 12300 South	Widening	1
<b>9000 South</b> I-15 to 700 East	Widening	1
<b>Monroe Street</b> 9000 South to 10000 South	New Construction	1
<b>9400 South</b> Monroe Street to State Street	Widening	1
<b>I-15 Interchange at 9400 South</b>	New Construction	1
<b>12300 South</b> I-15 to 700 East	Widening	1
<b>Highland Drive</b> 9800 South to Draper City Limit	New Construction	2
<b>700 East</b> 11400 South to 12300 South	Widening	2
<b>10600 South</b> 1700 East to Highland Drive	Widening	2
<b>Cottonwood Road</b> Eastdale Drive to Wasatch Boulevard	Operational	2
<b>Wasatch Boulevard</b> Bengal Boulevard to Little Cottonwood Canyon	Widening	2
<b>State Street</b> I-215 to 12300 South	Operational	2
<b>Winchester Street</b> 1300 West to State Street	Widening	2
<b>I-15 Interchange at 7200 South</b>	Upgrade	2
<b>I-15 Collectors and Distributors</b> 7800 South to 10600 South	New Construction	2
<b>Traverse Ridge Road</b> Highland Drive to Mike Weir Drive	Widening	3
<b>Highland Drive Connection</b> Traverse Road to 13800 South	Widening	3
<b>Highland Drive</b> Draper City Limit to 14600 South	Widening	3
<b>Traverse Ridge Road</b> Highland Drive to Mike Weir Drive	Widening	3
<b>11400 South</b> 1300 East to Highland Drive	Widening	3
<b>Wasatch Boulevard</b> 4500 South to 6200 South	Widening	3
<b>2000 East</b> Fort Union Boulevard to 9400 South	Widening	3



**TABLE 3.18-1, PRESENT AND REASONABLY FORESEEABLE FUTURE ACTIONS**

Facility	Description	Phase
<b>900 East/700 East</b> Fort Union Boulevard to 9400 South	Widening	3
<b>3000 East</b> 6200 South to 7000 South	Widening	3
<b>13800 South</b> Overpass at I-15	New Construction	3
<b>Transit Projects</b>		
<b>Draper Town Center</b> Riverton Corridor	Corridor Preservation	1
<b>State Street Corridor</b>	BRT/Enhanced Bus	2
<b>900 East Corridor</b>	BRT/Enhanced Bus	2
<b>1300 East Corridor</b>	BRT/Enhanced Bus	2
<b>Fort Union Transit Hub</b>	Transit Center	2
<b>Draper Light Rail</b> Draper Town Center to Utah County	New Construction	3
<b>Highland Drive Corridor</b>	Enhanced Bus	3
<b>Cottonwood – Kearns Corridor</b>	BRT	3

Source: WFRC 2015

### 3.18.2.1 Air Quality

Air quality is most often analyzed at a regional level due to the inherent mobility of air pollutants. County boundaries are the regulatory boundaries most often used to discuss air quality. For this reason the cumulative effects analysis area for this project is Salt Lake County. While there are no direct or indirect (see Section 3.7, Air Quality) air quality impacts anticipated with the project, a brief cumulative effects analysis was performed as this resource was identified during scoping as a resource of concern.

The EPA has established health-based air quality standards for six criteria pollutants: CO, NO<sub>2</sub>, O<sub>3</sub>, PM, SO<sub>2</sub>, and lead (EPA 2016). The UDEQ DAQ oversees air quality monitoring and enforcement of air quality regulations.

#### Past and Present Trends

Despite rapid growth and development throughout the state, air quality in Utah has improved in the past 25 years due to more rigorous guidelines for vehicle emissions and industry. Emissions for criterial pollutants have generally stayed the same, or continued their downward trend in 2015 (UDEQ DAQ 2015).

Salt Lake County and is in attainment or maintenance for all criteria pollutants with the exception of PM<sub>10</sub> and PM<sub>2.5</sub> and SO<sub>2</sub> (Table 3.7-2) (UDEQ DAQ 2015). Salt Lake County is currently designated as a nonattainment area for PM.

#### Particulate Matter

The project is within the Salt Lake County Non-Attainment Area for particulates 10-microns in diameter or less (PM<sub>10</sub>) and for particulates 2.5-microns in diameter or less (PM<sub>2.5</sub>). Regarding PM<sub>10</sub>, on November 14, 1991, Utah submitted its SIP for the Salt Lake and Utah County PM<sub>10</sub> nonattainment areas. The SIP showed 10 years of attainment for the PM<sub>10</sub> standard. The EPA

published approval of the SIP on July 8, 1994 (59 FR 35036). On December 2, 2015, the Air Quality Board adopted revisions to the SIP in the form of maintenance plans for both Salt Lake and Utah counties. These plans demonstrate attainment through the year 2030. The plans have been submitted to EPA, and Utah is currently awaiting approval for EPA to re-designate the areas as in attainment.

Regarding PM<sub>2.5</sub>, on December 3, 2014, the Air Quality Board approved a PM<sub>2.5</sub> SIP “meeting the moderate area planning requirements of both Subparts 1 and 4, of Part D, of Title 1, of the Clean Air Act.” A separate SIP was adopted for Salt Lake County under the Salt Lake City nonattainment area, which is one of three nonattainment areas in Utah. Amendments to SIP Subsections IX.H. 11, 12, and 13 were also adopted as each relates to emission limits and operating practices for large stationary sources in the Salt Lake City and Provo nonattainment areas.

#### Sulfur Dioxide

UDEQ DAQ measurements of sulfur dioxide indicate Utah’s ambient air has been well within the federal health standard for decades.

#### Future Trends

In 2015, the Utah Air Quality Board adopted a new maintenance plan for PM<sub>10</sub>. This plan suggests that Utah will continue to meet PM<sub>10</sub> standards through the year 2030 at which time the state will be able to request changing Utah’s PM<sub>10</sub> nonattainment status to attainment (UDEQ DAQ 2015).

Continued regional development in Salt Lake County through the 2040 planning period would continue to occur with or without the project. Although a growing population will continue to put pressure on the quality of Salt Lake County’s air, continued improvements in technology and vehicle emissions, as well as even more stringent air quality laws and

requirements, will continue to reduce auto-related emissions.

**Cumulative Impacts on Air Quality**

Regional modeling and transportation conformity analyses conducted by WFRC as part of the WFRC *RTP 2015–2040* planning process demonstrates that all regionally significant transportation projects (including the US-89, 11400 South to 10600 South project) will be in compliance with the NAAQS (WFRC 2016). There are no NAAQS for greenhouse gases and no regional or project-level conformity requirements associated with greenhouse gases. For these reasons, no cumulative impacts to air quality are anticipated as a result of the project.

### 3.19 Permits, Clearance, and Mitigation

Table 3.19-1, summarizes the permits and clearances that might be required for the Preferred Alternative. Table 3.19-2 summarizes the mitigation and project commitments for the Preferred Alternative. In addition, all UDOT Standard Specifications and BMPs will be followed.

**TABLE 3.19-1, REQUIRED PERMITS AND CLEARANCES**

Permit/Clearance	Granting Agency(ies)	Applicant	Application Time	Granting Time	Applicable Portion of Project
<b>Section 402 Permit (UPDES)</b>	Utah Division of Water Quality	UDOT and Contractor	After the construction contract has been awarded	Before construction	Areas of ground disturbance during construction
<b>Air Quality Approval Order</b>	Utah Division of Air Quality	Contractor	Before construction	Before construction	Air quality during construction phase (emission from operations and equipment)
<b>Environmental Clearance for offsite work</b>	Various Agencies	Contractor	Before offsite construction	Before offsite construction	Offsite construction-related activities such as staging sites, borrow areas, spoil sites, batch plant sites, etc.

**TABLE 3.19-2, MITIGATION AND PROJECT COMMITMENTS**

Permit/Clearance	Granting Agency(ies)	Applicant	Application Time	Granting Time	Applicable Portion of Project
<b>Section 402 Permit (UPDES)</b>	Utah Division of Water Quality	UDOT and Contractor	After the construction contract has been awarded	Before construction	Areas of ground disturbance during construction



## CHAPTER 4: COMMENTS AND COORDINATION

This chapter describes the program and activities for public involvement and stakeholder and agency coordination undertaken for the project. Activities included public scoping, stakeholder and business working groups, and distribution of various outreach materials. The public involvement, stakeholder, and coordination effort for the project was designed to be inclusive, comprehensive, transparent, and continuous throughout the course of the project.

The potential improvements to State Street from 11400 South to 10600 South have generally been met with public support and understanding. Sandy City's role as a partner on the project has been key to outreach efforts so far and will continue to play a role as the project progresses towards a public hearing.

### 4.1 Scoping

The project scoping period for the *State Street EA* took place between October 2016 and April 2017.

A public involvement/scoping workshop was held with Sandy City on November 22, 2016, to determine city involvement throughout the EA process, as well as coordinate for potential outreach opportunities with the preliminary list of key stakeholders. One-on-one meetings were scheduled with key stakeholders and property owners throughout the corridor to discuss the EA, individual needs and concerns, as well as timing and opportunities to provide public comments. The one-on-one meetings are listed in Table 4.1-1.

### 4.2 Agency Coordination

Agency coordination was conducted with agencies whose steward resource could be impacted or who provide approval or concurrence with UDOT impact

determinations. Agency coordination undertaken by UDOT is summarized in Table 4.1-2.

### 4.3 Additional Stakeholder/Public Outreach

In partnership with multiple area projects, UDOT developed an umbrella brand to improve and centralize stakeholder outreach and communication. The EA was included as part of the brand, and the associated outreach within the south end of the Salt Lake Valley. A central website, email, and hotline were established and used to share information with area stakeholders.

- Website: [udot.utah.gov/southvalleyimprovements](http://udot.utah.gov/southvalleyimprovements)
- Email: [southvalley@utah.gov](mailto:southvalley@utah.gov)
- Hotline: 801-228-0022

### 4.4 Comments Received

Public comments received during the course of the EA to date have primarily come from verbal dialogue as part of the one-on-one meetings. Comment themes include:

- General support and consensus for the need to improve State Street in this area
- Intersection congestion at State Street and 11400 South
- Concerns about new raised medians and possible access changes
- Potential construction impacts

### 4.5 Next Steps

A public hearing to review the EA and gather public comments has tentatively been scheduled for June 2017. Key stakeholders and the general public will be invited to the public hearing and encouraged to provide input through formal comments. The comment period will extend for 30 days and written comments will be accepted at the public hearing, online, as well as through email. A court reporter will be available at the public hearing to transcribe verbal comments related to the EA. A copy of the

environmental document will be available as a link on the project page during the comment period.

**TABLE 4.1-1, STAKEHOLDER SCOPING MEETINGS**

Date	Stakeholder
10/06/16	Automall Association (Continuous monthly updates)
10/11/16	South Towne Expo Center
10/17/16	Larry H. Miller Real Estate
10/20/16	Real Salt Lake/Rio Tinto Stadium
10/20/16	The Thackery Company
10/20/16	Woodbury Corporation
11/22/16	Sandy City
11/22/16	IHOP Corporation
11/28/16	Liljenquist Utah/Scheels
12/09/16	Home Depot
12/13/16	Larry H. Miller Real Estate
12/14/16	Synergy Utah
12/14/16	Wadsworth Development
12/16/16	Liv Salon/Property Management
12/16/16	First Utah Bank
01/03/17	Sandy City Communication Team
01/25/17	Crescent Cemetery
01/25/17	The Falls at Hunter Pointe
02/03/17	Liljenquist Utah/Scheels
03/17/17	Michael Carlson (5 properties)
03/17/17	Crescent Office Complex

**TABLE 4.1-2, AGENCY COORDINATION**

Date	Agency/Tribe	Subject	Appendix
5/10/2017	EPA; UDEQ UDAQ; Wasatch Front Regional Council	Technical report: <i>Project-Level PM Quantitative Hot-Spot Analysis: Project of Air Quality Concern Questionnaire</i>	B
04/04/2017	Eastern Shoshone Tribe of the Wind River Reservation	Native American Consultation	A
04/04/2017	Shoshone-Bannock Tribes of Fort Hall	Native American Consultation	A
04/04/2017	Paiute Indian Tribe of Utah	Native American Consultation	A
04/04/2017	Northwestern Band of Shoshone Nation	Native American Consultation	A
04/04/2017	Ute Indian Tribe of the Uintah and Ouray Ute Indian Reservation	Native American Consultation	A
04/04/2017	Skull Valley Band of Goshute Indians	Native American Consultation	A
04/04/2017	Cedar Ban of Paiutes	Native American Consultation	A
04/04/2017	Shivwits Band of Paiute Indian Tribe of Utah	Native American Consultation	A
04/04/2017	Confederated Tribes of the Goshute Reservation	Native American Consultation	A
05/04/2017	Sandy City	Section 4(f) <i>de minimis</i> determination	C
05/11/2017	Utah SHPO	Section 106 Consultation (DOEFOE)	C

## **CHAPTER 5: REFERENCES**

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**CHAPTER 6: LIST OF PREPARERS**

This EA was prepared by the following individuals:

<b>Name</b>	<b>Organization</b>	<b>Project Role/Title</b>
Oanh Le-Spradlin, PE	UDOT	UDOT Project Manager
Naomi Kisen	UDOT	UDOT Environmental Lead
Craig Brown	UDOT	UDOT Environmental Analysis
Jon Dugmore	UDOT	UDOT Environmental Analysis
Elisa Albury	Lochner	Environmental Lead
Justin Peterson, AICP	Lochner	Environmental Analysis
Derek Moss	Lochner	Environmental Analysis
Jason Green, AICP	Lochner	Environmental Analysis
Dave Shannon, PE	Lochner	Noise Analysis
Janusz Wielgos, PE	Lochner	Noise Analysis
Andrea Clayton, PE	Lochner	Quality Assurance
Phil Logsdon, AICP	Lochner	Quality Assurance
Rebecca Thompson, PE	Lochner	Quality Assurance
John Martin	Lochner	GIS Analysis
Justin Johnson	Lochner	GIS Analysis
Johanna Tietze	Lochner	Technical Editor
Aaron Rasmussen, PE	Avenue Consultants	Project Manager
Ivan Hooper, PE	Avenue Consultants	Traffic Engineer
Jeremiah Johnston, PE	Avenue Consultants	Air Quality Analysis
Sheri Murray Ellis, MS, RPA	Certus Environmental Solutions	Cultural Resources
Nancy Cozzens	Horrocks	Public Involvement
Beau Hunter	Horrocks	Public Involvement

## APPENDIX A: COORDINATION

The following coordination occurred to support the US-89; 11400 South to 10600 South Environmental Assessment:

### AGENCY COORDINATION

Agency	Nature of Correspondence
Utah Department of Transportation U.S. Environmental Protection Agency Federal Highway Administration UDEQ Utah Division of Air Quality Wasatch Front Regional Council	Distributing technical report: <i>Project-Level PM Quantitative Hot-Spot Analysis: Project of Air Quality Concern Questionnaire</i>
Eastern Shoshone Tribe of the Wind River Reservation	Native American Section 106 Consultation
Shoshone-Bannock Tribes	Native American Section 106 Consultation
Paiute Indian Tribe of Utah	Native American Section 106 Consultation
Northwestern Band of Shoshone Nation	Native American Section 106 Consultation
Uintah and Ouray Ute Tribes	Native American Section 106 Consultation
Skull Valley Band of the Goshute Indians	Native American Section 106 Consultation
Cedar Band of Paiutes	Native American Section 106 Consultation
Shivwits Band of Paiute Indian Tribe	Native American Section 106 Consultation
Confederate Band of Paiute Indian Tribe of Utah	Native American Section 106 Consultation
Utah State Historic Preservation Office	Section 106 Consultation (DOEFOE)







State of Utah

GARY R. HERBERT  
Governor

SPENCER J. COX  
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION

CARLOS M. BRACERAS, P.E.  
Executive Director

SHANE M. MARSHALL, P.E.  
Deputy Director

**Tribal Notification Form, Section 106 Consultation**

Federally funded projects classified as delegated categorical exclusions are processed in accordance with Stipulation II, Part A and Appendix B of the Memorandum of Understanding, State Assumption of Responsibility for Categorical Exclusions (23 USC §326), by which the UDOT assumes responsibility, assigned by the FHWA, for ensuring compliance with Section 106 of the NHPA and with Section 4(f). This form is submitted on behalf of the FHWA. Direct government-to-government consultation can be conducted upon request.

This project is being conducted pursuant to the Second Amended Programmatic Agreement among the FHWA, the Utah SHPO, the ACHP, the USACE Sacramento District, and the UDOT Regarding Section 106 Implementation for Federal-Aid Transportation Projects in the State of Utah, and the Programmatic Agreement between the UDOT and the Utah SHPO Regarding Implementation of U.C.A. 9-8-404 for State Funded Transportation Projects in Utah.

UDOT Project: PIN12561, Project # F-0089(375)364, US-89; 11400 South to 10600 South, Salt Lake County  
Contact Name: Jonathan Dugmore Date: April 4, 2017  
Address: 2010 South 2760 West, Salt Lake City, Utah 84104  
Telephone: 385-414-2066 Email: jdugmore@utah.gov

**Project Description:** UDOT proposes to widen State Street to add capacity from five to seven lanes, with three travel lanes in each direction from 11400 South to the current three-lane section just south of 10600 South largely within the existing Right-of-Way. Design elements would include: reducing existing travel lane widths from 12 feet to 11 feet; removing the existing shoulders (where present); installing continuous 2½-foot-wide curb and gutter throughout the study area; and installing park strips and sidewalks (where not currently present). A second southbound to westbound right-turn lane at the State Street and 11400 South intersection would be added and the lane configuration on State Street south of 11400 South would need to be shifted to the east to match the improvements on the north leg of this intersection. A traffic signal at the Scheels driveway just north of 11400 South would also be installed in addition to raised medians on select sections of State Street.

**Archaeological Potential (Prehistoric or Historic Sites):**

- Known prehistoric sites in the project area
- Known historic sites in the project area
- Likely to find prehistoric sites in the project area
- Likely to find historic sites in the project area
- Unlikely to find prehistoric sites in the project area
- Unlikely to find historic sites in the project area
- No expected ground disturbance
- Other:

**Additional Information/Comments:** NRHP-eligible historic canal sites 42SL214, The Jordan & Salt Lake City Canal, and 42SL290, The East Jordan Canal, both run underneath the project area. Neither site will be impacted by the proposed construction.

**Tribal Information**

«AddressBlock»

Copies to:

**Comments:**

1. Do you wish to be a Section106 consulting party on this project?  Yes  No  Not Sure
2. If you do not wish to be a Section 106 consulting party, do you wish to continue to be involved in the development of this project?  Yes  No  Not Sure

**Note:** If your answer is “Not Sure,” UDOT will continue to provide information.

3. Are you aware of any traditional religious or culturally important places in or near the project area?  Yes  No  Not Sure
4. If yes, can you share details about the place (e.g., location and other characteristics) and any concerns you may have?  Yes  No
5. Is this information sensitive?  Yes  No

**Additional Comments:**

Name of person completing this form, if different from above:

Signature:

Date:

Identical copies of the Project Notification Form sent to the following recipients:

Original to:	CC to:
Mr. Darwin St. Clair Jr., Chairman Eastern Shoshone Tribe of the Wind River Reservation P.O. Box 538/15 North Fork Rd Fort Washakie, WY 82514	Ms. Glenda Trosper, Director, Cultural Center Eastern Shoshone Tribe of the Wind River Reservation P.O. Box 538/15 North Fork Rd Fort Washakie, WY 82514
	Mr. Wilfred Ferris, THPO Eastern Shoshone Tribe of the Wind River Reservation P.O. Box 538/15 North Fork Rd Fort Washakie, WY 82514
Mr. Blaine Edmo, Chair Shoshone-Bannock Tribes of Fort Hall P.O. Box 306 Pima Drive Fort Hall, ID 83203	Ms. Carolyn Smith, Cultural Resource Director Shoshone-Bannock Tribes of Fort Hall P.O. Box 306 Pima Drive Fort Hall, ID 83203
Ms. Corrina Bow, Tribal Chairperson Paiute Indian Tribe of Utah 440 North Paiute Drive Cedar City, UT 84721	Ms. Dorena Martineau, Cultural Resources Manager Paiute Indian Tribe of Utah 440 North Paiute Drive Cedar City, UT 84721
Mr. Shane Warner, Chairman Northwestern Band of Shoshone Nation 707 North Main Street Brigham City, UT 84302	Ms. Patty Timbimboo-Madsen, Cultural Specialist Northwestern Band of Shoshone Nation 707 North Main Street Brigham City, UT 84302
Mr. Shaun Chapoose, Chairperson Ute Indian Tribe of the Uintah and Ouray Ute Indian Reservation P.O. Box 190 Fort Duchesne, UT 84026	Ms. Betsy Chapoose, Director, Cultural Rights and Protection Ute Indian Tribe of the Uintah and Ouray Ute Indian Reservation P.O. Box 190 Fort Duchesne, UT 84026
Ms. Candace Bear, Chairwoman Skull Valley Band of Goshute Indians P.O. Box 448 Grantsville, UT 84029	None

Original to:	CC to:	Email to:
Ms. Lora Tom, Band Chairwoman Cedar Band of Paiutes 4655 North Utah Trail Enoch, UT 84720	Ms. Vala Parashonts, Cultural Resources Representative Cedar Band of Paiutes 533 South 640 West Cedar City, UT 84721	<a href="mailto:lora.tom@ihs.gov">lora.tom@ihs.gov</a> (Lora Tom)
Ms. Jetta Wood, Band Chairwoman Shivwits Band of Paiute Indian Tribe of Utah 6060 West 3650 North Ivins, UT 84738	Ms. Shanan Anderson, Cultural Resource Director Shivwits Band of Paiute Indian Tribe of Utah 6060 West 3650 North Ivins, UT 84738	<a href="mailto:lomeli20034@aol.com">lomeli20034@aol.com</a> <a href="mailto:martineau@shivwits.org">martineau@shivwits.org</a>
Mr. Virgil Johnson, Chairman Confederated Tribes of the Goshute Reservation P.O. BOX 6104 195 Tribal Center Rd. Ibapah, UT 84034	Ms. Mary Pete-Freeman, Cultural Resources Coordinator Confederated Tribes of the Goshute Reservation P.O. BOX 6104 195 Tribal Center Rd. Ibapah, UT 84034	<a href="mailto:virgilwjohanson@yahoo.com">virgilwjohanson@yahoo.com</a> <a href="mailto:marypete@goshutetribe.com">marypete@goshutetribe.com</a>

## APPENDIX B: TECHNICAL REPORTS

The following technical reports have been prepared to support the US-89; 11400 South to 10600 South Environmental Assessment:

Technical Report Title	Prepared By	Contact
<i>Intensive-Level Archaeological Survey for the US-89; 11400 South to 10600 South Project, Salt Lake County, Utah</i>	Certus Environmental Solutions	Sheri Murray Ellis, MS RPA 655 7th Avenue Salt Lake City, Utah 84103
<i>A Selective Reconnaissance-Level Historic Structures Assessment for the US-89; 11400 South to 10600 South Project, Salt Lake County, Utah</i>	Certus Environmental Solutions	Sheri Murray Ellis, MS RPA 655 7th Avenue Salt Lake City, Utah 84103
<i>Traffic Analysis: US-89; 11400 South to 10600 South Environmental Assessment Project No. F-0089(375)364</i>	Avenue Consultants	Ivan Hooper, PE 6575 S. Redwood Rd., Ste. 101 Taylorsville, Utah 84123
<i>Project-Level PM Quantitative Hot-Spot Analysis: Project of Air Quality Concern Questionnaire</i>	Avenue Consultants	Jeremiah Johnston, PE 6575 S. Redwood Rd., Ste. 101 Taylorsville, Utah 84123
<i>Noise Assessment US-89 (State Street) 11400 South to 10600 South</i>	Lochner	Dave Shannon, PE & Janusz Wielgos, PE 3995 South 700 East, Ste. 450 Salt Lake City, Utah 84107





## PROJECT DATA SHEET

**Report Title:** *Intensive-Level Archaeological Survey for the US-89; 11400 South to 10600 South Project, Salt Lake County, Utah*

**Companion Report:** *A Selective Reconnaissance-Level Historic Structures Assessment for the US-89; 11400 South to 10600 South Project, Salt Lake County, Utah* (Ellis 2017)

**Utah State Antiquities Project Number:** U16HY0944ps

**Agency Project No.:** F-0089(375)364; PIN 12561

**Project Description:** The Utah Department of Transportation (UDOT), in conjunction with Sandy City, proposes improvements to State Street (US-89) between 11400 South and 10600 South to address traffic congestion. Improvements may include minor widening of the roadway pavement in some areas; installing sidewalk, curb, and gutter in areas where none currently exist; and installing new traffic signals. The work would necessitate ground disturbance up to several feet deep to relocate underground utilities, and minor acquisition of right-of-way and/or temporary construction easements from adjacent properties may be needed. Federal funding would be used to accomplish the project.

**Agencies:** Utah Department of Transportation; Sandy City

**Location:** Sandy, Salt Lake County, Utah

**Land Ownership:** State right-of-way, Private lands adjacent

**Date(s) of Fieldwork:** November 10, 2016 and January 18, 2017

**Methods:** Selective reconnaissance-level historic structures inventory

**Survey Area:** The survey area extended 15 meters (50 feet) from the edge of existing pavement along both sides of State Street (US-89) and each connector street where ground disturbance or property acquisition is anticipated. The actual area of potential effects (APE) is somewhat smaller than the survey area and will be defined in final project design.

**Acres Surveyed:** 38.3 acres (including paved roadways)

**Total # Archaeological Sites in APE:** 2 (42SL214 and 42SL290)

**New Sites Recorded:** 0

**Previously Recorded Sites Updated:** 1 (42SL290)

**Previously Recorded Sites Not Updated:** 1 (42SL214)

**NRHP Eligible Resources:** 2

**Site Numbers:** 42SL214 and 42SL290

## Archaeological Survey Report

### ADMINISTRATIVE INFORMATION

<b>Report Title:</b> Intensive-Level Archaeological Survey for the US-89; 11400 South to 10600 South Project, Salt Lake County, Utah		<b>Date of Report:</b> January 19, 2017	
<b>Project Sponsor:</b> Utah Dept. of Transportation, Sandy City		<b>Division of State History Project #:</b> U16HY0944ps	
<b>Lead Agency for Section 106:</b> Utah Dept. of Transportation, Region Two		<b>UDOT Project #/PIN:</b> F-0089(375)364 / 12561	<b>Certus Project #:</b> AVE02
<b>Author(s):</b> Sheri Murray Ellis	Certus Environmental Solutions, LLC 655 7 <sup>th</sup> Avenue Salt Lake City, UT 84103 (801) 230-7260		
<b>Type(s) of Survey:</b>			
<input checked="" type="checkbox"/> <b>Intensive</b> <input type="checkbox"/> <b>Reconnaissance</b> <input type="checkbox"/> <b>Not Applicable</b> <input type="checkbox"/> <b>Other (describe):</b>			

**Methods:** Certus employed standard intensive-level archaeological survey techniques consisting of transects spaced no more than 15 meters (50 feet) apart. Given the narrowness of the survey area beyond paved locations, this approach equated to a single transect in areas where the survey area extended beyond paved surfaces.

**Description of the Undertaking:** The Utah Department of Transportation (UDOT), in conjunction with Sandy City, proposes improvements to State Street (US-89) between 11400 South and 10600 South (hereafter referred to as the Project) to address traffic congestion (see **Figure 1** for general project location). Improvements may include minor widening of the roadway pavement in some areas; installing sidewalk, curb, and gutter in areas where none currently exist; and installing new traffic signals. The work would necessitate ground disturbance up to several feet deep to relocate underground utilities, and minor acquisition of right-of-way and/or temporary construction easements from adjacent properties may be needed. Federal funding would be used to accomplish the project, thereby invoking the National Historic Preservation Act and its implementing regulations at 36 CFR 800. The UDOT is the lead agency for the purposes of compliance with these regulations.

**Describe the Project Area, Area of Potential Effects, and Survey Area (figures attached):** The survey area extended 15 meters (50 feet) from the edge of existing pavement along both sides of State Street (US-89) and each connector street where ground disturbance or property acquisition is anticipated (see **Figures 2 and 3**). The actual area of potential effects (APE) is somewhat smaller than the survey area and will be defined in final project design. Lands in the APE are owned by private parties, but road rights-of-way are owned by UDOT and the local municipality.

The APE/Survey Area is located in Township 3 South, Range 1 East, Sections 18 and 19 and Township 3 South, Range 1 West, Sections 13 and 24 of the Salt Lake Base and Meridian. See USGS 7.5' topographic quadrangle Midvale, Utah (see **Figure 2**).

**Project Setting:** The Project is located in an urban/suburban area of the Salt Lake Valley. Most lands along the project corridor have been developed with modern commercial structures and associated paved parking lots and ornamental landscape. Most development has occurred within the past 10 years. Prior to that time, lands were occupied by historical single-family dwellings spaced apart on large lots. Elevation of the survey ranges from roughly 4400 feet above sea level to 4490 feet above sea level. The nearest natural freshwater source is the Jordan River, located approximately 1 mile to the west of the survey area. Surface and near-surface native soils are classified by the Natural Resources Conservation Service (NRCS) as Taylorsville silty clay loam with small pockets of Parleys silt loam and Bramwell silty clay loam.

## PREVIOUS RESEARCH

**Location of Records Search:** Utah Division of State History Preservation Pro

**Date:** November 8, 2016

**Summary of Previous Research:** Certus conducted a search of previous site and project files via the Utah Division of State History (UDSH) online Preservation Pro system for an area extending ½-mile in all directions from the edge of the survey area. The search indicates that 18 previous Section 106 surveys have been undertaken within ½-mile of the current survey area (see **Table 1**, below, and **Figure 4**, attached). Most of these have been linear projects associated with roadway improvements. Four of the previous projects included portions of the current survey area, through the most recent of these occurred more than 12 years ago.

**Table 1. Previous projects in the file search area**

Project #	Description / Survey Organization	Documented Sites in the File Search Area*
U85PD0525	10600 South Improvements / P-III Associates	None
U88BC0046	I-15/11400 South Interchange / BYU Office of Public Archaeology	None
U94BS0569	10600 South and I-15 Railroad Realignment Detour / Baseline	42SL218
U98BS0770	11400 South and I-15 Interchange and Road Expansion / Baseline	<b>42SL290</b>
U00BS0154	Additional Survey for 11400 South and I-15 Interchange and Road Expansion / Baseline	None
U00ST0400	Light Rail Trail Project / SWCA	<b>42SL290, 42SL344</b>
U00UT0458	Porter Rockwell Trail / UDOT	<b>42SL344</b>
U03ST0757	Carmax 190 W. 11400 S. / SWCA	None
U03UI0822	11400 South EIS / URS Corp.	<b>42SL214, 42SL365</b>
U04ST0105	State Street, 90 <sup>th</sup> South to 106 <sup>th</sup> South / SWCA	<b>42SL214, 42SL290</b>
U07JS0404	Provo to Salt Lake City Front Runner / Jones and Stokes	None
U08HK0272	Draper Transit Corridor / HDR Engineering	None
U14HO0351	Dry Creek Realignment / Bighorn Archaeological Consultants	None
U14HO1329	614715 Crescent Park Cell Tower / Bighorn Archaeological Consultants	None



**Table 1. Previous projects in the file search area (continued)**

<b>Project #</b>	<b>Description / Survey Organization</b>	<b>Documented Sites in the File Search Area*</b>
U14HY1349	Verizon SAL-Beckstead Cell Tower / Certus	None
U15UJ0378	Verizon SAL Roxanne Cell Tower / Utah State University	None
U16TD0332	Verizon SAL IX Sandy Cell Tower / Tetra Tech	None
U16UJ0122	SAL Fish Pond Cell Tower / Utah State University	None

\* Bold font indicates the site is located IN the current APE

Six archaeological sites have been previously documented in the file search area. These include the Jordan & Salt Lake City Canal (42SL214), a historic artifact scatter (42SL218), the East Jordan Canal (42SL290), the D&RGW Railroad (42SL293), the Union Pacific Railroad (42SL344), and the remains of a historic farmstead (42SL365). Of these six sites, two extend into the current survey area. These are the Jordan & Salt Lake City Canal (42SL214) and the East Jordan Canal (42SL290). Both of these sites were determined eligible for the National Register of Historic Places (NRHP) as a result of their prior documentation and documentation of other segments of the linear sites beyond the current survey area. Certus revisited both of these sites as part of the current undertaking. They are discussed further in the **Results and Recommendations** section of this report.

No resources in the APE/survey area are known to be listed on the NRHP.

Per the Memorandum of Understanding between UDOT and the Utah Geological Survey, this undertaking is exempt from consultation requirements regarding paleontological resources.

## RESULTS and RECOMMENDATIONS

<b>Date of Survey:</b> November 10, 2016 and January 18, 2017	<b>Surveyor:</b> Sheri Murray Ellis <b>P.I. Permit #:</b> 47
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**Results:** Two archaeological sites were identified in the survey area for the US-89; 11400 South to 10600 South Project. These are the previously recorded sites of the Jordan & Salt Lake City Canal (42SL214) and the East Jordan Canal (42SL290). No new sites were identified. The two linear historic sites are discussed in more detail below, and their locations relative to the current survey area are depicted on **Figures 5 and 6**, attached.

### Site 42SL214, The Jordan & Salt Lake City Canal

The Jordan & Salt Lake City Canal—a late-1800s irrigation canal—passes through the current survey area on a northeast-to-southwest alignment at approximately 10800 South. The entire segment of the canal in the current survey area has been piped underground and is no longer visible on the ground surface. The segment of the canal in the current survey area appears to have been most recently documented in 2004 (Ellis 2004). At that time, the segment of the canal in the current survey area was documented as being entirely underground. As such, the existing 2004 documentation accurately reflects the nature of the site as encountered during the current survey, and Certus did not prepare an update to the site record.

Site 42SL214 as a whole was **previously determined to be eligible for the NRHP**, though the segment in the current survey area no longer contributes to that eligibility as a result of piping the site underground.

### Site 42SL290, The East Jordan Canal

The East Jordan Canal (42SL290) is a late-1870s irrigation canal that passes through the current survey area on 11400 South, east of State Street. The file search indicated that the entire segment of the canal through the current survey area was previously documented. However, Certus was unable to locate a site form specific to this segment. As such, Certus provided an update to the site record.

The portion of the canal immediately south of 11400 South is an open, unlined channel measuring approximately 20 feet wide across the top and 3-4 feet deep. This channel remains open for approximately 470 feet as the canal trends to the south-southwest. It is then piped for a short distance under a commercial property before re-emerging in an open channel. The canal passes under 11400 South via a modern culvert. North of 11400 South, the canal has been almost entirely piped underground through the parking lot of a commercial property. Only a small segment of the open channel measuring approximately 25 feet long is located north of 11400 South and is situated immediately north of the sidewalk along the north side of the road.



42SL290; East Jordan Canal at 11400 South; view to the south

Site 42SL290 as a whole was ***previously determined to be eligible for the NRHP***. The segment of the canal in the current survey area south of 11400 South remains intact as an open, unlined channel. This segment contributes to the overall eligibility of the site. The segment of the canal north of 11400 South in the current survey area no longer contributes to the site due to piping of most of the canal in this area and a resulting isolation of a 25-foot long open channel.

**Recommendations:** Two NRHP-eligible archaeological resources are present in the survey area for the US-89; 11400 South to 10600 South Project. These are the Jordan & Salt Lake City Canal (site 42SL214) and the East Jordan Canal (42SL290).

The entire segment of the Jordan & Salt Lake City Canal (42SL214) in the current survey area has been piped underground. Although roadway improvements associated with the current undertaking would cross the canal alignment, Certus recommends that any activities in this area be considered to have *no adverse effect* on the site since the historical manifestation of the canal no longer exists in this area.

Most of the East Jordan Canal (42SL290) channel north of 11400 South has been piped underground, and only an isolated 25-foot long open segment remains. South of 11400 South the canal channel remains open. Certus recommends that the segment north of 11400 South lacks integrity and any changes to this segment of the canal associated with the current undertaking be considered to have *no adverse effect*. Although the segment of the canal south of 11400 South retains integrity as an open channel, any changes to the canal in this area from the proposed undertaking would be minor and likely limited to, if anything, minor lengthening of the modern culvert under 11400 South. Certus recommends such impacts and those of similar magnitude be considered to have *no adverse effect* on the canal site.

## **REFERENCES CITED**

Ellis, Sheri Murray. 2004. IMACS Update site form for 42SL000290. On file at Utah State Historic Preservation Office, Salt Lake City.



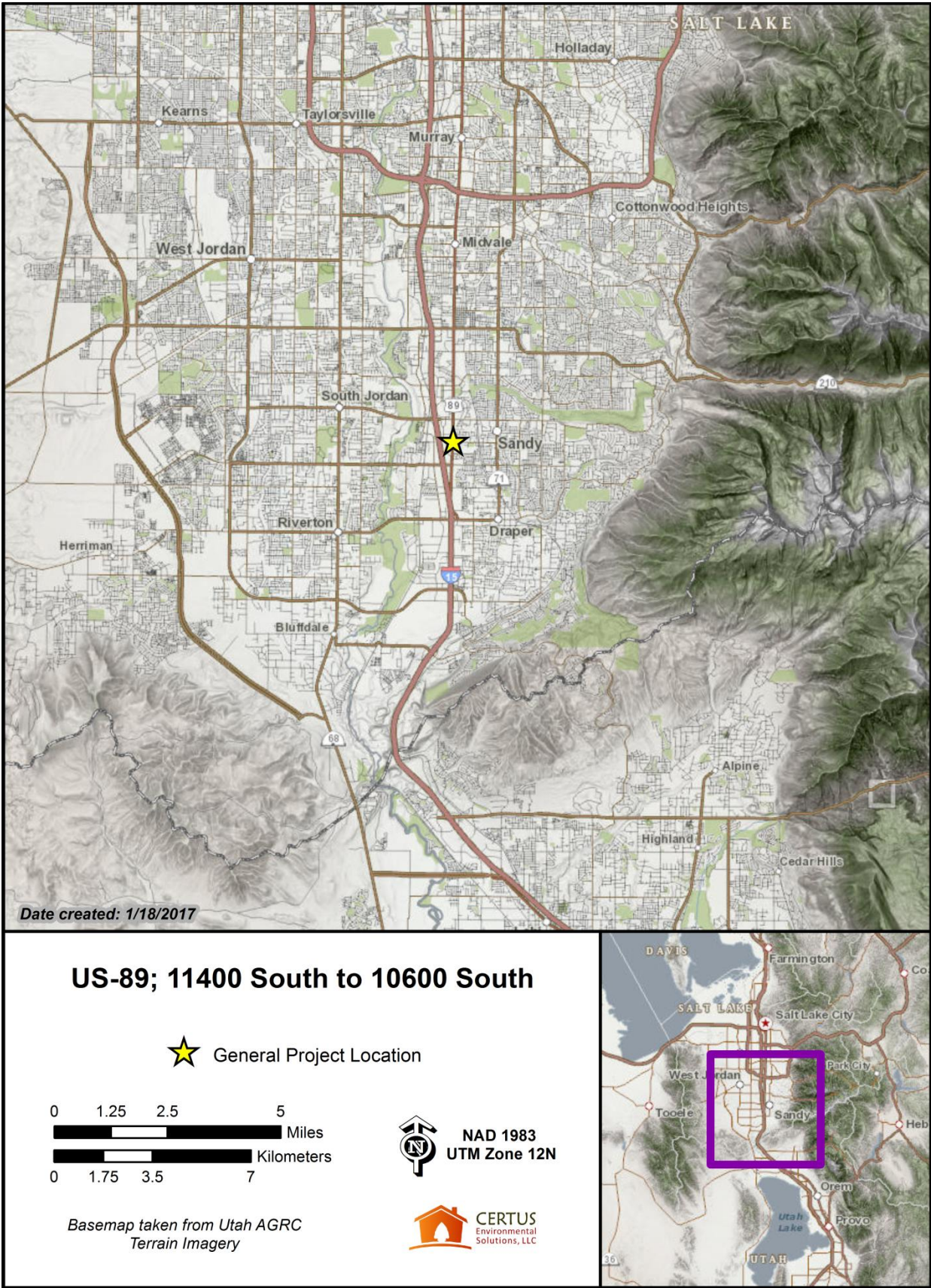
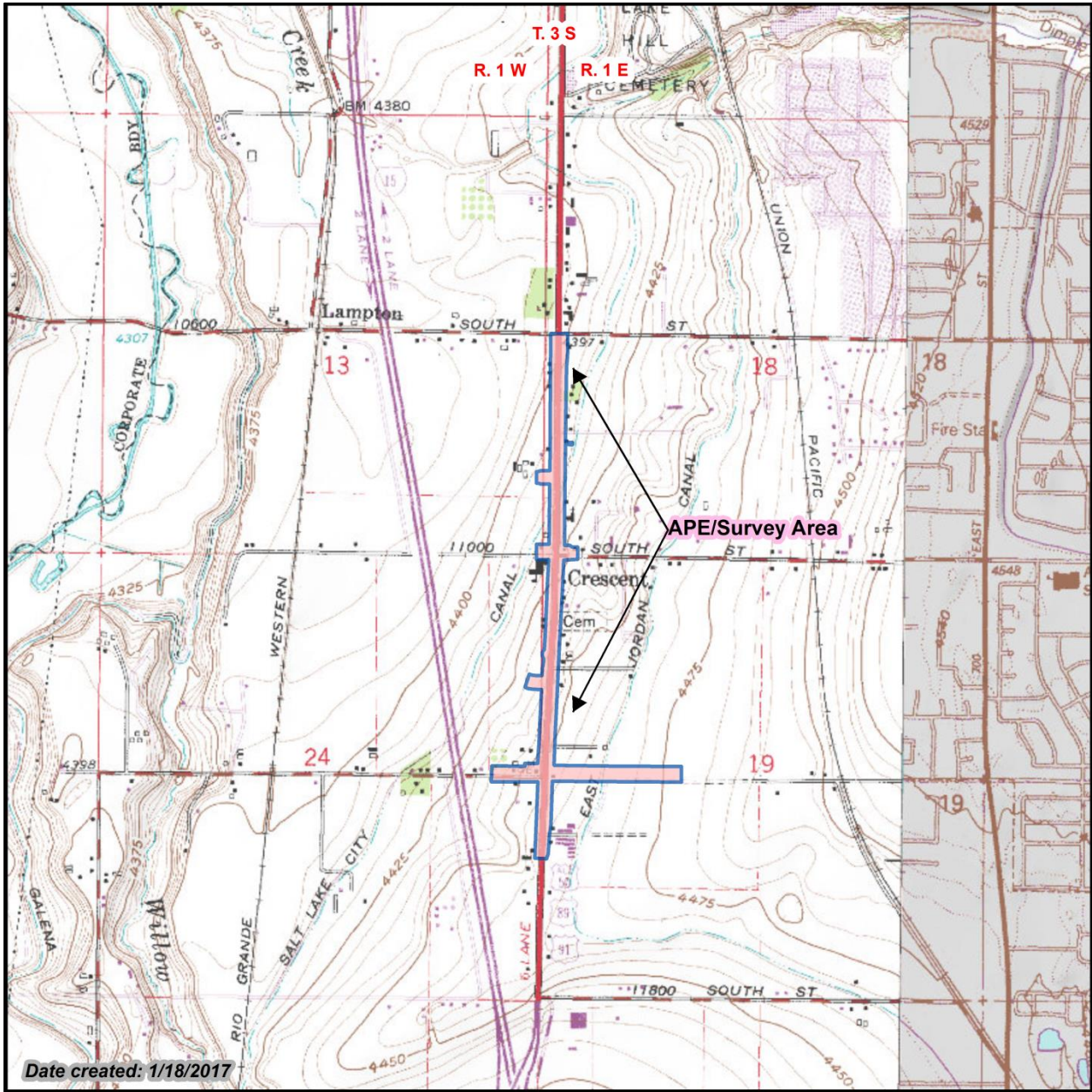



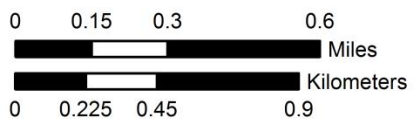
Figure 1. General Project Location; US-89, 11400 South to 10600 south






### 4100 South Signal Improvements 4000 West & 2700 West

 APE/Survey Area



 NAD 1983  
UTM Zone 12N

Basemap taken from USGS 7.5'  
Utah topographic quadrangles:  
Midvale | Draper

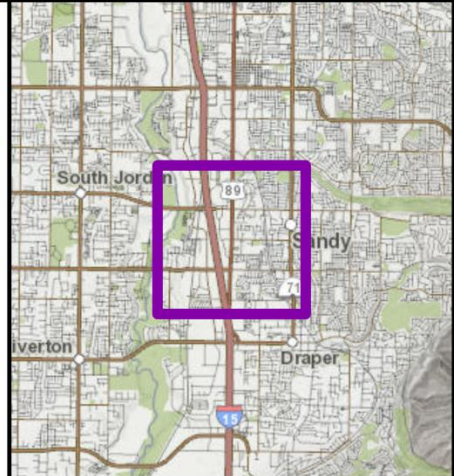
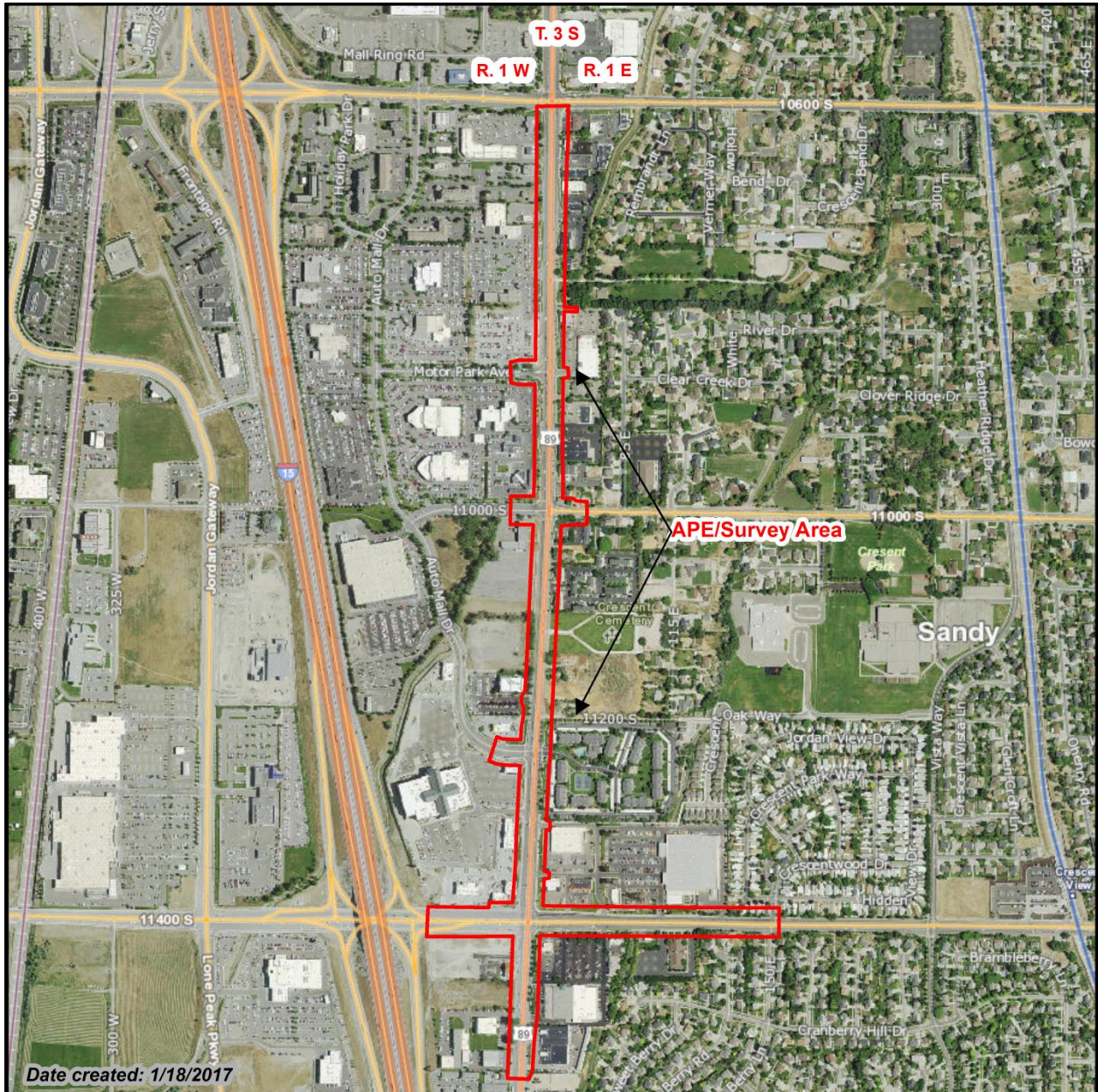


Figure 2. Location of archaeological survey area; topographic map





### 4100 South Signal Improvements 4000 West

 APE/Survey Area



 NAD 1983  
UTM Zone 12N

Basemap taken from Utah AGRC  
Hybrid Imagery (NAIP 2014 base)

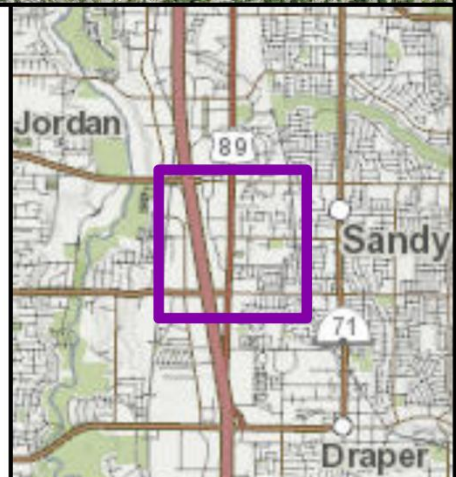


Figure 3. Location of archaeological survey area; aerial photograph



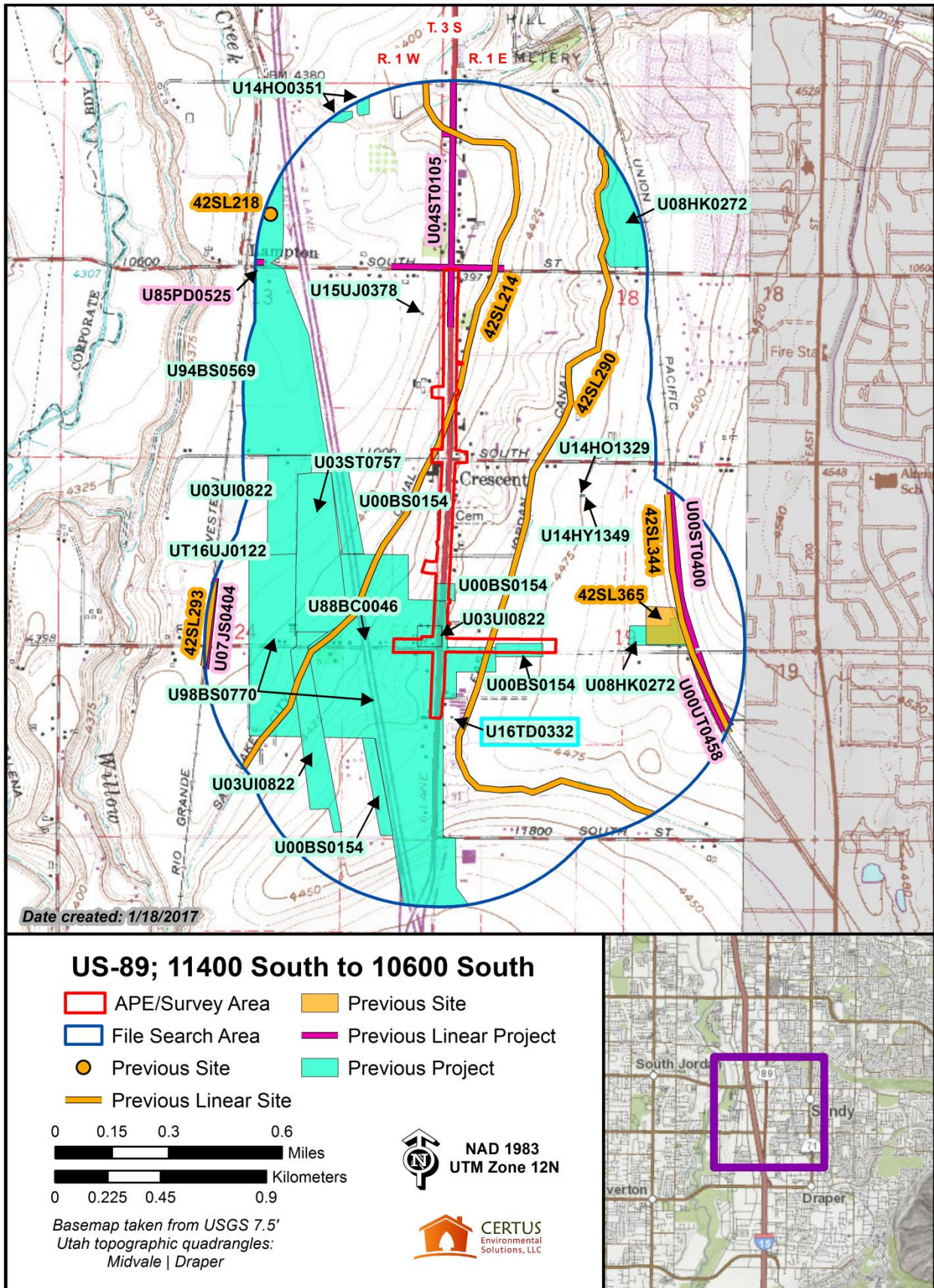


Figure 4. File search results



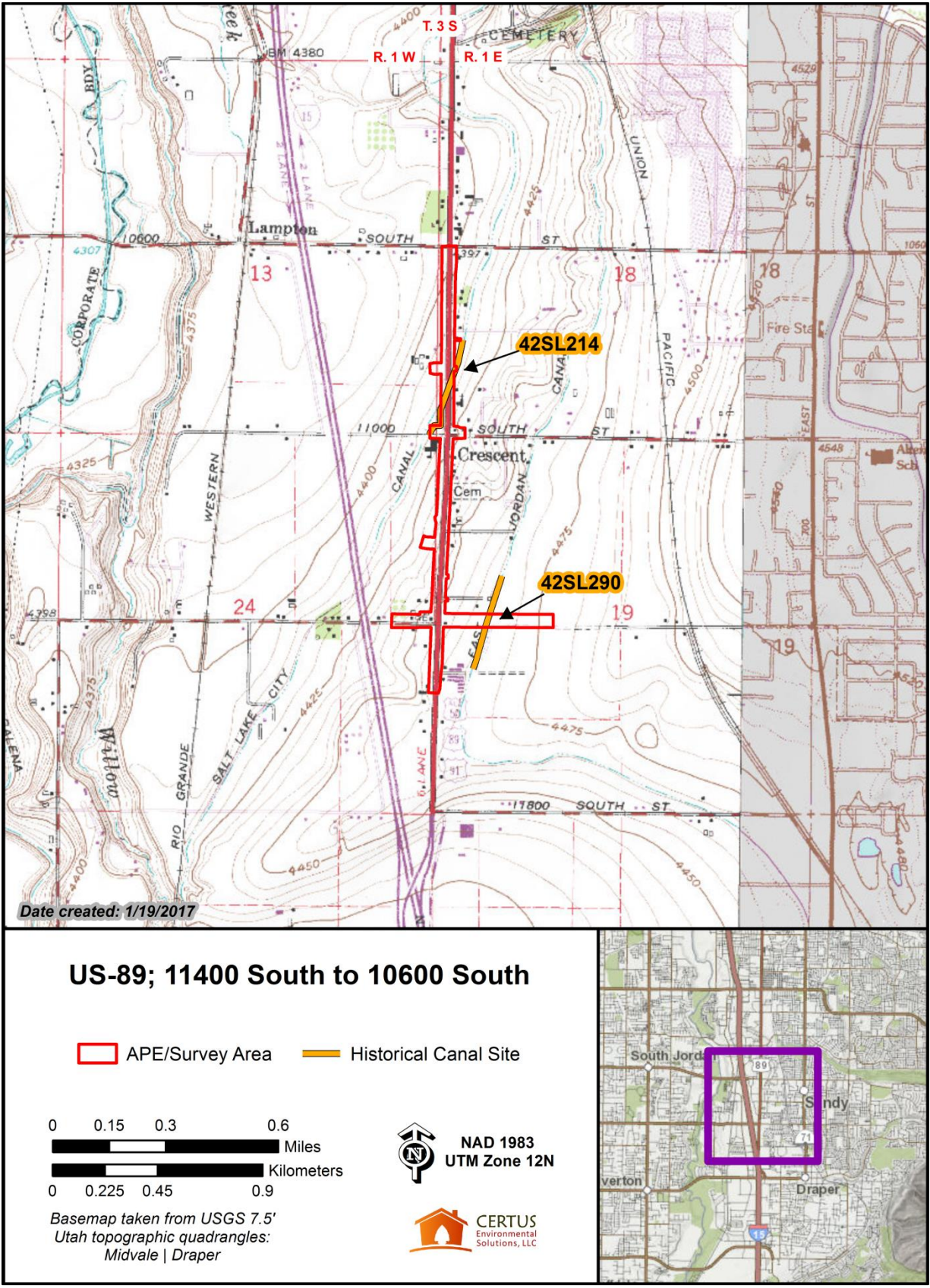


Figure 5. Survey results; topographic map



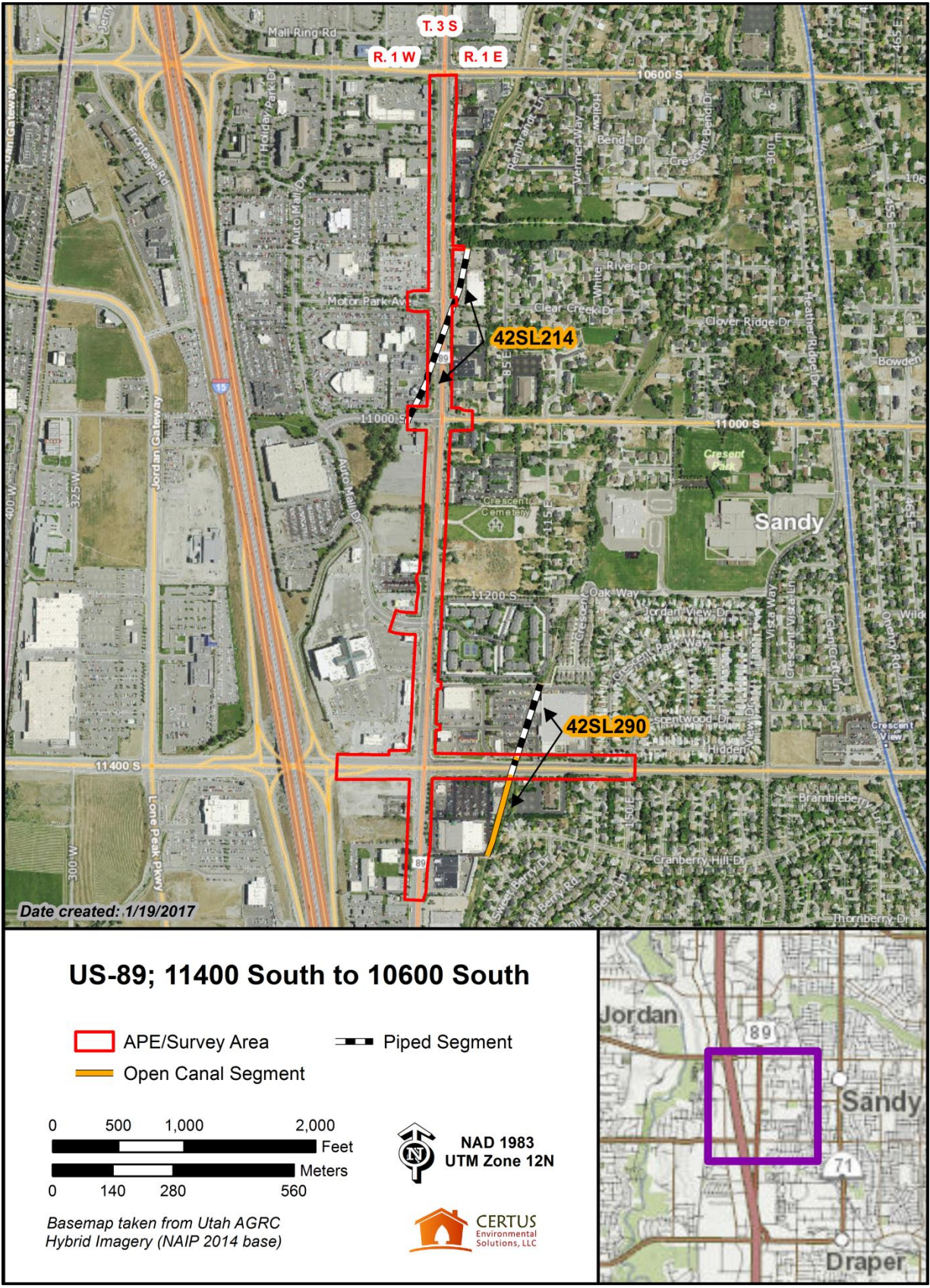


Figure 6. Survey results; air photo

**A Selective Reconnaissance-Level Historic Structures Assessment for  
the US-89; 11400 South to 10600 South Project,  
Salt Lake County, Utah  
*DRAFT***

**UDOT Project No. F-0089(375)364; PIN 12561**

Prepared for

The Utah Department of Transportation  
Region Two  
and  
Avenue Consultants

Prepared by

Sheri Murray Ellis, MS, RPA  
Owner / Consultant



Certus Environmental Solutions, LLC  
Salt Lake City, Utah  
801.230.7260

**Utah Antiquities Project No. U16HY0944ps  
PLPCO Permit No. 47**

**Certus Project Number AVE02**

February 18, 2017

## PROJECT ABSTRACT SHEET

**Report Title:** *A Selective Reconnaissance-Level Historic Structures Assessment for the US-89; 11400 South to 10600 South Project, Salt Lake County, Utah*

**Companion Report:** *Intensive-Level Archaeological Survey for the US-89; 11400 South to 10600 South Project, Salt Lake County, Utah* (Ellis 2017)

**Utah State Antiquities Project Number:** U16HY0944ps

**Agency Project No.:** F-0089(375)364; PIN 12561

**Project Description:** The Utah Department of Transportation (UDOT), in conjunction with Sandy City, proposes improvements to State Street (US-89) between 11400 South and 10600 South to traffic congestion. Improvements may include minor widening of the roadway pavement in some areas; installing sidewalk, curb, and gutter in areas where none currently exist; and installing new traffic signals. The work would necessitate ground disturbance up to several feet deep to relocate underground utilities, and minor acquisition of right-of-way and/or temporary construction easements from adjacent properties may be needed. Federal funding would be used to accomplish the project.

**Agencies:** Utah Department of Transportation; Sandy City

**Location:** Sandy, Salt Lake County, Utah

**Land Ownership:** State right-of-way, Private lands adjacent

**Date(s) of Fieldwork:** November 10, 2016 and January 18, 2017

**Methods:** Selective reconnaissance-level historic structures inventory

**Survey Area:** The survey area for historic structures extended 15 meters (50 feet) from the edge of existing pavement along both sides of State Street (US-89) and each connector street where ground disturbance or property acquisition is anticipated. The actual area of potential effects (APE) is somewhat smaller than the survey area and will be defined in final project design.

**Acres Surveyed:** 38.3 acres (including paved roadways)

**Historic Structures Recorded:** 11 (see Table S1, below)

**NRHP Eligible Structures:** 9 (see Table S1, below)

**Table S1.** Summary of Historic Structures and National Register Eligibility Recommendations

Eligible		Not Eligible
10831 S. State St.	11145 S. State St.	10975 S. State St.
10907 S. State St.	11155 S. State St.	43 E. 11000 S.
10985 S. State St.	11191 S. State St.	
11020 S. State St.	45 E. 11000 S.	
11031 S. State St.		



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## INTRODUCTION

The Utah Department of Transportation (UDOT), in conjunction with Sandy City, proposes improvements to State Street (US-89) between 11400 South and 10600 South (hereafter referred to as the Project) to address traffic congestion (see **Figure 1** for general project location). Improvements may include minor widening of the roadway pavement in some areas; installing sidewalk, curb, and gutter in areas where none currently exist; and installing new traffic signals. The work would necessitate ground disturbance up to several feet deep to relocate underground utilities, and minor acquisition of right-of-way and/or temporary construction easements from adjacent properties may be needed. Federal funding would be used to accomplish the project, thereby invoking the National Historic Preservation Act and its implementing regulations at 36 CFR 800. The UDOT is the lead agency for the purposes of compliance with these regulations.

The UDOT contracted with a consultant team, led by Avenue Consultants (Avenue), to prepare the environmental document and project design for the undertaking. Avenue, in turn, contracted with Certus Environmental Solutions, LLC (Certus) to conduct an assessment of cultural resources in the area of potential effects. Sheri Murray Ellis, architectural historian and Principal Investigator for Certus under State November 10, 2016 and January 18, 2017. The cultural resource assessment included both structural resources and archaeological resources; the results of the archaeological survey are reported under separate cover (see Ellis 2017). All work was carried out under Utah State Antiquities Project Number U16HY0944ps.

## THE AREA OF POTENTIAL EFFECTS AND SURVEY AREA

The survey area for historic structures extended 15 meters (50 feet) from the edge of existing pavement along both sides of State Street (US-89) and each connector street where ground disturbance or property acquisition is anticipated (see **Figures 2 and 3**). The actual area of potential effects (APE) is somewhat smaller than the survey area and will be defined in final project design. Lands in the APE are owned by private parties, but road rights-of-way are owned by UDOT and the local municipality.

The APE/Survey Area is located in Township 3 South, Range 1 East, Sections 18 and 19 and Township 3 South, Range 1 West, Sections 13 and 24 of the Salt Lake Base and Meridian. See USGS 7.5' topographic quadrangle Midvale, Utah (see **Figure 2**).

The historic structures survey included all parcels directly intersected by the above-defined survey area. Any parcel intersected by the survey area was assessed for the presence/absence of historic structures regardless of whether the structures themselves were located within that boundary.

## PROJECT SETTING

The Project is located in an urban/suburban area of the Salt Lake Valley. Most lands along the project corridor have been developed with modern commercial structures and associated paved parking lots and ornamental landscape. Most development has occurred within the past 10 years. Prior to that time, lands were occupied by historical single-family dwellings spaced apart on large lots. Many such structures have been demolished, and those that remain do so as isolated structures.

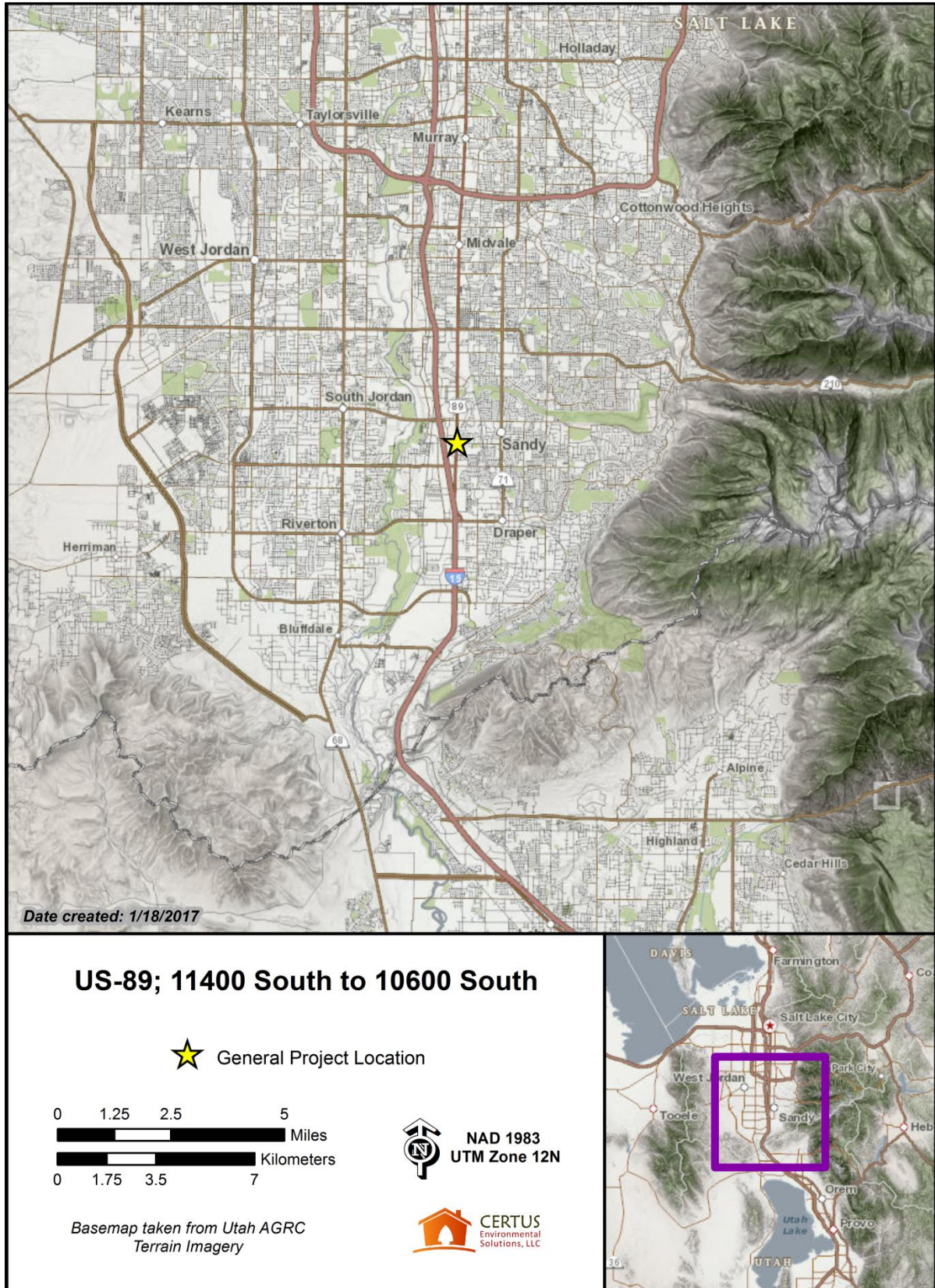


Figure 1. General project location; US-89; 11400 South to 10600 South



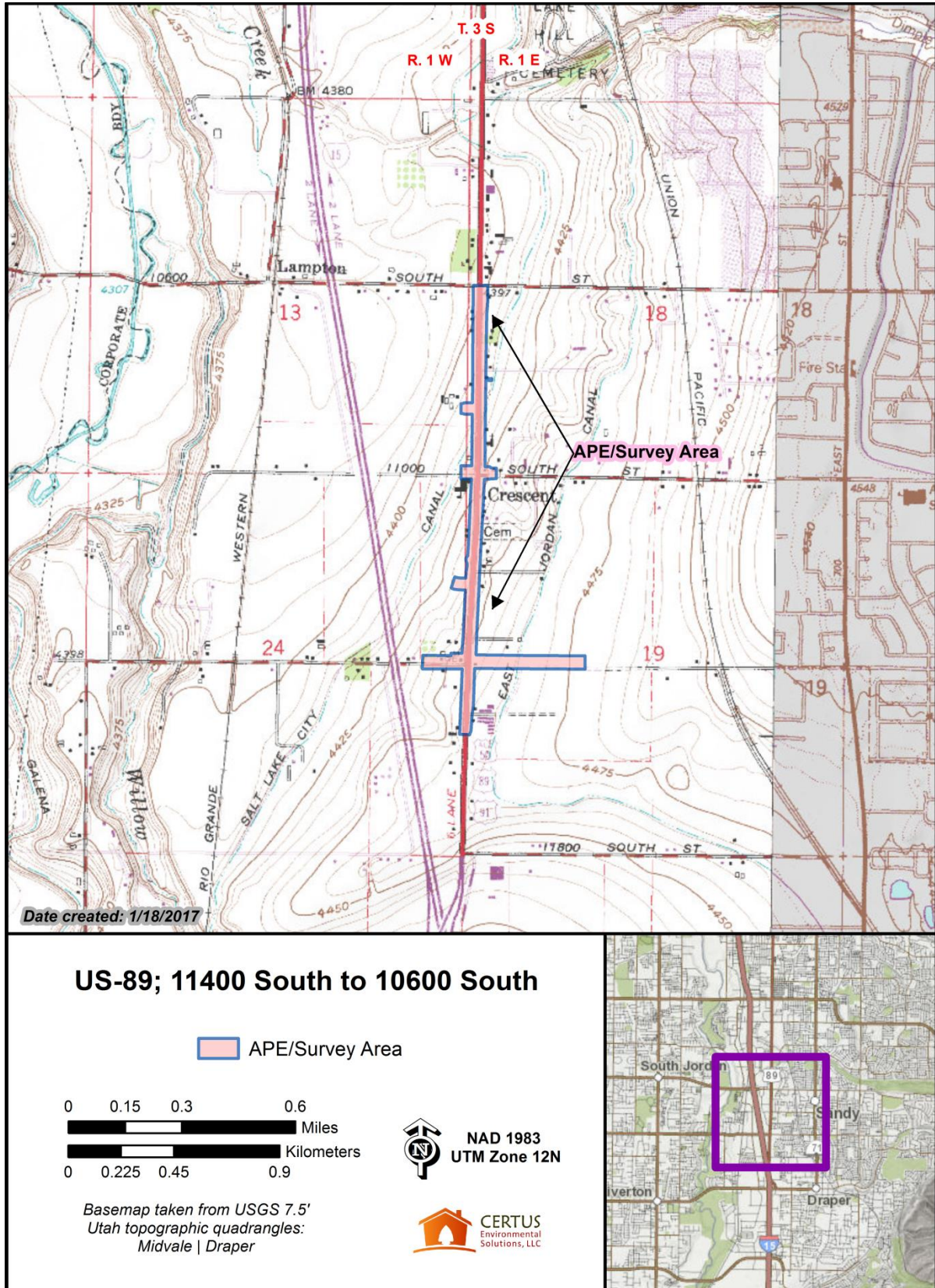


Figure 2. APE/Survey Area; topo map



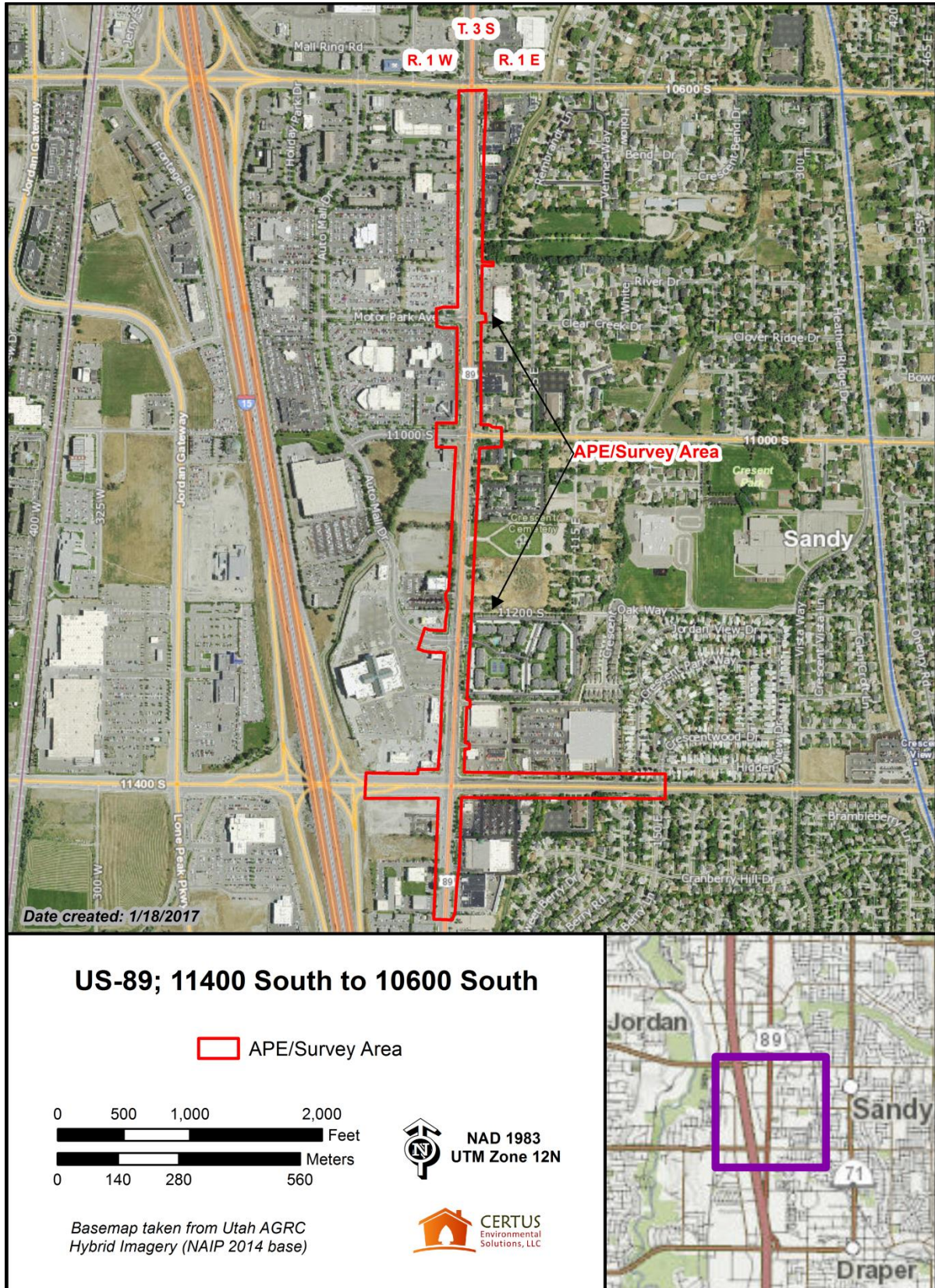


Figure 3. APE/ Survey Area; air photo



## PREVIOUS RESOURCE SURVEYS AND KNOWN HISTORICAL STRUCTURES

Certus conducted a search of previous site and project files via the Utah Division of State History (UDSH) online Preservation Pro system on November 8, 2016 for an area extending ½-mile in all directions from the edge of the survey area. The search indicates that 18 previous Section 106 surveys have been undertaken within ½-mile of the current survey area. Most of these have been linear projects associated with roadway improvements. Four of the previous projects included portions of the current survey area, through the most recent of these occurred more than 12 years ago.

More than 80 structural properties have been reported for the file search area as a result of previous Section 106 survey and other efforts to document historic structures. Of these, 23 are reported as being located in the current survey boundaries. These properties and their status as currently present or absent in the Project survey area are summarized in **Table 1**, below.

**Table 1. Previously Documented Historical Buildings in the Survey Area**

Address	UDSH Rating <sup>1</sup> /NRHP Eligibility per Previous Documentation	Current Status
43 E. 11000 S.	NC/Ineligible	Present
45 E. 11000 S.	EC/Eligible	Present
10621 S. State St.	NC/Ineligible	Demolished
10631 S. State St.	Undetermined	Demolished
10671 S. State St.	ES/Eligible	Demolished
10685 S. State St.	ES/Eligible	Demolished
10723 S. State St.	ES/Eligible	Demolished
10834 S. State St.	ES/Eligible	Demolished
10907 S. State St.	ES/Eligible	Present
10965 S. State St.	ES/Eligible	Demolished
10985 S. State St.	ES/Eligible	Present
10988 S. State St.	NC/Ineligible	Demolished
11020 S. State St.	ES/Eligible	Present
11031 S. State St.	ES/Eligible	Present
11135 S. State St.	ES/Eligible	Demolished
11145 S. State St.	ES/Eligible	Present
11155 S. State St.	NC/Ineligible	Present
11350 S. State St.	NC/Ineligible	Demolished
11355 S. State St.	EC/Eligible	Demolished
11357 S. State St.	NC/Ineligible	Demolished
11395 S. State St.	NC/Ineligible	Demolished
11398 S. State St.	ES/Eligible	Demolished
11450 S. State St.	ES/Eligible	Demolished

<sup>1</sup> ES = Eligible/Significant; EC = Eligible/Contributing; NC = Ineligible/Non-Contributing

As can be seen in Table 1, only eight of the 23 previously documented historic structures reported as having been located in the current survey area remain standing. Certus revisited all previously documented properties as part of the current undertaking. Additional information about this property can be found in the Findings section of this report.

## FIELD METHODS

Certus applied the methods outlined in the 2012 Utah SHPO Standard Operating Procedures for selective reconnaissance-level buildings surveys as well as the applicable components of the UDOT cultural resource inventory guidelines (UDOT 2010, as updated). Pursuant to the guidelines for selective reconnaissance-level surveys, Certus only documented those buildings identified as dating to the historic period; modern buildings were not documented. In accordance with UDOT guidelines, and to accommodate a time lag between the compilation of the survey data and any future construction associated with the undertaking, Certus employed a 45-year age cutoff to identify buildings as historical, meaning that for this project, any building constructed during or before 1972 was considered historical. Age of construction for each primary building was derived from a combination of estimation based upon architectural characteristics, records from prior documentation, and information obtained from the Salt Lake County Assessor.

Each primary historical building on each identified property was assessed for architectural type and style, historical integrity, and other basic architectural details. Substantive historical outbuildings were also documented. Each property was photographed using a digital camera set to a minimum resolution of 300 dpi. Upon acceptance by the Utah SHPO of the final historical buildings eligibility ratings, Certus will enter the relevant data for each documented property into the SHPO Preservation Pro online database system. Per Utah SHPO and UDOT requirements for surveys involving fewer than 20 historic structures, Certus compiled Section 106 Short Forms for each documented property.

## RESOURCE EVALUATION METHODS

In accordance with 36 CFR § 60, historical structures (and other cultural resources) documented as part of federal undertakings are to be evaluated for their eligibility for the NRHP under four specific criteria and with consideration for seven elements of integrity. A structure may be considered eligible for listing on the NRHP if it:

- A- is associated with events that have made a significant contribution to the broad patterns of our history; OR
- B- is associated with the lives of persons significant in our past; OR
- C- embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction; OR
- D- has yielded, or may be likely to yield, information important in prehistory or history.

Structures considered potentially eligible under one of the above criteria are also to be evaluated for integrity of location, design, setting, materials, workmanship, feeling, and association. To be eligible

for listing on the NRHP, a structure must possess integrity of those elements directly related to the criterion or criteria under which it would be determined eligible.

## Utah-Specific Considerations for Buildings

In Utah, all historic buildings documented at a reconnaissance-level are also evaluated using a rating system established by the Historic Preservation program at the Utah SHPO. This rating system assigns one of four ratings to buildings based on the degree to which they retain historical and architectural integrity. These ratings are as follows:

ES - Eligible/Significant: built within the historic period and retains integrity; excellent example of a style or type; unaltered or only minor alterations or additions; individually eligible for the [NRHP] under criterion "C"; also buildings of known historical significance.

EC - Eligible/Contributing: built within the historic period and retains integrity; good example of a style or type, but not as well-preserved or well-executed as "ES" buildings; more substantial alterations or additions than "ES" buildings, though overall integrity is retained; eligible for [the NRHP] as part of a potential historic district or primarily for historical, rather than architectural, reasons.

NC - Ineligible/Non-Contributing: built during the historic period but has had major alterations or additions; no longer retains integrity.

OP - Ineligible/Out-of-period: constructed outside the historic period.

The interaction between the SHPO ratings system and the criteria of the NRHP focuses on NRHP Criteria A and C and SHPO ratings ES and EC. Buildings assigned a SHPO rating of "ES" are considered eligible for listing under NRHP both Criteria A and C (Giraud 2007). Buildings assigned a SHPO rating of "EC" are considered eligible for the NRHP under Criterion A only (Giraud 2007).

## Historical Boundaries

To evaluate potential impacts to historic properties resulting from implementation of the proposed roadway improvements, appropriate historical boundaries must be established. National Register Bulletin 21, *Defining Boundaries for National Register Properties* (Seifert et al. 1997), offers guidance on how to establish such boundaries. The Bulletin offers the following recommendations for defining property boundaries associated with historical buildings:

- Select boundaries that encompass the entire resource, including both historic and modern additions. Include surrounding land historically associated with the resource that retains integrity and contributes to the property's historic significance.
- Use the legally recorded parcel number or lot lines for urban and suburban properties that retain their historic boundaries and integrity.
- For small rural properties, select boundaries that encompass significant resources, including outbuildings and the associated setting.

- For larger rural properties, select boundaries that include fields, forests, and open rangeland that is historically associated with the property and conveys the property's historic setting. The areas included must have integrity and contribute to the property's historic significance.

The survey area for the Project is urban/suburban in nature. For nearly all documented properties, the current legal boundaries for the parcel on which the building is located represents either the original historical boundaries or the sole remaining component of the original boundary as it is associated with the primary building. In these cases, current legal parcel boundaries were used to define the boundaries for these properties. In a few cases, adjacent undeveloped parcels were historically associated with the parcel on which the primary historical building is located and remains undeveloped. In others, multiple primary buildings occupy a single parcel, and the parcel only really pertains to one or the other building historically. In situations such as these, a boundary other than the current legal parcel boundary was defined for the consideration of project impacts. These situations are noted in the Findings section of this report.

## FINDINGS

Eleven (11) historical buildings were identified as a result of the selective reconnaissance-level survey for the US-89; 11400 South to 10600 South Project. Of the 11 resources, 10 are located on the east side of State Street, and one is located on the west side. The locations of the properties are illustrated on **Figures 4 and 5**, and descriptions of the properties are summarized in **Table 2**, below.

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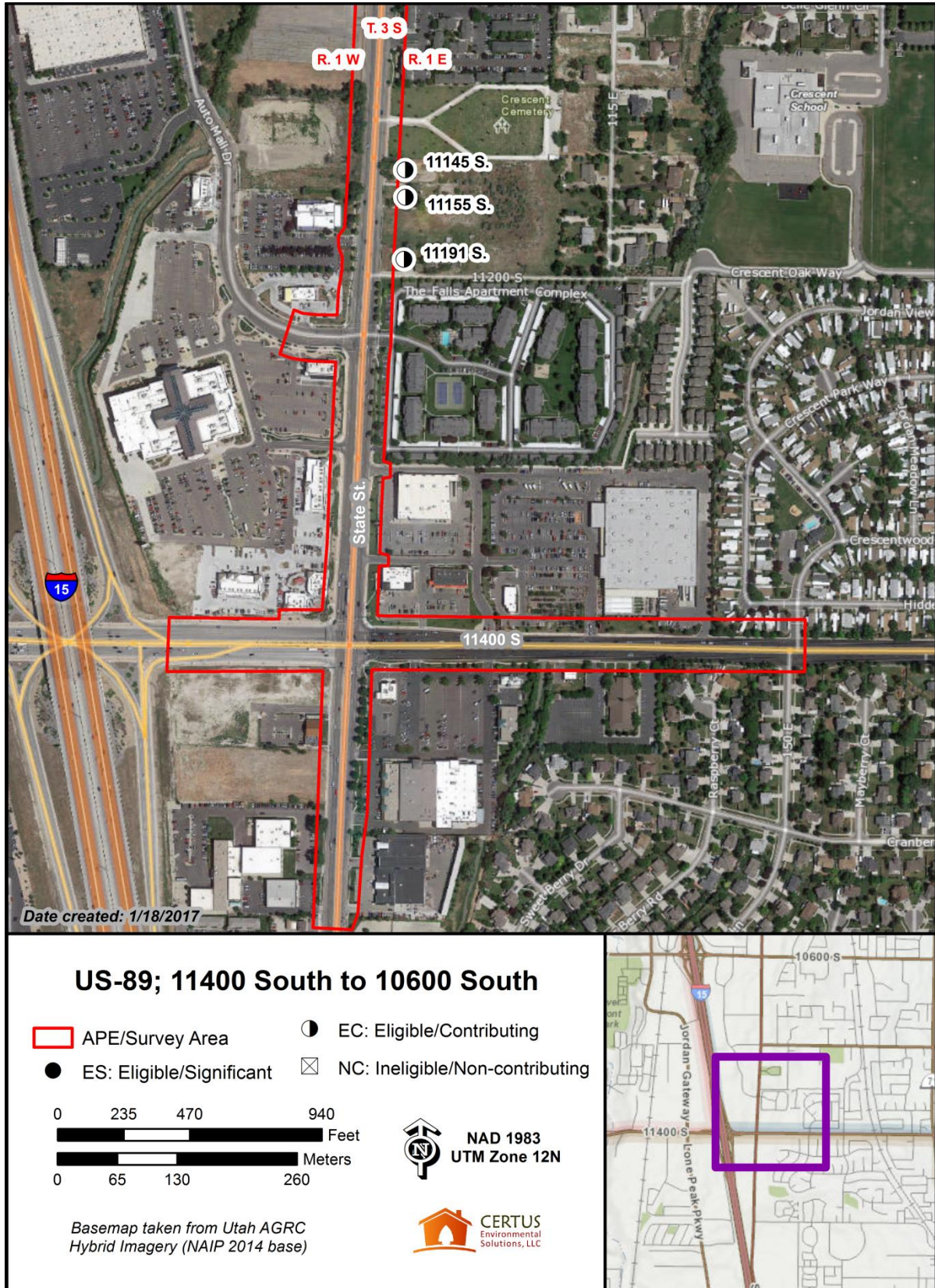
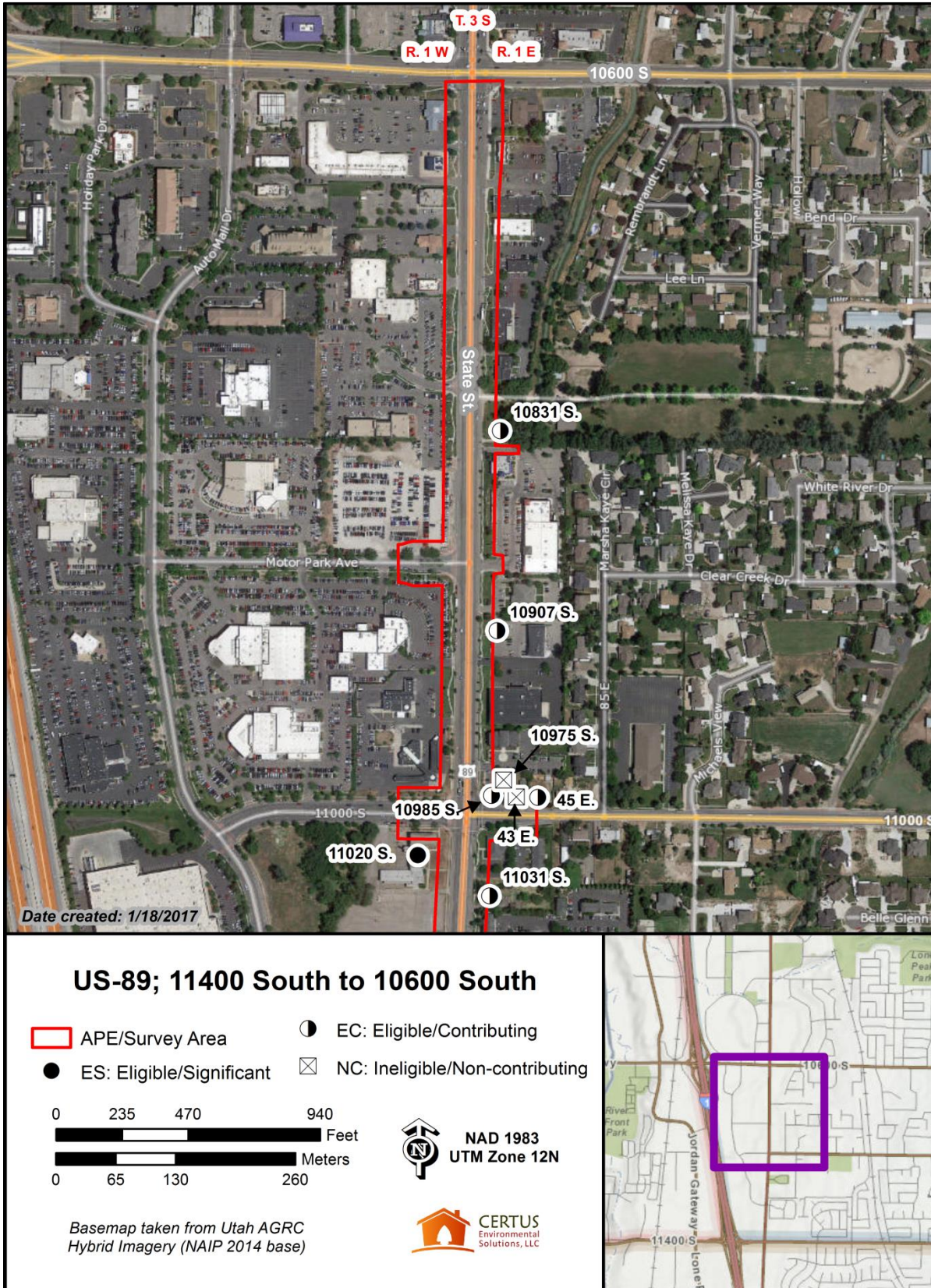




Figure 4. Location of documented historic structures; 11400 South to 11140 South





**Figure 5.** Location of documented historic structures; 11400 South to 10600 South

**Table 2. Historical buildings and structures documented in the APE/Survey Area**

Address	Year Built	Description and Historic Boundary	SHPO Rating & NRHP Eligibility	Photo
10831 S. State St.	c. 1947	<p>One-story Early Ranch single-family dwelling exhibiting Early Ranch and Minimal Traditional styles. Clad in striated brick. Notable alterations limited to modern windows in original openings. One contributing outbuilding was observed.</p> <p><b>Historic Boundary:</b> Current parcel boundary</p>	EC/Eligible	
10907 S. State St.	c. 1931	<p>One-story Period Cottage single-family dwelling exhibiting Period Revival and Bungalow styles. Clad in striated brick and vinyl siding. Notable alterations include vinyl siding on gable walls, modern windows in original openings, and a wheelchair ramp leading to the front porch. No outbuildings were observed.</p> <p><b>Historic Boundary:</b> Current parcel boundary</p>	EC/Eligible	
10975 S. State St.	c. 1935	<p>One-and-a-half-story Other Residential Type building exhibiting Ranch and Minimal Traditional styles. Clad in concrete block and vinyl siding. Notable alterations include a complete exterior remodel with modern materials and windows. No outbuildings were observed.</p> <p><b>Historic Boundary:</b> N/A</p>	NC/Ineligible	






**Table 2. Historical buildings and structures documented in the APE/Survey Area**



Address	Year Built	Description and Historic Boundary	SHPO Rating & NRHP Eligibility	Photo
10985 S. State St.	c. 1935	<p>Two-story Bungalow exhibiting Bungalow style. Clad in regular brick. Notable alterations include modern windows in original openings. No outbuildings were observed.</p> <p><b>Historic Boundary:</b> Building only; land no longer contributing</p>	EC/Eligible	
11020 S. State St.	c. 1930	<p>Crescent Elementary School. One-story horizontal school exhibiting Art Deco &amp; Post WWII: Other styles. Clad in striated brick. Notable alterations include several in-period additions. No outbuildings were observed.</p> <p><b>Historic Boundary:</b> Current parcel boundary</p>	ES/Eligible <i>Listed on NRHP</i>	
11031 S. State St.	c. 1912	<p>One-and-a-half-story Bungalow single-family dwelling exhibiting Bungalow and Arts &amp; Crafts styles. Clad in regular brick, shingle siding, and stone veneer. Notable alterations limited to replacement of the original wooden porch rail with a c. 1950s stone wall and a few modern windows in original openings. One contributing outbuilding was observed.</p> <p><b>Historic Boundary:</b> Current parcel boundary</p>	EC/Eligible	



**Table 2. Historical buildings and structures documented in the APE/Survey Area**

Address	Year Built	Description and Historic Boundary	SHPO Rating & NRHP Eligibility	Photo
11145 S. State St.	c. 1912	<p>One-story Bungalow single-family dwelling exhibiting Bungalow and Arts &amp; Crafts styles. Clad in regular brick. Notable alterations include several in-period additions to the rear of the building, enclosure of the front porch (in-period), and modern windows in several original openings. One non-contributing outbuilding was observed.</p> <p><b>Historic Boundary:</b> Current parcel boundary plus parcel 28-19-101-011</p>	EC/Eligible	
11155 S. State St.	c. 1927	<p>One-story Other Residential Type single-family dwelling exhibiting Other style. Clad in clapboard siding. Notable alterations include modern windows in several original openings. One non-contributing outbuilding was observed.</p> <p><b>Historic Boundary:</b> Current parcel boundary</p>	EC/Eligible	
11191 S. State St.	c. 1932	<p>One-and-a-half-story Period Cottage single-family dwelling exhibiting English Tudor Revival style. Clad in striated brick. Notable alterations include modern windows in several original openings. Three contributing outbuildings and two non-contributing outbuildings were observed.</p> <p><b>Historic Boundary:</b> Current parcel boundary</p>	EC/Eligible	

**Table 2. Historical buildings and structures documented in the APE/Survey Area**

Address	Year Built	Description and Historic Boundary	SHPO Rating & NRHP Eligibility	Photo
43 E. 11000 S.	c. 1954	<p>One-story WWII-Era Cottage single-family dwelling exhibiting Minimal Traditional style. Clad in modern synthetic horizontal siding. Notable alterations include modern windows throughout in original openings and the modern veneer. One non-contributing outbuilding was observed.</p> <p><b>Historic Boundary:</b> N/A</p>	NC/Ineligible	
45 E. 11000 S.	c. 1956	<p>One-story Early Ranch (w/ carport) single-family dwelling exhibiting Minimal Traditional style. Clad in oversized striated brick and vinyl siding. Notable alterations include modern windows in several original openings, minor use of modern vinyl siding on gable walls, and a modern vinyl porch railing. One non-contributing outbuilding was observed.</p> <p><b>Historic Boundary:</b> Current parcel boundary</p>	EC/Eligible	

## SUMMARY AND CONCLUSIONS

Certus conducted a selective reconnaissance-level structures inventory for the US-89; 11400 South to 10600 South Project in Salt Lake County, Utah. The assessment resulted in the identification of eleven (11) historical buildings. Certus recommends that nine (9) of the resources receive SHPO ratings of "ES" or "EC" and be considered eligible for the NRHP. One of these properties—Crescent Elementary School at 11020 South State Street—is currently listed on the National Register of Historic Places. Certus recommends the remaining two (2) resources receive SHPO ratings of "NC" and be considered ineligible for the NRHP. **Table 3** summarizes these recommendations.

**Table 3.** Summary of Historic Structures and National Register Eligibility Recommendations

Address	SHPO Rating	NRHP Eligibility
10831 S. State St.	EC	Eligible
10907 S. State St.	EC	Eligible
10975 S. State St.	NC	Ineligible
10985 S. State St.	EC	Eligible
11020 S. State St.	ES	Eligible/Listed
11031 S. State St.	EC	Eligible
11145 S. State St.	EC	Eligible
11155 S. State St.	EC	Eligible
11191 S. State St.	EC	Eligible
43 E. 11000 S.	NC	Ineligible
45 E. 11000 S.	EC	Eligible

Findings of effect for the undertaking as they relate to historic properties will be assessed by UDOT and documented in a separate determination of eligibility and finding of effect (DOE-FOE) letter. Based on the present project design, Certus recommends that the undertaking would have no adverse effect on any of the resources recommended herein as eligible for the NRHP. Current impacts appear to be limited to minor strip takes with no contributing features being affected.

## REFERENCES CITED

Ellis, Sheri Murray

- 2017 *Intensive-Level Archaeological Assessment for the US-89; 11400 South to 10600 South Project, Salt Lake County, Utah.* Certus Environmental Solutions, LLC, Salt Lake City.  
Submitted to the Utah Department of Transportation, Region Two.

Giraud, Elizabeth

- 2007 Personal Communication. Written review comments on the draft 200 East Project cultural resources technical report sent to Jennifer Elsken, Utah Department of Transportation, Region 1, Ogden, and provided to Sheri Murray Ellis, SWCA Environmental Consultants, Salt Lake City.

Seifert, Donna J., Barbara J. Little, Beth L. Savage and John H. Sprinkle Jr.

- 1997 *Defining Boundaries for National Register Properties.* National Register Bulletin Vol. 21. 1997. U.S. Department of the Interior, National Park Service, Washington, District of Columbia. Originally published 1995.

Utah Department of Transportation (UDOT)

- 2010 *UDOT Guidelines for Identifying, Recording, and Evaluating Archaeological and Paleontological Resources.* Utah Department of Transportation, Environmental Services, Salt Lake City.



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## MEMORANDUM

**To:** Oanh Le Spradlin, PE; UDOT Project Manager  
Craig Bown; UDOT Region Two Environmental Manager  
Naomi Kisen; UDOT Environmental Program Manager

**From:** Avenue Consultants

**Date:** April 3, 2017

**Subject:** Traffic Analysis: US-89; 11400 South to 10600 South Environmental Assessment  
Project No. F-0089(375)364, PIN 12561

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This memo describes a traffic evaluation performed for State Street (US-89), 11400 South to 10600 South Environmental Assessment in Sandy. This study area includes the signalized intersections US-89 and 10600 South, 11000 South, Auto Mall Drive, and 11400 South as shown in Figure 1. The analysis was performed for Existing Conditions, 2040 No Build Conditions, and 2040 Build Conditions. The 2040 Build Condition assumes widening State Street from two to three lanes per direction from 11400 South to just south of 10600 South. The build condition also adds a second southbound right turn lane at the 11400 South intersection and assumes a raised median along much of the widened section. The purpose of this analysis was to evaluate current (2016) traffic operations and future (2040) traffic operations with and without the proposed modifications to this section of State Street. The methodology for the evaluation and the associated results are described in the following sections.

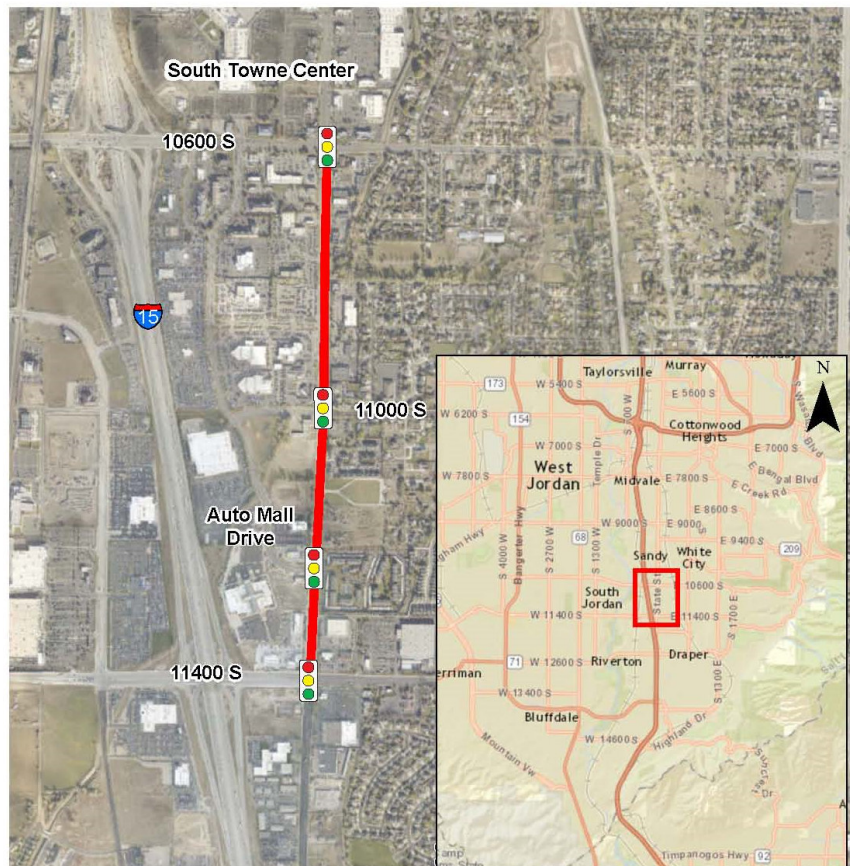


Figure 1: Study Area

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The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.

## **Analysis Methodology**

The analyses performed for this study used the jointly owned and maintained Wasatch Front Regional Council (WFRC)/Mountainland Association of Governments (MAG) travel demand model, identified herein as the WFRC /MAG travel demand model or just the travel demand model, and the VISSIM traffic operations evaluation software. This section describes how each of those tools were used.

### **Travel Demand Modeling**

The WFRC/MAG travel demand model is a tool used to predict future travel and traffic volumes for the Wasatch Front. WFRC and MAG are the Metropolitan Planning Organizations (MPOs) for the Wasatch Front and are responsible for coordinating transportation planning in the region. Version 8.1 of the travel model was used for this study.

The travel model has two primary inputs: land use data and transportation system data. The land use data consists of residential and employment data for the entire region. This data is prepared in geographic blocks called Traffic Analysis Zones (TAZs). The travel model inputs are prepared for a base year, which in this case was 2015, and for a future year, which in this case was 2040. In consultation with region's cities, WFRC and MAG prepare future land use projections. These projections are used by the MPOs to develop the Regional Transportation Plan (RTP), which is the plan for the development of the future transportation system. The RTP includes a list of projects that are planned to meet future transportation needs over a 20+ year horizon.

Using the land use and transportation system inputs, the travel demand model predicts how many person trips will be generated in the region, their destination, the mode by which they will be made, and the transportation facilities that will be used to get there. To improve the model's accuracy along this section of State Street, one TAZ was split into five smaller TAZs (see Appendix). Roadway links were also added for Auto Mall Drive and 11000 South west of State Street. The increase in TAZ density and additional roadway links in the study area improves the model's resolution and its ability to accurately represent traffic movement in the study area.

### **Traffic Operations Analysis**

The VISSIM software was used to evaluate traffic operations. VISSIM is a micro-simulation tool that was selected for this study because it allows for the evaluation of closely spaced intersections and the interaction between them. VISSIM can be modified and precisely calibrated to account for observed driving behaviors/conditions..

### **Traffic Counts**

To prepare the VISSIM model, existing traffic volumes were collected on Saturday, September 17, 2016 for the weekend peak period and Tuesday, September 20, 2016 for the weekday PM peak period. Intersection turning movement counts were collected between 1:00 PM and 3:00 PM on Saturday and between 4:00 PM and 6:00 PM on Tuesday at the following signalized intersections:

- 11400 South (SR-175) and State Street (US-89)
- Auto Mall Drive and State Street (US-89)
- 11000 South and State Street (US-89)

In addition to traffic counts at the signalized intersection, 10-hour counts were taken at the driveways along State Street on the same days as the intersection counts. Because the 2040 Build Condition includes raised medians, the driveway counts were performed for a longer duration to provide a better understanding of the possible

impacts associated with restricting turning movements at any given driveway. The driveway volumes can be found in the Appendix.

An initial review of the existing conditions using the Synchro software determined that the Saturday peak hour was the worst case for intersection delay. This is due to commercial shopping nature of the study area and to larger turning volumes for some of the key movements on Saturday. These movements include the northbound left turns onto Auto Mall Drive and the Scheels Driveway on US-89, in addition to the eastbound left turn and southbound right turn at 11400 South.

Based on this initial analysis, Avenue developed 2040 Saturday peak hour intersection volumes from the existing Saturday peak hour traffic volumes using principles described in the National Highway Cooperative Research Program (NCHRP) Report 255 document. For the future volumes, the WFRC/MAG travel demand model was run for the base year (2015) and the future year (2040), and the difference between these models was used to estimate the traffic increase. The travel model is built for weekday conditions, so the growth in PM volumes was used instead since it was deemed to be most similar to the anticipated growth in Saturday traffic. The resulting volumes were balanced through the study roadway network to ensure the correct number of inbound and outbound vehicles on each leg of each intersection.

### **Model Calibration**

To match existing traffic conditions the VISSIM models were calibrated with a focus on matching observed queues and vehicle behavior from the field observations. Existing traffic signal timing data were obtained from the UDOT Traffic Operations Center and entered into the VISSIM model. The acceleration and power of heavy vehicles in the VISSIM model were also adjusted to better match the performance of American heavy vehicles.

It was determined through the calibration effort that VISSIM's default headway time and safe following distance factors were appropriate at this location. However, priority rules and conflict areas were used to help mimic existing driver behavior so that the queues resulting from the model simulation runs represented what real world conditions were observed to be and the total number of vehicles counted at the intersections were served during the model period.

### **Measures of Effectiveness**

For each VISSIM analysis (e.g., existing conditions, 2040 no build, etc.), the model was run a minimum of 10 times and the results averaged. Two key measures of effectiveness were extracted from the VISSIM models, the first was vehicle travel speeds which was used to determine the arterial level of service (LOS), as described in the *2010 Highway Capacity Manual*. LOS is measured quantitatively and is reported on a scale from A to F, with A representing the best performance and F the worst. Arterial LOS is based on the average travel speed as a percentage of the flow speed. Table 1 provides a brief explanation for each LOS and the associated criteria.

Table 1: Arterial Level of Service Descriptions

Level of Service	Description of Operations	Travel Speed as a Percentage of Base Free Flow Speed
A	Primarily free-flow operations	> 85%
B	Reasonably unimpeded operations	> 67% and ≤ 85%
C	Stable operations	> 50% and ≤ 67%
D	Less than stable condition	> 40% and ≤ 50%
E	Unstable operations	> 30% and ≤ 40%
F	Flow at extremely low speed	≤ 30%

Source: Highway Capacity Manual (HCM) 2010, Transportation Research Board National Research Council, Washington D.C.

The second key measure of effectiveness was intersection and turning movement delay, which was used to determine intersection LOS, as described in the *2010 Highway Capacity Manual*. As with arterial roadways, intersection LOS describes the operating performance of an intersection. LOS is measured quantitatively and is reported on a scale from A to F, with A representing the best performance and F the worst. The criteria and scale for intersection LOS differs based on if the intersection is signalized or not. For signalized intersections, all turning movements are included in calculating the average delay for the entire intersection, which is then used to determine LOS. For unsignalized intersections, where there are free movements, only delay for the movement or approach with most delay is used to determine LOS. Table 2 provides a brief explanation for each LOS and the associated average delay per vehicle for signalized and unsignalized intersections.

Table 2: Intersection Level of Service Descriptions

Level of Service	Traffic Conditions	Signalized Intersection Average Delay (seconds/vehicle)	Unsignalized Intersection Average Delay (seconds/vehicle)
A	Free Flow Operations / Insignificant Delay	$0 \leq 10.0$	$0 \leq 10.0$
B	Smooth Operations / Short Delays	$> 10.0$ and $\leq 20.0$	$> 10.0$ and $\leq 15.0$
C	Stable Operations / Acceptable Delays	$> 20.0$ and $\leq 35.0$	$> 15.0$ and $\leq 25.0$
D	Approaching Unstable Operations / Tolerable Delays	$> 35.0$ and $\leq 55.0$	$> 25.0$ and $\leq 35.0$
E	Unstable Operations / Significant Delays Begin	$> 55.0$ and $\leq 80.0$	$> 35.0$ and $\leq 50.0$
F	Very Poor Operations / Excessive Delays Occur	$> 80.0$	$> 50.0$

Source: Highway Capacity Manual (HCM) 2010, Transportation Research Board National Research Council, Washington D.C.

## Analysis Results

### 2016 Existing Conditions Evaluation Results

The existing traffic volumes used in the Existing Conditions analysis can be seen in the Appendix. As mentioned above, the Saturday peak hour was determined to be the worst case and was used in the evaluation.

For the arterial LOS evaluation along US-89, travel times were derived from the VISSIM model along US-89 in the study area and then converted to vehicle speeds. For the arterial LOS evaluation the study area of US-89 was divided into three sections. These sections were located between the signalized intersections of 11400 South, Auto Mall Drive, 11000 South, and the northern extent of the project which is the lane drop south of the 10600 South intersection. Because the signalized intersection of 10600 South was not included in the model, northbound



travel speeds in the northern most section did not reflect any delay caused by this intersection. The section between 11400 South and Auto Mall Drive collected the travel times for vehicles traveling to or from the west leg of the 11400 South intersection (i.e., the southbound right turn and eastbound left turn at 11400 South). These travel times were selected due to volumes on these movements being larger than the southbound or northbound thru vehicles at the 11400 South intersection.

Based on an evaluation of the Existing Conditions traffic on US-89 during the Saturday peak hour, the northbound State Street segments operate at a LOS of D or better. In the southbound direction, the segment between Auto Mall Drive and 11400 South functions at LOS F with vehicles traveling 10 mph (compared to a posted speed limit of 40 mph), while the other segments north of Auto Mall Drive are at LOS C or better.

For the intersection evaluation, vehicle delay was collected at each of the signalized intersections along the corridor and at the unsignalized Scheels Driveway located on US-89. In the existing conditions, each of the intersections perform at a LOS D or better, although some individual movements operate at LOS F, particularly at 11400 South. Figure 2 illustrates the intersection LOS by movement for the study area intersections. The total network delay, which is the total delay collected within the extents of the VISSIM model and includes the study intersections and driveways, is also shown in Figure 2, a total of 206 hours of delay occurs during the existing Saturday peak hour.

General conclusions from the Existing Conditions analysis are:

- A major cause of arterial and intersection delay along US-89 is the unsignalized left turn at the Scheels Driveway. This left turn functions at a LOS E but consistently exceeds the provided storage and blocks one of the northbound thru lanes.
- Existing traffic volumes are served at an acceptable LOS with the exception of southbound traffic between Auto Mall Drive and 11400 South where delays at 11400 South cause traffic (particularly right turning vehicles) to back up through the Auto Mall Drive intersection, which also affects right turns out of the Scheels Driveway and from Auto Mall Drive.
- Each intersection in the study area performs at a LOS D or better. Overall the VISSIM model recorded 206 hours of delay in the Saturday peak hour.

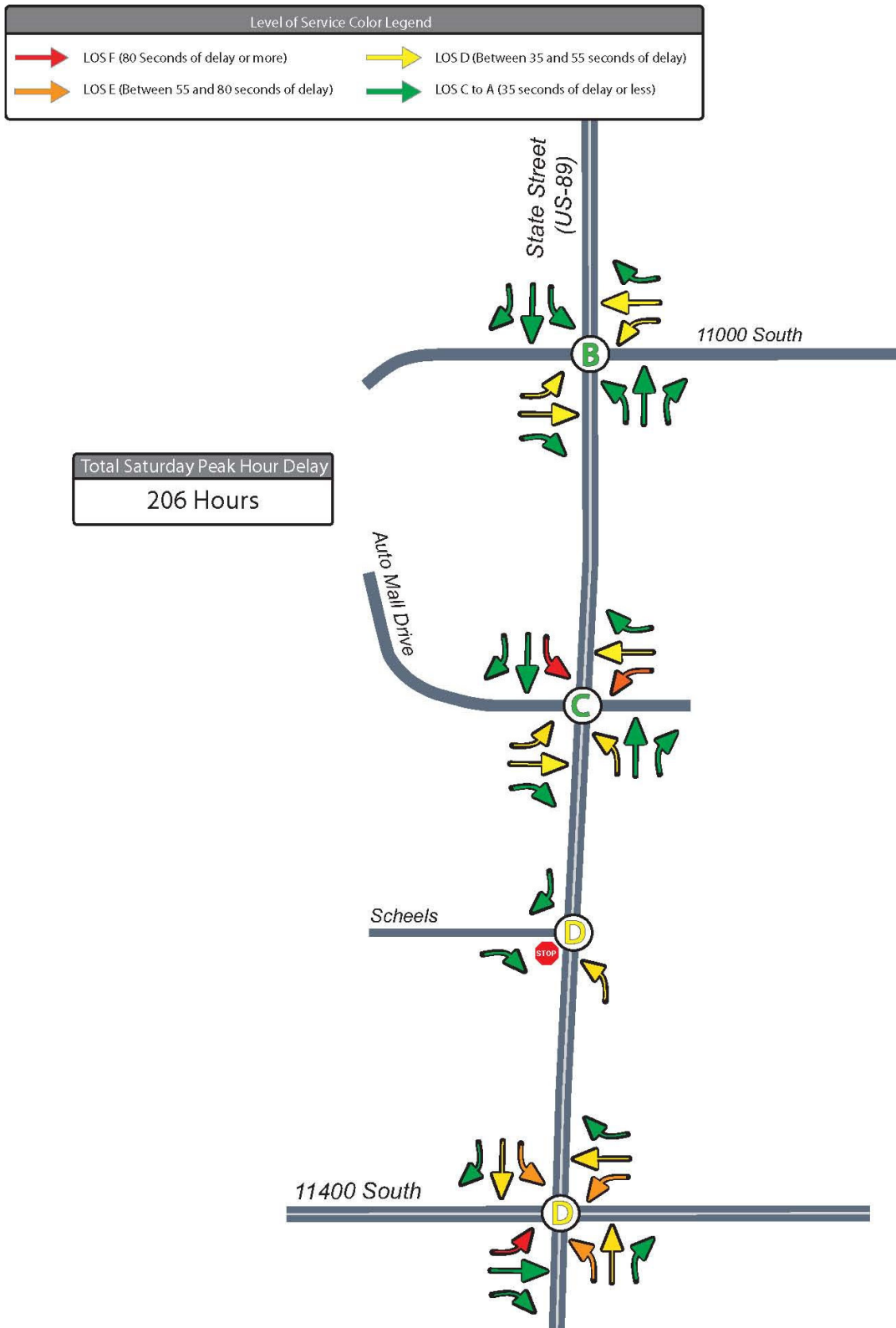


Figure 2: 2016 Existing Saturday Peak Hour Intersection LOS

## 2040 No Build Conditions Evaluation Results

The intersection traffic volumes used in the 2040 No Build Conditions analysis can be seen in the Appendix. As mentioned, the Saturday peak hour was determined to be the worst case and was used in the evaluation.

To determine the 2040 No Build Conditions arterial LOS, travel times were collected along the same three sections in the study area as the existing conditions. Based on an evaluation of the 2040 No Build Conditions traffic on US-89 during the Saturday peak hour, the northbound segments function at a LOS E between 11400 South and Auto Mall Drive and a LOS C or better in the other two sections. The southbound segments all function at a LOS F with vehicle speeds between 3 and 7 mph. This is caused by queuing from the 11400 South intersection, where the traffic demand exceeds the capacity of the intersection, particularly for the southbound right turn movement.

For the intersection LOS evaluation, the delay was collected at each of the signalized intersection along the corridor and at the unsignalized Scheels Driveway located on US-89. In the 2040 No Build Conditions, the intersection of 11400 South and US-89 performs at a LOS F with an average delay of 87 seconds per vehicle. The traffic demand at this intersection exceeds the intersection capacity. In particular, the capacity for the eastbound left turn is exceeded by 30% and the southbound right turn is exceeded by 20%. The intersection LOS for the main intersections in the study area can be seen in Figure 3. The total peak hour network delay of 918 hours is also shown in Figure 3, over four times as much as in the existing conditions.

General conclusions from the analysis include the following:

- In the 2040 No Build Conditions, the southbound on US-89 fails with travel speeds reaching only 9% of the base free flow speed, about 3 to 7 mph.
- Without improvements, the northbound section between 11400 South and Auto Mall Drive will deteriorate to a LOS E and vehicles will only reach 32% of the base free flow speed, about 13 mph.
- In the 2040 No Build Condition, the intersection of 11400 South and State Street will perform at LOS F and the traffic demand will exceed the capacity of the intersection.

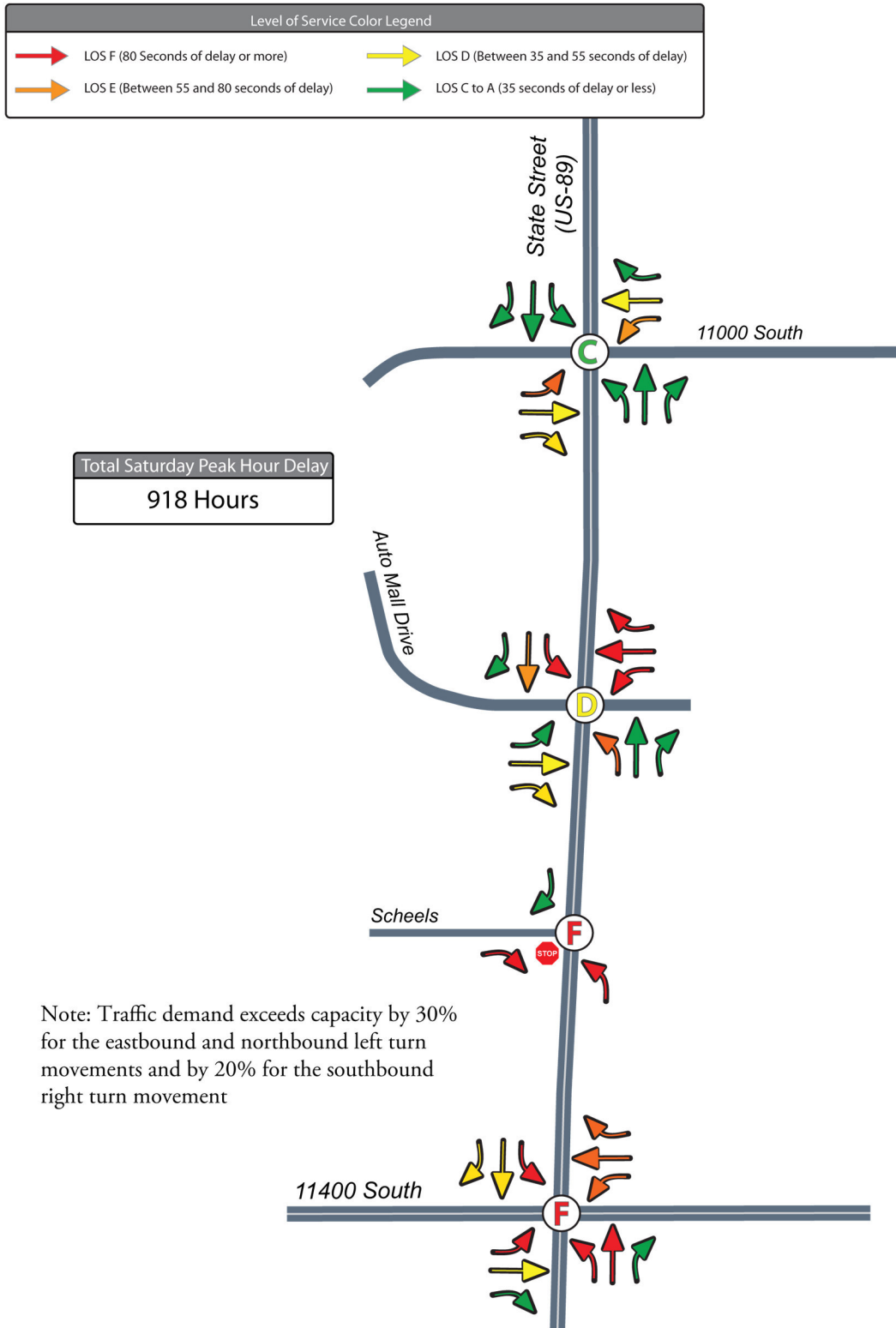


Figure 3: 2040 No Build Conditions Saturday Peak Hour Intersection LOS



## 2040 Build Conditions Evaluation Results

The 2040 traffic volumes used in the build conditions analysis are shown in the Appendix. As mentioned, the Saturday peak hour was determined to be the worst case and was used in the evaluation. The build condition assumed the following changes from the existing conditions:

- Three through lanes per direction from 11400 South to the current three lane section just south of 10600 South
- A traffic signal at the Scheels driveway on US-89 to allow the northbound left turn and the eastbound right turn to have a protected movement (no stops would be required for northbound traffic)
- Two southbound right turn lanes on State Street at 11400 South
- Assumed raised medians for select sections of State Street resulting in some vehicles entering and exiting driveways having to make U-turns to complete their desired movement

To determine the 2040 build arterial LOS, travel times were collected along the same three sections in the study area as the existing conditions. Based on an evaluation of the 2040 build traffic on US-89 during the Saturday peak hour, northbound traffic through the study area is expected to function at a LOS C or better in all segments. In the southbound direction between 11400 South and Auto Mall Drive, State Street is expected to function at a LOS E, while the other two segments function at LOS D or better.

For the intersection LOS evaluation, vehicle delay was collected at each of the signalized intersection along the corridor. In the build conditions, the intersection of 11400 South and US-89 performs at a LOS E with an average delay of 61 seconds of delay per vehicle. In addition the traffic demand at this intersection exceeds the capacity. In particular, the capacity for the eastbound left turn is exceeded by 20%. The intersection LOS for the main intersections in the study area can be seen in Figure 4. The total peak hour network delay of 480 hours is also shown in Figure 4, a delay reduction of nearly 50% compared to the no build conditions.

General conclusions from the analysis include the following:

- With the build improvements the northbound arterial LOS improves over the existing conditions with vehicles traveling at 63% of the base free flow speed compared to 42%.
- The 2040 Saturday peak hour travel speeds for the southbound segment between Auto Mall Drive and 11400 South are at 20% of the base free flow speed, about 13 mph, which is a 30% improvement over existing conditions and more than a 300% improvement over the 2040 no build conditions.
- In the 2040 build condition, the intersection of 11400 South and US-89 will perform at LOS E and the southbound approach at the intersection will be able to serve the traffic demand on US-89.

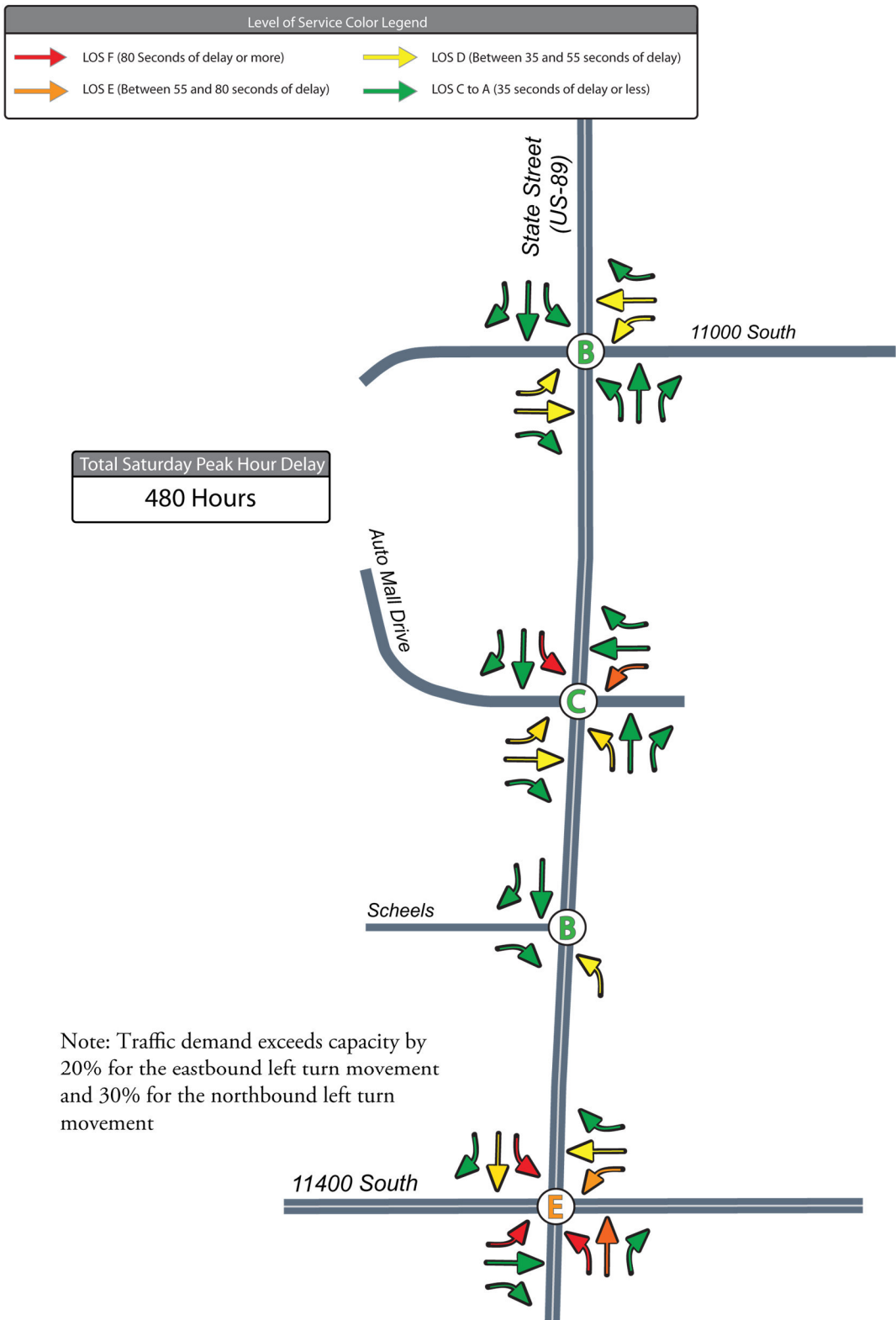


Figure 4: 2040 Build Saturday Peak Hour Intersection LOS

## Conclusion

By the year 2040 traffic demand on US-89 between 10600 South and 11400 South will increase causing the arterial to fail in the southbound direction and to operate poorly in the northbound direction unless changes are made. The primary improvements proposed for this project are widening US-89 to three lanes between the lane drop just south of 10600 South and 11400 South, adding a second southbound right turn lane at 11400 South, and signalizing the Scheels driveway. A summary of the arterial LOS for Existing Conditions, 2040 No Build Conditions, and 2040 Build Conditions is found in Figure 5. In the build conditions, the arterial LOS between 10600 South to 11400 South ranges from LOS B to LOS E. The LOS E section is between Auto Mall Drive and 11400 South, the average speed in this section is 13 mph which better than the 10 mph experienced under Existing Conditions and the 4 mph in the 2040 No Build Conditions.

Table 3 summarizes the intersection LOS for existing conditions, 2040 no build, and 2040 build conditions for the signalized intersections in the study area and the Scheels driveway on US-89 which only has a signal in the 2040 Build condition.

*Table 3: Intersection Delay and LOS for Existing Conditions, 2040 No Build and 2040 Build*

Intersection	Intersection Delay (s/veh) and Level of Service		
	2016 Existing	2040 No Build	2040 Build
11000 S	14 / B	25 / C	15 / B
Auto Mall Drive	20 / C	55 / D	24 / C
Scheels Driveway <sup>1</sup>	30 / D	170 / F	16 / B
11400 S	45 / D	87 / F	61 / E

<sup>1</sup>In the Existing and 2040 No Build Conditions this intersection is unsignalized; the reported value is for the northbound left turn

In 2040, the intersection of 11400 South and State Street will perform at a LOS F in the no build condition and at a LOS E in the build condition. Without the build modifications, the traffic demand for the southbound approach will exceed the capacity of the intersection. With the modifications, the southbound demand is expected to be fully met by the 11400 South intersection.

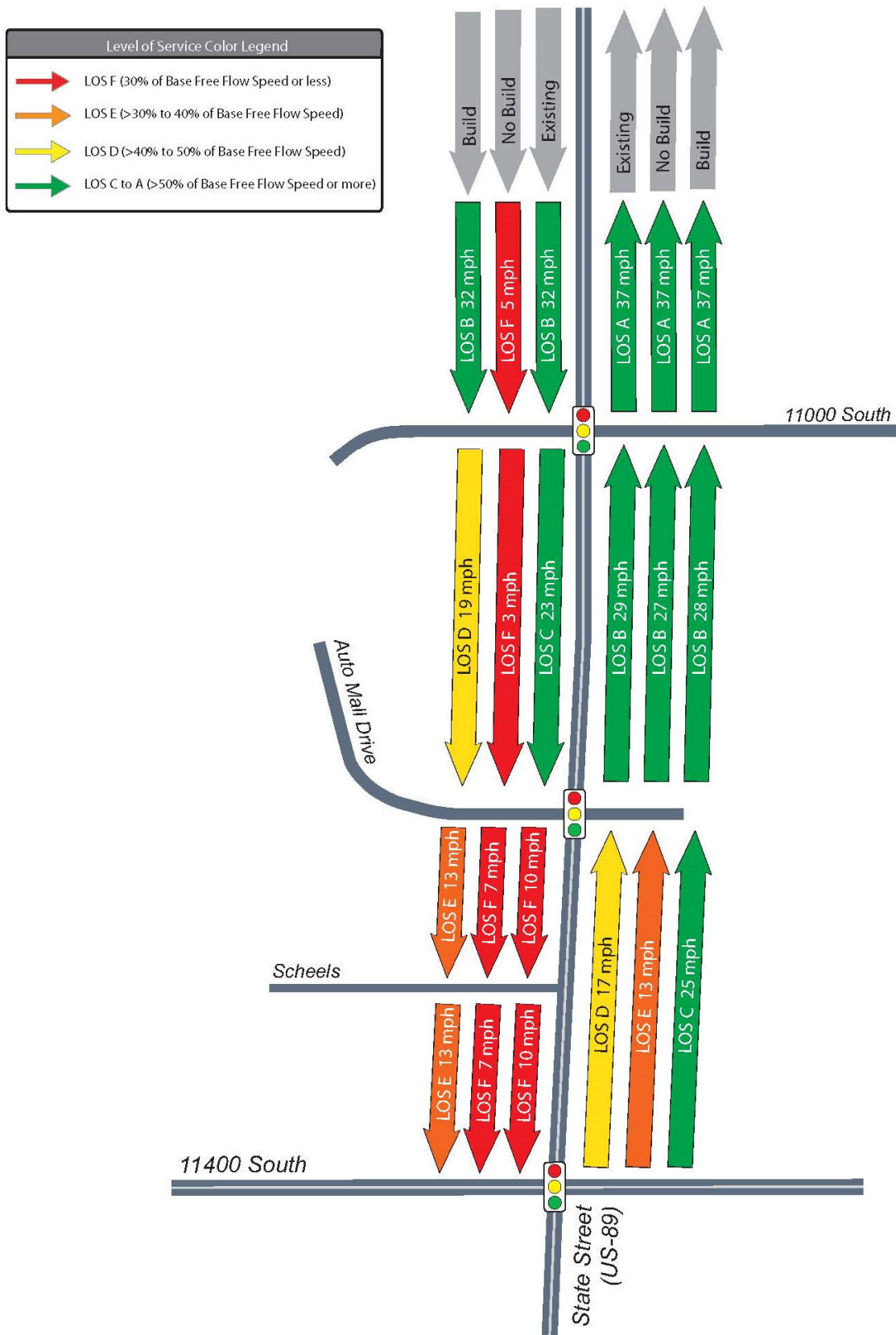


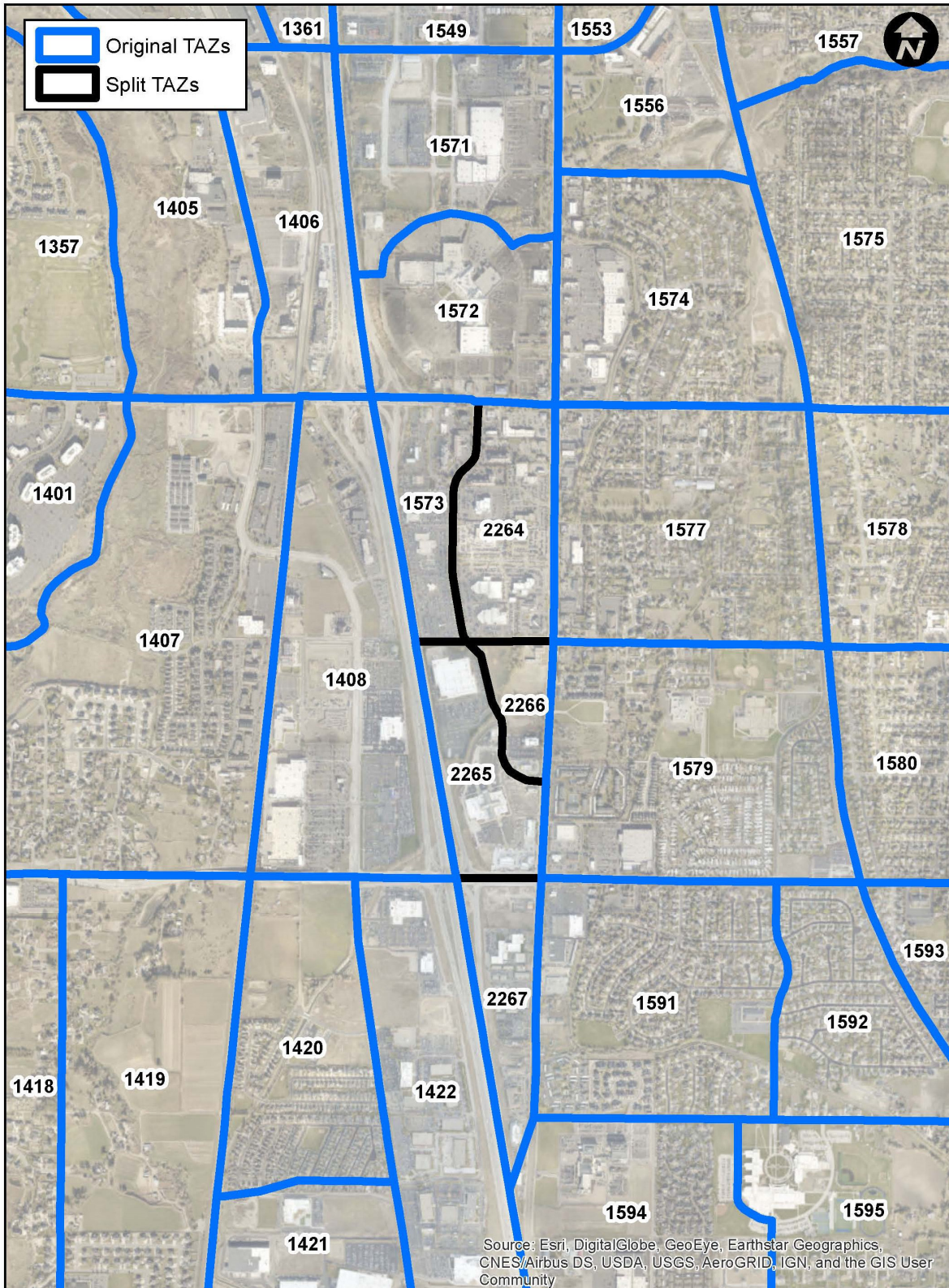
Figure 5: Saturday Peak Hour Arterial LOS



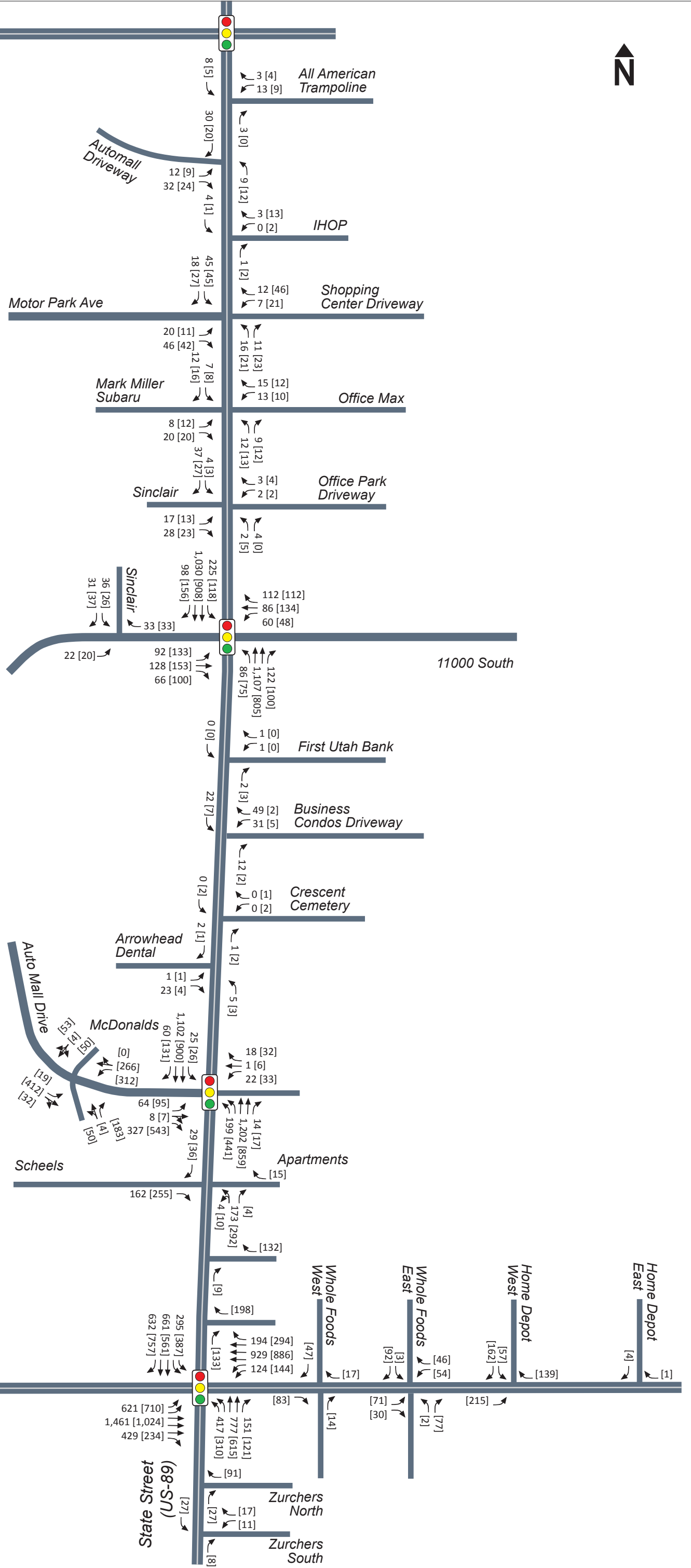
**Appendix**  
**TAZ Splits & Intersection Volume Figures**

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## US-89; 11400 S to 10600 S TAZ Splits



10600 South



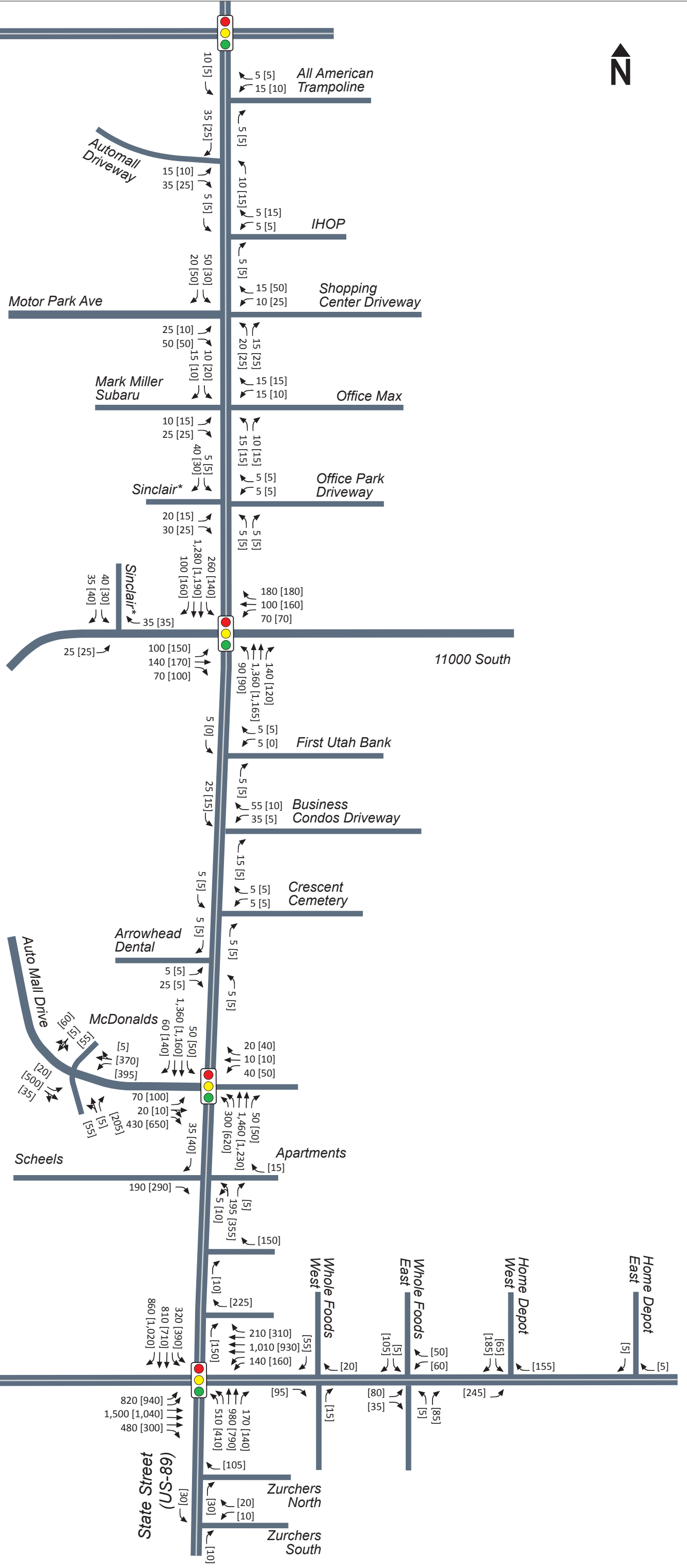
PM Peak Hour [Saturday Peak Hour]

# 2016 Existing Conditions Peak Hour Volumes

US-89; 11400 South to 10600 South

Counts conducted September 17 and 20, 2016

10600 South



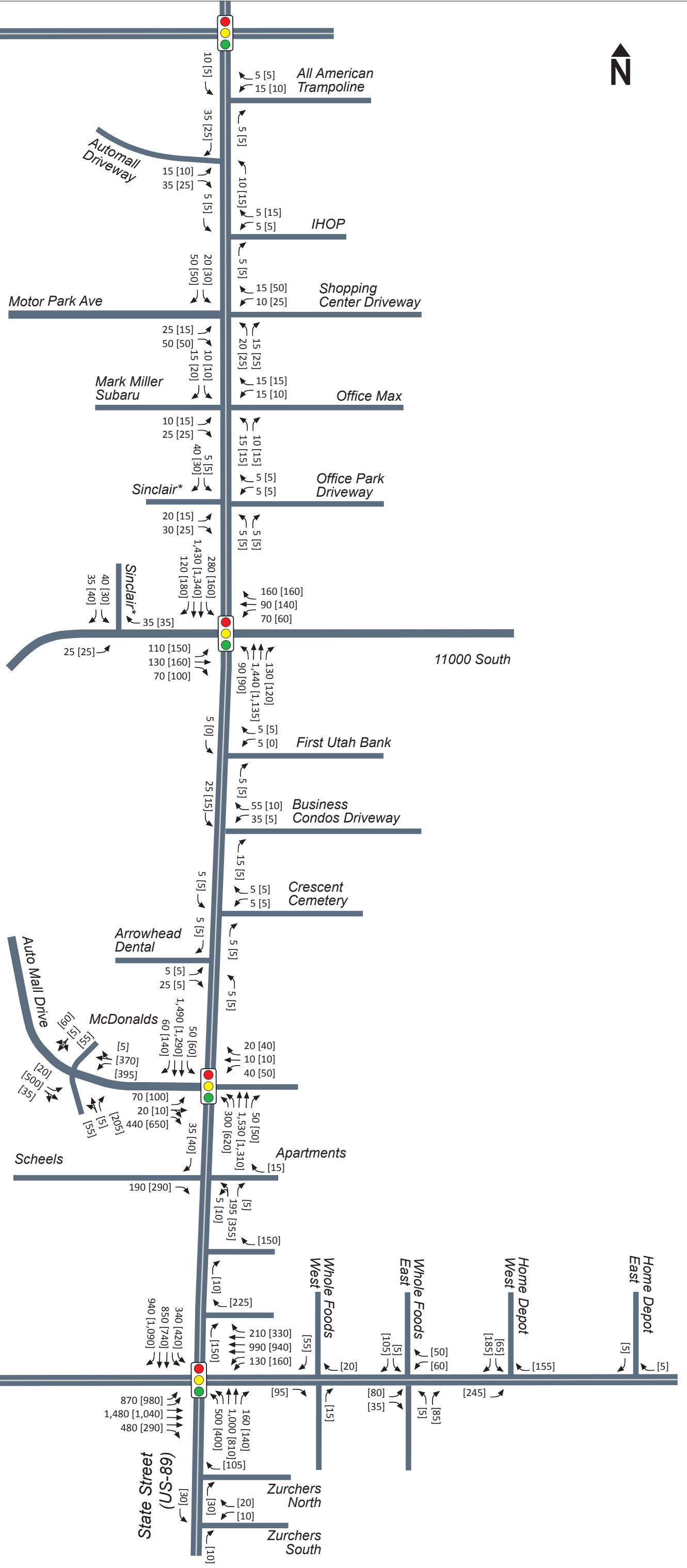
PM Peak Hour [Saturday Peak Hour]

### 2040 No Build Conditions Peak Hour Volumes

US-89; 11400 South to 10600 South



10600 South



PM Peak Hour [Saturday Peak Hour]

### 2040 Build Conditions Peak Hour Volumes

US-89; 11400 South to 10600 South

# MEMORANDUM

**Project:** US-89; 11400 South to 10600 South (PIN: 12561)

**Date:** May 26, 2017

**Subject:** Project-Level PM Quantitative Hot-Spot Analysis: Project of Air Quality Concern Questionnaire

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## 1 PROJECT SETTING AND DESCRIPTION

The Utah Department of Transportation (UDOT) proposes to widen and reconstruct US-89 (State Street) from 11400 South to 10600 South. The work would add a southbound and northbound travel lane by restriping a majority of the corridor and would widen the corridor in select locations to accommodate the additional travel lane in each direction. The project would also add a dual southbound right-turn lane at 11400 South and new curb and gutter on the east and west side of State Street. Lastly, the project would install raised medians (in select locations) and left-hand turn pockets along State Street within the project limits shown on Figure 1.

UDOT Environmental Services has recommended that the above referenced project meets the definition for an Environmental Assessment (EA).

As depicted on Figure 1, the portion of State Street between 11400 South to 10600 South is within Salt Lake County and serves as a north/south urban arterial presently experiencing congestion. The existing four-lane state route (two-lanes in each direction) does not have capacity to accommodate current and future traffic volumes. Congestion is compounded by:

- i) The number of accesses that serve the auto mall and commercial/retail centers, and
- ii) Existing traffic signals that are inefficiently configured for the number of vehicles currently using and projected to use the corridor during peak and off-peak hours.

To meet the needs of the corridor’s increased traffic demand, UDOT has proposed to construct an additional travel lane to State Street in each direction, install raised medians and left-hand turn pockets, and modify three congested intersections in order to improve regional and local travel conditions and reduce congestion and air quality impacts. These improvements are intended to accommodate current and future traffic demand by providing increased capacity and efficiency throughout the corridor. This project is partially funded under Wasatch Front Regional Council’s (WFRC’s) Congestion Management Air Quality (CMAQ) Program, and the project is currently listed in the approved WFRC *Regional Transportation Plan 2015-2040*.<sup>1</sup>

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<sup>1</sup> See Project Number S-189 of WFRC, 2015, *Regional Transportation Plan 2015-2040*, [http://www.wfrc.org/publications/RTP-publications/RTP\\_2015\\_FINAL.pdf](http://www.wfrc.org/publications/RTP-publications/RTP_2015_FINAL.pdf)



**Figure 1:** Project and Regional Location

The project is within the Salt Lake County Non-Attainment Area for particulates 10-microns in diameter or less (PM<sub>10</sub>) and for particulates 2.5-microns in diameter or less (PM<sub>2.5</sub>). Regarding PM<sub>10</sub>, on November 14, 1991, Utah submitted its State Implementation Plan (SIP) for the Salt Lake and Utah County PM<sub>10</sub> nonattainment areas. The SIP showed 10 years of attainment for the PM<sub>10</sub> standard. The U.S. Environmental Protection Agency (EPA) published approval of the SIP on July 8, 1994 (59 FR 35036). On December 2, 2015, the Air Quality Board adopted revisions to the SIP in the form of maintenance plans for both Salt Lake and Utah counties. These plans demonstrate attainment through the year 2030. The plans have been submitted to EPA, and Utah is currently awaiting approval for EPA to re-designate the areas as in attainment.<sup>2</sup>

Regarding PM<sub>2.5</sub>, on December 3, 2014, the Air Quality Board approved a PM<sub>2.5</sub> SIP “meeting the moderate area planning requirements of both Subparts 1 and 4, of Part D, of title 1, of the Clean Air Act.” A separate SIP was adopted for Salt Lake County under the Salt Lake City nonattainment area, which is one of three

<sup>2</sup> This summary of the PM<sub>10</sub> and PM<sub>2.5</sub> SIP process was taken from the Utah Department of Environmental Quality’s (UDEQ’s) State Implementation Plan overview at [http://www.deq.utah.gov/Laws\\_Rules/daq/sip/index.htm](http://www.deq.utah.gov/Laws_Rules/daq/sip/index.htm).

nonattainment areas in Utah. Amendments to SIP Subsections IX.H. 11, 12, and 13 were also adopted as each relates to emission limits and operating practices for large stationary sources in the Salt Lake City and Provo nonattainment areas.<sup>3</sup>

The following agencies are included for interagency consultation and are requested to provide input to this Project of Air Quality Concern (POAQC) Questionnaire: EPA, FHWA, Utah Division of Air Quality (UDEQ), WFRC, and UDOT.

## 2 PROJECT ASSESSMENT

This project is not a type of project exempt from the requirement to determine conformity under 40 CFR 93.126 or 40 CFR 93.128 because it will add travel lanes. The following questionnaire is being used to determine if the proposed project meets the criteria for air quality concern and would require a quantitative analysis of local particulate emissions (or PM hot-spot analysis) in nonattainment or maintenance areas. The project types defined in 40 CFR 93.123(b) as of air quality concern include:

- New highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of diesel vehicles;
- Projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level-of-Service D, E, or F because of an increase in traffic volumes from a significant number of diesel vehicles related to the project;
- New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and
- Projects in or affecting locations, areas, or categories of sites which are identified in the PM10 or PM2.5 applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

If the project matches one of the listed project types in 40 CFR 93.123(b)(1) as bulleted above, it would be considered a POAQC, and the PM hot-spot demonstration must be based on both quantitative analysis methods in accordance to 40 CFR 93.116(a) and consultation requirements of 40 CFR 93.105(c)(1)(i). If the project does not require a PM hot-spot analysis, a qualitative statement will be developed that demonstrates that the project will not contribute to any new localized violations, increase the frequency or severity of any existing violations, or delay the timely attainment of any national ambient air quality standards (NAAQS) or any required emission reductions or milestones in any nonattainment or maintenance area.

### 2.1 New Highway Capacity

**Question:** Is this a new highway project that has a significant number of diesel vehicles?

**Answer:** No. This project is not a new highway project.

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<sup>3</sup> Ibid.



## 2.2 Expanded Highway Capacity

**Question:** Is this an expanded highway project that has a significant increase in the number of diesel vehicles?

*Example: the build scenario of the expanded highway or expressway causes a significant increase in the number of diesel trucks compared with the no-build scenario, truck volumes > 8% of the total traffic.*

**Answer:** No. The data in Table 1 depicts that there is no significant increase in the number or percentage of diesel vehicles in 2040 (the design year) when comparing the Build and No-Build scenarios. The projected annual average daily traffic (AADT) would average approximately 32,200 vehicles per day (vpd) under the Build scenario and approximately 31,500 vehicles per day (vpd) under the No-Build scenario between 11400 South and 10600 South. Presently, there are two travel lanes in each direction on State Street, and considerable congestion occurs near the State Street intersections at Auto Mall Drive and 11400 South. With the addition of the new travel lanes, AADT would increase slightly under the Build scenario as compared to the No-Build scenario.

Table 1 also presents diesel vehicle AADT and percent diesel vehicle traffic for the roadway segment from 11400 South to 10600 South. The data in the table represent i) an actual traffic count by vehicle type to establish existing traffic conditions along State Street (see Appendix A) and ii) WFRC travel demand model output to establish projected volumes and diesel vehicle percentages. Because the data sources do not distinguish between fuel types (i.e., gasoline vs. diesel fuel) for light, medium, and heavy trucks/vehicles, a diesel vehicle factor was applied using the Bureau of Transportation Statistics’ fleet information for vehicle classification by fuel type. This factor considers the composition of a diesel and non-diesel fleet mix based on the Department of Energy’s most recent Annual Energy Outlook. Applying this factor will best represent the type of traffic and vehicle mix currently using and anticipated to use State Street from 11400 South to 10600 South.

As shown in Table 1, about 6 percent of the total existing AADT are diesel vehicles. Future AADTs were developed using the WFRC travel demand model, which was run for the base year (2016) and both future (2040) scenarios. The difference between the future year and the base year volumes was calculated and added to the existing volume. The total number of all diesel vehicle types was calculated in a similar manner to the existing year. Based on the Bureau of Transportation Statistics’ diesel vehicle factor, the resulting daily number of all diesel vehicle types for each scenario was multiplied by 0.8 to obtain the estimated daily number of diesel vehicles for each scenario.

**Table 1:** AADT and Percent Truck Traffic for the Project Roadway Segment

Segment along State Street (US-89)	2016 (Existing)			2040 (Build [B] vs. No Build [NB])		
	AADT	Diesel Vehicle AADT	Diesel Vehicle %	AADT	Diesel Vehicle AADT	Diesel Vehicle %
11400 South to 10600 South	27,100	1,550	5.7%	32,200 (B)	1,840	5.7%
				31,500 (NB)	1,800	5.7%

Source: Diesel vehicle AADTs were derived based on actual counts in the project area (representing existing conditions) and were developed for the future year (2040) using the WFRC travel demand model. Diesel vehicle AADTs and percentages were then calculated by applying a diesel vehicle factor based on the Bureau of Transportation Statistics data related to vehicle composition and mix percentages published in October 2015, “Diesel-powered Passenger Cars and Light Trucks,” [http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/bts\\_fact\\_sheets/oct\\_2015/html/entire.html](http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/bts_fact_sheets/oct_2015/html/entire.html).

While the 2040 Build scenario would have an increase in the diesel vehicle AADT and percent of diesel vehicles, the data show this increase to be insignificant (about a 2 percent increase) for a facility that will average 1,800 diesel vehicles in 2040. The proposed improvements would not alter access to commercial, retail, or other land

uses that typically impact freight traffic. As such, there is no substantive increase in the diesel vehicle percentages and volumes under the Build scenario when compared to the No-Build scenario.

### 2.3 Projects with Congested Intersections

**Question:** Is this a project that affects a congested intersection (Level of Service [LOS] D or greater) that has a significant number of diesel trucks, OR will change LOS to D or greater because of an increase in traffic volumes from a significant number of diesel trucks related to the project?

**Answer:** No. This project will not affect any existing congested intersection that has a significant number or a significant increase in the number of diesel vehicles/trucks. Further, there are **no instances** in which a Build scenario intersection projected to have a LOS D, E, or F would have a poorer LOS (i.e., be more congested) than the No-Build scenario. LOS calculations were completed for existing conditions (2016), in addition to the 2040 Build and No-Build scenarios. The following LOS and diesel vehicle comparisons evaluate only the project intersections that are or would experience an LOS D or worse conditions in the existing or future years. Data for the 11000 South and State Street intersection, which would operate at LOS C or better, are included as Appendix B.

#### 11400 SOUTH AND STATE STREET INTERSECTION

Under existing conditions, 11400 South and State Street intersection is the most congested intersection, and it operates at LOS D in the peak period (see Table 2a).<sup>4</sup> Under the 2040 Build scenario, this intersection would operate at an LOS E in the peak period (see Table 2c). However, the Build scenario would represent higher intersection efficiency than the No-Build scenario, which would not only operate at an LOS F, but have 26 seconds of more delay per vehicle compared to the Build scenario (see Table 2b).

#### SCHEELS DRIVEWAY

Under existing conditions, the driveway to Scheels (a local retailer near 11400 South) operates at LOS D in the peak period (see Table 3a). Under the 2040 Build scenario, this intersection would operate at an LOS B in the peak period (see Table 3c) as compared to an LOS F under the No-Build scenario (see Table 3b).

#### AUTO MALL DRIVE

Under existing conditions, Auto Mall Drive operates at LOS C in the peak period (see Table 4a). Under the 2040 Build scenario, this intersection would also operate at an LOS C in the peak period (see Table 4c) when compared to an LOS D under the No-Build scenario (see Table 4b).

Additionally, the 2040 Build scenario's diesel vehicle traffic would be about 6 percent of the total traffic in the corridor, which includes the two intersections and the driveway (see Table 1). When comparing this against the No-Build scenario, there is a slight increase in diesel vehicle volumes. However, the increase is only 40 diesel vehicles per day, which represents about a 2 percent increase in diesel vehicles/trucks.

<sup>4</sup> The peak period for this project is Saturday PM.

**Table 2a:** Existing (2016) Peak Hour Data at the 11400 South and State Street Intersection

Intersection Delay	Intersection LOS	Approach	Movement	Movement Delay	Movement LOS	95 Percentile Queue
45	D	NB	Left	59	E	225
			Thru	41	D	300
			Right	6	A	100
		EB	Left	70	E	800
			Thru	41	D	350
			Right	18	B	275
		SB	Left	65	E	275
			Thru	49	D	275
			Right	23	C	550
		WB	Left	54	D	125
			Thru	52	D	625
			Right	25	C	375

**Table 2b:** No-Build (2040) Peak Hour Data at the 11400 South and State Street Intersection

Intersection Delay	Intersection LOS	Approach	Movement	Movement Delay	Movement LOS	95 Percentile Queue
87	F	NB	Left	272	F	775
			Thru	96	F	775
			Right	9	A	125
		EB	Left	200	F	975
			Thru	43	D	475
			Right	9	A	250
		SB	Left	152	F	925
			Thru	47	D	300
			Right	44	D	1,275
		WB	Left	66	E	125
			Thru	65	E	575
			Right	60	E	700

**Table 2c:** Build (2040) Peak Hour Data at the 11400 South and State Street Intersection

Intersection Delay	Intersection LOS	Approach	Movement	Movement Delay	Movement LOS	95 Percentile Queue
61	E	NB	Left	287	F	1,500
			Thru	61	E	1,850
			Right	9	A	125
		EB	Left	100	F	975
			Thru	31	C	450
			Right	11	B	325
		SB	Left	97	F	375
			Thru	54	C	425
			Right	26	C	500
		WB	Left	60	E	125
			Thru	53	D	1,075
			Right	16	B	725

**Table 3a:** Existing (2016) Peak Hour Data at the Scheels Driveway onto State Street

Intersection Delay	Intersection LOS	Approach	Movement	Movement Delay	Movement LOS	95 Percentile Queue
30	D	NB	Left	30	D	450
		EB	Right	22	C	150
		SB	Right	2	A	25

**Table 3b:** No-Build (2040) Peak Hour Data at the Scheels Driveway onto State Street

Intersection Delay	Intersection LOS	Approach	Movement	Movement Delay	Movement LOS	95 Percentile Queue
170	F	NB	Left	170	F	900
		EB	Right	384	F	825
		SB	Right	6	A	25

**Table 3c:** Build (2040) Peak Hour Data at the Scheels Driveway onto State Street

Intersection Delay	Intersection LOS	Approach	Movement	Movement Delay	Movement LOS	95 Percentile Queue
16	B	NB	Left	52	D	375
			Right	29	C	250
		SB	Thru	8	A	275
			Right	3	A	25

**Table 4a:** Existing (2016) Peak Hour Data at the Auto Mall Drive and State Street Intersection

Intersection Delay	Intersection LOS	Approach	Movement	Movement Delay	Movement LOS	95 Percentile Queue
20	C	NB	Left	43	D	275
			Thru	9	A	300
			Right	8	A	300
		EB	Left	47	D	125
			Thru	29	C	100
			Right	13	B	125
		SB	Left	212	F	75
			Thru	19	B	350
			Right	5	A	100
		WB	Left	57	E	50
			Thru	56	E	25
			Right	8	A	75

**Table 4b:** No-Build (2040) Peak Hour Data at the Auto Mall Drive and State Street Intersection

Intersection Delay	Intersection LOS	Approach	Movement	Movement Delay	Movement LOS	95 Percentile Queue
55	D	NB	Left	62	E	375
			Thru	14	B	325
			Right	12	B	350
		EB	Left	34	C	100
			Thru	53	D	300
			Right	45	D	350
		SB	Left	136	F	725
			Thru	73	E	1,700
			Right	11	B	100
		WB	Left	502	F	475
			Thru	236	F	125
			Right	237	F	175



**Table 4c:** Build (2040) Peak Hour Data at the Auto Mall Drive and State Street Intersection

Intersection Delay	Intersection LOS	Approach	Movement	Movement Delay	Movement LOS	95 Percentile Queue
24	C	NB	Left	56	E	375
			Thru	7	A	175
			Right	5	A	200
		EB	Left	44	D	125
			Thru	444	D	125
			Right	15	B	175
		SB	Left	112	F	125
			Thru	24	C	500
			Right	21	C	525
		WB	Left	60	E	75
			Thru	47	D	25
			Right	8	A	50

**LOS INTERSECTION SUMMARY**

Table 5 summarizes the results of the traffic analysis in terms of LOS.

**Table 5:** LOS Summary of Project Intersections in 2016 (Existing) and 2040 (Build and No-Build)

Intersection w/ State Street	Condition	Existing	2040
11000 South <sup>a</sup>	Existing/No-Build: Signalized intersection	B	C
	Build: Additional northbound & southbound through lanes	-	B
Auto Mall Drive	Existing/No-Build: Signalized intersection	C	D
	Build: Additional northbound & southbound through lanes	-	C
Scheels Driveway	Existing/No-Build: Unsignalized intersection	D	F
	Build: Signalized intersection	-	B
11400 South	Existing/No-Build: Signalized intersection	D	F
	Build: Dual southbound right-turn lanes	-	E

<sup>a</sup>Data for the 11000 South and State Street intersection, which operates at LOS C or better, are included as Appendix B.

**2.4 New Bus and Rail Terminals**

**Question:** Does the project involve construction of a new bus or intermodal terminal that accommodates a significant number of diesel vehicles?

**Answer:** No. The project does not include any bus or intermodal terminal facilities.

**2.5 Expanded Bus and Rail Terminals**

**Question:** Does the project involve an existing bus or intermodal terminal that has a large vehicle fleet where the number of diesel buses (or trains) increases by 50 percent or more, as measured by arrivals?

**Answer:** No. The project does not include any bus or intermodal terminal facilities.

**2.6 Projects Affecting PM Sites of Violation or Possible Violation**

**Question:** Does the project affect locations, areas or categories of sites that are identified in the PM10 or PM2.5 applicable plan or implementation plan submissions, as appropriate, as sites of violation or potential violation?

////////////////////////////////////  
**Answer:** No. Concerning PM10, Utah’s SIP has demonstrated attainment of the PM10 standard for 10 years from 1993 through 2003. The adopted SIP revisions, presented as maintenance plans for Salt Lake and Utah counties, have been submitted to the EPA, and Utah is currently awaiting approval, which will re-designate these areas as attainment areas.

Regarding PM2.5, the Salt Lake nonattainment area has not violated the annual NAAQS for PM2.5, as detailed in the Salt Lake Nonattainment Area SIP. While the closest monitoring station to the project corridor (Hawthorn) shows no annual exceedances of the standard from 2008 to 2012, which are the years surrounding 2010 or the year the baseline modeling inventory was prepared, there were noted exceedances at the Hawthorn monitoring station (approximately 13 miles from the project area) that led to 24-hr NAAQS violations. The Salt Lake City, Utah PM2.5 Nonattainment SIP stated that these 24-hr NAAQS violations are “associated with relatively short-term meteorological occurrences.”

Further, only the State Street and 11400 South intersection would experience LOS D or worse conditions under the Build scenario. However, this intersection shows improvements in LOS and intersection delay compared to the No-Build scenario. These improvements would improve efficiency that would increase traffic flow and vehicle speeds, which, in turn, would reduce idling and the possibility to create or worsen PM2.5 or PM10 violations. All other intersections under the Build scenario would operate at an LOS C or better.

### 3 POAQC DETERMINATION

**Question/Comment:** State whether the project is a POAQC and summarize the response(s) above that support that determination. Document the relevant agencies that require interagency consultation on any input for the questionnaire from federal, state, and local transportation and air agencies as necessary for this project per 40 CFR 93.105. This information will be included as part of the Environmental Assessment.

**Answer:** The project is not a Project of Air Quality Concern (POAQC). The expanded highway capacity and intersection improvements that would result from the proposed changes do not significantly increase the total diesel vehicle traffic under the Build scenario compared to the No-Build scenario. Actual traffic counts established diesel vehicle volumes and percentages along the project corridor for existing conditions. Based on these counts and a Bureau of Transportation diesel truck factor, about 6 percent of the total AADT were diesel vehicles in 2016. Future diesel vehicle volumes, developed using the WFRC travel demand model, show about a 2 percent increase in volumes from the Build to the No-Build scenario in 2040.

When LOS is evaluated, the project’s most congested intersection at State Street and 11400 South shows an improved LOS during the peak period for the Build scenario as compared to the No-Build scenario. The other two intersections of note (the Scheels Driveway and Auto Mall Drive) would operate with an improved LOS for the peak period under the Build scenario when compared to the No-Build scenario.

All project intersections under the Build scenario would experience improved traffic flow and vehicle speeds, thereby decreasing idling, and each intersection would be expected to have a neutral or positive affect on PM emissions. Further, the Build scenario would not create an air quality concern because there is only a 2 percent increase in diesel vehicle traffic compared to the No-Build scenario, as shown in Table 1.

Therefore, UDOT is presenting this project to EPA, FHWA, WFRC, and UDEQ for interagency consultation per 40 CFR 93.105, as a project that is **NOT** of air quality concern and thereby will not require a PM10 or PM 2.5 hot-spot analysis.



#### **4 INTERAGENCY CONSULTATION RESULTS**

On May 10, 2017, UDOT provided a copy of this questionnaire to the following consultation parties: EPA, FHWA, WFRC, and UDEQ. There were no objections to the project determination, and on May 26, 2017, UDOT concluded the interagency consultation process. The project will proceed as a project that does not require a quantitative PM10 and PM2.5 hot-spot analyses.

## **Appendix A**

### **US-89 (State Street) Traffic Counts and Vehicle Classifications**





## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/17/16	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	0	12	8	0	2	0	0	0	0	0	0	0	0	22
05:00	2	30	8	0	1	0	0	1	0	0	0	0	0	42
06:00	0	57	17	0	5	0	0	0	0	0	0	0	0	79
07:00	1	126	31	1	4	1	0	2	0	0	0	0	0	166
08:00	2	198	56	0	11	3	0	1	2	0	0	0	0	273
09:00	10	335	88	1	20	3	1	3	0	0	0	0	0	461
10:00	16	495	113	0	17	3	1	7	0	0	1	0	0	653
11:00	16	<b>620</b>	<b>138</b>	1	<b>27</b>	<b>10</b>	<b>3</b>	<b>10</b>	0	<b>1</b>	0	0	0	<b>826</b>
12 PM	20	716	141	1	35	9	2	10	0	0	0	0	0	934
13:00	26	<b>770</b>	151	<b>2</b>	<b>47</b>	<b>13</b>	0	11	0	2	0	<b>1</b>	0	<b>1023</b>
14:00	19	742	<b>170</b>	0	47	6	1	9	0	1	0	1	0	996
15:00	19	738	148	2	35	5	1	<b>12</b>	0	0	<b>1</b>	0	0	961
16:00	<b>29</b>	722	147	2	25	4	0	6	0	0	0	0	0	935
17:00	24	666	144	0	32	8	<b>3</b>	12	<b>2</b>	0	0	1	0	892
18:00	19	635	119	0	18	4	1	7	0	0	0	0	0	803
19:00	10	508	113	1	21	5	2	5	0	1	0	0	0	666
20:00	10	430	92	0	15	2	1	5	0	0	0	1	0	556
21:00	14	481	109	0	11	8	1	6	0	<b>3</b>	0	0	0	633
22:00	22	447	67	0	13	6	1	4	0	0	1	0	0	561
23:00	0	130	21	0	4	0	0	0	0	0	0	0	0	155
Day Total	259	8858	1881	11	390	90	18	111	4	8	3	4	0	11637
Percent	2.2%	76.1%	16.2%	0.1%	3.4%	0.8%	0.2%	1.0%	0.0%	0.1%	0.0%	0.0%	0.0%	
AM Peak	10:00	11:00	11:00	07:00	11:00	11:00	11:00	11:00	08:00	11:00	10:00			11:00
Vol.	16	620	138	1	27	10	3	10	2	1	1			826
PM Peak	16:00	13:00	14:00	13:00	13:00	13:00	17:00	15:00	17:00	21:00	15:00	13:00		13:00
Vol.	29	770	170	2	47	13	3	12	2	3	1	1		1023

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/18/16	3	95	9	0	2	0	0	0	0	0	0	0	0	109
01:00	0	39	7	0	1	0	0	0	0	0	0	0	0	47
02:00	0	23	2	0	1	0	0	0	0	0	0	0	0	26
03:00	0	7	3	0	0	0	0	0	0	0	0	0	0	10
04:00	0	13	4	0	0	0	0	0	0	0	0	0	0	17
05:00	0	10	5	0	2	0	0	1	0	0	0	0	0	18
06:00	0	30	8	0	0	0	0	0	1	0	0	0	0	39
07:00	1	37	15	0	4	0	0	2	0	0	0	0	0	59
08:00	1	83	20	0	5	0	0	0	0	0	0	0	0	109
09:00	2	139	29	0	5	0	0	0	1	0	0	0	0	176
10:00	2	254	59	1	14	1	1	2	0	0	0	0	0	334
11:00	9	287	50	1	25	3	1	3	0	0	0	0	0	379
12 PM	11	383	67	0	19	1	1	5	0	1	0	0	0	488
13:00	14	419	63	0	17	3	0	8	0	1	0	0	0	525
14:00	9	407	83	0	13	2	0	3	0	0	0	0	0	517
15:00	10	416	68	0	18	2	1	4	0	0	0	0	0	519
16:00	11	397	70	0	12	3	0	4	0	0	0	0	0	497
17:00	6	327	60	0	14	4	1	0	0	0	0	0	0	412
18:00	11	333	63	0	9	1	0	0	0	0	0	0	0	417
19:00	7	231	43	0	8	2	0	3	0	0	0	0	0	294
20:00	5	150	36	0	2	0	0	2	0	0	0	0	0	195
21:00	4	130	17	0	3	1	0	0	0	0	0	0	0	155
22:00	1	68	14	0	1	0	0	1	0	0	0	0	0	85
23:00	1	37	4	0	1	0	0	0	0	0	0	0	0	43
Day Total	108	4315	799	2	176	23	5	38	2	2	0	0	0	5470
Percent	2.0%	78.9%	14.6%	0.0%	3.2%	0.4%	0.1%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	11:00	11:00	10:00	10:00	11:00	11:00	10:00	11:00	06:00					11:00
Vol.	9	287	59	1	25	3	1	3	1					379
PM Peak	13:00	13:00	14:00		12:00	17:00	12:00	13:00		12:00				13:00
Vol.	14	419	83		19	4	1	8		1				525

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/19/16	1	23	9	0	0	0	0	0	0	0	0	0	0	33
01:00	0	15	1	0	0	0	0	0	0	0	0	0	0	16
02:00	1	3	2	0	1	1	0	0	0	0	0	0	0	8
03:00	0	12	3	0	0	0	0	0	0	0	0	0	0	15
04:00	0	19	7	0	0	0	0	0	0	0	0	0	0	26
05:00	0	53	19	0	5	0	0	1	0	0	0	0	0	78
06:00	5	111	27	2	10	1	0	1	0	0	0	0	0	157
07:00	3	297	63	1	18	3	1	5	0	0	0	0	0	391
08:00	3	295	80	4	22	3	1	5	2	0	0	0	0	415
09:00	3	284	92	2	31	2	4	6	1	1	0	0	0	426
10:00	5	336	103	1	31	4	2	19	2	0	0	0	0	503
11:00	12	496	111	4	30	6	2	10	0	2	0	0	0	673
12 PM	9	650	139	3	39	8	1	11	0	2	0	0	0	862
13:00	13	638	146	3	33	6	2	14	2	1	1	0	0	859
14:00	19	570	150	4	34	4	1	13	2	3	0	0	0	800
15:00	18	660	132	5	39	8	1	13	2	3	0	0	0	881
16:00	25	759	156	2	43	6	2	15	1	1	0	0	0	1010
17:00	29	904	167	2	44	12	1	20	1	2	2	0	1	1185
18:00	27	757	134	2	30	10	2	10	1	1	0	0	0	974
19:00	8	519	115	0	23	5	0	6	1	0	0	0	0	677
20:00	4	353	72	0	12	1	1	3	0	1	0	0	0	447
21:00	10	246	32	0	6	0	1	1	0	0	0	0	0	296
22:00	3	133	17	0	3	0	0	0	0	0	0	0	0	156
23:00	0	68	5	0	0	0	0	0	0	0	0	0	0	73
Day Total	198	8201	1782	35	454	80	22	153	15	17	3	0	1	10961
Percent	1.8%	74.8%	16.3%	0.3%	4.1%	0.7%	0.2%	1.4%	0.1%	0.2%	0.0%	0.0%	0.0%	
AM Peak	11:00	11:00	11:00	08:00	09:00	11:00	09:00	10:00	08:00	11:00				11:00
Vol.	12	496	111	4	31	6	4	19	2	2				673
PM Peak	17:00	17:00	17:00	15:00	17:00	17:00	13:00	17:00	13:00	14:00	17:00		17:00	17:00
Vol.	29	904	167	5	44	12	2	20	2	3	2		1	1185

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/20/16	1	26	5	0	3	0	0	0	0	0	0	0	0	35
01:00	1	9	0	0	0	0	0	0	0	0	0	0	0	10
02:00	0	8	3	0	1	1	0	0	1	0	0	0	0	14
03:00	0	7	2	0	0	0	0	0	0	0	0	0	0	9
04:00	1	25	8	0	0	0	0	0	0	0	0	0	0	34
05:00	0	54	11	0	2	2	0	0	1	0	0	0	0	70
06:00	3	111	30	4	11	0	0	3	0	0	0	0	0	162
07:00	6	304	60	1	16	3	0	4	<b>2</b>	0	0	0	0	396
08:00	3	310	99	4	27	2	0	4	2	<b>2</b>	0	0	0	453
09:00	3	321	103	1	23	6	1	9	0	1	0	0	0	468
10:00	10	343	90	3	27	4	1	7	2	2	0	0	0	489
11:00	<b>15</b>	<b>516</b>	<b>144</b>	<b>6</b>	<b>30</b>	<b>11</b>	<b>5</b>	<b>10</b>	0	0	0	0	0	<b>737</b>
12 PM	22	631	160	1	<b>44</b>	<b>14</b>	0	<b>15</b>	0	0	0	0	<b>1</b>	888
13:00	23	620	159	4	38	10	3	11	0	1	0	1	0	870
14:00	11	650	130	4	39	9	1	14	0	2	0	0	0	860
15:00	24	704	159	<b>8</b>	34	3	0	9	1	<b>4</b>	0	0	0	946
16:00	32	793	<b>166</b>	1	38	8	0	12	<b>2</b>	2	0	<b>2</b>	1	1057
17:00	<b>51</b>	<b>878</b>	166	0	35	12	<b>4</b>	13	0	1	0	1	0	<b>1161</b>
18:00	20	746	136	1	33	8	3	14	2	1	0	0	0	964
19:00	14	567	92	0	23	6	1	12	0	1	0	0	0	716
20:00	9	396	74	0	21	0	0	2	0	0	0	0	0	502
21:00	8	249	39	0	8	0	0	0	0	0	0	0	0	304
22:00	2	137	25	0	3	0	0	0	0	0	0	0	0	167
23:00	0	56	15	0	1	0	0	0	0	0	0	0	0	72
Day Total	259	8461	1876	38	457	99	19	139	13	17	0	4	2	11384
Percent	2.3%	74.3%	16.5%	0.3%	4.0%	0.9%	0.2%	1.2%	0.1%	0.1%	0.0%	0.0%	0.0%	
AM Peak	11:00	11:00	11:00	11:00	11:00	11:00	11:00	11:00	07:00	08:00				11:00
Vol.	15	516	144	6	30	11	5	10	2	2				737
PM Peak	17:00	17:00	16:00	15:00	12:00	12:00	17:00	12:00	16:00	15:00		16:00	12:00	17:00
Vol.	51	878	166	8	44	14	4	15	2	4		2	1	1161



## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/21/16	0	33	5	0	1	0	0	1	0	0	0	0	0	40
01:00	0	14	4	0	1	0	0	0	0	0	0	0	0	19
02:00	0	5	3	0	2	1	0	1	0	0	0	0	0	12
03:00	0	7	2	0	0	0	0	0	0	0	0	0	0	9
04:00	0	27	7	0	0	0	0	0	0	0	0	0	0	34
05:00	0	47	11	0	3	1	0	0	1	0	0	0	0	63
06:00	1	104	33	3	10	0	0	1	0	0	0	0	0	152
07:00	<b>9</b>	276	67	0	21	2	0	6	1	0	0	0	0	382
08:00	8	307	90	<b>6</b>	19	1	0	6	1	0	0	0	0	438
09:00	8	304	73	3	27	2	0	4	<b>2</b>	<b>1</b>	0	0	0	424
10:00	7	424	106	5	<b>38</b>	<b>6</b>	<b>1</b>	7	0	0	0	0	0	594
11:00	7	<b>554</b>	<b>150</b>	4	36	5	1	<b>8</b>	0	1	0	0	0	<b>766</b>
12 PM	27	734	<b>161</b>	2	<b>50</b>	7	1	12	1	2	<b>1</b>	0	0	998
13:00	17	643	152	5	36	7	<b>3</b>	15	0	1	1	0	0	880
14:00	17	631	136	<b>7</b>	43	6	2	10	0	2	1	0	0	855
15:00	17	678	154	7	38	9	3	<b>21</b>	0	0	0	<b>1</b>	0	928
16:00	21	707	139	3	40	6	2	15	1	1	0	1	0	936
17:00	<b>52</b>	<b>861</b>	160	1	37	9	3	13	<b>4</b>	1	1	0	0	<b>1142</b>
18:00	11	692	154	0	48	<b>11</b>	1	15	0	1	0	0	0	933
19:00	9	514	89	0	19	3	0	4	1	<b>3</b>	0	1	0	643
20:00	7	388	80	0	17	2	1	3	1	0	0	0	0	499
21:00	3	239	41	0	6	1	0	3	1	1	0	0	0	295
22:00	0	119	23	0	3	0	0	0	0	0	0	0	0	145
23:00	0	52	7	0	2	0	0	0	0	0	0	0	0	61
Day Total	221	8360	1847	46	497	79	18	145	14	14	4	3	0	11248
Percent	2.0%	74.3%	16.4%	0.4%	4.4%	0.7%	0.2%	1.3%	0.1%	0.1%	0.0%	0.0%	0.0%	
AM Peak	07:00	11:00	11:00	08:00	10:00	10:00	10:00	11:00	09:00	09:00				11:00
Vol.	9	554	150	6	38	6	1	8	2	1				766
PM Peak	17:00	17:00	12:00	14:00	12:00	18:00	13:00	15:00	17:00	19:00	12:00	15:00		17:00
Vol.	52	861	161	7	50	11	3	21	4	3	1	1		1142

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/22/16	0	30	2	0	1	0	0	0	0	0	0	0	0	33
01:00	0	16	3	0	1	0	0	1	0	0	0	0	0	21
02:00	0	11	1	0	0	1	0	0	0	0	0	0	0	13
03:00	0	9	1	0	1	0	0	0	0	0	0	0	0	11
04:00	2	11	8	0	1	0	0	0	0	0	0	0	0	22
05:00	0	54	11	0	1	0	0	0	1	0	0	0	0	67
06:00	1	103	28	4	13	0	1	1	1	0	0	0	0	152
07:00	4	297	55	2	14	1	0	5	0	0	0	0	0	378
08:00	5	302	84	5	30	1	0	4	1	0	0	0	0	432
09:00	9	340	87	1	19	5	<b>2</b>	5	<b>2</b>	0	0	0	<b>1</b>	471
10:00	<b>14</b>	368	109	6	<b>36</b>	3	0	<b>7</b>	1	<b>1</b>	0	0	0	545
11:00	13	<b>545</b>	<b>151</b>	<b>10</b>	32	<b>10</b>	2	5	0	1	0	0	0	<b>769</b>
12 PM	49	688	143	4	<b>49</b>	8	1	<b>16</b>	0	1	<b>1</b>	0	<b>1</b>	961
13:00	30	633	145	4	35	6	1	15	2	3	0	0	0	874
14:00	91	652	154	<b>6</b>	39	16	2	11	2	1	0	0	0	974
15:00	14	684	148	5	39	10	3	14	1	<b>5</b>	0	0	0	923
16:00	47	799	149	2	46	13	1	14	<b>3</b>	1	1	0	0	1076
17:00	<b>116</b>	<b>879</b>	<b>180</b>	3	36	<b>18</b>	<b>4</b>	10	2	3	0	0	0	<b>1251</b>
18:00	30	732	146	2	35	10	1	11	1	0	0	0	1	969
19:00	4	564	116	0	31	4	0	4	0	1	0	0	0	724
20:00	8	463	81	0	13	0	1	3	0	0	0	0	0	569
21:00	10	321	65	0	13	1	0	2	0	0	0	0	0	412
22:00	1	167	19	0	4	1	0	0	0	0	0	0	0	192
23:00	2	71	9	0	1	0	0	0	0	0	0	0	0	83
Day Total	450	8739	1895	54	490	108	19	128	17	17	2	0	3	11922
Percent	3.8%	73.3%	15.9%	0.5%	4.1%	0.9%	0.2%	1.1%	0.1%	0.1%	0.0%	0.0%	0.0%	
AM Peak	10:00	11:00	11:00	11:00	10:00	11:00	09:00	10:00	09:00	10:00			09:00	11:00
Vol.	14	545	151	10	36	10	2	7	2	1			1	769
PM Peak	17:00	17:00	17:00	14:00	12:00	17:00	17:00	12:00	16:00	15:00	12:00		12:00	17:00
Vol.	116	879	180	6	49	18	4	16	3	5	1		1	1251

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/23/16	2	38	6	0	3	0	0	0	0	0	0	0	0	49
01:00	0	19	4	0	0	0	0	0	0	0	0	0	0	23
02:00	0	10	1	0	0	1	0	0	0	0	0	0	0	12
03:00	0	12	1	0	1	0	0	0	0	0	0	0	0	14
04:00	0	23	7	0	1	0	0	1	0	0	0	0	0	32
05:00	1	44	10	0	2	2	0	0	1	0	0	0	0	60
06:00	3	102	26	0	9	0	0	0	0	0	0	0	0	140
07:00	5	228	58	1	11	2	1	6	0	0	0	0	0	312
08:00	7	276	78	2	29	0	0	5	0	1	1	0	0	399
09:00	5	372	87	0	33	2	0	7	1	1	0	3	0	511
10:00	5	468	128	1	40	3	0	5	1	0	0	0	0	651
11:00	<b>22</b>	<b>589</b>	<b>174</b>	<b>3</b>	32	<b>9</b>	<b>3</b>	<b>12</b>	0	0	0	1	0	<b>845</b>
12 PM	83	748	<b>186</b>	5	<b>44</b>	22	1	14	0	0	0	0	0	1103
13:00	156	487	120	9	26	26	2	8	0	3	1	0	2	840
14:00	126	664	135	8	32	24	3	10	0	3	0	1	0	1006
15:00	93	790	162	5	35	15	3	9	2	0	1	0	2	1117
16:00	<b>227</b>	578	118	16	38	<b>36</b>	4	15	1	<b>6</b>	1	0	1	1041
17:00	222	609	124	<b>17</b>	41	33	<b>5</b>	<b>16</b>	1	4	0	0	2	1074
18:00	126	<b>819</b>	153	4	31	25	1	12	0	2	0	0	0	<b>1173</b>
19:00	16	594	112	1	20	8	1	5	0	0	0	0	0	757
20:00	9	448	68	0	14	2	1	3	0	0	0	0	0	545
21:00	4	306	34	0	9	2	0	2	0	0	0	0	0	357
22:00	1	208	21	0	3	2	0	0	0	0	0	0	0	235
23:00	1	151	15	0	6	0	0	0	0	1	0	0	0	174
Day Total	1114	8583	1828	72	460	214	25	130	7	21	4	5	7	12470
Percent	8.9%	68.8%	14.7%	0.6%	3.7%	1.7%	0.2%	1.0%	0.1%	0.2%	0.0%	0.0%	0.1%	
AM Peak	11:00	11:00	11:00	11:00	10:00	11:00	11:00	11:00	05:00	08:00	08:00	09:00		11:00
Vol.	22	589	174	3	40	9	3	12	1	1	1	3		845
PM Peak	16:00	18:00	12:00	17:00	12:00	16:00	17:00	17:00	15:00	16:00	13:00	14:00	13:00	18:00
Vol.	227	819	186	17	44	36	5	16	2	6	1	1	2	1173

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/24/16	0	89	6	0	2	0	0	0	0	0	0	0	0	97
01:00	0	33	2	0	3	0	0	0	0	0	0	0	0	38
02:00	0	18	1	0	0	0	0	0	0	0	0	0	0	19
03:00	0	15	1	0	1	0	0	0	0	0	0	0	0	17
04:00	0	13	2	0	1	0	0	0	0	0	0	0	0	16
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Day Total	0	168	12	0	7	0	0	0	0	0	0	0	0	187
Percent	0.0%	89.8%	6.4%	0.0%	3.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak Vol.		00:00 89	00:00 6		01:00 3									00:00 97
PM Peak Vol.														
Grand Total	2609	55685	11920	258	2931	693	126	844	72	96	16	16	13	75279
Percent	3.5%	74.0%	15.8%	0.3%	3.9%	0.9%	0.2%	1.1%	0.1%	0.1%	0.0%	0.0%	0.0%	



## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/17/16	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	3	8	3	0	0	0	0	0	0	0	0	0	0	14
05:00	1	18	4	0	0	0	0	0	1	0	0	0	0	24
06:00	1	54	9	0	6	0	0	1	0	0	0	0	0	71
07:00	5	121	35	0	11	0	2	0	0	0	0	0	0	174
08:00	8	202	51	1	16	2	1	5	0	0	0	0	0	286
09:00	6	344	85	0	19	4	0	4	0	0	1	0	0	463
10:00	15	472	92	0	19	5	0	12	1	2	0	0	0	618
11:00	<b>26</b>	<b>597</b>	<b>142</b>	0	<b>27</b>	<b>10</b>	0	10	1	1	0	0	0	<b>814</b>
12 PM	14	734	138	<b>3</b>	31	12	1	<b>18</b>	0	2	0	0	0	<b>953</b>
13:00	33	653	<b>157</b>	3	<b>34</b>	<b>13</b>	1	13	<b>1</b>	<b>5</b>	0	0	0	913
14:00	<b>38</b>	704	123	1	31	7	<b>3</b>	8	0	2	<b>1</b>	<b>1</b>	0	919
15:00	31	633	116	1	27	8	0	10	0	3	1	0	<b>1</b>	831
16:00	26	596	119	0	27	8	2	6	0	2	1	0	0	787
17:00	25	632	126	0	29	4	0	11	1	1	0	0	0	829
18:00	26	<b>747</b>	95	0	22	7	3	12	0	0	0	0	0	912
19:00	8	530	97	1	15	5	2	9	0	0	0	0	0	667
20:00	10	299	62	0	10	1	0	1	0	0	0	0	0	383
21:00	4	185	36	0	9	1	0	2	0	0	0	0	0	237
22:00	2	159	15	0	3	1	0	0	0	0	0	0	0	180
23:00	3	117	15	0	1	0	0	0	0	0	0	0	0	136
Day Total	285	7805	1520	10	337	88	15	122	5	18	4	1	1	10211
Percent	2.8%	76.4%	14.9%	0.1%	3.3%	0.9%	0.1%	1.2%	0.0%	0.2%	0.0%	0.0%	0.0%	
AM Peak	11:00	11:00	11:00	08:00	11:00	11:00	07:00	10:00	05:00	10:00	09:00			11:00
Vol.	26	597	142	1	27	10	2	12	1	2	1			814
PM Peak	14:00	18:00	13:00	12:00	13:00	13:00	14:00	12:00	13:00	13:00	14:00	14:00	15:00	12:00
Vol.	38	747	157	3	34	13	3	18	1	5	1	1	1	953

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/18/16	0	85	13	0	0	0	0	0	0	0	0	0	0	98
01:00	2	40	7	0	2	0	0	0	0	0	0	0	0	51
02:00	2	25	4	0	0	0	0	0	0	0	0	0	0	31
03:00	2	5	2	0	2	0	0	0	0	0	0	0	0	11
04:00	0	6	1	0	0	0	0	0	0	0	0	0	0	7
05:00	0	13	3	0	0	0	0	0	0	0	0	0	0	16
06:00	0	19	3	0	0	0	0	0	0	0	0	0	0	22
07:00	0	48	5	0	1	1	0	0	0	1	0	0	0	56
08:00	3	84	16	0	3	0	1	0	0	0	0	0	0	107
09:00	5	143	25	2	6	1	0	2	0	0	0	0	0	184
10:00	8	253	39	0	5	4	0	3	0	0	0	0	0	312
11:00	15	276	69	1	16	7	0	1	0	1	0	0	0	386
12 PM	10	348	70	0	22	5	1	7	0	0	1	0	0	464
13:00	15	403	62	0	24	2	0	4	1	0	0	0	0	511
14:00	17	354	68	1	12	1	1	6	0	0	0	0	0	460
15:00	13	364	62	0	12	0	0	1	0	0	0	0	0	452
16:00	5	318	59	0	9	5	1	3	0	0	0	0	0	400
17:00	8	268	49	0	8	0	0	5	0	1	0	1	0	340
18:00	11	255	42	1	13	2	0	2	0	0	0	0	0	326
19:00	10	206	48	0	3	1	0	4	0	0	0	0	0	272
20:00	7	156	31	0	7	4	0	3	0	0	0	0	0	208
21:00	3	106	22	0	0	0	0	0	0	0	0	0	0	131
22:00	4	62	20	0	1	0	0	1	0	0	0	0	0	88
23:00	1	35	5	0	0	0	0	1	1	0	0	0	0	43
Day Total	141	3872	725	5	146	33	4	43	2	3	1	1	0	4976
Percent	2.8%	77.8%	14.6%	0.1%	2.9%	0.7%	0.1%	0.9%	0.0%	0.1%	0.0%	0.0%	0.0%	
AM Peak	11:00	11:00	11:00	09:00	11:00	11:00	08:00	10:00		07:00				11:00
Vol.	15	276	69	2	16	7	1	3		1				386
PM Peak	14:00	13:00	12:00	14:00	13:00	12:00	12:00	12:00	13:00	17:00	12:00	17:00		13:00
Vol.	17	403	70	1	24	5	1	7	1	1	1	1		511

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/19/16	0	18	3	0	0	0	0	0	0	0	0	0	0	21
01:00	0	10	2	0	1	0	0	0	0	0	0	0	0	13
02:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
03:00	0	7	2	0	0	0	0	0	0	0	0	0	0	9
04:00	0	7	2	0	0	0	0	0	0	0	0	0	0	9
05:00	2	33	10	0	3	0	0	1	0	1	0	0	0	50
06:00	9	163	39	1	11	0	1	5	1	1	0	0	0	231
07:00	44	659	135	5	29	12	6	12	1	3	2	2	0	910
08:00	<b>53</b>	<b>725</b>	<b>157</b>	5	<b>43</b>	<b>26</b>	5	<b>23</b>	0	<b>5</b>	0	<b>3</b>	0	<b>1045</b>
09:00	17	371	84	1	36	6	0	12	1	2	0	0	0	530
10:00	15	403	95	1	31	6	1	6	0	3	1	0	0	562
11:00	15	463	109	0	29	11	1	11	1	0	2	0	1	643
12 PM	<b>33</b>	530	147	3	22	9	0	13	0	<b>3</b>	1	0	0	761
13:00	18	504	126	3	31	7	4	21	0	0	0	0	0	714
14:00	18	493	107	5	33	7	1	10	0	1	1	0	0	676
15:00	23	565	125	2	37	7	1	7	2	0	1	0	0	770
16:00	24	629	135	3	36	18	2	9	0	2	1	1	2	862
17:00	31	<b>994</b>	<b>155</b>	5	<b>46</b>	15	1	<b>30</b>	1	3	4	3	1	<b>1289</b>
18:00	20	602	112	0	34	10	2	7	0	2	1	0	0	790
19:00	10	374	81	0	22	2	0	1	0	0	0	2	0	492
20:00	14	262	41	0	12	3	0	0	1	0	0	0	0	333
21:00	5	144	22	0	10	1	0	0	0	0	0	0	0	182
22:00	2	90	9	0	3	1	0	0	0	0	0	0	0	105
23:00	1	52	12	0	2	2	0	0	0	0	0	0	0	69
Day Total	354	8102	1710	34	471	143	25	168	8	26	14	11	4	11070
Percent	3.2%	73.2%	15.4%	0.3%	4.3%	1.3%	0.2%	1.5%	0.1%	0.2%	0.1%	0.1%	0.0%	
AM Peak	08:00	08:00	08:00	07:00	08:00	08:00	07:00	08:00	06:00	08:00	07:00	08:00	11:00	08:00
Vol.	53	725	157	5	43	26	6	23	1	5	2	3	1	1045
PM Peak	12:00	17:00	17:00	14:00	17:00	16:00	13:00	17:00	15:00	12:00	17:00	17:00	16:00	17:00
Vol.	33	994	155	5	46	18	4	30	2	3	4	3	2	1289

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/20/16	1	21	5	0	3	0	0	1	0	0	0	0	0	31
01:00	0	8	1	0	0	0	0	0	0	0	0	0	0	9
02:00	0	6	1	0	0	0	0	0	0	0	0	0	0	7
03:00	0	7	2	0	0	0	0	0	0	0	0	0	0	9
04:00	0	13	3	0	1	0	0	0	0	0	0	0	0	17
05:00	0	38	13	0	3	1	0	0	0	0	0	0	0	55
06:00	0	156	38	0	18	1	0	3	2	0	0	0	0	218
07:00	32	700	121	4	38	13	3	18	0	2	3	0	0	934
08:00	<b>40</b>	<b>765</b>	<b>152</b>	<b>7</b>	<b>50</b>	<b>20</b>	3	<b>23</b>	<b>5</b>	<b>3</b>	0	<b>2</b>	<b>1</b>	<b>1071</b>
09:00	18	385	91	2	30	8	2	11	2	1	0	1	1	552
10:00	9	379	87	0	26	9	0	11	0	1	0	1	0	523
11:00	27	440	104	2	27	3	3	12	1	0	1	0	0	620
12 PM	12	532	149	3	34	8	2	12	0	<b>5</b>	1	0	0	758
13:00	22	500	118	2	36	9	2	15	1	0	<b>2</b>	0	0	707
14:00	16	488	119	1	31	4	<b>4</b>	7	1	1	0	0	0	672
15:00	17	594	106	8	<b>48</b>	7	1	8	<b>2</b>	0	0	0	0	791
16:00	<b>45</b>	863	<b>164</b>	<b>11</b>	47	<b>16</b>	4	<b>16</b>	1	5	0	0	0	<b>1172</b>
17:00	37	<b>878</b>	161	3	39	8	3	16	2	3	0	0	0	1150
18:00	16	536	101	0	25	8	1	4	0	1	0	0	<b>1</b>	693
19:00	11	419	78	0	16	2	1	2	0	0	0	0	0	529
20:00	8	276	57	0	11	0	0	3	0	1	0	0	0	356
21:00	3	174	33	0	4	1	0	1	0	0	0	0	0	216
22:00	0	116	17	0	1	1	0	0	2	0	0	0	0	137
23:00	0	46	6	0	0	0	0	0	0	0	0	0	0	52
Day Total	314	8340	1727	43	488	119	29	163	19	23	7	4	3	11279
Percent	2.8%	73.9%	15.3%	0.4%	4.3%	1.1%	0.3%	1.4%	0.2%	0.2%	0.1%	0.0%	0.0%	
AM Peak	08:00	08:00	08:00	08:00	08:00	08:00	07:00	08:00	08:00	08:00	07:00	08:00	08:00	08:00
Vol.	40	765	152	7	50	20	3	23	5	3	3	2	1	1071
PM Peak	16:00	17:00	16:00	16:00	15:00	16:00	14:00	16:00	15:00	12:00	13:00		18:00	16:00
Vol.	45	878	164	11	48	16	4	16	2	5	2		1	1172



## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/21/16	0	38	6	0	0	0	0	0	0	0	0	0	0	44
01:00	0	18	3	0	0	0	0	0	0	0	0	0	0	21
02:00	0	6	0	0	0	0	0	0	0	0	0	0	0	6
03:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
04:00	2	9	5	0	0	0	0	0	0	0	0	0	0	16
05:00	1	39	12	0	0	0	0	0	0	0	0	0	0	52
06:00	8	179	34	1	9	1	0	6	1	1	0	0	0	240
07:00	49	687	125	6	31	13	2	13	1	5	0	1	0	933
08:00	<b>55</b>	<b>954</b>	<b>176</b>	<b>10</b>	<b>59</b>	<b>29</b>	<b>5</b>	<b>41</b>	<b>3</b>	<b>6</b>	<b>2</b>	0	0	<b>1340</b>
09:00	38	617	128	5	36	11	2	18	2	7	1	1	0	866
10:00	10	393	96	1	24	3	0	10	0	1	1	0	0	539
11:00	17	480	107	1	26	6	2	11	1	1	1	1	0	654
12 PM	19	554	130	2	28	7	0	7	2	4	1	0	0	754
13:00	22	577	121	0	33	8	4	14	2	5	2	0	0	788
14:00	9	529	105	3	36	10	0	9	1	0	1	0	0	703
15:00	12	556	124	4	33	8	3	8	1	1	0	0	0	750
16:00	24	677	127	3	34	14	4	11	3	3	0	0	3	903
17:00	<b>59</b>	<b>1041</b>	<b>171</b>	0	33	<b>25</b>	2	<b>22</b>	0	<b>8</b>	2	<b>1</b>	0	<b>1364</b>
18:00	13	595	106	2	32	10	1	8	2	2	0	0	0	771
19:00	11	418	64	0	23	7	0	2	0	1	0	0	0	526
20:00	2	272	61	1	7	1	0	1	1	0	0	0	0	346
21:00	0	149	26	0	11	1	0	0	0	0	0	0	0	187
22:00	3	92	11	0	1	0	0	0	0	0	0	0	0	107
23:00	0	45	4	0	1	0	0	1	0	0	0	0	0	51
Day Total	354	8927	1743	39	457	154	25	182	20	45	11	4	3	11964
Percent	3.0%	74.6%	14.6%	0.3%	3.8%	1.3%	0.2%	1.5%	0.2%	0.4%	0.1%	0.0%	0.0%	
AM Peak	08:00	08:00	08:00	08:00	08:00	08:00	08:00	08:00	08:00	09:00	08:00	07:00		08:00
Vol.	55	954	176	10	59	29	5	41	3	7	2	1		1340
PM Peak	17:00	17:00	17:00	15:00	14:00	17:00	13:00	17:00	16:00	17:00	13:00	17:00	16:00	17:00
Vol.	59	1041	171	4	36	25	4	22	3	8	2	1	3	1364

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/22/16	0	20	3	0	0	0	0	0	0	0	0	0	0	23
01:00	0	9	1	0	0	0	0	0	0	0	0	0	0	10
02:00	0	12	0	0	0	0	0	0	0	0	0	0	0	12
03:00	0	6	1	0	0	0	0	0	0	0	0	0	0	7
04:00	0	8	5	0	0	0	0	0	0	0	0	0	0	13
05:00	0	37	12	0	1	0	0	0	0	0	0	0	0	50
06:00	3	136	31	0	13	0	0	2	0	0	0	0	0	185
07:00	23	<b>667</b>	<b>129</b>	3	35	<b>15</b>	0	<b>16</b>	<b>2</b>	2	1	0	0	893
08:00	<b>24</b>	664	126	<b>4</b>	<b>44</b>	10	<b>3</b>	15	0	<b>4</b>	<b>3</b>	<b>2</b>	0	<b>899</b>
09:00	16	352	103	2	25	7	0	10	2	2	0	1	0	520
10:00	18	382	95	1	34	3	1	5	0	3	0	0	0	542
11:00	17	486	119	0	25	9	2	12	1	3	1	0	0	675
12 PM	17	602	101	2	30	14	2	22	1	6	1	0	0	798
13:00	23	679	149	2	36	11	3	24	<b>4</b>	2	1	0	0	934
14:00	31	788	147	2	40	11	2	25	1	3	1	0	0	1051
15:00	36	746	146	3	<b>44</b>	23	1	18	2	4	0	0	0	1023
16:00	40	884	148	<b>6</b>	44	23	<b>6</b>	<b>27</b>	3	5	0	<b>1</b>	0	1187
17:00	<b>64</b>	<b>1049</b>	<b>165</b>	2	35	<b>28</b>	2	25	0	<b>8</b>	<b>2</b>	0	<b>1</b>	<b>1381</b>
18:00	43	744	115	2	25	8	3	24	0	2	2	0	1	969
19:00	10	455	65	0	9	2	1	7	0	1	0	0	0	550
20:00	14	286	58	1	8	4	0	2	1	0	0	0	0	374
21:00	8	223	30	0	10	3	0	0	0	1	0	0	0	275
22:00	4	134	13	0	3	0	0	1	0	0	0	0	0	155
23:00	4	71	6	0	2	0	0	0	0	0	0	0	0	83
Day Total	395	9440	1768	30	463	171	26	235	17	46	12	4	2	12609
Percent	3.1%	74.9%	14.0%	0.2%	3.7%	1.4%	0.2%	1.9%	0.1%	0.4%	0.1%	0.0%	0.0%	
AM Peak	08:00	07:00	07:00	08:00	08:00	07:00	08:00	07:00	07:00	08:00	08:00	08:00		08:00
Vol.	24	667	129	4	44	15	3	16	2	4	3	2		899
PM Peak	17:00	17:00	17:00	16:00	15:00	17:00	16:00	16:00	13:00	17:00	17:00	16:00	17:00	17:00
Vol.	64	1049	165	6	44	28	6	27	4	8	2	1	1	1381

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/23/16	0	34	6	0	3	0	0	0	0	0	0	0	0	43
01:00	0	21	2	0	0	0	0	0	0	0	0	0	0	23
02:00	1	11	1	0	0	0	0	0	0	0	0	0	0	13
03:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
04:00	0	21	6	0	0	1	0	1	0	0	0	0	0	29
05:00	0	30	10	0	2	1	0	0	0	0	0	0	0	43
06:00	3	126	23	3	4	2	0	1	0	0	0	0	0	162
07:00	27	533	91	6	20	6	2	14	1	1	1	0	0	702
08:00	30	533	117	5	29	16	1	16	1	1	1	1	0	751
09:00	16	424	97	2	29	11	0	11	2	1	0	0	1	594
10:00	17	457	130	0	38	13	1	16	0	0	0	0	1	673
11:00	28	546	130	2	40	7	3	24	1	4	0	0	1	786
12 PM	21	654	155	4	42	15	5	14	1	4	1	1	0	917
13:00	45	695	166	4	38	15	4	16	2	2	0	1	0	988
14:00	28	626	125	1	36	11	2	12	3	0	0	0	1	845
15:00	40	726	140	4	32	8	8	17	3	3	0	0	2	983
16:00	59	893	183	2	39	22	6	23	3	4	2	0	0	1236
17:00	63	925	195	5	39	28	5	33	4	4	2	0	1	1304
18:00	78	894	194	2	30	15	5	21	2	2	0	2	0	1245
19:00	31	454	92	1	17	9	2	5	1	1	0	0	0	613
20:00	47	355	70	1	18	7	0	2	0	0	0	0	0	500
21:00	10	239	39	0	13	1	0	2	0	0	0	1	0	305
22:00	11	164	20	0	1	2	0	2	0	0	0	1	0	201
23:00	26	124	13	0	3	3	0	0	1	2	0	0	0	172
Day Total	581	9488	2005	42	473	193	44	230	25	29	7	7	7	13131
Percent	4.4%	72.3%	15.3%	0.3%	3.6%	1.5%	0.3%	1.8%	0.2%	0.2%	0.1%	0.1%	0.1%	
AM Peak	08:00	11:00	10:00	07:00	11:00	08:00	11:00	11:00	09:00	11:00	07:00	08:00	09:00	11:00
Vol.	30	546	130	6	40	16	3	24	2	4	1	1	1	786
PM Peak	18:00	17:00	17:00	17:00	12:00	17:00	15:00	17:00	17:00	12:00	16:00	18:00	15:00	17:00
Vol.	78	925	195	5	42	28	8	33	4	4	2	2	2	1304

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/24/16	24	57	11	0	0	3	0	0	0	0	0	0	0	95
01:00	13	27	5	0	1	1	0	1	0	0	0	0	0	48
02:00	6	13	0	0	1	1	0	0	0	0	0	0	0	21
03:00	0	9	0	0	0	1	0	0	0	0	0	0	0	10
04:00	2	6	0	0	0	0	1	0	0	0	0	0	0	9
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Day Total	45	112	16	0	2	6	1	1	0	0	0	0	0	183
Percent	24.6%	61.2%	8.7%	0.0%	1.1%	3.3%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	00:00	00:00	00:00		01:00	00:00	04:00	01:00						00:00
Vol.	24	57	11		1	3	1	1						95
PM Peak														
Vol.														
Grand Total	2469	56086	11214	203	2837	907	169	1144	96	190	56	32	20	75423
Percent	3.3%	74.4%	14.9%	0.3%	3.8%	1.2%	0.2%	1.5%	0.1%	0.3%	0.1%	0.0%	0.0%	



## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound, Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/17/16	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	3	20	11	0	2	0	0	0	0	0	0	0	0	36
05:00	3	48	12	0	1	0	0	1	1	0	0	0	0	66
06:00	1	111	26	0	11	0	0	1	0	0	0	0	0	150
07:00	6	247	66	1	15	1	2	2	0	0	0	0	0	340
08:00	10	400	107	1	27	5	1	6	2	0	0	0	0	559
09:00	16	679	173	1	39	7	1	7	0	0	1	0	0	924
10:00	31	967	205	0	36	8	1	19	1	2	1	0	0	1271
11:00	<b>42</b>	<b>1217</b>	<b>280</b>	1	<b>54</b>	<b>20</b>	<b>3</b>	<b>20</b>	1	2	0	0	0	<b>1640</b>
12 PM	34	<b>1450</b>	279	4	66	21	3	<b>28</b>	0	2	0	0	0	1887
13:00	<b>59</b>	1423	<b>308</b>	<b>5</b>	<b>81</b>	<b>26</b>	1	24	1	<b>7</b>	0	1	0	<b>1936</b>
14:00	57	1446	293	1	78	13	<b>4</b>	17	0	3	1	<b>2</b>	0	1915
15:00	50	1371	264	3	62	13	1	22	0	3	<b>2</b>	0	<b>1</b>	1792
16:00	55	1318	266	2	52	12	2	12	0	2	1	0	0	1722
17:00	49	1298	270	0	61	12	3	23	<b>3</b>	1	0	1	0	1721
18:00	45	1382	214	0	40	11	4	19	0	0	0	0	0	1715
19:00	18	1038	210	2	36	10	4	14	0	1	0	0	0	1333
20:00	20	729	154	0	25	3	1	6	0	0	0	1	0	939
21:00	18	666	145	0	20	9	1	8	0	3	0	0	0	870
22:00	24	606	82	0	16	7	1	4	0	0	1	0	0	741
23:00	3	247	36	0	5	0	0	0	0	0	0	0	0	291
Day Total	544	16663	3401	21	727	178	33	233	9	26	7	5	1	21848
Percent	2.5%	76.3%	15.6%	0.1%	3.3%	0.8%	0.2%	1.1%	0.0%	0.1%	0.0%	0.0%	0.0%	
AM Peak	11:00	11:00	11:00	07:00	11:00	11:00	11:00	11:00	08:00	10:00	09:00			11:00
Vol.	42	1217	280	1	54	20	3	20	2	2	1			1640
PM Peak	13:00	12:00	13:00	13:00	13:00	13:00	14:00	12:00	17:00	13:00	15:00	14:00	15:00	13:00
Vol.	59	1450	308	5	81	26	4	28	3	7	2	2	1	1936

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound, Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/18/16	3	180	22	0	2	0	0	0	0	0	0	0	0	207
01:00	2	79	14	0	3	0	0	0	0	0	0	0	0	98
02:00	2	48	6	0	1	0	0	0	0	0	0	0	0	57
03:00	2	12	5	0	2	0	0	0	0	0	0	0	0	21
04:00	0	19	5	0	0	0	0	0	0	0	0	0	0	24
05:00	0	23	8	0	2	0	0	1	0	0	0	0	0	34
06:00	0	49	11	0	0	0	0	0	1	0	0	0	0	61
07:00	1	85	20	0	5	1	0	2	0	1	0	0	0	115
08:00	4	167	36	0	8	0	1	0	0	0	0	0	0	216
09:00	7	282	54	2	11	1	0	2	1	0	0	0	0	360
10:00	10	507	98	1	19	5	1	5	0	0	0	0	0	646
11:00	<b>24</b>	<b>563</b>	<b>119</b>	2	<b>41</b>	<b>10</b>	1	4	0	1	0	0	0	<b>765</b>
12 PM	21	731	137	0	<b>41</b>	6	<b>2</b>	<b>12</b>	0	<b>1</b>	<b>1</b>	0	0	952
13:00	<b>29</b>	<b>822</b>	125	0	41	5	0	12	<b>1</b>	1	0	0	0	<b>1036</b>
14:00	26	761	<b>151</b>	<b>1</b>	25	3	1	9	0	0	0	0	0	977
15:00	23	780	130	0	30	2	1	5	0	0	0	0	0	971
16:00	16	715	129	0	21	<b>8</b>	1	7	0	0	0	0	0	897
17:00	14	595	109	0	22	4	1	5	0	1	0	<b>1</b>	0	752
18:00	22	588	105	1	22	3	0	2	0	0	0	0	0	743
19:00	17	437	91	0	11	3	0	7	0	0	0	0	0	566
20:00	12	306	67	0	9	4	0	5	0	0	0	0	0	403
21:00	7	236	39	0	3	1	0	0	0	0	0	0	0	286
22:00	5	130	34	0	2	0	0	2	0	0	0	0	0	173
23:00	2	72	9	0	1	0	0	1	1	0	0	0	0	86
Day Total	249	8187	1524	7	322	56	9	81	4	5	1	1	0	10446
Percent	2.4%	78.4%	14.6%	0.1%	3.1%	0.5%	0.1%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	11:00	11:00	11:00	09:00	11:00	11:00	08:00	10:00	06:00	07:00				11:00
Vol.	24	563	119	2	41	10	1	5	1	1				765
PM Peak	13:00	13:00	14:00	14:00	12:00	16:00	12:00	12:00	13:00	12:00	12:00	17:00		13:00
Vol.	29	822	151	1	41	8	2	12	1	1	1	1		1036

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound, Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/19/16	1	41	12	0	0	0	0	0	0	0	0	0	0	54
01:00	0	25	3	0	1	0	0	0	0	0	0	0	0	29
02:00	1	7	2	0	1	1	0	0	0	0	0	0	0	12
03:00	0	19	5	0	0	0	0	0	0	0	0	0	0	24
04:00	0	26	9	0	0	0	0	0	0	0	0	0	0	35
05:00	2	86	29	0	8	0	0	2	0	1	0	0	0	128
06:00	14	274	66	3	21	1	1	6	1	1	0	0	0	388
07:00	47	956	198	6	47	15	<b>7</b>	17	1	3	<b>2</b>	2	0	1301
08:00	<b>56</b>	<b>1020</b>	<b>237</b>	<b>9</b>	65	<b>29</b>	6	<b>28</b>	<b>2</b>	<b>5</b>	0	<b>3</b>	0	<b>1460</b>
09:00	20	655	176	3	<b>67</b>	8	4	18	2	3	0	0	0	956
10:00	20	739	198	2	62	10	3	25	2	3	1	0	0	1065
11:00	27	959	220	4	59	17	3	21	1	2	2	0	<b>1</b>	1316
12 PM	42	1180	286	6	61	17	1	24	0	<b>5</b>	1	0	0	1623
13:00	31	1142	272	6	64	13	<b>6</b>	35	2	1	1	0	0	1573
14:00	37	1063	257	<b>9</b>	67	11	2	23	2	4	1	0	0	1476
15:00	41	1225	257	7	76	15	2	20	<b>4</b>	3	1	0	0	1651
16:00	49	1388	291	5	79	24	4	24	1	3	1	1	<b>2</b>	1872
17:00	<b>60</b>	<b>1898</b>	<b>322</b>	7	<b>90</b>	<b>27</b>	2	<b>50</b>	2	5	<b>6</b>	<b>3</b>	2	<b>2474</b>
18:00	47	1359	246	2	64	20	4	17	1	3	1	0	0	1764
19:00	18	893	196	0	45	7	0	7	1	0	0	2	0	1169
20:00	18	615	113	0	24	4	1	3	1	1	0	0	0	780
21:00	15	390	54	0	16	1	1	1	0	0	0	0	0	478
22:00	5	223	26	0	6	1	0	0	0	0	0	0	0	261
23:00	1	120	17	0	2	2	0	0	0	0	0	0	0	142
Day Total	552	16303	3492	69	925	223	47	321	23	43	17	11	5	22031
Percent	2.5%	74.0%	15.9%	0.3%	4.2%	1.0%	0.2%	1.5%	0.1%	0.2%	0.1%	0.0%	0.0%	
AM Peak	08:00	08:00	08:00	08:00	09:00	08:00	07:00	08:00	08:00	08:00	07:00	08:00	11:00	08:00
Vol.	56	1020	237	9	67	29	7	28	2	5	2	3	1	1460
PM Peak	17:00	17:00	17:00	14:00	17:00	17:00	13:00	17:00	15:00	12:00	17:00	17:00	16:00	17:00
Vol.	60	1898	322	9	90	27	6	50	4	5	6	3	2	2474

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound, Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/20/16	2	47	10	0	6	0	0	1	0	0	0	0	0	66
01:00	1	17	1	0	0	0	0	0	0	0	0	0	0	19
02:00	0	14	4	0	1	1	0	0	1	0	0	0	0	21
03:00	0	14	4	0	0	0	0	0	0	0	0	0	0	18
04:00	1	38	11	0	1	0	0	0	0	0	0	0	0	51
05:00	0	92	24	0	5	3	0	0	1	0	0	0	0	125
06:00	3	267	68	4	29	1	0	6	2	0	0	0	0	380
07:00	38	1004	181	5	54	16	3	22	2	2	<b>3</b>	0	0	1330
08:00	<b>43</b>	<b>1075</b>	<b>251</b>	<b>11</b>	<b>77</b>	<b>22</b>	3	<b>27</b>	<b>7</b>	<b>5</b>	0	<b>2</b>	<b>1</b>	<b>1524</b>
09:00	21	706	194	3	53	14	3	20	2	2	0	1	1	1020
10:00	19	722	177	3	53	13	1	18	2	3	0	1	0	1012
11:00	42	956	248	8	57	14	<b>8</b>	22	1	0	1	0	0	1357
12 PM	34	1163	309	4	78	22	2	27	0	5	1	0	<b>1</b>	1646
13:00	45	1120	277	6	74	19	5	26	1	1	<b>2</b>	1	0	1577
14:00	27	1138	249	5	70	13	5	21	1	3	0	0	0	1532
15:00	41	1298	265	<b>16</b>	82	10	1	17	<b>3</b>	4	0	0	0	1737
16:00	77	1656	<b>330</b>	12	<b>85</b>	<b>24</b>	4	28	3	<b>7</b>	0	<b>2</b>	1	2229
17:00	<b>88</b>	<b>1756</b>	327	3	74	20	<b>7</b>	<b>29</b>	2	4	0	1	0	<b>2311</b>
18:00	36	1282	237	1	58	16	4	18	2	2	0	0	1	1657
19:00	25	986	170	0	39	8	2	14	0	1	0	0	0	1245
20:00	17	672	131	0	32	0	0	5	0	1	0	0	0	858
21:00	11	423	72	0	12	1	0	1	0	0	0	0	0	520
22:00	2	253	42	0	4	1	0	0	2	0	0	0	0	304
23:00	0	102	21	0	1	0	0	0	0	0	0	0	0	124
Day Total	573	16801	3603	81	945	218	48	302	32	40	7	8	5	22663
Percent	2.5%	74.1%	15.9%	0.4%	4.2%	1.0%	0.2%	1.3%	0.1%	0.2%	0.0%	0.0%	0.0%	
AM Peak	08:00	08:00	08:00	08:00	08:00	08:00	11:00	08:00	08:00	08:00	07:00	08:00	08:00	08:00
Vol.	43	1075	251	11	77	22	8	27	7	5	3	2	1	1524
PM Peak	17:00	17:00	16:00	15:00	16:00	16:00	17:00	17:00	15:00	16:00	13:00	16:00	12:00	17:00
Vol.	88	1756	330	16	85	24	7	29	3	7	2	2	1	2311



## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound, Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/21/16	0	71	11	0	1	0	0	1	0	0	0	0	0	84
01:00	0	32	7	0	1	0	0	0	0	0	0	0	0	40
02:00	0	11	3	0	2	1	0	1	0	0	0	0	0	18
03:00	0	9	3	0	0	0	0	0	0	0	0	0	0	12
04:00	2	36	12	0	0	0	0	0	0	0	0	0	0	50
05:00	1	86	23	0	3	1	0	0	1	0	0	0	0	115
06:00	9	283	67	4	19	1	0	7	1	1	0	0	0	392
07:00	58	963	192	6	52	15	2	19	2	5	0	1	0	1315
08:00	<b>63</b>	<b>1261</b>	<b>266</b>	<b>16</b>	<b>78</b>	<b>30</b>	<b>5</b>	<b>47</b>	<b>4</b>	<b>6</b>	<b>2</b>	0	0	<b>1778</b>
09:00	46	921	201	8	63	13	2	22	4	8	1	1	0	1290
10:00	17	817	202	6	62	9	1	17	0	1	1	0	0	1133
11:00	24	1034	257	5	62	11	3	19	1	2	1	1	0	1420
12 PM	46	1288	291	4	78	14	1	19	3	6	2	0	0	1752
13:00	39	1220	273	5	69	15	7	29	2	6	3	0	0	1668
14:00	26	1160	241	10	79	16	2	19	1	2	2	0	0	1558
15:00	29	1234	278	11	71	17	6	29	1	1	0	1	0	1678
16:00	45	1384	266	6	74	20	6	26	4	4	0	1	3	1839
17:00	<b>111</b>	<b>1902</b>	<b>331</b>	1	70	<b>34</b>	5	<b>35</b>	4	<b>9</b>	3	1	0	<b>2506</b>
18:00	24	1287	260	2	80	21	2	23	2	3	0	0	0	1704
19:00	20	932	153	0	42	10	0	6	1	4	0	1	0	1169
20:00	9	660	141	1	24	3	1	4	2	0	0	0	0	845
21:00	3	388	67	0	17	2	0	3	1	1	0	0	0	482
22:00	3	211	34	0	4	0	0	0	0	0	0	0	0	252
23:00	0	97	11	0	3	0	0	1	0	0	0	0	0	112
Day Total	575	17287	3590	85	954	233	43	327	34	59	15	7	3	23212
Percent	2.5%	74.5%	15.5%	0.4%	4.1%	1.0%	0.2%	1.4%	0.1%	0.3%	0.1%	0.0%	0.0%	
AM Peak	08:00	08:00	08:00	08:00	08:00	08:00	08:00	08:00	08:00	09:00	08:00	07:00		08:00
Vol.	63	1261	266	16	78	30	5	47	4	8	2	1		1778
PM Peak	17:00	17:00	17:00	15:00	18:00	17:00	13:00	17:00	16:00	17:00	13:00	15:00	16:00	17:00
Vol.	111	1902	331	11	80	34	7	35	4	9	3	1	3	2506

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound, Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/22/16	0	50	5	0	1	0	0	0	0	0	0	0	0	56
01:00	0	25	4	0	1	0	0	1	0	0	0	0	0	31
02:00	0	23	1	0	0	1	0	0	0	0	0	0	0	25
03:00	0	15	2	0	1	0	0	0	0	0	0	0	0	18
04:00	2	19	13	0	1	0	0	0	0	0	0	0	0	35
05:00	0	91	23	0	2	0	0	0	1	0	0	0	0	117
06:00	4	239	59	4	26	0	1	3	1	0	0	0	0	337
07:00	27	964	184	5	49	16	0	<b>21</b>	2	2	1	0	0	1271
08:00	29	966	210	9	<b>74</b>	11	3	19	1	<b>4</b>	<b>3</b>	<b>2</b>	0	1331
09:00	25	692	190	3	44	12	2	15	<b>4</b>	2	0	1	<b>1</b>	991
10:00	<b>32</b>	750	204	7	70	6	1	12	1	4	0	0	0	1087
11:00	30	<b>1031</b>	<b>270</b>	<b>10</b>	57	<b>19</b>	<b>4</b>	17	1	4	1	0	0	<b>1444</b>
12 PM	66	1290	244	6	79	22	3	38	1	7	<b>2</b>	0	1	1759
13:00	53	1312	294	6	71	17	4	39	<b>6</b>	5	1	0	0	1808
14:00	122	1440	301	<b>8</b>	79	27	4	36	3	4	1	0	0	2025
15:00	50	1430	294	8	83	33	4	32	3	9	0	0	0	1946
16:00	87	1683	297	8	<b>90</b>	36	<b>7</b>	<b>41</b>	6	6	1	<b>1</b>	0	2263
17:00	<b>180</b>	<b>1928</b>	<b>345</b>	5	71	<b>46</b>	6	35	2	<b>11</b>	2	0	1	<b>2632</b>
18:00	73	1476	261	4	60	18	4	35	1	2	2	0	<b>2</b>	1938
19:00	14	1019	181	0	40	6	1	11	0	2	0	0	0	1274
20:00	22	749	139	1	21	4	1	5	1	0	0	0	0	943
21:00	18	544	95	0	23	4	0	2	0	1	0	0	0	687
22:00	5	301	32	0	7	1	0	1	0	0	0	0	0	347
23:00	6	142	15	0	3	0	0	0	0	0	0	0	0	166
Day Total	845	18179	3663	84	953	279	45	363	34	63	14	4	5	24531
Percent	3.4%	74.1%	14.9%	0.3%	3.9%	1.1%	0.2%	1.5%	0.1%	0.3%	0.1%	0.0%	0.0%	
AM Peak	10:00	11:00	11:00	11:00	08:00	11:00	11:00	07:00	09:00	08:00	08:00	08:00	09:00	11:00
Vol.	32	1031	270	10	74	19	4	21	4	4	3	2	1	1444
PM Peak	17:00	17:00	17:00	14:00	16:00	17:00	16:00	16:00	13:00	17:00	12:00	16:00	18:00	17:00
Vol.	180	1928	345	8	90	46	7	41	6	11	2	1	2	2632

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound, Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/23/16	2	72	12	0	6	0	0	0	0	0	0	0	0	92
01:00	0	40	6	0	0	0	0	0	0	0	0	0	0	46
02:00	1	21	2	0	0	1	0	0	0	0	0	0	0	25
03:00	0	15	1	0	1	0	0	0	0	0	0	0	0	17
04:00	0	44	13	0	1	1	0	2	0	0	0	0	0	61
05:00	1	74	20	0	4	3	0	0	1	0	0	0	0	103
06:00	6	228	49	3	13	2	0	1	0	0	0	0	0	302
07:00	32	761	149	<b>7</b>	31	8	3	20	1	1	1	0	0	1014
08:00	37	809	195	7	58	<b>16</b>	1	21	1	2	<b>2</b>	1	0	1150
09:00	21	796	184	2	62	13	0	18	<b>3</b>	2	0	<b>3</b>	<b>1</b>	1105
10:00	22	925	258	1	<b>78</b>	16	1	21	1	0	0	0	1	1324
11:00	<b>50</b>	<b>1135</b>	<b>304</b>	5	72	16	<b>6</b>	<b>36</b>	1	<b>4</b>	0	1	1	<b>1631</b>
12 PM	104	1402	341	9	<b>86</b>	37	6	28	1	4	1	1	0	2020
13:00	201	1182	286	13	64	41	6	24	2	5	1	1	2	1828
14:00	154	1290	260	9	68	35	5	22	3	3	0	1	1	1851
15:00	133	1516	302	9	67	23	<b>11</b>	26	<b>5</b>	3	1	0	<b>4</b>	2100
16:00	<b>286</b>	1471	301	18	77	58	10	38	4	<b>10</b>	<b>3</b>	0	1	2277
17:00	285	1534	319	<b>22</b>	80	<b>61</b>	10	<b>49</b>	5	8	2	0	3	2378
18:00	204	<b>1713</b>	<b>347</b>	6	61	40	6	33	2	4	0	<b>2</b>	0	<b>2418</b>
19:00	47	1048	204	2	37	17	3	10	1	1	0	0	0	1370
20:00	56	803	138	1	32	9	1	5	0	0	0	0	0	1045
21:00	14	545	73	0	22	3	0	4	0	0	0	1	0	662
22:00	12	372	41	0	4	4	0	2	0	0	0	1	0	436
23:00	27	275	28	0	9	3	0	0	1	3	0	0	0	346
Day Total	1695	18071	3833	114	933	407	69	360	32	50	11	12	14	25601
Percent	6.6%	70.6%	15.0%	0.4%	3.6%	1.6%	0.3%	1.4%	0.1%	0.2%	0.0%	0.0%	0.1%	
AM Peak	11:00	11:00	11:00	07:00	10:00	08:00	11:00	11:00	09:00	11:00	08:00	09:00	09:00	11:00
Vol.	50	1135	304	7	78	16	6	36	3	4	2	3	1	1631
PM Peak	16:00	18:00	18:00	17:00	12:00	17:00	15:00	17:00	15:00	16:00	16:00	18:00	15:00	18:00
Vol.	286	1713	347	22	86	61	11	49	5	10	3	2	4	2418

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070

Type: Volume / Direction / Class

Tech: Judd / Mosdell / Anderson

Count: Vehicle Classification

State St b 10600 S & 11400 S CLASS

Date Start: 17-Sep-16

Date End: 24-Sep-16

State Street between 10600 S & 11400 S

Draper, Utah

### Southbound, Northbound

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/24/16	24	146	17	0	2	3	0	0	0	0	0	0	0	192
01:00	13	60	7	0	4	1	0	1	0	0	0	0	0	86
02:00	6	31	1	0	1	1	0	0	0	0	0	0	0	40
03:00	0	24	1	0	1	1	0	0	0	0	0	0	0	27
04:00	2	19	2	0	1	0	1	0	0	0	0	0	0	25
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Day Total	45	280	28	0	9	6	1	1	0	0	0	0	0	370
Percent	12.2%	75.7%	7.6%	0.0%	2.4%	1.6%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	00:00	00:00	00:00		01:00	00:00	04:00	01:00						00:00
Vol.	24	146	17		4	3	1	1						192
PM Peak														
Vol.														
Grand Total	5078	111771	23134	461	5768	1600	295	1988	168	286	72	48	33	150702
Percent	3.4%	74.2%	15.4%	0.3%	3.8%	1.1%	0.2%	1.3%	0.1%	0.2%	0.0%	0.0%	0.0%	



## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	17-Sep-16 Sat	SB	NB							Total
12:00 AM		*	*							*
12:15		*	*							*
12:30		*	*							*
12:45		*	*							*
01:00		*	*							*
01:15		*	*							*
01:30		*	*							*
01:45		*	*							*
02:00		*	*							*
02:15		*	*							*
02:30		*	*							*
02:45		*	*							*
03:00		*	*							*
03:15		*	*							*
03:30		*	*							*
03:45		*	*							*
04:00		7	6							13
04:15		5	1							6
04:30		5	1							6
04:45		5	6							11
05:00		3	3							6
05:15		18	5							23
05:30		10	10							20
05:45		11	6							17
06:00		16	16							32
06:15		21	8							29
06:30		15	14							29
06:45		27	33							60
07:00		27	34							61
07:15		32	26							58
07:30		43	59							102
07:45		64	55							119
08:00		62	65							127
08:15		65	74							139
08:30		65	66							131
08:45		81	81							162
09:00		107	91							198
09:15		114	115							229
09:30		99	132							231
09:45		141	125							266
10:00		133	134							267
10:15		156	131							287
10:30		168	156							324
10:45		196	197							393
11:00		<b>180</b>	<b>202</b>							<b>382</b>
11:15		<b>208</b>	<b>185</b>							<b>393</b>
11:30		<b>214</b>	<b>209</b>							<b>423</b>
11:45		<b>224</b>	<b>218</b>							<b>442</b>
Total		2522	2464							4986
Percent		50.6%	49.4%							
Peak	-	11:00	11:00	-	-	-	-	-	-	11:00
Vol.	-	826	814	-	-	-	-	-	-	1640
P.H.F.		0.922	0.933							0.928

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	17-Sep-16 Sat	SB	NB							Total
12:00 PM		252	226							478
12:15		239	224							463
12:30		227	250							477
12:45		216	253							469
01:00		269	198							467
01:15		244	229							473
01:30		243	229							472
01:45		267	257							524
02:00		245	240							485
02:15		263	219							482
02:30		260	231							491
02:45		228	229							457
03:00		226	207							433
03:15		251	209							460
03:30		243	205							448
03:45		241	210							451
04:00		229	201							430
04:15		228	199							427
04:30		237	187							424
04:45		241	200							441
05:00		222	202							424
05:15		236	216							452
05:30		233	231							464
05:45		201	180							381
06:00		213	214							427
06:15		227	243							470
06:30		195	228							423
06:45		168	227							395
07:00		179	212							391
07:15		169	167							336
07:30		143	165							308
07:45		175	123							298
08:00		171	121							292
08:15		140	92							232
08:30		152	81							233
08:45		93	89							182
09:00		110	74							184
09:15		99	51							150
09:30		149	59							208
09:45		275	53							328
10:00		317	44							361
10:15		129	39							168
10:30		58	49							107
10:45		57	48							105
11:00		51	46							97
11:15		35	37							72
11:30		39	37							76
11:45		30	16							46
Total		9115	7747							16862
Percent		54.1%	45.9%							
Peak	-	13:45	13:15	-	-	-	-	-	-	13:45
Vol.	-	1035	955	-	-	-	-	-	-	1982
P.H.F.		0.969	0.929							0.946

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	18-Sep-16 Sun	SB	NB							Total
12:00 AM		20	31							51
12:15		31	23							54
12:30		22	25							47
12:45		36	19							55
01:00		13	19							32
01:15		12	10							22
01:30		12	12							24
01:45		10	10							20
02:00		10	8							18
02:15		6	7							13
02:30		6	5							11
02:45		4	11							15
03:00		4	2							6
03:15		1	2							3
03:30		1	4							5
03:45		4	3							7
04:00		1	1							2
04:15		4	2							6
04:30		11	3							14
04:45		1	1							2
05:00		1	2							3
05:15		5	2							7
05:30		6	5							11
05:45		6	7							13
06:00		11	6							17
06:15		8	7							15
06:30		9	4							13
06:45		11	5							16
07:00		7	11							18
07:15		12	12							24
07:30		22	14							36
07:45		18	19							37
08:00		17	19							36
08:15		28	18							46
08:30		25	32							57
08:45		39	38							77
09:00		30	37							67
09:15		40	34							74
09:30		48	56							104
09:45		58	57							115
10:00		68	64							132
10:15		75	74							149
10:30		90	69							159
10:45		<b>101</b>	<b>105</b>							<b>206</b>
11:00		<b>88</b>	<b>101</b>							<b>189</b>
11:15		<b>100</b>	<b>80</b>							<b>180</b>
11:30		<b>96</b>	<b>104</b>							<b>200</b>
11:45		95	101							196
Total		1323	1281							2604
Percent		50.8%	49.2%							
Peak	-	10:45	10:45	-	-	-	-	-	-	10:45
Vol.	-	385	390	-	-	-	-	-	-	775
P.H.F.		0.953	0.929							0.941

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554    Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	18-Sep-16 Sun	SB	NB							Total
12:00 PM		126	103							229
12:15		98	123							221
12:30		136	119							255
12:45		128	119							247
01:00		128	123							251
01:15		133	136							269
01:30		117	110							227
01:45		147	142							289
02:00		126	125							251
02:15		152	127							279
02:30		121	95							216
02:45		118	113							231
03:00		113	128							241
03:15		128	97							225
03:30		147	103							250
03:45		131	124							255
04:00		129	104							233
04:15		131	97							228
04:30		109	104							213
04:45		128	95							223
05:00		96	95							191
05:15		111	88							199
05:30		99	84							183
05:45		106	73							179
06:00		115	82							197
06:15		116	89							205
06:30		91	78							169
06:45		95	77							172
07:00		75	76							151
07:15		71	63							134
07:30		65	65							130
07:45		83	68							151
08:00		61	75							136
08:15		50	48							98
08:30		52	47							99
08:45		32	38							70
09:00		47	38							85
09:15		40	25							65
09:30		36	28							64
09:45		32	40							72
10:00		27	35							62
10:15		21	28							49
10:30		21	12							33
10:45		16	13							29
11:00		13	10							23
11:15		15	8							23
11:30		6	8							14
11:45		9	17							26
<b>Total</b>		4147	3695							7842
<b>Percent</b>		52.9%	47.1%							
Peak	-	13:45	13:15	-	-	-	-	-	-	13:30
Vol.	-	546	513	-	-	-	-	-	-	1046
P.H.F.		0.898	0.903							0.905



## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	19-Sep-16 Mon	SB	NB							Total
12:00 AM		8	7							15
12:15		8	5							13
12:30		11	5							16
12:45		6	4							10
01:00		4	3							7
01:15		3	5							8
01:30		5	3							8
01:45		4	2							6
02:00		1	2							3
02:15		1	1							2
02:30		1	0							1
02:45		5	1							6
03:00		4	5							9
03:15		3	3							6
03:30		6	1							7
03:45		2	0							2
04:00		4	3							7
04:15		3	3							6
04:30		10	2							12
04:45		9	1							10
05:00		13	8							21
05:15		9	13							22
05:30		27	9							36
05:45		29	20							49
06:00		24	38							62
06:15		37	45							82
06:30		39	52							91
06:45		57	96							153
07:00		51	146							197
07:15		76	204							280
07:30		113	259							372
07:45		151	301							452
08:00		97	266							363
08:15		102	274							376
08:30		107	264							371
08:45		109	241							350
09:00		104	169							273
09:15		95	130							225
09:30		120	113							233
09:45		107	118							225
10:00		116	125							241
10:15		116	132							248
10:30		133	141							274
10:45		138	164							302
11:00		134	146							280
11:15		159	144							303
11:30		185	159							344
11:45		195	194							389
Total		2741	4027							6768
Percent		40.5%	59.5%							
Peak	-	11:00	07:45	-	-	-	-	-	-	07:30
Vol.	-	673	1105	-	-	-	-	-	-	1563
P.H.F.		0.863	0.918							0.864

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	19-Sep-16 Mon	SB	NB							Total
12:00 PM		216	181							397
12:15		228	194							422
12:30		202	204							406
12:45		216	182							398
01:00		211	200							411
01:15		228	181							409
01:30		216	151							367
01:45		204	182							386
02:00		171	192							363
02:15		209	192							401
02:30		210	151							361
02:45		210	141							351
03:00		214	186							400
03:15		205	182							387
03:30		229	186							415
03:45		233	216							449
04:00		243	230							473
04:15		263	218							481
04:30		237	177							414
04:45		267	237							504
05:00		266	246							512
05:15		<b>332</b>	<b>356</b>							<b>688</b>
05:30		<b>301</b>	<b>370</b>							<b>671</b>
05:45		<b>286</b>	<b>317</b>							<b>603</b>
06:00		<b>310</b>	<b>296</b>							<b>606</b>
06:15		259	186							445
06:30		214	138							352
06:45		191	170							361
07:00		203	129							332
07:15		148	138							286
07:30		157	107							264
07:45		169	118							287
08:00		129	101							230
08:15		129	98							227
08:30		113	76							189
08:45		76	58							134
09:00		99	47							146
09:15		77	52							129
09:30		60	53							113
09:45		60	30							90
10:00		48	48							96
10:15		59	23							82
10:30		35	18							53
10:45		14	16							30
11:00		20	17							37
11:15		26	15							41
11:30		11	27							38
11:45		16	10							26
<b>Total</b>		<b>8220</b>	<b>7043</b>							<b>15263</b>
<b>Percent</b>		<b>53.9%</b>	<b>46.1%</b>							
Peak	-	17:15	17:15	-	-	-	-	-	-	17:15
Vol.	-	1229	1339	-	-	-	-	-	-	2568
P.H.F.		0.925	0.905							0.933

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554    Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	20-Sep-16 Tue	SB	NB							Total
12:00 AM		12	10							22
12:15		10	6							16
12:30		7	9							16
12:45		6	6							12
01:00		7	5							12
01:15		1	3							4
01:30		1	1							2
01:45		1	0							1
02:00		1	1							2
02:15		6	2							8
02:30		6	2							8
02:45		1	2							3
03:00		1	1							2
03:15		3	4							7
03:30		2	2							4
03:45		3	2							5
04:00		2	4							6
04:15		11	3							14
04:30		8	4							12
04:45		13	6							19
05:00		14	11							25
05:15		12	11							23
05:30		18	11							29
05:45		26	22							48
06:00		21	26							47
06:15		38	44							82
06:30		46	50							96
06:45		57	98							155
07:00		65	126							191
07:15		75	194							269
07:30		122	271							393
07:45		134	343							477
08:00		108	302							410
08:15		112	256							368
08:30		109	241							350
08:45		124	272							396
09:00		131	157							288
09:15		125	123							248
09:30		101	130							231
09:45		111	142							253
10:00		84	117							201
10:15		133	129							262
10:30		141	132							273
10:45		131	145							276
11:00		140	134							274
11:15		171	148							319
11:30		217	155							372
11:45		209	183							392
Total		2877	4046							6923
Percent		41.6%	58.4%							
Peak	-	11:00	07:30	-	-	-	-	-	-	07:30
Vol.	-	737	1172	-	-	-	-	-	-	1648
P.H.F.		0.849	0.854							0.864

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	20-Sep-16 Tue	SB	NB							Total
12:00 PM		225	175							400
12:15		223	186							409
12:30		220	214							434
12:45		220	183							403
01:00		231	183							414
01:15		207	195							402
01:30		237	190							427
01:45		195	139							334
02:00		200	175							375
02:15		207	161							368
02:30		238	175							413
02:45		215	161							376
03:00		244	167							411
03:15		221	210							431
03:30		236	202							438
03:45		245	212							457
04:00		272	243							515
04:15		226	327							553
04:30		282	304							586
04:45		277	298							575
05:00		303	308							611
05:15		271	322							593
05:30		317	277							594
05:45		270	243							513
06:00		281	202							483
06:15		241	173							414
06:30		202	155							357
06:45		240	163							403
07:00		226	137							363
07:15		163	146							309
07:30		181	127							308
07:45		146	119							265
08:00		133	109							242
08:15		128	98							226
08:30		126	82							208
08:45		115	67							182
09:00		98	64							162
09:15		81	69							150
09:30		81	44							125
09:45		44	39							83
10:00		56	43							99
10:15		53	41							94
10:30		37	28							65
10:45		21	25							46
11:00		23	17							40
11:15		23	15							38
11:30		18	7							25
11:45		8	13							21
<b>Total</b>		<b>8507</b>	<b>7233</b>							<b>15740</b>
<b>Percent</b>		<b>54.0%</b>	<b>46.0%</b>							
Peak	-	16:45	16:15	-	-	-	-	-	-	16:45
Vol.	-	1168	1237	-	-	-	-	-	-	2373
P.H.F.		0.921	0.946							0.971



## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	21-Sep-16 Wed	SB	NB	Total						
12:00 AM		7	20	27						
12:15		10	10	20						
12:30		15	9	24						
12:45		8	5	13						
01:00		9	9	18						
01:15		4	4	8						
01:30		3	4	7						
01:45		3	4	7						
02:00		4	1	5						
02:15		0	2	2						
02:30		2	3	5						
02:45		6	0	6						
03:00		1	1	2						
03:15		1	1	2						
03:30		4	1	5						
03:45		3	0	3						
04:00		6	1	7						
04:15		4	5	9						
04:30		7	5	12						
04:45		17	5	22						
05:00		8	7	15						
05:15		12	9	21						
05:30		19	21	40						
05:45		24	15	39						
06:00		28	22	50						
06:15		36	38	74						
06:30		39	61	100						
06:45		49	119	168						
07:00		51	143	194						
07:15		68	209	277						
07:30		125	258	383						
07:45		138	323	461						
08:00		104	269	373						
08:15		108	308	416						
08:30		104	384	488						
08:45		122	379	501						
09:00		114	311	425						
09:15		113	230	343						
09:30		97	194	291						
09:45		100	131	231						
10:00		120	115	235						
10:15		143	149	292						
10:30		158	140	298						
10:45		173	135	308						
11:00		183	145	328						
11:15		187	157	344						
11:30		184	168	352						
11:45		212	184	396						
<b>Total</b>		2933	4714	7647						
<b>Percent</b>		38.4%	61.6%							
Peak	-	11:00	08:15	-	-	-	-	-	-	08:15
Vol.	-	766	1382	-	-	-	-	-	-	1830
P.H.F.		0.903	0.900							0.913

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554    Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	21-Sep-16 Wed	SB	NB							Total
12:00 PM		227	196							423
12:15		257	181							438
12:30		260	177							437
12:45		254	200							454
01:00		214	186							400
01:15		225	240							465
01:30		227	187							414
01:45		214	175							389
02:00		214	168							382
02:15		207	163							370
02:30		230	182							412
02:45		204	190							394
03:00		236	175							411
03:15		233	187							420
03:30		228	190							418
03:45		231	198							429
04:00		215	188							403
04:15		233	198							431
04:30		251	212							463
04:45		237	305							542
05:00		303	339							642
05:15		319	363							682
05:30		287	321							608
05:45		233	341							574
06:00		277	238							515
06:15		234	213							447
06:30		234	180							414
06:45		188	140							328
07:00		172	150							322
07:15		159	119							278
07:30		159	134							293
07:45		153	123							276
08:00		146	103							249
08:15		141	97							238
08:30		117	79							196
08:45		95	67							162
09:00		82	53							135
09:15		81	54							135
09:30		63	44							107
09:45		69	36							105
10:00		66	36							102
10:15		40	32							72
10:30		28	25							53
10:45		11	14							25
11:00		22	24							46
11:15		18	14							32
11:30		7	8							15
11:45		14	5							19
<b>Total</b>		<b>8315</b>	<b>7250</b>							<b>15565</b>
<b>Percent</b>		<b>53.4%</b>	<b>46.6%</b>							
Peak	-	16:45	17:00	-	-	-	-	-	-	17:00
Vol.	-	1146	1364	-	-	-	-	-	-	2506
P.H.F.		0.898	0.939							0.919

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	22-Sep-16 Thu	SB	NB	Total						
12:00 AM		13	10	23						
12:15		5	3	8						
12:30		9	5	14						
12:45		6	5	11						
01:00		4	3	7						
01:15		8	1	9						
01:30		7	2	9						
01:45		2	4	6						
02:00		4	5	9						
02:15		3	1	4						
02:30		3	2	5						
02:45		3	4	7						
03:00		5	2	7						
03:15		1	2	3						
03:30		3	2	5						
03:45		2	1	3						
04:00		3	1	4						
04:15		7	4	11						
04:30		5	1	6						
04:45		7	7	14						
05:00		9	9	18						
05:15		14	10	24						
05:30		23	14	37						
05:45		21	17	38						
06:00		25	21	46						
06:15		29	32	61						
06:30		46	45	91						
06:45		52	87	139						
07:00		61	153	214						
07:15		81	190	271						
07:30		112	235	347						
07:45		124	315	439						
08:00		94	240	334						
08:15		93	238	331						
08:30		111	218	329						
08:45		134	203	337						
09:00		99	151	250						
09:15		101	119	220						
09:30		149	123	272						
09:45		122	127	249						
10:00		137	133	270						
10:15		109	132	241						
10:30		153	129	282						
10:45		146	148	294						
11:00		159	153	312						
11:15		181	184	365						
11:30		196	162	358						
11:45		233	176	409						
Total		2914	3829	6743						
Percent		43.2%	56.8%							
Peak	-	11:00	07:30	-	-	-	-	-	-	07:30
Vol.	-	769	1028	-	-	-	-	-	-	1451
P.H.F.		0.825	0.816							0.826

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554    Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	22-Sep-16 Thu	SB	NB							Total
12:00 PM		229	180							409
12:15		228	191							419
12:30		236	209							445
12:45		268	218							486
01:00		217	206							423
01:15		225	259							484
01:30		215	252							467
01:45		217	217							434
02:00		238	272							510
02:15		233	274							507
02:30		232	232							464
02:45		271	273							544
03:00		225	253							478
03:15		228	248							476
03:30		241	245							486
03:45		229	277							506
04:00		241	267							508
04:15		260	280							540
04:30		283	319							602
04:45		292	321							613
05:00		<b>293</b>	<b>336</b>							<b>629</b>
05:15		<b>308</b>	<b>343</b>							<b>651</b>
05:30		<b>347</b>	<b>335</b>							<b>682</b>
05:45		<b>303</b>	<b>367</b>							<b>670</b>
06:00		274	302							576
06:15		257	282							539
06:30		234	238							472
06:45		204	147							351
07:00		205	168							373
07:15		200	145							345
07:30		175	132							307
07:45		144	105							249
08:00		185	93							278
08:15		130	104							234
08:30		155	96							251
08:45		99	81							180
09:00		122	89							211
09:15		111	53							164
09:30		77	71							148
09:45		102	62							164
10:00		64	48							112
10:15		55	45							100
10:30		46	42							88
10:45		27	20							47
11:00		29	33							62
11:15		24	22							46
11:30		18	13							31
11:45		12	15							27
<b>Total</b>		<b>9008</b>	<b>8780</b>							<b>17788</b>
<b>Percent</b>		<b>50.6%</b>	<b>49.4%</b>							
Peak	-	17:00	17:00	-	-	-	-	-	-	17:00
Vol.	-	1251	1381	-	-	-	-	-	-	2632
P.H.F.		0.901	0.941							0.965

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	23-Sep-16 Fri	SB	NB							Total
12:00 AM		13	14							27
12:15		14	6							20
12:30		10	10							20
12:45		12	13							25
01:00		6	9							15
01:15		7	5							12
01:30		7	4							11
01:45		3	5							8
02:00		5	6							11
02:15		2	4							6
02:30		2	1							3
02:45		3	2							5
03:00		3	0							3
03:15		2	0							2
03:30		4	1							5
03:45		5	2							7
04:00		7	10							17
04:15		1	7							8
04:30		15	6							21
04:45		9	6							15
05:00		9	3							12
05:15		10	8							18
05:30		16	11							27
05:45		25	21							46
06:00		26	16							42
06:15		30	22							52
06:30		36	44							80
06:45		48	80							128
07:00		46	87							133
07:15		61	130							191
07:30		86	186							272
07:45		119	299							418
08:00		89	229							318
08:15		94	187							281
08:30		107	156							263
08:45		109	179							288
09:00		116	145							261
09:15		122	130							252
09:30		156	157							313
09:45		117	162							279
10:00		155	147							302
10:15		151	176							327
10:30		150	166							316
10:45		195	184							379
11:00		190	206							396
11:15		201	177							378
11:30		230	199							429
11:45		224	204							428
Total		3048	3822							6870
Percent		44.4%	55.6%							
Peak	-	11:00	07:30	-	-	-	-	-	-	11:00
Vol.	-	845	901	-	-	-	-	-	-	1631
P.H.F.		0.918	0.753							0.950



## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	23-Sep-16 Fri	SB	NB							Total
12:00 PM		249	205							454
12:15		278	221							499
12:30		294	238							532
12:45		282	253							535
01:00		244	234							478
01:15		201	254							455
01:30		187	258							445
01:45		208	242							450
02:00		206	210							416
02:15		265	224							489
02:30		266	189							455
02:45		269	222							491
03:00		273	227							500
03:15		291	241							532
03:30		281	232							513
03:45		272	283							555
04:00		288	271							559
04:15		256	330							586
04:30		234	307							541
04:45		263	328							591
05:00		235	310							545
05:15		297	339							636
05:30		240	323							563
05:45		302	332							634
06:00		317	336							653
06:15		295	327							622
06:30		312	312							624
06:45		249	270							519
07:00		227	185							412
07:15		214	159							373
07:30		148	153							301
07:45		168	116							284
08:00		142	137							279
08:15		126	131							257
08:30		156	136							292
08:45		121	96							217
09:00		111	85							196
09:15		92	88							180
09:30		91	70							161
09:45		63	62							125
10:00		73	52							125
10:15		62	63							125
10:30		47	47							94
10:45		53	39							92
11:00		41	50							91
11:15		58	40							98
11:30		42	37							79
11:45		33	45							78
Total		9422	9309							18731
Percent		50.3%	49.7%							
Peak	-	17:45	17:15	-	-	-	-	-	-	17:45
Vol.	-	1226	1330	-	-	-	-	-	-	2533
P.H.F.		0.967	0.981							0.970

## L2 Data Collection

L2DataCollection.com

Idaho (208) 860-7554 Utah (801) 431-2993

Study: AVEN0070  
 Type: Volume / Direction  
 Tech: Judd / Mosdell / Anderson  
 Count: Vehicle Volume

State St b 10600 S & 11400 S VOL  
 Date Start: 17-Sep-16  
 Date End: 24-Sep-16  
 State Street between 10600 S & 11400 S  
 Draper, Utah

Start Time	24-Sep-16 Sat	SB	NB							Total
12:00 AM		33	25							58
12:15		17	28							45
12:30		24	21							45
12:45		23	21							44
01:00		11	10							21
01:15		8	20							28
01:30		8	10							18
01:45		11	8							19
02:00		6	9							15
02:15		8	7							15
02:30		3	4							7
02:45		2	1							3
03:00		2	4							6
03:15		6	2							8
03:30		6	4							10
03:45		3	0							3
04:00		0	4							4
04:15		5	0							5
04:30		4	5							9
04:45		7	0							7
05:00		*	*							*
05:15		*	*							*
05:30		*	*							*
05:45		*	*							*
06:00		*	*							*
06:15		*	*							*
06:30		*	*							*
06:45		*	*							*
07:00		*	*							*
07:15		*	*							*
07:30		*	*							*
07:45		*	*							*
08:00		*	*							*
08:15		*	*							*
08:30		*	*							*
08:45		*	*							*
09:00		*	*							*
09:15		*	*							*
09:30		*	*							*
09:45		*	*							*
10:00		*	*							*
10:15		*	*							*
10:30		*	*							*
10:45		*	*							*
11:00		*	*							*
11:15		*	*							*
11:30		*	*							*
11:45		*	*							*
Total		187	183							370
Percent		50.5%	49.5%							
Peak	-	12:00	12:00	-	-	-	-	-	-	12:00
Vol.	-	97	95	-	-	-	-	-	-	192
P.H.F.		0.735	0.848							0.828
Grand Total		75279	75423							150702
Percent		50.0%	50.0%							

## **Appendix B**

### **11000 South: Traffic Approach, Movement, Delay, and LOS**



**Table 1:** Existing (2016) Peak Hour Data at the 11000 South and State Street Intersection

Intersection Delay	Intersection LOS	Approach	Movement	Movement Delay	Movement LOS	95 Percentile Queue
14	B	NB	Left	22	C	75
			Thru	7	A	250
			Right	2	A	25
		EB	Left	55	E	175
			Thru	41	D	175
			Right	7	A	100
		SB	Left	15	B	100
			Thru	7	A	250
			Right	3	A	100
		WB	Left	58	E	75
			Thru	46	D	225
			Right	12	B	125

**Table 2:** No-Build (2040) Peak Hour Data at the 11000 South and State Street Intersection

Intersection Delay	Intersection LOS	Approach	Movement	Movement Delay	Movement LOS	95 Percentile Queue
25	C	NB	Left	28	C	100
			Thru	8	A	300
			Right	2	A	25
		EB	Left	63	E	225
			Thru	41	D	200
			Right	37	D	125
		SB	Left	15	B	725
			Thru	33	C	3,000
			Right	3	A	100
		WB	Left	65	E	100
			Thru	45	D	275
			Right	14	B	150

**Table 3:** Build (2040) Peak Hour Data at the 11000 South and State Street Intersection

Intersection Delay	Intersection LOS	Approach	Movement	Movement Delay	Movement LOS	95 Percentile Queue
15	B	NB	Left	36	D	100
			Thru	9	A	250
			Right	7	A	250
		EB	Left	57	E	200
			Thru	41	D	175
			Right	7	A	100
		SB	Left	20	B	125
			Thru	8	A	275
			Right	7	A	300
		WB	Left	51	D	100
			Thru	44	D	250
			Right	12	B	125



Naomi Kisen &lt;nkisen@utah.gov&gt;

## UDOT Project of Air Quality Concern Assessment for US-89; 11400 South to 10600 South: EPA Review and Concurrence

2 messages

**Russ, Timothy** <Russ.Tim@epa.gov>

Mon, May 22, 2017 at 2:15 PM

To: Naomi Kisen <nkisen@utah.gov>

Cc: "Dresser, Chris" <Dresser.Chris@epa.gov>, "Houk, Jeff (FHWA)" <Jeff.Houk@dot.gov>, "Call, Steven (FHWA)" <Steven.CALL@dot.gov>, "jkarmazyn@utah.gov" <jkarmazyn@utah.gov>, "Jackson, Scott" <Jackson.Scott@epa.gov>

Hi Naomi,

The EPA (Region 8 Office) has reviewed the attached UDOT Draft Project of Air Quality Concern (POAQC) evaluation for the proposed US-89; 11400 South to 10600 South Environmental Assessment (EA). We also reviewed the below question/observation from the FHWA Resource Center and have provided additional information and observations.

We agree with Jeff Houk (FHWA), as he noted below, that the EPA also cannot see the diesel vehicle projected AADT calculation method as stated below (and on page 4 of the UDOT attached assessment):

As shown in Table 1, about 6 percent of the total existing AADT are diesel vehicles. Future AADTs were developed using the WFRC travel demand model, which was run for the base year (2016) and both future (2040) scenarios. The difference between the future year and the base year volumes was calculated and added to the existing volume. The total number of all diesel vehicle types was calculated in a similar manner to the existing year. Based on the Bureau of Transportation Statistics' diesel vehicle factor, the resulting daily number of all diesel vehicle types for each scenario was multiplied by 0.8 to obtain the estimated daily number of diesel vehicles for each scenario.

**Table 1: AADT and Percent Truck Traffic for the Project Roadway Segment**

Segment along State Street (US-89)	2016 (Existing)			2040 (Build [B] vs. No Build [NB])		
	AADT	Diesel Vehicle AADT	Diesel Vehicle %	AADT	Diesel Vehicle AADT	Diesel Vehicle %
11400 South to 10600 South	27,100	1,550	5.7%	32,200 (B)	1,840	5.7%
				31,500 (NB)	1,800	5.7%

Source: Diesel vehicle AADTs were derived based on actual counts in the project area (representing existing conditions) and were developed for the future year (2040) using the WFRC travel demand model. Diesel vehicle AADTs and percentages were then calculated by applying a diesel vehicle factor based on the Bureau of Transportation Statistics data related to vehicle composition and mix percentages published in October 2015, "Diesel-powered Passenger Cars and Light Trucks," [http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/bts\\_fact\\_sheets/oct\\_2015/html/entire.html](http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/bts_fact_sheets/oct_2015/html/entire.html).

However, and maybe just by coincidence, we found that the "calculated" diesel 2040 AADT also reflect almost exactly the same percent growth in total AADT.

For example; the growth between the 2016 total AADT (27,100) and the build alternative 2040 total AADT (32,200) is 18.819%. Applying this growth factor to the 2016 diesel AADT (1550) yields **1841.7** diesel AADT for the 2040 build alternative. And, the growth between the 2016 total AADT (27,100) and the no-build 2040 total AADT (31,500) is 16.235%. Applying this growth factor to the 2016 diesel AADT (1550) yields **1801.6** diesel AADT for the 2040 no-build alternative. In addition, we note that the 2040 projected diesel AADT would still continue to appear as 5.7% of the total AADT.



Based on our review of the draft POAQC analysis, and in consideration of the above discussion, we concur with the draft POAQC's conclusion that this project does not need PM<sub>2.5</sub> hot-spot modeling.

Thank you for providing us with the opportunity to review these materials and please let me know if there are any questions.

Tim

Tim Russ  
Environmental Scientist  
USEPA Region 8  
Air Program  
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Denver, CO 80202-1129  
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---

**From:** Houk, Jeff (FHWA) [<mailto:Jeff.Houk@dot.gov>]  
**Sent:** Monday, May 15, 2017 1:53 PM  
**To:** Naomi Kisen <[nkisen@utah.gov](mailto:nkisen@utah.gov)>; Russ, Timothy <[Russ.Tim@epa.gov](mailto:Russ.Tim@epa.gov)>; Call, Steven (FHWA) <[Steven.CALL@dot.gov](mailto:Steven.CALL@dot.gov)>; [jkarmazyn@utah.gov](mailto:jkarmazyn@utah.gov); Kip Billings <[kip@wfr.org](mailto:kip@wfr.org)>  
**Subject:** RE: Project of Air Quality Concern assessment for US-89; 11400 South to 10600 South

I agree that this is not a POAQC based on the low traffic volumes and the small increase in diesel vehicles. However, I'm not clear on how you are using the BTS information to arrive at a 0.8 factor and how it was used in the calculations. Also, in the paragraph immediately below Table 1, an increase of 40 diesel vehicles per day would be a 2% increase, not a 0.02% increase.

Jeff

**From:** Naomi Kisen [<mailto:nkisen@utah.gov>]  
**Sent:** Wednesday, May 10, 2017 2:16 PM  
**To:** Houk, Jeff (FHWA); Russ, Timothy; Call, Steven (FHWA); Joel Karmazyn; Kip Billings  
**Subject:** Project of Air Quality Concern assessment for US-89; 11400 South to 10600 South

Hello,

Per 40 CFR 93.105 procedures for interagency consultation, UDOT submits this Project of Air Quality Concern evaluation for the US-89; 11400 South to 10600 South project for your review. If consultation determines this project does not require a hot-spot analysis, the information in the attached document will be included as part of the air quality discussion in the Environmental Assessment. If you believe the project does require a hot-spot analysis, please provide supporting details in your response. We request all comments be provided by May 26th.

Thanks for your time,

Naomi

--

Naomi Kisen

Environmental Program Manager

Utah Department of Transportation

[385.226.7614](tel:385.226.7614)

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 **US89\_114to106\_EA\_Utah\_POAQC\_Eval.pdf**  
524K

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**Naomi Kisen** <nkisen@utah.gov>

Mon, May 22, 2017 at 3:59 PM

To: "Russ, Timothy" <Russ.Tim@epa.gov>

Cc: "Dresser, Chris" <Dresser.Chris@epa.gov>, "Houk, Jeff (FHWA)" <Jeff.Houk@dot.gov>, "Call, Steven (FHWA)" <Steven.CALL@dot.gov>, "jkarmazyn@utah.gov" <jkarmazyn@utah.gov>, "Jackson, Scott" <Jackson.Scott@epa.gov>

Hi Tim,

Thank you for your and EPA's review and comment. We appreciate the effort made to review these evaluations in a short time frame.

In response to your and Jeff's questions concerning the use of the BTS information and 0.8 factor, the factor is derived from vehicle composition data referenced by BTS in Figure 1 (Composition of Diesel and Non-Diesel Fleet: 2014) of the article entitled: "Diesel-powered Passenger Cars and Light Trucks" ([http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/bts\\_fact\\_sheets/oct\\_2015/html/entire.html](http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/bts_fact_sheets/oct_2015/html/entire.html)). Out of every 100 vehicles, it is estimated that 3.3 of the vehicles would be diesel-powered medium and heavy duty trucks and 0.8 vehicles would be gasoline-powered medium and heavy duty trucks. (Figure 1 rounds these numbers to a percentage, but the excel spreadsheet provides more detail.)

When adding these two numbers together, one gets 4.1 medium and heavy duty trucks, of which 80 percent (or 0.8) is diesel trucks. The air quality evaluation accounts for the two different fuel types (gasoline and diesel) by using the 0.8 multiplier to quantify a more exact representation of diesel vehicles using the roadway. While it is an estimate (and is complicated by other factors such as diesel vs. gasoline-powered cars), we have found this factor better depicts what actually is occurring in the field based on the count data we collected. If the BTS factor was not applied, the total truck percentage would be 7 percent, with about 1.3 percent of that being gasoline-powered medium and heavy duty trucks.

Please let us know if you have general concerns with using this approach.

We have also updated the evaluation to correctly identify the increase of 40 diesel vehicles as a 2% increase.

Thanks again,

Naomi

[Quoted text hidden]

# Noise Assessment

---

## US-89 (State Street) 11400 South to 10600 South

Project No. F-0089(375)364 | PIN 12561

*Cities of Sandy and Draper  
Salt Lake County, Utah  
May 10, 2017*

*Prepared by:*

**LOCHNER**

3995 South 700 East, Ste. 450  
Salt Lake City, UT 84107

*Prepared for:*



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- Appendix B: Traffic Used in the Noise Analysis
- Appendix C: Traffic Noise Model Results
- Appendix D: Noise Abatement Results

## Key to Abbreviations

*Abbreviations appearing in the TNM printouts*

<b>Crit'n</b>	Critical value defining a noise level impact
<b>Crit'n Sub'l Inc</b>	Critical value defining a substantial increase impact
<b>LAeq1h</b>	One-hour, A-weighted equivalent sound energy level
<b>No.</b>	Object Number (Used by TNM)
<b>Snd Lvl</b>	Sound Level
<b>TNM</b>	Traffic Noise Model



## 1. INTRODUCTION

This study addresses the traffic-generated noise impacts from the proposed improvement of US-89 (State Street) from 11400 South to 10600 South in the cities of Sandy and Draper in Salt Lake County, Utah. The project adds through-lanes on northbound and southbound State Street from 11400 South to 10600 South and will also provide right turn lanes in various locations. The location of the proposed project, including noise monitoring locations, are shown in Figure 1.

One Build Alternative was addressed in this Noise Assessment.

Construction noise impacts are discussed in Section 7 of this report.

The environmental review, consultation and other actions required by applicable Federal environmental laws for this project are being or have been carried-out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.



Figure 1: Project Overview

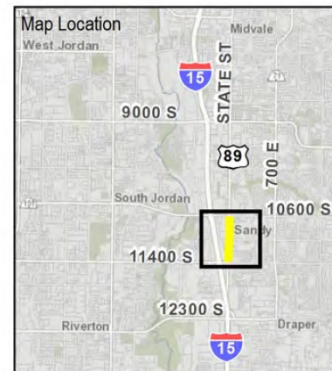


US-89; 11400 South to 10600 South  
F-0089(375)364  
PIN 12561

### Noise Project Overview

Page 1 of 5

-  Noise Monitoring Site
-  Project Area Extent



## 2. FUNDAMENTALS OF TRAFFIC NOISE

The following is a brief discussion of fundamental traffic noise concepts.

### Sound, Noise, and Acoustics

---

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through the air to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound. In acoustics, the fundamental model consists of a sound source, a receptor, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receptor determines the sound level and characteristics of the noise perceived by the receptor.

### Frequency

---

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz). For example, a frequency of 250 cycles per second is referred to as 250 Hz. High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

### Sound Pressure Levels and Decibels

---

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.0000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this huge range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of hearing for young people is about 0 dB, which corresponds to 20 mPa.

### Addition of Decibels

---

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3 dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one vehicle produces 70 dB when it passes an observer, two vehicles passing simultaneously would not produce 140 dB. Instead, they would combine to produce 73 dB.

---

## Human Response to Changes in Noise Levels

---

As discussed above, doubling sound energy results in a 3 dB increase in sound. Under controlled conditions in a laboratory, the trained, healthy human ear is able to discern 1 dB changes in sound levels, when exposed to steady, pure-tone signals in the mid-frequency (1,000 Hz–8,000 Hz) range. Typically, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in most environments. Further, a 5 dB increase is generally perceived as a distinctly noticeable increase, and a 10 dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy, such as by doubling the volume of traffic on a highway, which would result in a 3 dB increase in sound, would generally be perceived as barely detectable.

---

## Noise Descriptors

---

Noise in the daily environment fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in traffic noise analysis.

- **Equivalent Sound Level (Leq):** Leq represents an average of the sound energy occurring over a specified period. In effect, Leq 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 (Leq[h]) is the energy average of A-weighted sound levels occurring during a one-hour period, and is the basis for Noise Abatement Criteria (NAC) used by UDOT and the Federal Highway Administration (FHWA).
- **Percentile-Exceeded Sound Level (Lxx):** Lxx represents the sound level exceeded for a given percentage of a specified period (e.g., L10 is the sound level exceeded 10 percent of the time, and L90 is the sound level exceeded 90 percent of the time).
- **Maximum Sound Level (Lmax):** Lmax is the highest instantaneous sound level measured during a specified period.
- **Day-Night Level (Ldn):** Ldn is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during nighttime hours between 10 PM and 7 AM.
- **Community Noise Equivalent Level (CNEL):** Similar to Ldn, CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during the nighttime

hours between 10 PM and 7 AM, and a 5 dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 PM and 10 PM.

---

## **Sound Propagation**

---

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

---

### **Geometric Spreading**

---

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source.

---

### **Ground Absorption**

---

The propagation path of noise from a highway to a receptor is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites, such as sites with a reflective surface between the source and the receptor, such as a parking lot or body of water, no excess ground attenuation is assumed. For acoustically absorptive or soft sites such as soft dirt, grass, or scattered bushes and trees, an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance.

---

### **Atmospheric Effects**

---

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (more than 500 feet) from the highway due to atmospheric temperature inversion when temperatures increase with elevation. Other factors such as air temperature, humidity, and turbulence can also have significant effects.

---

### **Shielding by Natural or Human-Made Features**

---

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features, such as hills and dense woods, and human-made features such as buildings and walls, can



substantially reduce noise levels. Walls are often constructed between a source and a receptor specifically to reduce noise. A barrier that breaks the line of sight between a source and a receptor will typically result in at least 5 dB of noise reduction. Taller barriers provide increased noise reduction. Vegetation between the highway and receptor is rarely effective in reducing noise because it does not create a solid barrier.

### A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the sound pressure level in that range. People are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an “A-weighted” sound level, or dB(A), can be computed based on this information. Table 1 describes typical A-weighted noise levels for various noise sources.

Table 1: Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level dB(A)	Common Indoor Activities
Jet fly-over at 1,000 feet	— 110 —	Rock band
Gas lawn mower at 3 feet	— 100 —	
Diesel truck at 50 feet at 50 mph	— 90 —	Food blender at 3 feet
Noisy urban area, daytime	— 80 —	Garbage disposal at 3 feet
Gas lawn mower, 100 feet	— 70 —	Vacuum cleaner at 10 feet
Commercial area	— 60 —	Normal speech at 3 feet
Heavy traffic at 300 feet	— 50 —	Large business office
Quiet urban daytime	— 40 —	Dishwasher next room
Quiet urban nighttime	— 30 —	Theater, large conference room (background)
Quiet suburban nighttime	— 20 —	Library
Quiet rural nighttime	— 10 —	Bedroom at night, concert hall (background)
	— 0 —	Broadcast/recording studio
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

Source: Caltrans 2013

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Noise levels for traffic noise reports are typically reported in terms of A-weighted decibels or dB(A).

### 3. FEDERAL REGULATIONS AND STATE POLICIES

This noise report has been assessed in accordance with the federal regulations specified in Title 23 of the Code of Federal Regulations (CFR) Part 772 and state policy (UDOT's March 2017 Noise Abatement Policy (08A2-01)).

#### Federal Regulations

---

##### 23 CFR 772

23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. Under 23 CFR 772.7, projects are categorized as Type I, Type II, or Type III projects.

FHWA defines a Type I project as a proposed federal or federal-aid highway project for the construction of a highway on a new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment of the highway. The following projects are also considered to be Type I projects:

- The addition of a through-traffic lane(s). This includes the addition of a through-traffic lane that functions as a high-occupancy vehicle (HOV) lane, high-occupancy toll (HOT) lane, bus lane, or truck climbing lane
- The addition of an auxiliary lane, except for when the auxiliary lane is a turn lane
- The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange
- Restriping existing pavement for the purpose of adding a through traffic lane or an auxiliary lane
- The addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot, or toll plaza

If a project is determined to be a Type I project under this definition, the entire project area as defined in the environmental document is a Type I project.

A Type II project is a noise barrier retrofit project that involves no changes to highway capacity or alignment. A Type III project is a project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a noise analysis.

Under 23 CFR 772.11, noise abatement must be considered for Type I projects if the project is predicted to result in a traffic noise impact. In such cases, 23 CFR 772 requires that the project sponsor “consider” noise abatement before adoption of the final National Environmental Policy Act document. This process involves identification of noise abatement measures that are reasonable, feasible, and likely to be incorporated into the project, and of noise impacts for which no apparent solution is available.

Traffic noise impacts, as defined in 23 CFR 772.5, occur when the predicted noise level in the design-year approaches or exceeds the NAC specified in 23 CFR 772, or a predicted noise level substantially exceeds the existing noise level (a “substantial” noise increase). The terms “substantial increase” or “approach” are not specifically defined in 23 CFR 772. The UDOT Noise Abatement Policy defines a “substantial increase” as a 10 dB(A) increase in the predicted noise level over existing noise levels and “approach” as 1 dB(A) below the NAC. These criteria are further described below.

Table 2 summarizes NAC corresponding to various land use activity categories. Activity categories and related traffic noise impacts are determined based on the actual or permitted land use in a given area.

### **State Regulations and Policies**

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The noise impacts for the proposed improvements have been assessed in accordance with the March 2017 UDOT Noise Abatement Policy (08A2-01). The policy was developed to be consistent with Type I, II and III projects as defined in 23 CFR 772.

To determine the degree of impact of highway traffic noise on human activity, the NAC put forth in the policy were used. The NAC, listed in Table 2 for various activities, represent noise levels that when approached or exceeded, require consideration of noise abatement. The NAC apply to areas having regular human use and where lowered noise levels would be a benefit. The NAC are given in terms of the A-weighted, hourly equivalent sound level in decibels or dB(A).

The UDOT policy provides a second criterion for assessing impact. For some locations, a project may impose a large increase in noise levels over existing levels, although the levels may not reach the NAC. If the noise level increases 10 dB(A) between the existing and future worst-case conditions then the property is considered impacted and a variety of abatement measures must be considered.

Table 2: Noise Abatement Criteria (NAC)<sup>1</sup>

Activity Category	FHWA Criteria Leq(h)	UDOT Criteria Leq(h) <sup>2</sup>	Description of Activity
A	57 (Exterior)	56 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 (Exterior)	66 (Exterior)	Residential
C	67 (Exterior)	66 (Exterior)	Active sports areas, amphitheatres, auditoriums, campgrounds, cemeteries, daycare 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)	51 (Interior)	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E	72 (Exterior)	71 (Exterior)	Hotels, motels, offices, restaurants/bars and other developed lands, properties or activities not included in A–D or F
F	---	---	Agricultural, 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

1. Hourly A-Weighted Sound Level Decibels (dB(A))

2. Hourly A-weighted sound level in decibels reflecting a 1 dB(A) "approach" value below 23 CFR 772 values.

Source: UDOT Noise Policy

## 4. STUDY METHODS AND PROCEDURES

### Methods for Identifying Land Use and Selecting Noise Measurement and Modeling Receiver Locations

An investigation was conducted to identify land uses that could be subject to traffic and construction noise impacts from the proposed project. Existing land uses in the project area were categorized by land use type and Activity Category as defined in Table 2, and extent of frequent human use. As stated in the UDOT policy, noise abatement is only considered where frequent human use occurs and where a lowered noise level would be beneficial. Although all land uses are evaluated in this analysis, the focus is on locations of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards and common-use areas at multi-family residences, as well as local parks and outdoor recreation facilities.

The noise-sensitive areas were identified from aerial mapping, taking into consideration the limits and locations of the proposed improvements.

Short-term measurement locations were selected to represent each major developed area within the project area and to serve as representative modeling locations. These measurement locations are identified on Figure 1 as Noise Monitoring Sites.

### **Field Measurement Procedures**

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Noise measurements were collected at four locations on February 15, 2017, using a Larson Davis 824 Sound Level Meter. Each measurement was a minimum of 20 minutes in length at each location.

Traffic was classified and counted during the measurements (see Appendix A). Vehicles were classified as automobiles, medium-duty trucks and heavy-duty trucks. An automobile was defined as a vehicle with two axles and four tires designed primarily to carry passengers. Small vans and light trucks were included in this category. Medium-duty trucks included all cargo vehicles with two axles and six tires. Heavy-duty trucks included all vehicles with three or more axles. Operating speeds were also noted.

Temperature and wind speed were recorded manually during the measurements. Wind speeds typically ranged from 0 to 10 miles per hour (mph). Temperatures were approximately 40°F.

### **Traffic Noise Level Prediction Methods**

---

A FHWA-approved highway noise prediction computer model (FHWA Traffic Noise Model (TNM), Version 2.5) was used to determine the traffic-generated noise for existing and worst-case future conditions. The model accounts for such factors as ground absorption, roadway geometry, receptor distance, vehicle volumes and speeds, and volumes of medium trucks (vehicles with two axles/six tires) and heavy trucks (three axles or more).

Noise levels have been predicted for that hour of the day when the vehicle volume, operating speed and number of heavy trucks combine to produce the worst traffic noise conditions. That worst hour typically is experienced when traffic is flowing at level of service C.

Appendix B includes a discussion of how traffic data for the project was developed as well as supporting calculations. The traffic used in the analysis for the existing and build conditions corresponds to a Level of Service C as predicted by the Highway Capacity Software.



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## Methods for Identifying Traffic Noise Impacts

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The assessment of traffic noise impacts requires two comparisons:

- The noise levels under build conditions must be compared to the applicable NAC. This comparison determines the compatibility of noise levels under build conditions and present land use.
- The noise levels under existing conditions must be compared to those under build conditions. This comparison shows the change in noise level that will occur between the present time and the design year if the project is built.

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## Methods for Consideration of Abatement

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If a noise impact is identified, the abatement measures listed in the policy may be considered. The abatement measures include: traffic management, noise insulation, and construction of noise barriers.

### Traffic Management

Traffic management measures that are considered effective to reduce traffic noise include speed reduction and the restriction of heavy truck traffic. Speed reduction along this project is not considered to be a viable option. The reduction of the speed limit in order to reduce traffic noise is very large and would not likely be observed. State Street serves as a truck route; restricting heavy truck traffic is contrary to one of the purposes of the road and is therefore not feasible.

### Noise Insulation

Noise insulation may only routinely be considered for facilities such as public schools. Since none of the impacts occur inside of this type of property, noise insulation was not considered.

### Noise Barriers

The construction of noise barriers has been considered for the impacted receptors. Preliminary barrier investigations were performed to determine their feasibility. For a barrier to be effective, it should be continuous along the roadway adjacent to the impacted site or sites. Openings for pedestrian or vehicular access greatly reduce the ability of a noise barrier to reduce noise levels. For safety purposes, a barrier should also not be taller than the distance from the barrier to the curb line in urban areas.

In addition to physical constraints, the feasibility of a noise barrier is based on its effectiveness in reducing traffic noise levels. Per the UDOT Noise Abatement Policy, a minimum reduction of 5 dB(A) at a minimum of 50 percent of the impacted front-row receptors is required for a barrier to be considered feasible.

The cost of a noise abatement measure is considered reasonable by the policy if the cost of the measure per benefitted property does not exceed a set cost index. The cost index varies according to the unit cost of the barrier being recommended. For this study, the cost index is \$30,000 per benefitted residence and \$360 per linear foot for parks, schools, churches and other Category A, C, D and E land uses. In the analysis, each residential unit is considered a single residential property. To remain in compliance with 23 CFR 772, the cost analysis must also consider properties that are not impacted, but which would also benefit from the construction of a noise barrier. The policy defines “benefitted” as a 5 dB(A) reduction in sound levels. Per the policy, a substantial reduction in noise levels should be attempted with a minimum noise reduction (design goal) of 7 dB(A) or greater for at least 35 percent of front-row receptors for a barrier to be considered reasonable.

Per the Procedures section of the policy, barrier costs are to be estimated at \$20 per square foot of noise wall. This estimate is based on a current average unit cost for noise barrier and takes into consideration the undeveloped area and an assumed lack of construction difficulties.

## 5. EXISTING NOISE ENVIRONMENT

### Existing Land Uses

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An investigation was conducted to identify land uses that could be subject to traffic and construction noise impacts from the proposed project. The following land uses were identified in the project area:

- Single-family and multi-family residences: Activity Category B
- Recreational properties: Activity Category C
- Restaurants with outdoor seating: Activity Category E

Other commercial land uses in the project area were found not to have any outdoor activities that would be considered noise-sensitive.

Although all developed land uses are evaluated in this analysis, noise abatement is only considered for areas of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards and common-use areas at multi-family residences, as well as local parks and outdoor facilities.

### Noise Measurement Results

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The existing noise environment in the project area is characterized in Table 3 based on the noise monitoring that was conducted.

The measurements were used to validate the use of a noise model to predict existing and future noise levels. For two measurement locations (Sites A and D), model results, indicated below as TNM predicted noise levels, were within 3 dB(A) of the measured values. These results indicate that the noise model is reasonably accurate. At the other two sites (Sites B and C) where the TNM results were 7.6 to 13.7 dB(A) lower than the measured level, the difference can be attributed to background noise from a variety of sources including landscape maintenance, a helicopter, an airplane and nearby idling vehicles. Table 3 compares measured and modeled noise levels at each measurement location. Details of the measurements are included in Appendix A.

Table 3: Comparison of Recorded and Modeled Noise Levels

Site	Field Measured Noise Level dB(A)	TNM Predicted Noise Level dB(A)	Difference dB(A)
A	68.0	67.4	-0.6
B	66.2	52.5	-13.7
C	64.8	57.2	-7.6
D	54.5	52.1	-2.4

## 6. FUTURE NOISE ENVIRONMENT, IMPACTS, AND ABATEMENT CONSIDERED

### Future Noise Environment and Impacts

Impact assessments have been performed for 169 residential properties, three restaurants with outdoor seating, one recreational area and one cemetery. These properties were represented by 68 receptors, which are listed in Table 4 along with their TNM-predicted results, and shown in Exhibit 1. Included for each study area are the applicable NAC land use category and the worst hourly equivalent sound levels that will occur on a regular basis for the existing and build conditions.

Table 4: Noise Analysis Locations and Results<sup>1</sup>

Receptor	Properties Represented	NAC Land Use Category	NAC dB(A)	Noise Levels dB(A)		
				Existing	Build	Increase
R01	RESTAURANT	E	71	71	<b>73</b>	2
R02	2	B	66	67	<b>67</b>	0
R03	2	B	66	68	<b>69</b>	1
R04	2	B	66	69	<b>70</b>	1
R05	2	B	66	68	<b>68</b>	0
R06	2	B	66	69	<b>70</b>	1
R07	2	B	66	69	<b>70</b>	1

Table 4: Noise Analysis Locations and Results<sup>1</sup>

Receptor	Properties Represented	NAC Land Use Category	NAC dB(A)	Noise Levels dB(A)		
				Existing	Build	Increase
R08	2	B	66	65	<b>66</b>	1
R09	2	B	66	66	<b>67</b>	1
R10	2	B	66	66	<b>67</b>	1
R11	4	B	66	62	63	1
R12	4	B	66	63	65	2
R13	4	B	66	64	65	1
R14	4	B	66	49	49	0
R15	4	B	66	50	50	0
R16	4	B	66	51	51	0
R17	4	B	66	58	58	0
R18	4	B	66	60	60	0
R19	4	B	66	61	61	0
R20	4	B	66	46	47	1
R21	4	B	66	46	47	1
R22	4	B	66	47	48	1
R23	4	B	66	50	52	2
R24	4	B	66	52	54	2
R25	4	B	66	53	54	1
R26	4	B	66	50	50	0
R27	4	B	66	52	52	0
R28	4	B	66	53	53	0
R29	4	B	66	58	59	1
R30	4	B	66	59	60	1
R31	4	B	66	59	60	1
R32	4	B	66	55	55	0
R33	4	B	66	58	59	1
R34	4	B	66	58	60	2
R35	4	B	66	50	51	1
R36	4	B	66	53	54	1
R37	4	B	66	54	55	1
R38	REC	C	66	61	62	1
R39	1	B	66	65	65	0
R40	1	B	66	51	52	1
R41	1	B	66	63	63	0
R42	CEMETERY	C	66	61	62	1
R43	1	B	66	63	63	0
R44	1	B	66	60	61	1
R45	1	B	66	63	64	1
R46	1	B	66	61	62	1

Table 4: Noise Analysis Locations and Results<sup>1</sup>

Receptor	Properties Represented	NAC Land Use Category	NAC dB(A)	Noise Levels dB(A)		
				Existing	Build	Increase
R47	1	B	66	60	60	0
R48	2	B	66	56	56	0
R49	1	B	66	54	55	1
R50	2	B	66	55	55	0
R51	2	B	66	53	54	1
R52	2	B	66	57	57	0
R53	1	B	66	54	55	1
R54	1	B	66	57	57	0
R55	1	B	66	65	<b>66</b>	1
R56	1	B	66	56	57	1
R57	1	B	66	59	59	0
R58	1	B	66	39	39	0
R59	1	B	66	58	58	0
R60	1	B	66	58	59	1
R61	RESTAURANT	E	71	68	68	0
R62	RESTAURANT	E	71	68	68	0
R63	4	B	66	67	<b>68</b>	1
R64	4	B	66	68	<b>69</b>	1
R65	4	B	66	69	<b>70</b>	1
R66	2	B	66	62	62	0
R67	2	B	66	63	63	0
R68	2	B	66	63	64	1

1. Noise impacts are shown in **BOLD**

A comparison of the design-year build noise levels with the applicable NAC, as shown in Table 2, reveals that 31 residential properties and 1 restaurant with an outdoor seating area are predicted to be impacted by traffic noise. No properties would be substantially higher than existing levels (defined as a 10 dB(A) increase). See Table 4 and Appendix C for results of the noise modeling.



A summary of the noise modeling results is included in Table 5.

Table 5: Summary of Noise Analysis Results

Alternative	Outdoor				Indoor			
	Noise Level dB(A)		Increase over Existing dB(A)		Noise Level dB(A)		Increase over Existing dB(A)	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Existing (No-Build)	46	69	N/A	N/A	N/A	N/A	N/A	N/A
Build	47	70	0	2	N/A	N/A	N/A	N/A

### Preliminary Noise Abatement Analysis

Initially, noise barriers were considered for all properties that were predicted to be impacted by noise. However, noise barriers were found not to be feasible for the impacted restaurant (R01) and an isolated residence (R55) due to the location of nearby driveways and side roads. Gaps in the barrier would be required to provide access to adjacent properties and those gaps would render the barriers ineffective.

Noise barriers in one other location were considered to provide noise abatement to the noise impacted properties. The locations of the investigated noise barriers are shown in Exhibit 2.

#### Barriers 1a and 1b

Two noise barriers were investigated to provide noise abatement to 30 impacted properties on the east side of State Street represented by receptors R02 through R10 and R63 through R65, all located within the Falls at Hunters Pointe apartments. The barriers are separate by a driveway but act as a system. Even though a gap would exist between the barriers, these barriers were investigated because the density of the residences combined with the lengths of the barriers could potentially combine to provide the desired levels of noise reduction. The barriers would be located in a grass parkway approximately 20 feet from the edge of State Street. According to the UDOT noise policy, for safety purposes the barrier would therefore be limited to 20 feet in height.

Barrier 1a is 335 feet long and Barrier 1b is 170 feet long. Both barriers were studied up to 20 feet in height and at 20 feet tall would provide at least a 5 dB(A) reduction in noise levels at 26 residential properties, 18 of which are impacted front-row properties. The barriers would provide a 7 dB(A) or greater reduction in noise levels at 12 front-row properties. These barriers would cost approximately \$202,000.

*Since 18 out of 30, or 60%, of the impacted front-row properties would receive a 5 dB(A) reduction in noise levels these barriers are acoustically feasible.*

*These barriers would provide a 7 dB(A) reduction in traffic noise at 12 out of 42, or 29%, of the front-row properties and are therefore not acoustically reasonable. The barriers would cost approximately \$7,769 per benefited property which is less than the \$30,000 allowance and the barriers are therefore considered reasonable per Section C.2.b of the UDOT Noise Abatement Policy.*

Recommendation: These barriers are considered feasible but not reasonable. Although they are cost reasonable, they only produces a 7 dB(A) or greater reduction in noise for 29 percent of front-row receptors and are therefore not recommended for balloting. See Exhibit 2 for the noise barrier locations and Appendix D for the barrier analysis.

## **7. CONSTRUCTION NOISE**

Land uses that are sensitive to traffic noise are also sensitive to construction noise. Methods of controlling construction noise include establishing the hours that construction equipment can be operated and permissible sound levels at those times. In view of this, UDOT has developed a specification that establishes construction noise control. This specification can be found in the 2017 UDOT *Standard Specifications for Road and Bridge Construction, Specification 01355, Environmental Protection, Part 3, Sub-section 3.6, "Noise Control."* The contractor will be required to conform to this specification to reduce the impact of construction noise on the surrounding community.

## **8. COORDINATION WITH LOCAL OFFICIALS**

To assist local authorities in exercising land use control over the undeveloped lands adjacent to the roadways proposed for this project, land use compatibility noise data was developed. The 66 dB(A) contour will typically fall approximately 100 to 150 feet from the edge of the outside lane of State Street, and the 71 dB(A) contour will typically fall approximately 30 to 50 feet from the edge of the outside lane of State Street.

Although the noise contour information is based on the results of the noise modeling for the build (2040) condition, it is not site-specific for any area along State Street. Variations in terrain, the roadway profile, the proximity to intersections and existing development can result in changes to the distances to these noise contours. This information is intended to provide a general guide for future planning, but should not be used in the final design or layout of future development.

Results of the noise contour modeling are included in Appendix C. The receptors which are predicted to experience noise levels of 66 dB(A) and 71 dB(A) are highlighted in yellow. The last number in the receptor name indicates its distance from the edge of the nearest lane of State Street.

## 9. CONCLUSIONS

A comparison of the design-year (2040) build noise levels with the applicable NAC, as shown in Table 2, reveals that 31 residential properties and 1 restaurant with an outdoor seating area are predicted to be impacted by traffic noise. No properties would be substantially higher than existing levels (defined as a 10 dB(A) increase). See Table 4 and Appendix C for results of the noise modeling.

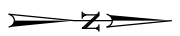
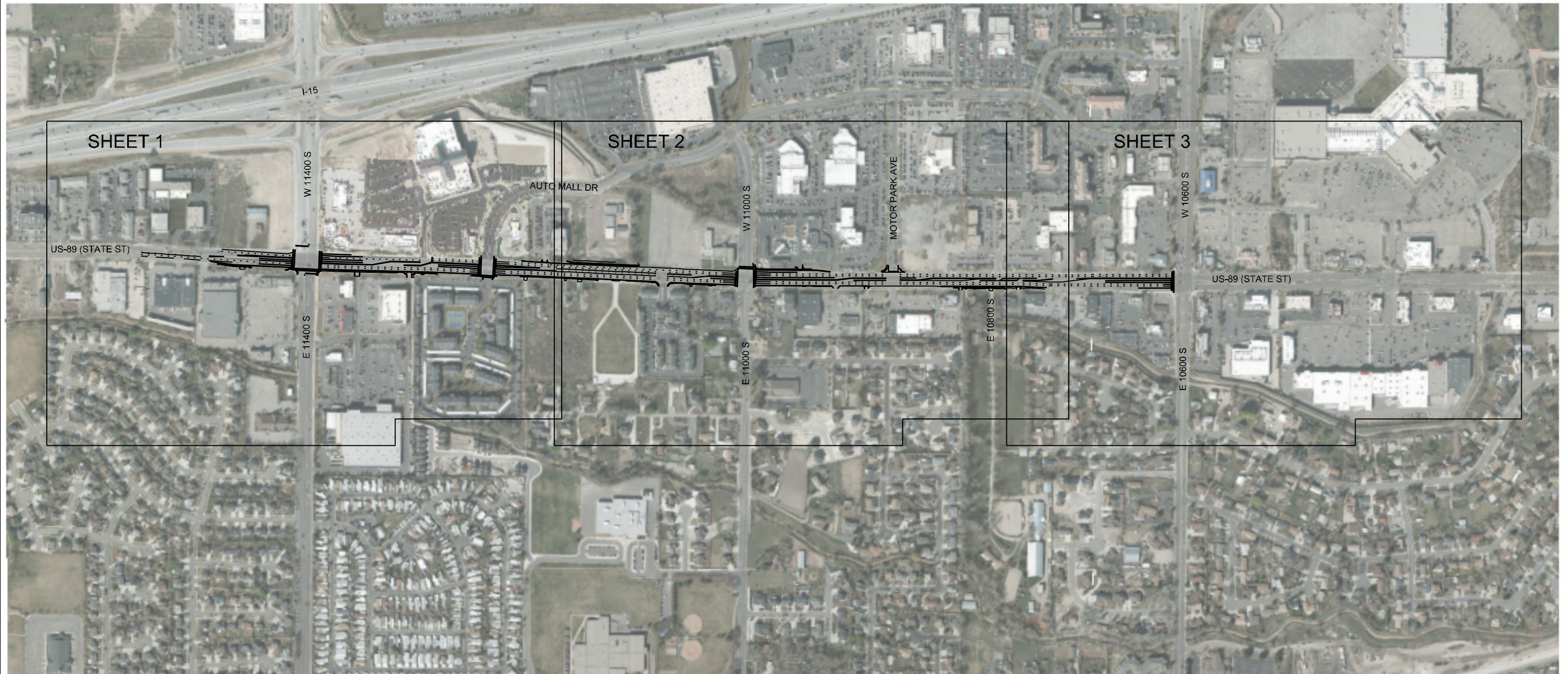
Two barriers were found to be feasible but not reasonable and are not recommended for balloting.

The final decision to build or not build any of the noise barriers will be made upon completion of the project design, the public involvement process and concurrence with the UDOT Noise Policy. No barriers were identified as recommended for balloting.

The environmental review, consultation and other actions required by applicable Federal environmental laws for this project are being or have been carried-out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.

## **Exhibit 1: Noise Analysis Locations**





NOT TO SCALE

**US-89**  
10600 SOUTH TO 11400 SOUTH  
NOISE ANALYSIS LOCATIONS  
EXHIBIT 1  
KEY TO SHEETS





W 11400 S

E 11400 S

AUTO MALL DR

US-89 (STATE ST)

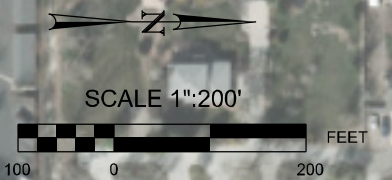
LIMIT OF NOISE ANALYSIS

R01  
RESTAURANT

R61- RESTAURANT  
R62- RESTAURANT

- R02 (1st FLR)-2
- R03 (2nd FLR)-2
- R04 (3rd FLR)-2
- R05 (1st FLR)-2
- R06 (2nd FLR)-2
- R07 (3rd FLR)-2
- R63 (1st FLR)-4
- R64 (2nd FLR)-4
- R65 (3rd FLR)-4
- R14 (1st FLR)-4
- R15 (2nd FLR)-4
- R16 (3rd FLR)-4
- R17 (1st FLR)-4
- R18 (2nd FLR)-4
- R19 (3rd FLR)-4
- R20 (1st FLR)-4
- R21 (2nd FLR)-4
- R22 (3rd FLR)-4
- R23 (1st FLR)-4
- R24 (2nd FLR)-4
- R25 (3rd FLR)-4
- R26 (1st FLR)-4
- R27 (2nd FLR)-4
- R28 (3rd FLR)-4
- R29 (1st FLR)-4
- R30 (2nd FLR)-4
- R31 (3rd FLR)-4
- R32 (1st FLR)-4
- R33 (2nd FLR)-4
- R34 (3rd FLR)-4
- R35 (1st FLR)-4
- R36 (2nd FLR)-4
- R37 (3rd FLR)-4
- R38 REC

- R39 1
- R40 1
- R11 (1st FLR)-4
- R12 (2nd FLR)-4
- R13 (3rd FLR)-4
- R08 (1st FLR)-2
- R09 (2nd FLR)-2
- R10 (3rd FLR)-2
- R66 (1st FLR)-2
- R67 (2nd FLR)-2
- R68 (3rd FLR)-2



- R01 =NOISE RECEPTOR
- 1 =PROPERTIES REPRESENTED
- [Dashed Box] =NOISE ANALYSIS AREA
- [Red Box] =NOISE IMPACT

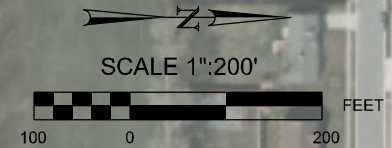
**US-89**  
10600 SOUTH TO 11400 SOUTH  
NOISE ANALYSIS LOCATIONS  
EXHIBIT 1  
SHEET 1 OF 3





)-4  
 R)-4  
 )-4  
 FLR)-2  
 FLR)-2  
 FLR)-2  
 FLR)-2  
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 )-4  
 R)-4  
 R)-4

- R01 = NOISE RECEPTOR
- 1 = PROPERTIES REPRESENTED
- [---] = NOISE ANALYSIS AREA
- [Red Box] = NOISE IMPACT

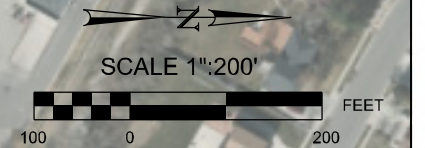


**US-89**  
 10600 SOUTH TO 11400 SOUTH  
 NOISE ANALYSIS LOCATIONS  
 EXHIBIT 1  
 SHEET 2 OF 3





- R01 = NOISE RECEPTOR
- 1 = PROPERTIES REPRESENTED
- [---] = NOISE ANALYSIS AREA
- [red outline] = NOISE IMPACT

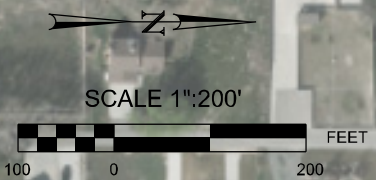


**US-89**  
 10600 SOUTH TO 11400 SOUTH  
 NOISE ANALYSIS LOCATIONS  
 EXHIBIT 1  
 SHEET 3 OF 3



## **Exhibit 2: Noise Barrier Locations**





- R01 = NOISE RECEPTOR
- 1 = PROPERTIES REPRESENTED
- [Dashed Box] = NOISE ANALYSIS AREA
- [Red Box] = NOISE IMPACT
- [Yellow Line] = NOISE BARRIER

**US-89**  
 10600 SOUTH TO 11400 SOUTH  
 NOISE BARRIER LOCATIONS  
 EXHIBIT 2  
 SHEET 1 OF 1



## **Appendix A: Noise Field Measurements**

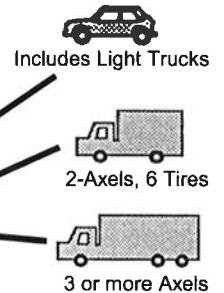
# H.W. LOCHNER, INC.

# NOISE MEASUREMENT DATA SHEET

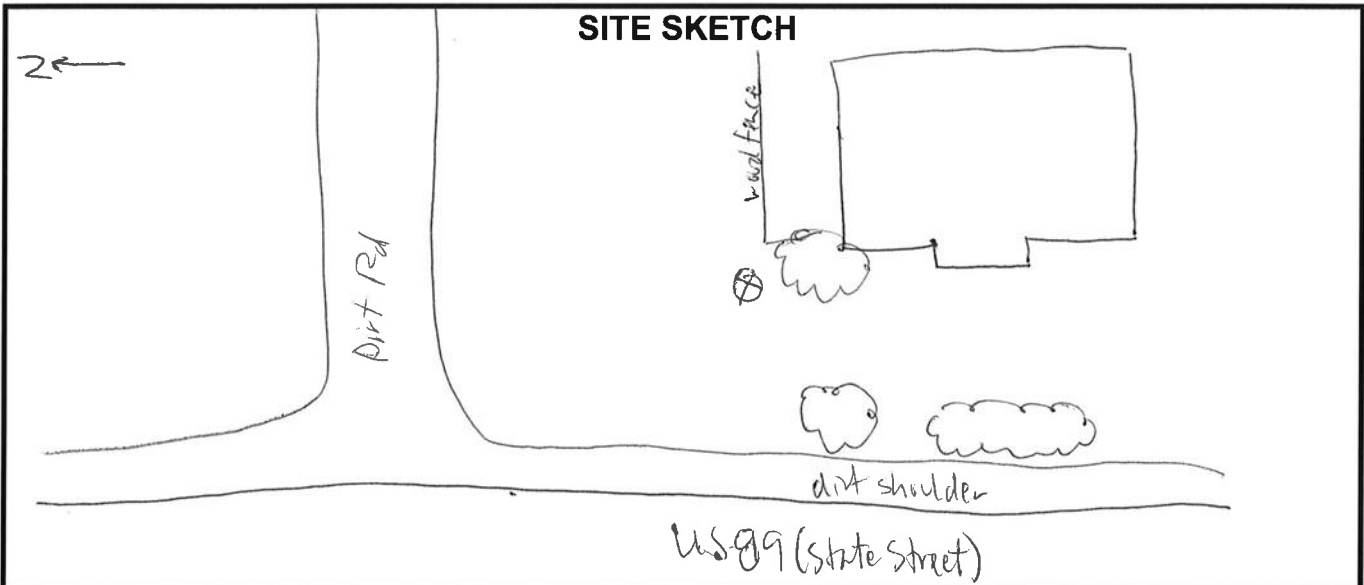
**SITE NUMBER:** Site A **PROJECT:** PIN 12561: US-89 EA  
**SITE DESCRIPTION:** Residences along the E side of US-89 near 10800 S **DATE:** 2/15/17  
**EVENT NUMBER:** #21 **START TIME:** 12:29  
**TECHNICIAN:** E. Albany **END TIME:** 12:49  
**CALIBRATION:** START - DB END 94.1 DB **DURATION:** 70.08  
**WEATHER DATA:** SKY CONDITION clear TEMP 40  
**WIND:** START 5 MPH END 10 MPH DIRECTION S  
**EQUIPMENT:** METER \_\_\_\_\_ CALIBRATOR \_\_\_\_\_  
**RESPONSE:** FAST \_\_\_\_\_ SLOW \_\_\_\_\_ BATTERY CHECK 30%  
**RESULTS:** Leq 48.0 dBA Lmax 81.5 dBA

### TRAFFIC DATA

ROAD	state street			
	N	S	E	W
TRAFFIC SPEED	40-45	40-45		
AUTOMOBILES	320	355		
MEDIUM TRUCKS	4	3		
HEAVY TRUCKS	1	0		



### SITE SKETCH



**MAJOR SOURCES:** \_\_\_\_\_  
**BACKGROUND NOISE:** Semi idling on West side of state (through measurement), birds chirping in bushes  
**UNUSUAL EVENTS:** 9:36 plake (the remain. throughout.  
**OTHER NOTES:** \_\_\_\_\_

Integrating Sound Level Meter Summary

Translated: 8-Apr-17 13:34:34  
File Translated: I:\CHI\PRJ\000012551\Noise\Field Monitoring\Data\_021517\12561\_SiteA\_021517.slmdl  
Model Number: 824  
Serial Number: A1255  
Firmware Rev: 4.29  
Software Versior 3.12  
Name: H.W. Lochner, Inc.  
Descr1: 20 N. Wacker, Suite 1200  
Descr2: Chicago, Illinois 60606  
Setup: SLM.ism  
Setup Descr: Simple Integrating SLM  
Location: ResidenceEofUS89near10800S  
Note 1: US-89, 11400 to 10600  
Note 2: Site A

Current Any Data

Start Time: 2/15/2017 12:28  
Elapsed Time: 20:08.4

	A Weight	C Weight	Flat
Leq:	68.0 dBA	76.7 dBC	78.1 dBF
SEL:	98.9 dBA	107.5 dBC	108.9 dBF
Peak:	96.1 dBA	102.9 dBC	103.1 dBF
	2/15/2017 12:40	2/15/2017 12:34	2/15/2017 12:34
Lmax (slow):	81.5 dBA	90.1 dBC	90.4 dBF
	2/15/2017 12:40	2/15/2017 12:34	2/15/2017 12:34
Lmin (slow):	57.3 dBA	73.5 dBC	75.4 dBF
	2/15/2017 12:35	2/15/2017 12:35	2/15/2017 12:31
Lmax (fast):	84.3 dBA	92.2 dBC	92.4 dBF
	2/15/2017 12:40	2/15/2017 12:34	2/15/2017 12:34
Lmin (fast):	56.1 dBA	72.2 dBC	73.8 dBF
	2/15/2017 12:35	2/15/2017 12:43	2/15/2017 12:43
Lmax (impulse):	85.5 dBA	93.3 dBC	93.5 dBF
	2/15/2017 12:40	2/15/2017 12:34	2/15/2017 12:34
Lmin (impulse):	57.2 dBA	73.9 dBC	75.7 dBF
	2/15/2017 12:35	2/15/2017 12:42	2/15/2017 12:42

**RESULTS: SOUND LEVELS**

**US-89; 11400 South to 10600 South**

UDOT										7 April 2017				
J Wielgos / HW Lochner										TNM 2.5				
										Calculated with TNM 2.5				
<b>RESULTS: SOUND LEVELS</b>														
<b>PROJECT/CONTRACT:</b>		US-89; 11400 South to 10600 South												
<b>RUN:</b>		Field Measurement Site A												
<b>BARRIER DESIGN:</b>		INPUT HEIGHTS						Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.						
<b>ATMOSPHERICS:</b>		40 deg F, 50% RH												
<b>Receiver</b>														
<b>Name</b>		<b>No.</b>	<b>#DUs</b>	<b>Existing LAeq1h</b>	<b>No Barrier LAeq1h Calculated</b>	<b>Crit'n</b>	<b>Increase over existing</b>		<b>Type Impact</b>	<b>With Barrier</b>		<b>Noise Reduction</b>		<b>Calculated minus Goal</b>
							<b>Calculated</b>	<b>Crit'n</b>		<b>Calculated LAeq1h</b>	<b>Calculated</b>	<b>Goal</b>	<b>Calculated</b>	
				dB	dB	dB	dB	dB		dB	dB	dB	dB	
Site A		3	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0	
<b>Dwelling Units</b>		<b># DUs</b>	<b>Noise Reduction</b>											
			<b>Min</b>	<b>Avg</b>	<b>Max</b>									
			<b>dB</b>	<b>dB</b>	<b>dB</b>									
All Selected		1	0.0	0.0	0.0									
All Impacted		1	0.0	0.0	0.0									
All that meet NR Goal		0	0.0	0.0	0.0									





SITE A – LOOKING SOUTH



SITE A – LOOKING WEST

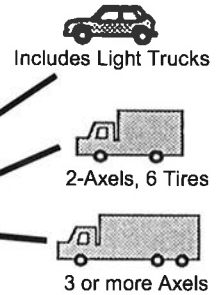
# H.W. LOCHNER, INC.

# NOISE MEASUREMENT DATA SHEET

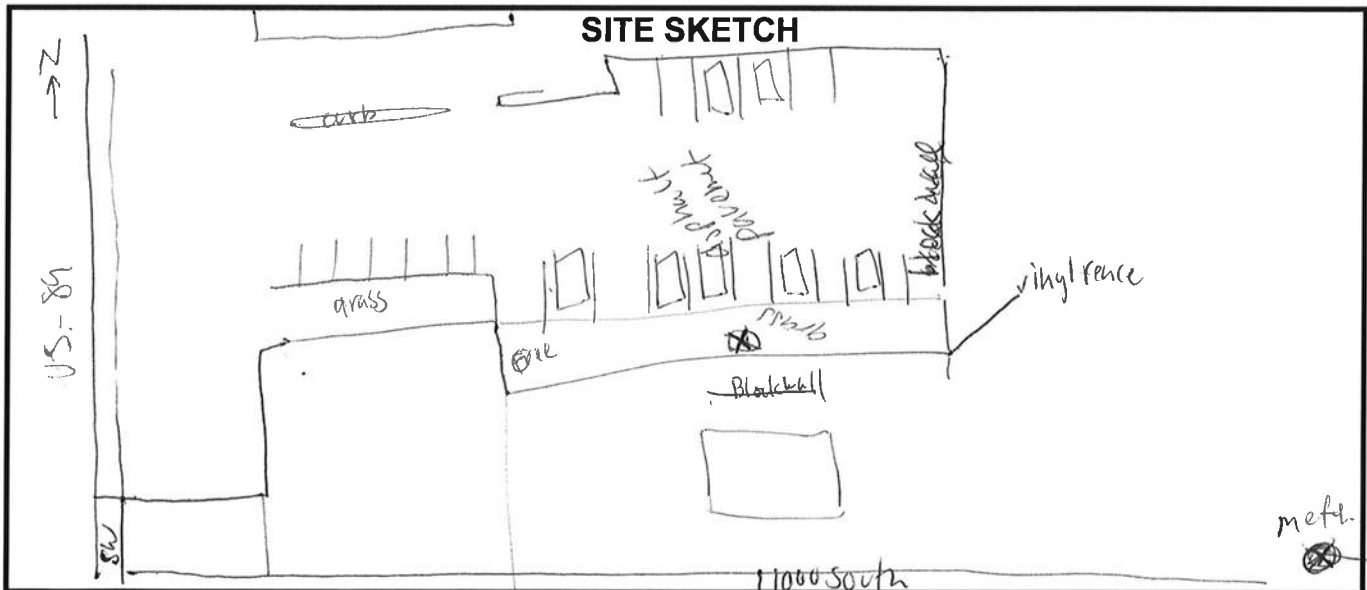
**SITE NUMBER:** Site B **PROJECT:** PIN 12561: US-89 EA  
**SITE DESCRIPTION:** Residences along the N side of 11000 S near US-89 near **DATE:** 2/15/17  
**EVENT NUMBER:** #20 **START TIME:** 11:53  
**TECHNICIAN:** E. Albany **END TIME:** 12:13 (isl)  
**CALIBRATION:** START — DB END — DB **DURATION:** 20:41  
**WEATHER DATA:** SKY CONDITION clear TEMP 42  
**WIND:** START 0 MPH END 0 MPH DIRECTION N/A  
**EQUIPMENT:** METER Larsen Davis 865 CALIBRATOR —  
**RESPONSE:** FAST — SLOW — BATTERY CHECK —  
**RESULTS:** Leq 64.2 dBA Lmax 88.1

### TRAFFIC DATA

ROAD	state street.		11000 S			
	N	S	E	W		
TRAFFIC SPEED	40	40	20	20		
AUTOMOBILES	277	279	54	67		
MEDIUM TRUCKS	3	7	2	0		
HEAVY TRUCKS	0	0	0	0		



### SITE SKETCH



**MAJOR SOURCES:** US 89 / 11000 traffic.  
**BACKGROUND NOISE:** people working in yard to M (metal framing)  
**UNUSUAL EVENTS:** 2:30 or more (helicopter)  
**OTHER NOTES:** —

Integrating Sound Level Meter Summary

Translated: 8-Apr-17 13:34:50  
File Translated: I:\CHI\PRJ\000012551\Noise\Field Monitoring\Data\_021517\12561\_SiteB\_021517.slmdl  
Model Number: 824  
Serial Number: A1255  
Firmware Rev: 4.29  
Software Versior 3.12  
Name: H.W. Lochner, Inc.  
Descr1: 20 N. Wacker, Suite 1200  
Descr2: Chicago, Illinois 60606  
Setup: SLM.ism  
Setup Descr: Simple Integrating SLM  
Location: ResidencesNof11000S  
Note 1: US-89, 11400 to 10600  
Note 2: Site B

Current Any Data

Start Time: 2/15/2017 11:51  
Elapsed Time: 20:41.0

	A Weight	C Weight	Flat
Leq:	66.2 dBA	74.4 dBC	75.5 dBF
SEL:	97.1 dBA	105.3 dBC	106.5 dBF
Peak:	103.8 dBA	107.5 dBC	107.8 dBF
	2/15/2017 12:09	2/15/2017 12:09	2/15/2017 12:09
Lmax (slow):	88.1 dBA	95.2 dBC	96.2 dBF
	2/15/2017 12:09	2/15/2017 12:09	2/15/2017 12:09
Lmin (slow):	47.5 dBA	59.9 dBC	61.8 dBF
	2/15/2017 11:51	2/15/2017 11:55	2/15/2017 12:00
Lmax (fast):	90.1 dBA	97.0 dBC	97.9 dBF
	2/15/2017 12:09	2/15/2017 12:09	2/15/2017 12:09
Lmin (fast):	46.1 dBA	57.8 dBC	59.5 dBF
	2/15/2017 11:55	2/15/2017 11:55	2/15/2017 12:00
Lmax (impulse):	91.4 dBA	97.9 dBC	98.7 dBF
	2/15/2017 12:09	2/15/2017 12:09	2/15/2017 12:09
Lmin (impulse):	47.3 dBA	60.4 dBC	63.3 dBF
	2/15/2017 11:51	2/15/2017 12:00	2/15/2017 12:00

**RESULTS: SOUND LEVELS**

**US-89; 11400 South to 10600 South**

<b>UDOT</b>						<b>7 April 2017</b>						
<b>J Wielgos / HW Lochner</b>						<b>TNM 2.5</b>						
						<b>Calculated with TNM 2.5</b>						
<b>RESULTS: SOUND LEVELS</b>												
<b>PROJECT/CONTRACT:</b>			<b>US-89; 11400 South to 10600 South</b>									
<b>RUN:</b>			<b>Field Measurement Site B</b>									
<b>BARRIER DESIGN:</b>			<b>INPUT HEIGHTS</b>						<b>Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.</b>			
<b>ATMOSPHERICS:</b>			<b>68 deg F, 50% RH</b>									
<b>Receiver</b>												
<b>Name</b>	<b>No.</b>	<b>#DUs</b>	<b>Existing LAeq1h</b>	<b>No Barrier LAeq1h Calculated</b>	<b>Crit'n</b>	<b>Increase over existing</b>		<b>Type Impact</b>	<b>With Barrier</b>			
						<b>Calculated</b>	<b>Crit'n</b>		<b>Calculated LAeq1h</b>	<b>Noise Reduction</b>		<b>Calculated minus Goal</b>
							<b>Sub'l Inc</b>			<b>Calculated</b>	<b>Goal</b>	<b>Calculated minus Goal</b>
			<b>dB</b>	<b>dB</b>	<b>dB</b>	<b>dB</b>	<b>dB</b>		<b>dB</b>	<b>dB</b>	<b>dB</b>	<b>dB</b>
Site B	3	1	0.0	52.5	66	52.5	10	----	52.5	0.0	8	-8.0
<b>Dwelling Units</b>		<b># DUs</b>	<b>Noise Reduction</b>									
			<b>Min</b>	<b>Avg</b>	<b>Max</b>							
			<b>dB</b>	<b>dB</b>	<b>dB</b>							
All Selected		1	0.0	0.0	0.0							
All Impacted		0	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							





SITE B – LOOKING EAST



SITE B – LOOKING WEST

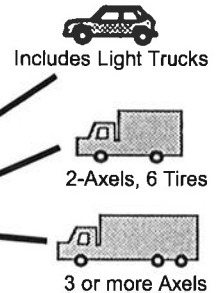
# H.W. LOCHNER, INC.

# NOISE MEASUREMENT DATA SHEET

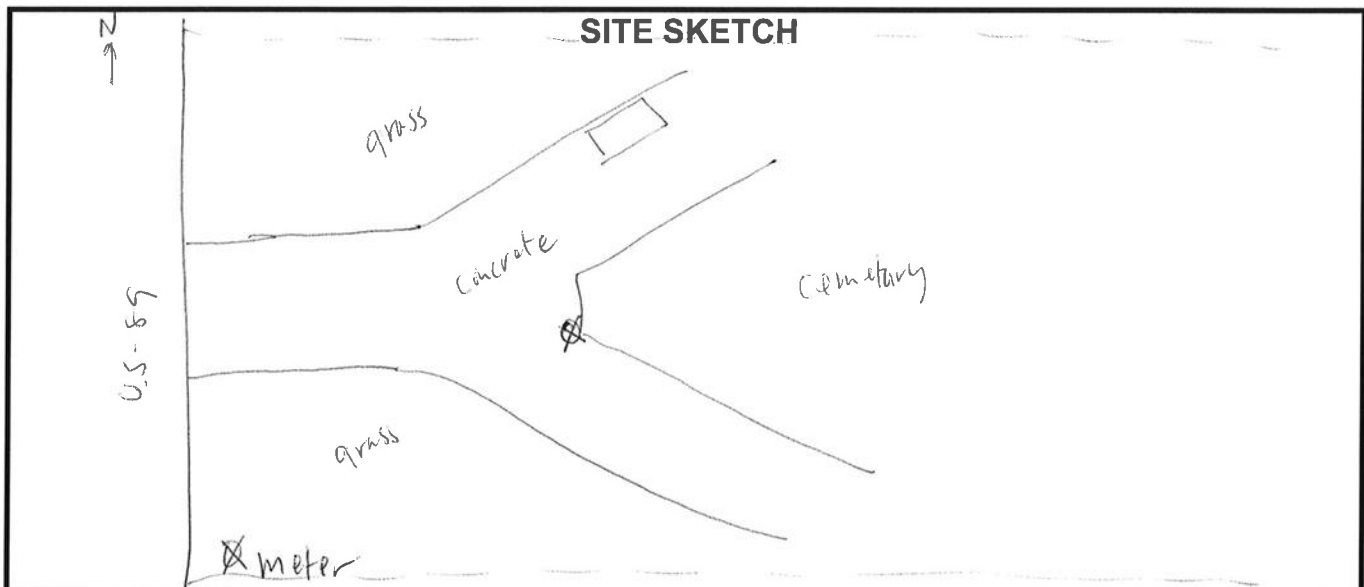
**SITE NUMBER:** Site C **PROJECT:** PIN 12561: US-89 EA  
**SITE DESCRIPTION:** Cemetery along the **DATE:** 2/15/17  
E side of US-89 **START TIME:** 11:09  
**EVENT NUMBER:** #19 **END TIME:** 11:29  
**TECHNICIAN:** E. Alborn **DURATION:** 20:02  
**CALIBRATION:** START — DB END — DB  
**WEATHER DATA:** SKY CONDITION — TEMP 40  
**WIND:** START 5 MPH END 5 MPH DIRECTION S  
**EQUIPMENT:** METER — CALIBRATOR —  
**RESPONSE:** FAST — SLOW — BATTERY CHECK —  
**RESULTS:** Leq 64.8 Lmax 74.9

### TRAFFIC DATA

ROAD	State Street (89)		E	W		
	N	S				
TRAFFIC SPEED	40	40				
AUTOMOBILES	187	181				
MEDIUM TRUCKS	4	4				
HEAVY TRUCKS	0	2				



### SITE SKETCH



**MAJOR SOURCES:** US 89  
**BACKGROUND NOISE:** groundskeeper, utility cars, lawn roller, gas blower,  
**UNUSUAL EVENTS:** plane overhead 2:09 (remote), blower 7:20-4:50 (remote)  
**OTHER NOTES:** —

Integrating Sound Level Meter Summary

Translated: 8-Apr-17 13:35:09  
File Translated: I:\CHI\PRJ\000012551\Noise\Field Monitoring\Data\_021517\12561\_SiteC\_021517.slmdl  
Model Number: 824  
Serial Number: A1255  
Firmware Rev: 4.29  
Software Versior 3.12  
Name: H.W. Lochner, Inc.  
Descr1: 20 N. Wacker, Suite 1200  
Descr2: Chicago, Illinois 60606  
Setup: SLM.ism  
Setup Descr: Simple Integrating SLM  
Location: Cemetery  
Note 1: US-89, 11400 to 10600  
Note 2: Site C

Current Any Data

Start Time: 2/15/2017 11:10  
Elapsed Time: 20:02.2

	A Weight	C Weight	Flat
Leq:	64.8 dBA	70.5 dBC	71.6 dBF
SEL:	95.6 dBA	101.3 dBC	102.4 dBF
Peak:	96.9 dBA	101.4 dBC	101.7 dBF
	2/15/2017 11:16	2/15/2017 11:21	2/15/2017 11:21
Lmax (slow):	76.9 dBA	81.1 dBC	82.4 dBF
	2/15/2017 11:23	2/15/2017 11:23	2/15/2017 11:26
Lmin (slow):	52.6 dBA	63.5 dBC	65.2 dBF
	2/15/2017 11:30	2/15/2017 11:28	2/15/2017 11:28
Lmax (fast):	80.6 dBA	86.6 dBC	89.7 dBF
	2/15/2017 11:23	2/15/2017 11:21	2/15/2017 11:26
Lmin (fast):	52.0 dBA	61.9 dBC	63.4 dBF
	2/15/2017 11:30	2/15/2017 11:28	2/15/2017 11:28
Lmax (impulse):	83.3 dBA	90.1 dBC	93.4 dBF
	2/15/2017 11:21	2/15/2017 11:21	2/15/2017 11:26
Lmin (impulse):	52.3 dBA	64.2 dBC	66.2 dBF
	2/15/2017 11:30	2/15/2017 11:28	2/15/2017 11:10

**RESULTS: SOUND LEVELS**

**US-89; 11400 South to 10600 South**

<b>UDOT</b>						<b>7 April 2017</b>						
<b>J Wielgos / HW Lochner</b>						<b>TNM 2.5</b>						
						<b>Calculated with TNM 2.5</b>						
<b>RESULTS: SOUND LEVELS</b>												
<b>PROJECT/CONTRACT:</b>			<b>US-89; 11400 South to 10600 South</b>									
<b>RUN:</b>			<b>Field Measurement Site C</b>									
<b>BARRIER DESIGN:</b>			<b>INPUT HEIGHTS</b>						<b>Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.</b>			
<b>ATMOSPHERICS:</b>			<b>68 deg F, 50% RH</b>									
<b>Receiver</b>												
<b>Name</b>	<b>No.</b>	<b>#DUs</b>	<b>Existing LAeq1h</b>	<b>No Barrier LAeq1h Calculated</b>	<b>Crit'n</b>	<b>Increase over existing</b>		<b>With Barrier</b>				
						<b>Calculated</b>	<b>Crit'n</b>	<b>Type Impact</b>	<b>Calculated LAeq1h</b>	<b>Noise Reduction</b>		<b>Calculated minus Goal</b>
							<b>Sub'l Inc</b>			<b>Calculated</b>	<b>Goal</b>	<b>Calculated minus Goal</b>
			<b>dB</b>	<b>dB</b>	<b>dB</b>	<b>dB</b>	<b>dB</b>		<b>dB</b>	<b>dB</b>	<b>dB</b>	<b>dB</b>
Site C	3	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0
<b>Dwelling Units</b>		<b># DUs</b>	<b>Noise Reduction</b>									
			<b>Min</b>	<b>Avg</b>	<b>Max</b>							
			<b>dB</b>	<b>dB</b>	<b>dB</b>							
All Selected		1	0.0	0.0	0.0							
All Impacted		0	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							





SITE C – LOOKING NORTH



SITE C - LOOKING WEST

# H.W. LOCHNER, INC.

# NOISE MEASUREMENT DATA SHEET


**SITE NUMBER:** Site D **PROJECT:** PIN 12561: US-89 EA  
**SITE DESCRIPTION:** The Falls at Hunters **DATE:** 2/15/17  
Pointe Apts; E side of US-89 **START TIME:** 10:17 AM  
**EVENT NUMBER:** #18 **END TIME:** 10:37 AM  
**TECHNICIAN:** E. Albury **DURATION:** 20:03  
**CALIBRATION:** START 94.1 DB END \_\_\_\_\_ DB  
**WEATHER DATA:** SKY CONDITION clear TEMP 40  
**WIND:** START 0 MPH END 0 MPH DIRECTION N/A  
**EQUIPMENT:** METER \_\_\_\_\_ CALIBRATOR \_\_\_\_\_  
**RESPONSE:** FAST \_\_\_\_\_ SLOW \_\_\_\_\_ BATTERY CHECK \_\_\_\_\_  
**RESULTS:** Leq 54.5 dBA Lmax 45.3 dBA

### TRAFFIC DATA

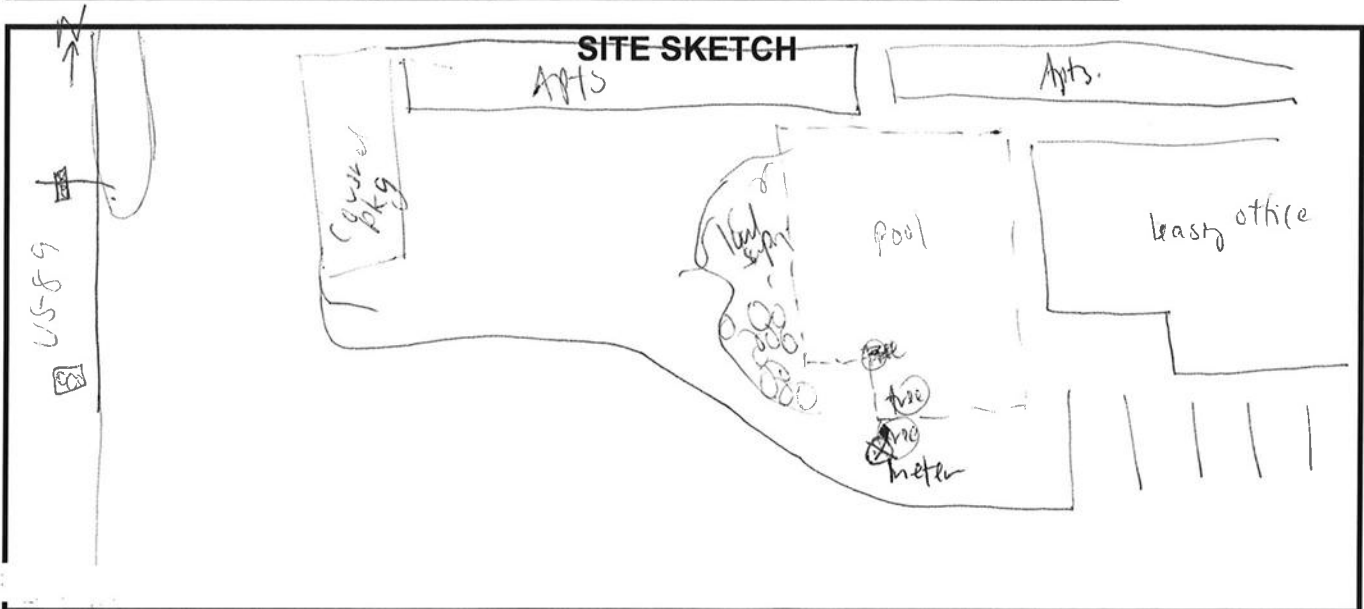
ROAD	State St. (89)		Auto Mall Drive		Auto Mall Dr	
	N	S	E/N	W	S	
TRAFFIC SPEED	40	40	20	20	20	
AUTOMOBILES	182	105	4	82	53	
MEDIUM TRUCKS	0	2	0	1	1	
HEAVY TRUCKS	0	1	0	0	0	

 Includes Light Trucks

 2-Axels, 6 Tires

 3 or more Axels

### SITE SKETCH



**MAJOR SOURCES:** \_\_\_\_\_  
**BACKGROUND NOISE:** \_\_\_\_\_  
**UNUSUAL EVENTS:** \_\_\_\_\_  
**OTHER NOTES:** \_\_\_\_\_

Integrating Sound Level Meter Summary

Translated: 8-Apr-17 13:35:25  
File Translated: I:\CHI\PRJ\000012551\Noise\Field Monitoring\Data\_021517\12561\_SiteD\_021517.slmdl  
Model Number: 824  
Serial Number: A1255  
Firmware Rev: 4.29  
Software Versior 3.12  
Name: H.W. Lochner, Inc.  
Descr1: 20 N. Wacker, Suite 1200  
Descr2: Chicago, Illinois 60606  
Setup: SLM.ism  
Setup Descr: Simple Integrating SLM  
Location: FallsatHuntersPtApts  
Note 1: US-89, 11400 to 10600  
Note 2: Site D

Current Any Data

Start Time: 2/15/2017 10:17  
Elapsed Time: 20:03.9

	A Weight	C Weight	Flat
Leq:	54.5 dBA	65.1 dBC	66.7 dBF
SEL:	85.3 dBA	95.9 dBC	97.6 dBF
Peak:	82.8 dBA	85.4 dBC	86.5 dBF
	2/15/2017 10:29	2/15/2017 10:29	2/15/2017 10:29
Lmax (slow):	65.3 dBA	75.1 dBC	75.7 dBF
	2/15/2017 10:29	2/15/2017 10:34	2/15/2017 10:34
Lmin (slow):	47.0 dBA	59.9 dBC	61.8 dBF
	2/15/2017 10:24	2/15/2017 10:28	2/15/2017 10:23
Lmax (fast):	69.7 dBA	77.9 dBC	78.5 dBF
	2/15/2017 10:29	2/15/2017 10:34	2/15/2017 10:34
Lmin (fast):	46.3 dBA	58.3 dBC	60.2 dBF
	2/15/2017 10:24	2/15/2017 10:28	2/15/2017 10:23
Lmax (impulse):	71.8 dBA	78.9 dBC	79.4 dBF
	2/15/2017 10:29	2/15/2017 10:34	2/15/2017 10:34
Lmin (impulse):	46.8 dBA	60.8 dBC	62.0 dBF
	2/15/2017 10:24	2/15/2017 10:28	2/15/2017 10:17

**RESULTS: SOUND LEVELS**

**US-89; 11400 South to 10600 South**

<b>UDOT</b>													7 April 2017	
<b>J Wielgos / HW Lochner</b>													TNM 2.5	
													Calculated with TNM 2.5	
<b>RESULTS: SOUND LEVELS</b>														
<b>PROJECT/CONTRACT:</b>			<b>US-89; 11400 South to 10600 South</b>											
<b>RUN:</b>			<b>Field Measurement Site D</b>											
<b>BARRIER DESIGN:</b>			<b>INPUT HEIGHTS</b>						Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.					
<b>ATMOSPHERICS:</b>			<b>68 deg F, 50% RH</b>											
<b>Receiver</b>														
<b>Name</b>		<b>No.</b>	<b>#DUs</b>	<b>Existing LAeq1h</b>	<b>No Barrier LAeq1h Calculated</b>	<b>Crit'n</b>	<b>Increase over existing</b>		<b>Type Impact</b>	<b>With Barrier</b>				
							<b>Calculated</b>	<b>Crit'n</b>		<b>Calculated LAeq1h</b>	<b>Noise Reduction</b>		<b>Calculated minus Goal</b>	
								<b>Sub'l Inc</b>			<b>Calculated</b>	<b>Goal</b>	<b>Calculated minus Goal</b>	
				dB	dB	dB	dB	dB		dB	dB	dB	dB	
Site D		3	1	0.0	52.1	66	52.1	10	----	52.1	0.0	8	-8.0	
<b>Dwelling Units</b>			<b># DUs</b>	<b>Noise Reduction</b>										
				<b>Min</b>	<b>Avg</b>	<b>Max</b>								
				<b>dB</b>	<b>dB</b>	<b>dB</b>								
All Selected			1	0.0	0.0	0.0								
All Impacted			0	0.0	0.0	0.0								
All that meet NR Goal			0	0.0	0.0	0.0								





SITE D – LOOKING NORTH



SITE D – LOOKING WEST



## **Appendix B: Traffic Used in the Noise Analysis**

## Memorandum

T 312.372.3011  
F 312.372.5974

---

**To:** Project File (HWL #12551)  
**From:** Dave Shannon  
**Subject:** US-89, 11400 South to 10600 South  
Traffic Data for Use in the Noise Study  
**Date:** April 1, 2017

---

This memo documents the development for traffic volumes for use in the noise analysis for the US-89 project. The noise analysis is a supporting document in an Environmental Evaluation. The project area is primarily commercial with pockets of noise-sensitive land use.

Traffic data and a capacity analysis were provided for the project in a memo from Avenue Consultants dated February 23, 2017. The analysis documented in the memo considered one mid-week peak hour and one Saturday afternoon peak hour. Traffic volumes appear to be slightly higher for through-movements in the mid-week peak hour and the driveway and side road volumes appear to be slightly higher in the Saturday peak hour. Based on the levels of congestion being higher, the Saturday afternoon peak hour was selected for the traffic capacity analysis. The weekday volumes were not included in a capacity analysis.

The existing condition is based on 2016 volumes. The capacity analysis showed that the majority of the project will operate at LOS B/C and the intersection at 11400 South will operate at LOS D. These volumes are considered representative of worst-case operating conditions for noise because they are near LOS C and the area which is predicted to operate at LOS D is limited to the southbound traffic approaching the 11400 South intersection.

Since the existing condition generally operates at LOS C, it is also representative of the no-build condition because additional traffic volumes will result in higher congestion and less noise.

The build condition is based on 2040 volumes. The capacity analysis showed that the majority of the project will operate at LOS B/C and the intersection at 11400 South will operate at LOS E with the southbound approach operating at LOS D. These volumes are considered representative of worst-case operating conditions for noise because they are near LOS C and the area which is predicted to operate at LOS D is limited to the southbound traffic approaching the 11400 South intersection.

Traffic volumes were not provided in the traffic memo for 10600 South or for US-89 north of 10600 South. AADT data was obtained from the UDOT traffic statistics website. The AADT on 10600 South west of US-89 is 41,130 vehicles, east of US-89 it is 26,670 vehicles and north of 10600 South the AADT is 30,135 vehicles. The AADT on US-89 is 25,945 vehicles and the peak-hour volumes are approximately 9% of the AADT. For the noise study, 9% of the AADT on 10600 South and on US-89 north of 10600 South was used in the noise modeling.

Truck percentages were not provided in the traffic memo. Data acquired from the UDOT website indicated that in 2015 7% of the traffic volume was medium trucks and 3% of the volume was heavy trucks. These volumes were used in the noise study.

A spreadsheet is attached which shows how the traffic was calculated for use in the noise modelling.

**US-89 Environmental Assessment**  
**10600 South to 11400 South**  
**Noise Study**  
**Traffic for TNM**  
**Existing (2016)**

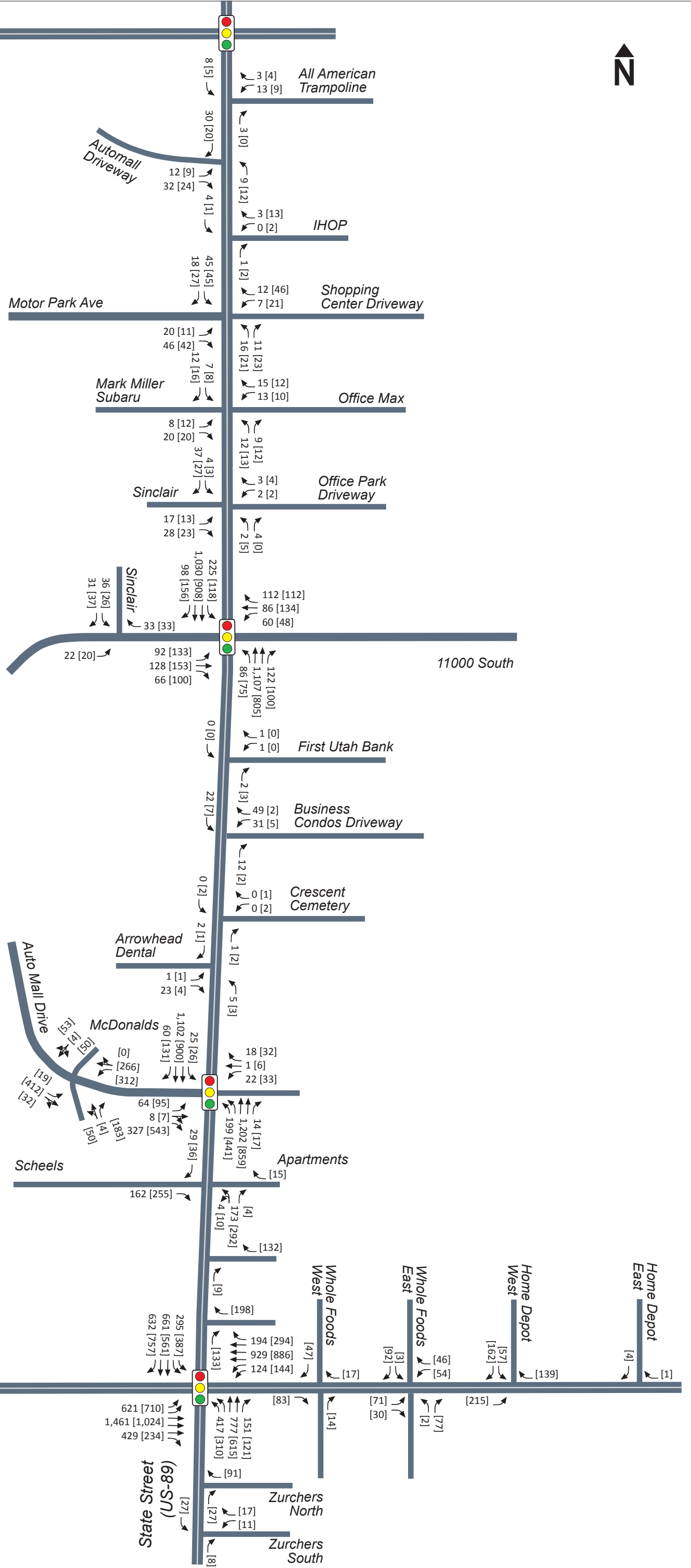
Roadway Name	Base DHV	Lanes	MT%	HT%	Cars	For TNM		Speed
						MT	HT	
US89 N of 10600 NB	1356	3	7	3	406	32	14	40
US89 N of 10600 SB	1356	3	7	3	406	32	14	40
US89 10600 to 11000 NB	1050	3	7	3	314	25	11	40
US89 10600 to 11000 SB	1182	3	7	3	354	28	12	40
US89 10600 to 11000 NB	1050	2	7	3	472	37	16	40
US89 10600 to 11000 SB	1182	2	7	3	532	41	18	40
US89 11000 to Auto Mall NB	986	2	7	3	443	35	15	40
US89 11000 to Auto Mall SB	1056	2	7	3	475	37	16	40
US89 Auto Mall to 11400 NB	1620	2	7	3	729	57	24	40
US89 Auto Mall to 11400 SB	1706	2	7	3	767	60	26	40
US89 South of 11400 NB	1046	2	7	3	470	37	16	40
US89 South of 11400 SB	940	2	7	3	423	33	14	40
10600 W of US89 EB	1852	2	7	3	833	65	28	35
10600 W of US89 WB	1851	3	7	3	555	43	19	35
10600 E of US89 EB	1200	2	7	3	540	42	18	35
10600 E of US89 WB	1800	3	7	3	540	42	18	35
11000 W of US89 EB	386	1	7	3	347	27	12	35
11000 W of US89 WB	366	2	7	3	165	13	5	35
11000 E of US89 EB	371	1	7	3	334	26	11	35
11000 E of US89 WB	294	1	7	3	264	21	9	35
Auto Mall W of US89 EB	645	1	7	3	581	45	19	30
Auto Mall W of US89 WB	578	1	7	3	521	40	17	30
Apt Drive E of US89 EB	50	1	7	3	44	4	2	15
Apt Drive E of US89 WB	71	1	7	3	64	5	2	15
11400 W of US89 EB	1968	3	7	3	590	46	20	40
11400 W of US89 WB	1953	3	7	3	585	46	20	40
11400 E of US89 EB	1533	3	7	3	460	36	15	40
11400 E of US89 WB	1323	3	7	3	397	31	13	40

**US-89 Environmental Assessment**  
**10600 South to 11400 South**  
**Noise Study**  
**Traffic for TNM**  
**Build (2040)**

Roadway Name	Base DHV	Lanes	MT%	HT%	Cars	For TNM		Speed
						MT	HT	
US89 N of 10600 NB	1356	3	7	3	406	32	14	40
US89 N of 10600 SB	1356	3	7	3	406	32	14	40
US89 10600 to 11000 NB	1446	3	7	3	434	34	14	40
US89 10600 to 11000 SB	1680	3	7	3	504	39	17	40
US89 11000 to Auto Mall NB	1449	3	7	3	435	34	14	40
US89 11000 to Auto Mall SB	1500	3	7	3	450	35	15	40
US89 Auto Mall to 11400 NB	2121	3	7	3	637	49	21	40
US89 Auto Mall to 11400 SB	2250	3	7	3	674	53	23	40
US89 South of 11400 NB	1350	2	7	3	608	47	20	40
US89 South of 11400 SB	1190	2	7	3	535	42	18	40
10600 W of US89 EB	1852	2	7	3	833	65	28	35
10600 W of US89 WB	1851	3	7	3	555	43	19	35
10600 E of US89 EB	1200	2	7	3	540	42	18	35
10600 E of US89 WB	1800	3	7	3	540	42	18	35
11000 W of US89 EB	410	1	7	3	369	29	12	35
11000 W of US89 WB	410	2	7	3	185	14	6	35
11000 E of US89 EB	440	1	7	3	396	31	13	35
11000 E of US89 WB	360	1	7	3	324	25	11	35
Auto Mall W of US89 EB	760	1	7	3	684	53	23	30
Auto Mall W of US89 WB	770	1	7	3	693	54	23	30
Apt Drive E of US89 EB	120	1	0	0	120	0	0	15
Apt Drive E of US89 WB	100	1	0	0	100	0	0	15
11400 W of US89 EB	2310	3	7	3	693	54	23	40
11400 W of US89 WB	2430	3	7	3	729	57	24	40
11400 E of US89 EB	1599	3	7	3	480	37	16	40
11400 E of US89 WB	1431	3	7	3	430	33	14	40



10600 South



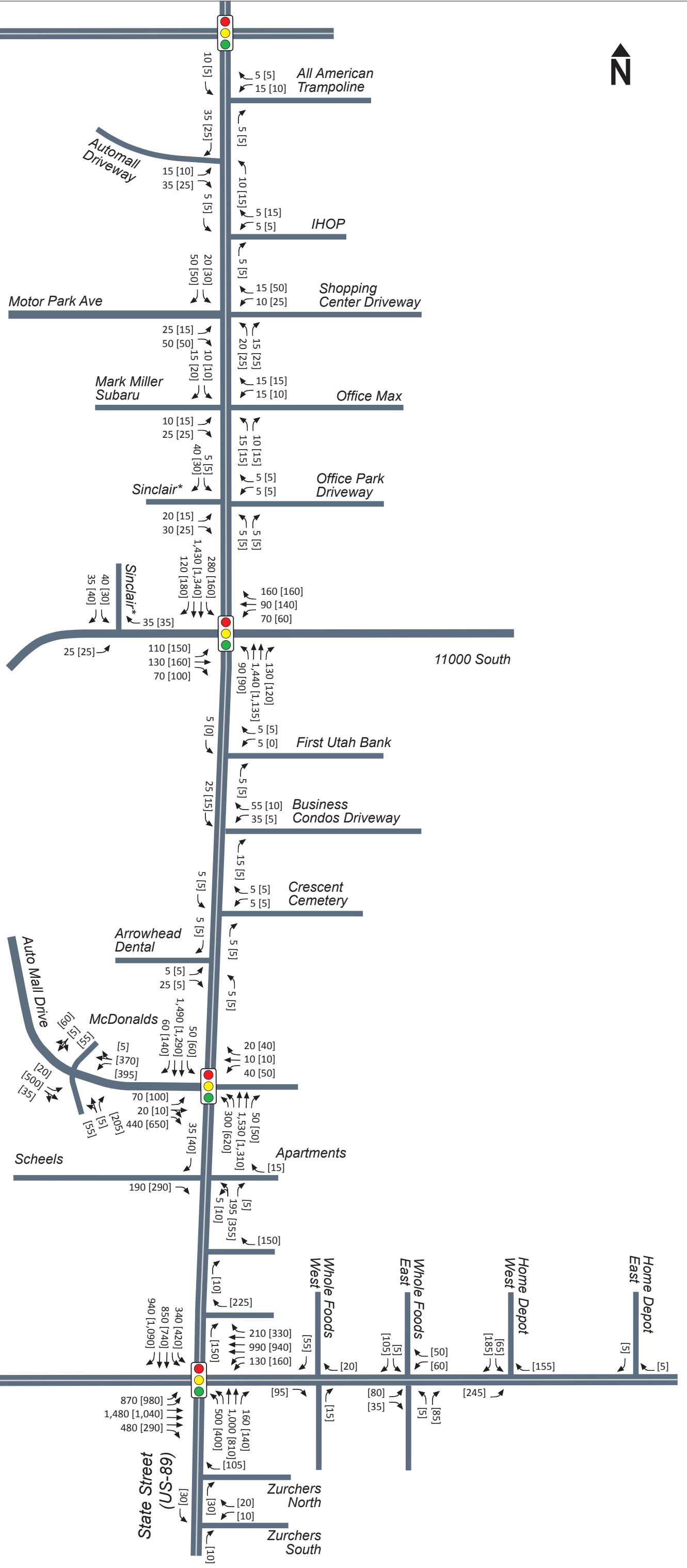
PM Peak Hour [Saturday Peak Hour]

# 2016 Existing Conditions Peak Hour Volumes

US-89; 11400 South to 10600 South

Counts conducted September 17 and 20, 2016

10600 South



PM Peak Hour [Saturday Peak Hour]

### 2040 Build Conditions Peak Hour Volumes

US-89; 11400 South to 10600 South

## **Appendix C: Traffic Noise Model Results**

RESULTS: SOUND LEVELS

US-89; 10600 SOUTH TO 11400 SOUTH

UDOT		8 April 2017											
J WIELGOS / LOCHNER		TNM 2.5											
		Calculated with TNM 2.5											
RESULTS: SOUND LEVELS													
PROJECT/CONTRACT:		US-89; 10600 SOUTH TO 11400 SOUTH											
RUN:		EXISTING											
BARRIER DESIGN:		INPUT HEIGHTS											
ATMOSPHERICS:		68 deg F, 50% RH											
		Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.											
Receiver													
Name	No.	#DUs	Existing			Increase over existing		Type	With Barrier				
			LAeq1h	LAeq1h	Crit'n	Calculated	Crit'n		Impact	Calculated	Noise Reduction		Calculated
				Calculated	Crit'n	Calculated	Crit'n						
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB	dB
R01	49	1	0.0	71.0	66	71.0	10	Snd Lvl	71.0	0.0	8	-8.0	
R02	50	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0	
R02	51	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0	
R04	52	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0	
R05	53	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0	
R06	54	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0	
R07	55	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0	
R08	56	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0	
R09	57	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0	
R10	58	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0	
R11	59	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0	
R12	60	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0	
R13	61	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0	
R14	62	1	0.0	48.6	66	48.6	10	----	48.6	0.0	8	-8.0	
R15	63	1	0.0	49.6	66	49.6	10	----	49.6	0.0	8	-8.0	
R16	64	1	0.0	50.6	66	50.6	10	----	50.6	0.0	8	-8.0	
R17	65	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0	
R18	66	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0	
R19	67	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0	
R20	68	1	0.0	46.0	66	46.0	10	----	46.0	0.0	8	-8.0	
R21	69	1	0.0	45.5	66	45.5	10	----	45.5	0.0	8	-8.0	
R22	70	1	0.0	47.4	66	47.4	10	----	47.4	0.0	8	-8.0	
R23	71	1	0.0	50.3	66	50.3	10	----	50.3	0.0	8	-8.0	
R24	72	1	0.0	52.1	66	52.1	10	----	52.1	0.0	8	-8.0	

## RESULTS: SOUND LEVELS

## US-89; 10600 SOUTH TO 11400 SOUTH

R25	73	1	0.0	52.7	66	52.7	10	----	52.7	0.0	8	-8.0
R26	74	1	0.0	49.6	66	49.6	10	----	49.6	0.0	8	-8.0
R27	75	1	0.0	51.9	66	51.9	10	----	51.9	0.0	8	-8.0
R28	76	1	0.0	52.6	66	52.6	10	----	52.6	0.0	8	-8.0
R29	77	1	0.0	58.0	66	58.0	10	----	58.0	0.0	8	-8.0
R30	78	1	0.0	58.9	66	58.9	10	----	58.9	0.0	8	-8.0
R31	79	1	0.0	59.3	66	59.3	10	----	59.3	0.0	8	-8.0
R32	80	1	0.0	54.7	66	54.7	10	----	54.7	0.0	8	-8.0
R33	81	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
R34	82	1	0.0	58.3	66	58.3	10	----	58.3	0.0	8	-8.0
R35	83	1	0.0	50.4	66	50.4	10	----	50.4	0.0	8	-8.0
R36	84	1	0.0	53.3	66	53.3	10	----	53.3	0.0	8	-8.0
R37	85	1	0.0	54.0	66	54.0	10	----	54.0	0.0	8	-8.0
R38	86	1	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0
R39	87	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
R40	88	1	0.0	51.1	66	51.1	10	----	51.1	0.0	8	-8.0
R41	89	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
R42	90	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0
R43	91	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
R44	92	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
R45	94	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
R46	95	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
R47	96	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
R48	97	1	0.0	55.6	66	55.6	10	----	55.6	0.0	8	-8.0
R49	98	1	0.0	54.4	66	54.4	10	----	54.4	0.0	8	-8.0
R50	99	1	0.0	54.8	66	54.8	10	----	54.8	0.0	8	-8.0
R51	100	1	0.0	52.9	66	52.9	10	----	52.9	0.0	8	-8.0
R52	101	1	0.0	56.5	66	56.5	10	----	56.5	0.0	8	-8.0
R53	102	1	0.0	53.7	66	53.7	10	----	53.7	0.0	8	-8.0
R54	103	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0
R55	104	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
R56	105	1	0.0	56.3	66	56.3	10	----	56.3	0.0	8	-8.0
R57	106	1	0.0	58.5	66	58.5	10	----	58.5	0.0	8	-8.0
R58	107	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
R59	108	1	0.0	58.0	66	58.0	10	----	58.0	0.0	8	-8.0
R60	109	1	0.0	58.3	66	58.3	10	----	58.3	0.0	8	-8.0
R61	110	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
R62	111	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
R63	114	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
R64	115	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R65	116	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0



**RESULTS: SOUND LEVELS**

**US-89; 10600 SOUTH TO 11400 SOUTH**

R66	118	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
R67	119	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R68	120	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
<b>Dwelling Units</b>		<b># DUs</b>	<b>Noise Reduction</b>									
			<b>Min</b>	<b>Avg</b>	<b>Max</b>							
			<b>dB</b>	<b>dB</b>	<b>dB</b>							
All Selected		68	0.0	0.0	0.0							
All Impacted		13	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

RESULTS: SOUND LEVELS

US-89; 10600 SOUTH TO 11400 SOUTH

UDOT										8 April 2017			
J. WIELGOS / HW LOCHNER										TNM 2.5			
										Calculated with TNM 2.5			
RESULTS: SOUND LEVELS													
PROJECT/CONTRACT:			US-89; 10600 SOUTH TO 11400 SOUTH										
RUN:			BUILD										
BARRIER DESIGN:			INPUT HEIGHTS					Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.					
ATMOSPHERICS:			68 deg F, 50% RH										
Receiver													
Name		No.	#DUs	Existing LAeq1h	No Barrier LAeq1h	Increase over existing		Type	With Barrier	Noise Reduction			
					Calculated	Crit'n	Calculated	Crit'n	Impact	Calculated LAeq1h	Calculated	Goal	Calculated minus Goal
				dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R01		49	1	0.0	72.9	66	72.9	10	Snd Lvl	72.9	0.0	8	-8.0
R02		50	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
R03		51	1	0.0	69.3	66	69.3	10	Snd Lvl	69.3	0.0	8	-8.0
R04		52	1	0.0	69.7	66	69.7	10	Snd Lvl	69.7	0.0	8	-8.0
R05		53	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
R06		54	1	0.0	69.7	66	69.7	10	Snd Lvl	69.7	0.0	8	-8.0
R07		55	1	0.0	70.2	66	70.2	10	Snd Lvl	70.2	0.0	8	-8.0
R08		56	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
R09		57	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
R10		58	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
R11		59	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
R12		60	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
R13		61	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
R14		62	1	0.0	49.4	66	49.4	10	----	49.4	0.0	8	-8.0
R15		63	1	0.0	50.4	66	50.4	10	----	50.4	0.0	8	-8.0
R16		64	1	0.0	51.5	66	51.5	10	----	51.5	0.0	8	-8.0
R17		65	1	0.0	57.7	66	57.7	10	----	57.7	0.0	8	-8.0
R18		66	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
R19		67	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
R20		68	1	0.0	47.1	66	47.1	10	----	47.1	0.0	8	-8.0
R21		69	1	0.0	46.5	66	46.5	10	----	46.5	0.0	8	-8.0
R22		70	1	0.0	48.4	66	48.4	10	----	48.4	0.0	8	-8.0
R23		71	1	0.0	51.9	66	51.9	10	----	51.9	0.0	8	-8.0
R24		72	1	0.0	53.6	66	53.6	10	----	53.6	0.0	8	-8.0

## RESULTS: SOUND LEVELS

## US-89; 10600 SOUTH TO 11400 SOUTH

R25	73	1	0.0	54.3	66	54.3	10	----	54.3	0.0	8	-8.0
R26	74	1	0.0	50.3	66	50.3	10	----	50.3	0.0	8	-8.0
R27	75	1	0.0	52.5	66	52.5	10	----	52.5	0.0	8	-8.0
R28	76	1	0.0	53.3	66	53.3	10	----	53.3	0.0	8	-8.0
R29	77	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
R30	78	1	0.0	59.7	66	59.7	10	----	59.7	0.0	8	-8.0
R31	79	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
R32	80	1	0.0	55.4	66	55.4	10	----	55.4	0.0	8	-8.0
R33	81	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
R34	82	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
R35	83	1	0.0	51.2	66	51.2	10	----	51.2	0.0	8	-8.0
R36	84	1	0.0	53.7	66	53.7	10	----	53.7	0.0	8	-8.0
R37	85	1	0.0	54.8	66	54.8	10	----	54.8	0.0	8	-8.0
R38	86	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
R39	87	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R40	88	1	0.0	52.1	66	52.1	10	----	52.1	0.0	8	-8.0
R41	89	1	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
R42	94	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
R43	95	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R44	96	1	0.0	60.9	66	60.9	10	----	60.9	0.0	8	-8.0
R45	97	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R46	98	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
R47	99	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
R48	100	1	0.0	55.9	66	55.9	10	----	55.9	0.0	8	-8.0
R49	101	1	0.0	54.8	66	54.8	10	----	54.8	0.0	8	-8.0
R50	102	1	0.0	55.0	66	55.0	10	----	55.0	0.0	8	-8.0
R51	103	1	0.0	53.3	66	53.3	10	----	53.3	0.0	8	-8.0
R52	104	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0
R53	105	1	0.0	54.4	66	54.4	10	----	54.4	0.0	8	-8.0
R54	106	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0
R55	107	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
R56	108	1	0.0	56.7	66	56.7	10	----	56.7	0.0	8	-8.0
R57	109	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
R58	110	1	0.0	58.5	66	58.5	10	----	58.5	0.0	8	-8.0
R59	111	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0
R60	112	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
R61	113	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
R62	115	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R63	117	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
R64	118	1	0.0	69.3	66	69.3	10	Snd Lvl	69.3	0.0	8	-8.0
R65	119	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0

**RESULTS: SOUND LEVELS**

**US-89; 10600 SOUTH TO 11400 SOUTH**

R66	121	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R67	122	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R68	123	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
<b>Dwelling Units</b>		<b># DUs</b>	<b>Noise Reduction</b>									
			<b>Min</b>	<b>Avg</b>	<b>Max</b>							
			<b>dB</b>	<b>dB</b>	<b>dB</b>							
All Selected		68	0.0	0.0	0.0							
All Impacted		14	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

RESULTS: SOUND LEVELS

US-89; 10600 SOUTH TO 11400 SOUTH

UDOT										8 April 2017			
J. WIELGOS / HW LOCHNER										TNM 2.5			
										Calculated with TNM 2.5			
RESULTS: SOUND LEVELS													
PROJECT/CONTRACT:		US-89; 10600 SOUTH TO 11400 SOUTH											
RUN:		CONTOURS											
BARRIER DESIGN:		INPUT HEIGHTS										Average pavement type shall be used unless	
ATMOSPHERICS:		68 deg F, 50% RH										a State highway agency substantiates the use	
												of a different type with approval of FHWA.	
Receiver													
Name		No.	#DUs	Existing LAeq1h	No Barrier LAeq1h	Increase over existing		Type	With Barrier		Noise Reduction		
					Calculated	Crit'n	Calculated	Crit'n	Impact	Calculated LAeq1h	Calculated	Goal	Calculated minus Goal
				dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
US89 South of 11400 10		49	1	0.0	73.1	66	73.1	10	Snd Lvl	73.1	0.0	8	-8.0
US89 South of 11400 20		50	1	0.0	71.9	66	71.9	10	Snd Lvl	71.9	0.0	8	-8.0
US89 South of 11400 30		51	1	0.0	70.9	66	70.9	10	Snd Lvl	70.9	0.0	8	-8.0
US89 South of 11400 40		52	1	0.0	69.9	66	69.9	10	Snd Lvl	69.9	0.0	8	-8.0
US89 South of 11400 50		53	1	0.0	69.1	66	69.1	10	Snd Lvl	69.1	0.0	8	-8.0
US89 South of 11400 60		54	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
US89 South of 11400 70		55	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
US89 South of 11400 80		56	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
US89 South of 11400 90		57	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
US89 South of 11400 100		58	1	0.0	66.5	66	66.5	10	Snd Lvl	66.5	0.0	8	-8.0
US89 South of 11400 125		59	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
US89 South of 11400 150		60	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
US89 South of 11400 175		61	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
US89 South of 11400 200		62	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
US89 South of 11400 225		63	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
US89 South of 11400 250		64	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
US89 11400 to Auto Mall 10		65	1	0.0	76.3	66	76.3	10	Snd Lvl	76.3	0.0	8	-8.0
US89 11400 to Auto Mall 20		66	1	0.0	74.8	66	74.8	10	Snd Lvl	74.8	0.0	8	-8.0
US89 11400 to Auto Mall 30		67	1	0.0	73.5	66	73.5	10	Snd Lvl	73.5	0.0	8	-8.0
US89 11400 to Auto Mall 40		68	1	0.0	72.4	66	72.4	10	Snd Lvl	72.4	0.0	8	-8.0
US89 11400 to Auto Mall 50		69	1	0.0	71.4	66	71.4	10	Snd Lvl	71.4	0.0	8	-8.0
US89 11400 to Auto Mall 60		70	1	0.0	70.5	66	70.5	10	Snd Lvl	70.5	0.0	8	-8.0
US89 11400 to Auto Mall 70		71	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0
US89 11400 to Auto Mall 80		72	1	0.0	69.3	66	69.3	10	Snd Lvl	69.3	0.0	8	-8.0



**RESULTS: SOUND LEVELS**

**US-89; 10600 SOUTH TO 11400 SOUTH**

US89 11400 to Auto Mall 90	73	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
US89 11400 to Auto Mall 100	74	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
US89 11400 to Auto Mall 125	75	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
<b>US89 11400 to Auto Mall 150</b>	<b>76</b>	<b>1</b>	<b>0.0</b>	<b>66.2</b>	<b>66</b>	<b>66.2</b>	<b>10</b>	<b>Snd Lvl</b>	<b>66.2</b>	<b>0.0</b>	<b>8</b>	<b>-8.0</b>
US89 11400 to Auto Mall 175	77	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
US89 11400 to Auto Mall 200	78	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
US89 11400 to Auto Mall 225	79	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
US89 11400 to Auto Mall 250	80	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
US89 Auto Mall to 11000 10	81	1	0.0	74.5	66	74.5	10	Snd Lvl	74.5	0.0	8	-8.0
US89 Auto Mall to 11000 20	82	1	0.0	73.0	66	73.0	10	Snd Lvl	73.0	0.0	8	-8.0
US89 Auto Mall to 11000 30	83	1	0.0	71.9	66	71.9	10	Snd Lvl	71.9	0.0	8	-8.0
<b>US89 Auto Mall to 11000 40</b>	<b>84</b>	<b>1</b>	<b>0.0</b>	<b>70.8</b>	<b>66</b>	<b>70.8</b>	<b>10</b>	<b>Snd Lvl</b>	<b>70.8</b>	<b>0.0</b>	<b>8</b>	<b>-8.0</b>
US89 Auto Mall to 11000 50	85	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0
US89 Auto Mall to 11000 60	86	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
US89 Auto Mall to 11000 70	87	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
US89 Auto Mall to 11000 80	88	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
US89 Auto Mall to 11000 90	89	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
<b>US89 Auto Mall to 11000 100</b>	<b>94</b>	<b>1</b>	<b>0.0</b>	<b>66.2</b>	<b>66</b>	<b>66.2</b>	<b>10</b>	<b>Snd Lvl</b>	<b>66.2</b>	<b>0.0</b>	<b>8</b>	<b>-8.0</b>
US89 Auto Mall to 11000 125	95	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
US89 Auto Mall to 11000 150	96	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
US89 Auto Mall to 11000 175	97	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
US89 Auto Mall to 11000 200	98	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
US89 Auto Mall to 11000 225	99	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
US89 Auto Mall to 11000 250	100	1	0.0	60.9	66	60.9	10	----	60.9	0.0	8	-8.0
US89 11000 to 10600 10	101	1	0.0	74.5	66	74.5	10	Snd Lvl	74.5	0.0	8	-8.0
US89 11000 to 10600 20	102	1	0.0	73.0	66	73.0	10	Snd Lvl	73.0	0.0	8	-8.0
US89 11000 to 10600 30	103	1	0.0	71.8	66	71.8	10	Snd Lvl	71.8	0.0	8	-8.0
<b>US89 11000 to 10600 40</b>	<b>104</b>	<b>1</b>	<b>0.0</b>	<b>70.7</b>	<b>66</b>	<b>70.7</b>	<b>10</b>	<b>Snd Lvl</b>	<b>70.7</b>	<b>0.0</b>	<b>8</b>	<b>-8.0</b>
US89 11000 to 10600 50	105	1	0.0	69.7	66	69.7	10	Snd Lvl	69.7	0.0	8	-8.0
US89 11000 to 10600 60	106	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
US89 11000 to 10600 70	107	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
US89 11000 to 10600 80	108	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
US89 11000 to 10600 90	109	1	0.0	66.5	66	66.5	10	Snd Lvl	66.5	0.0	8	-8.0
<b>US89 11000 to 10600 100</b>	<b>110</b>	<b>1</b>	<b>0.0</b>	<b>66.0</b>	<b>66</b>	<b>66.0</b>	<b>10</b>	<b>Snd Lvl</b>	<b>66.0</b>	<b>0.0</b>	<b>8</b>	<b>-8.0</b>
US89 11000 to 10600 125	111	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
US89 11000 to 10600 150	112	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
US89 11000 to 10600 175	113	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
US89 11000 to 10600 200	115	1	0.0	61.6	66	61.6	10	----	61.6	0.0	8	-8.0
US89 11000 to 10600 225	117	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
US89 11000 to 10600 250	123	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
<b>Dwelling Units</b>		<b># DUs</b>	<b>Noise Reduction</b>									

**RESULTS: SOUND LEVELS****US-89; 10600 SOUTH TO 11400 SOUTH**




			<b>Min</b>	<b>Avg</b>	<b>Max</b>								
			<b>dB</b>	<b>dB</b>	<b>dB</b>								
All Selected		64	0.0	0.0	0.0								
All Impacted		42	0.0	0.0	0.0								
All that meet NR Goal		0	0.0	0.0	0.0								

## **Appendix D: Noise Abatement Results**

**US-89 (State Street); 11400 South to 10600 South  
Noise Analysis**

**Build Alternative - Barriers 1a & 1b**

Receptor	First Row	Residences Represented	NAC			Taller Wall			Intermediate Wall			Shorter Wall		
			Land Use Category	Existing dB(A)	Build dB(A)	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties
R02	Yes	2	B	67	67	63	4		63	4		64	3	
R03	Yes	2	B	68	69	65	4		65	4		66	3	
R04	Yes	2	B	69	70	66	4		66	4		68	2	
R05	Yes	2	B	68	68	63	5	2	64	4		64	4	
R06	Yes	2	B	69	70	65	5	2	65	5	2	66	4	
R07	Yes	2	B	69	70	65	5	2	67	3		69	1	
R08	Yes	2	B	65	66	63	3		63	3		64	2	
R09	Yes	2	B	66	67	64	3		65	2		65	2	
R10	Yes	2	B	66	67	65	2		65	2		66	1	
R11	Yes	4	B	62	63	57	6	4	57	6	4	58	5	4
R12	Yes	4	B	63	65	60	5	4	60	5	4	61	4	
R13	Yes	4	B	64	65	61	4		62	3		63	2	
R14		4	B	49	49	48	1		49			49		
R15		4	B	50	50	49	1		49	1		50		
R16		4	B	51	52	49	3		50	2		50	2	
R17		4	B	58	58	57	1		57	1		57	1	
R18		4	B	60	60	59	1		59	1		59	1	
R19		4	B	61	61	60	1		61			61		
R20		4	B	46	47	45	2		46	1		46	1	
R21		4	B	46	47	45	2		45	2		46	1	
R22		4	B	47	48	46	2		47	1		48		
R23		4	B	50	52	51	1		52			52		
R24		4	B	52	54	53	1		53	1		53	1	
R25		4	B	53	54	53	1		54			54		
R26		4	B	50	50	48	2		49	1		49	1	
R27		4	B	52	53	51	2		51	2		51	2	
R28		4	B	53	53	51	2		51	2		51	2	
R29		4	B	58	59	57	2		57	2		57	2	
R30		4	B	59	60	58	2		58	2		58	2	
R31		4	B	59	60	59	1		59	1		59	1	
R32		4	B	55	55	53	2		53	2		54	1	
R33		4	B	58	59	57	2		57	2		57	2	
R34		4	B	58	60	58	2		58	2		58	2	
R35		4	B	50	51	51			51			51		
R36		4	B	53	54	54			54			54		
R37		4	B	54	55	55			55			55		
R38		REC	C	61	62	60	2		60	2		60	2	
R63	Yes	4	B	67	68	61	7	4	61	7	4	62	6	4
R64	Yes	4	B	68	69	62	7	4	63	6	4	65	4	
R65	Yes	4	B	69	70	63	7	4	65	5	4	68	2	
R66		2	B	62	62	60	2		60	2		61	1	
R67		2	B	63	63	61	2		61	2		62	1	
R68		2	B	63	64	62	2		62	2		63	1	

	= Impacted receptor	Length =	505	505	505
	= 5 dB(A) reduction or better	Average Height =	20	16	12
	= 7 dB(A) reduction or better	Area of Noise Barrier =	10100	8080	6060
		Cost of Noise Barrier=	\$ 202,000	\$ 161,600	\$ 121,200
		Properties With a 5 dB(A) Reduction =	26	22	8
		Impacted Properties =	30	30	30
		Impacted Front-Row Properties =	30	30	30
		Impacted Front-Row Properties with a 5 dB(A) Reduction =	18	14	4
		Percentage of Impacted Front-Row Properties Reduced At Least 5 dB(A) =	60%	47%	13%
		Feasible =	Yes	No	No
		First Row Properties =	42	42	42
		First Row Properties with 7 dB(A) Reduction=	12	4	
		Percentage of First Row Reduced At Least 7 dB(A) =	29%	10%	
		Reasonable (Meets Noise Reduction Goal)=	No	No	No
		Cost / Benefitted Property =	\$ 7,769	\$ 7,345	\$ 15,150
		Cost Reasonable =	Yes	Yes	Yes

RESULTS: SOUND LEVELS

US-89; 10600 SOUTH TO 11400 SOUTH

UDOT										18 April 2017		
J. WIELGOS / HW LOCHNER										TNM 2.5		
										Calculated with TNM 2.5		
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:			US-89; 10600 SOUTH TO 11400 SOUTH									
RUN:			BUILD_BARRIERS									
BARRIER DESIGN:			Barrier 1a and 1b - 12ft							Average pavement type shall be used unless		
ATMOSPHERICS:			68 deg F, 50% RH							a State highway agency substantiates the use		
										of a different type with approval of FHWA.		
Receiver												
Name		No.	#DUs	Existing LAeq1h	No Barrier LAeq1h	Increase over existing		Type	With Barrier Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
				dBA	dBA	dBA	dB		dBA	dB	dB	dB
R02	50	1	0.0	67.2	66	67.2	10	Snd Lvl	63.6	3.6	8	-4.4
R03	51	1	0.0	69.3	66	69.3	10	Snd Lvl	66.0	3.3	8	-4.7
R04	52	1	0.0	69.7	66	69.7	10	Snd Lvl	68.1	1.6	8	-6.4
R05	53	1	0.0	68.1	66	68.1	10	Snd Lvl	63.9	4.2	8	-3.8
R06	54	1	0.0	69.7	66	69.7	10	Snd Lvl	66.1	3.6	8	-4.4
R07	55	1	0.0	70.2	66	70.2	10	Snd Lvl	68.6	1.6	8	-6.4
R08	56	1	0.0	65.7	66	65.7	10	----	63.6	2.1	8	-5.9
R09	57	1	0.0	66.9	66	66.9	10	Snd Lvl	65.0	1.9	8	-6.1
R10	58	1	0.0	67.4	66	67.4	10	Snd Lvl	66.3	1.1	8	-6.9
R11	59	1	0.0	62.9	66	62.9	10	----	57.8	5.1	8	-2.9
R12	60	1	0.0	64.9	66	64.9	10	----	61.3	3.6	8	-4.4
R13	61	1	0.0	65.4	66	65.4	10	----	63.2	2.2	8	-5.8
R14	62	1	0.0	49.0	66	49.0	10	----	48.7	0.3	8	-7.7
R15	63	1	0.0	50.0	66	50.0	10	----	49.5	0.5	8	-7.5
R16	64	1	0.0	50.6	66	50.6	10	----	50.2	0.4	8	-7.6
R17	65	1	0.0	57.7	66	57.7	10	----	57.1	0.6	8	-7.4
R18	66	1	0.0	59.7	66	59.7	10	----	59.2	0.5	8	-7.5
R19	67	1	0.0	61.0	66	61.0	10	----	60.6	0.4	8	-7.6
R20	68	1	0.0	46.8	66	46.8	10	----	46.2	0.6	8	-7.4
R21	69	1	0.0	46.0	66	46.0	10	----	45.6	0.4	8	-7.6
R22	70	1	0.0	48.1	66	48.1	10	----	47.5	0.6	8	-7.4
R23	71	1	0.0	51.8	66	51.8	10	----	51.7	0.1	8	-7.9
R24	72	1	0.0	53.6	66	53.6	10	----	53.3	0.3	8	-7.7
R25	73	1	0.0	54.2	66	54.2	10	----	53.8	0.4	8	-7.6



**RESULTS: SOUND LEVELS**

**US-89; 10600 SOUTH TO 11400 SOUTH**

R26	74	1	0.0	49.5	66	49.5	10	----	48.7	0.8	8	-7.2
R27	75	1	0.0	51.6	66	51.6	10	----	50.8	0.8	8	-7.2
R28	76	1	0.0	52.2	66	52.2	10	----	51.3	0.9	8	-7.1
R29	77	1	0.0	58.5	66	58.5	10	----	57.4	1.1	8	-6.9
R30	78	1	0.0	59.7	66	59.7	10	----	58.4	1.3	8	-6.7
R31	79	1	0.0	60.2	66	60.2	10	----	59.0	1.2	8	-6.8
R32	80	1	0.0	55.4	66	55.4	10	----	53.5	1.9	8	-6.1
R33	81	1	0.0	58.7	66	58.7	10	----	57.1	1.6	8	-6.4
R34	82	1	0.0	59.5	66	59.5	10	----	58.2	1.3	8	-6.7
R35	83	1	0.0	51.1	66	51.1	10	----	51.2	-0.1	8	-8.1
R36	84	1	0.0	53.6	66	53.6	10	----	53.6	0.0	8	-8.0
R37	85	1	0.0	54.7	66	54.7	10	----	54.7	0.0	8	-8.0
R38	86	1	0.0	61.7	66	61.7	10	----	60.2	1.5	8	-6.5
R63	117	1	0.0	67.4	66	67.4	10	Snd Lvl	61.7	5.7	8	-2.3
R64	118	1	0.0	69.3	66	69.3	10	Snd Lvl	64.6	4.7	8	-3.3
R65	119	1	0.0	69.8	66	69.8	10	Snd Lvl	67.7	2.1	8	-5.9
R66	121	1	0.0	62.2	66	62.2	10	----	60.6	1.6	8	-6.4
R67	122	1	0.0	63.4	66	63.4	10	----	61.8	1.6	8	-6.4
R68	123	1	0.0	64.2	66	64.2	10	----	62.6	1.6	8	-6.4
<b>Dwelling Units</b>		<b># DUs</b>	<b>Noise Reduction</b>									
			<b>Min</b>	<b>Avg</b>	<b>Max</b>							
			<b>dB</b>	<b>dB</b>	<b>dB</b>							
All Selected		43	-0.1	1.6	5.7							
All Impacted		11	1.1	3.0	5.7							
All that meet NR Goal		0	0.0	0.0	0.0							

RESULTS: SOUND LEVELS

US-89; 10600 SOUTH TO 11400 SOUTH

UDOT													18 April 2017	
J. WIELGOS / HW LOCHNER													TNM 2.5	
													Calculated with TNM 2.5	
RESULTS: SOUND LEVELS														
PROJECT/CONTRACT:			US-89; 10600 SOUTH TO 11400 SOUTH											
RUN:			BUILD_BARRIERS											
BARRIER DESIGN:			Barrier 1a and 1b - 16ft						Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.					
ATMOSPHERICS:			68 deg F, 50% RH											
Receiver														
Name		No.	#DUs	Existing LAeq1h	No Barrier LAeq1h	Increase over existing		Type	With Barrier LAeq1h	Noise Reduction				
				Calculated	Crit'n	Calculated	Crit'n	Impact	Calculated	Calculated	Goal	Calculated		
							Sub'l Inc					minus Goal		
				dBA	dBA	dBA	dB		dBA	dB	dB	dB		
R02	50	1	0.0	67.2	66	67.2	10	Snd Lvl	63.3	3.9	8	-4.1		
R03	51	1	0.0	69.3	66	69.3	10	Snd Lvl	65.2	4.1	8	-3.9		
R04	52	1	0.0	69.7	66	69.7	10	Snd Lvl	66.4	3.3	8	-4.7		
R05	53	1	0.0	68.1	66	68.1	10	Snd Lvl	63.5	4.6	8	-3.4		
R06	54	1	0.0	69.7	66	69.7	10	Snd Lvl	65.0	4.7	8	-3.3		
R07	55	1	0.0	70.2	66	70.2	10	Snd Lvl	66.6	3.6	8	-4.4		
R08	56	1	0.0	65.7	66	65.7	10	----	63.4	2.3	8	-5.7		
R09	57	1	0.0	66.9	66	66.9	10	Snd Lvl	64.5	2.4	8	-5.6		
R10	58	1	0.0	67.4	66	67.4	10	Snd Lvl	65.3	2.1	8	-5.9		
R11	59	1	0.0	62.9	66	62.9	10	----	57.3	5.6	8	-2.4		
R12	60	1	0.0	64.9	66	64.9	10	----	60.1	4.8	8	-3.2		
R13	61	1	0.0	65.4	66	65.4	10	----	61.6	3.8	8	-4.2		
R14	62	1	0.0	49.0	66	49.0	10	----	48.5	0.5	8	-7.5		
R15	63	1	0.0	50.0	66	50.0	10	----	49.3	0.7	8	-7.3		
R16	64	1	0.0	50.6	66	50.6	10	----	50.0	0.6	8	-7.4		
R17	65	1	0.0	57.7	66	57.7	10	----	57.0	0.7	8	-7.3		
R18	66	1	0.0	59.7	66	59.7	10	----	59.1	0.6	8	-7.4		
R19	67	1	0.0	61.0	66	61.0	10	----	60.5	0.5	8	-7.5		
R20	68	1	0.0	46.8	66	46.8	10	----	46.0	0.8	8	-7.2		
R21	69	1	0.0	46.0	66	46.0	10	----	45.3	0.7	8	-7.3		
R22	70	1	0.0	48.1	66	48.1	10	----	47.2	0.9	8	-7.1		
R23	71	1	0.0	51.8	66	51.8	10	----	51.6	0.2	8	-7.8		
R24	72	1	0.0	53.6	66	53.6	10	----	53.2	0.4	8	-7.6		
R25	73	1	0.0	54.2	66	54.2	10	----	53.6	0.6	8	-7.4		

**RESULTS: SOUND LEVELS**

**US-89; 10600 SOUTH TO 11400 SOUTH**

R26	74	1	0.0	49.5	66	49.5	10	----	48.6	0.9	8	-7.1
R27	75	1	0.0	51.6	66	51.6	10	----	50.6	1.0	8	-7.0
R28	76	1	0.0	52.2	66	52.2	10	----	51.2	1.0	8	-7.0
R29	77	1	0.0	58.5	66	58.5	10	----	57.2	1.3	8	-6.7
R30	78	1	0.0	59.7	66	59.7	10	----	58.1	1.6	8	-6.4
R31	79	1	0.0	60.2	66	60.2	10	----	58.7	1.5	8	-6.5
R32	80	1	0.0	55.4	66	55.4	10	----	53.3	2.1	8	-5.9
R33	81	1	0.0	58.7	66	58.7	10	----	56.9	1.8	8	-6.2
R34	82	1	0.0	59.5	66	59.5	10	----	57.9	1.6	8	-6.4
R35	83	1	0.0	51.1	66	51.1	10	----	51.1	0.0	8	-8.0
R36	84	1	0.0	53.6	66	53.6	10	----	53.5	0.1	8	-7.9
R37	85	1	0.0	54.7	66	54.7	10	----	54.6	0.1	8	-7.9
R38	86	1	0.0	61.7	66	61.7	10	----	60.1	1.6	8	-6.4
R63	117	1	0.0	67.4	66	67.4	10	Snd Lvl	61.1	6.3	8	-1.7
R64	118	1	0.0	69.3	66	69.3	10	Snd Lvl	63.0	6.3	8	-1.7
R65	119	1	0.0	69.8	66	69.8	10	Snd Lvl	64.9	4.9	8	-3.1
R66	121	1	0.0	62.2	66	62.2	10	----	60.4	1.8	8	-6.2
R67	122	1	0.0	63.4	66	63.4	10	----	61.3	2.1	8	-5.9
R68	123	1	0.0	64.2	66	64.2	10	----	62.2	2.0	8	-6.0
<b>Dwelling Units</b>		<b># DUs</b>	<b>Noise Reduction</b>									
			<b>Min</b>	<b>Avg</b>	<b>Max</b>							
			<b>dB</b>	<b>dB</b>	<b>dB</b>							
All Selected		43	0.0	2.1	6.3							
All Impacted		11	2.1	4.2	6.3							
All that meet NR Goal		0	0.0	0.0	0.0							

RESULTS: SOUND LEVELS

US-89; 10600 SOUTH TO 11400 SOUTH

UDOT										18 April 2017			
J. WIELGOS / HW LOCHNER										TNM 2.5			
										Calculated with TNM 2.5			
RESULTS: SOUND LEVELS													
PROJECT/CONTRACT:		US-89; 10600 SOUTH TO 11400 SOUTH											
RUN:		BUILD_BARRIERS											
BARRIER DESIGN:		Barrier 1a and 1b - 20ft								Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.			
ATMOSPHERICS:		68 deg F, 50% RH											
Receiver													
Name		No.	#DUs	Existing LAeq1h	No Barrier LAeq1h	Increase over existing		Type	With Barrier	Noise Reduction			
					Calculated	Crit'n	Calculated	Crit'n	Impact	Calculated LAeq1h	Calculated	Goal	Calculated minus Goal
				dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R02		50	1	0.0	67.2	66	67.2	10	Snd Lvl	63.1	4.1	8	-3.9
R03		51	1	0.0	69.3	66	69.3	10	Snd Lvl	65.0	4.3	8	-3.7
R04		52	1	0.0	69.7	66	69.7	10	Snd Lvl	65.5	4.2	8	-3.8
R05		53	1	0.0	68.1	66	68.1	10	Snd Lvl	63.3	4.8	8	-3.2
R06		54	1	0.0	69.7	66	69.7	10	Snd Lvl	64.6	5.1	8	-2.9
R07		55	1	0.0	70.2	66	70.2	10	Snd Lvl	65.3	4.9	8	-3.1
R08		56	1	0.0	65.7	66	65.7	10	----	63.3	2.4	8	-5.6
R09		57	1	0.0	66.9	66	66.9	10	Snd Lvl	64.3	2.6	8	-5.4
R10		58	1	0.0	67.4	66	67.4	10	Snd Lvl	64.9	2.5	8	-5.5
R11		59	1	0.0	62.9	66	62.9	10	----	57.0	5.9	8	-2.1
R12		60	1	0.0	64.9	66	64.9	10	----	59.8	5.1	8	-2.9
R13		61	1	0.0	65.4	66	65.4	10	----	60.8	4.6	8	-3.4
R14		62	1	0.0	49.0	66	49.0	10	----	48.0	1.0	8	-7.0
R15		63	1	0.0	50.0	66	50.0	10	----	48.6	1.4	8	-6.6
R16		64	1	0.0	50.6	66	50.6	10	----	49.3	1.3	8	-6.7
R17		65	1	0.0	57.7	66	57.7	10	----	57.0	0.7	8	-7.3
R18		66	1	0.0	59.7	66	59.7	10	----	59.1	0.6	8	-7.4
R19		67	1	0.0	61.0	66	61.0	10	----	60.4	0.6	8	-7.4
R20		68	1	0.0	46.8	66	46.8	10	----	45.1	1.7	8	-6.3
R21		69	1	0.0	46.0	66	46.0	10	----	44.7	1.3	8	-6.7
R22		70	1	0.0	48.1	66	48.1	10	----	46.1	2.0	8	-6.0
R23		71	1	0.0	51.8	66	51.8	10	----	51.4	0.4	8	-7.6
R24		72	1	0.0	53.6	66	53.6	10	----	52.8	0.8	8	-7.2
R25		73	1	0.0	54.2	66	54.2	10	----	53.2	1.0	8	-7.0

**RESULTS: SOUND LEVELS**

**US-89; 10600 SOUTH TO 11400 SOUTH**

R26	74	1	0.0	49.5	66	49.5	10	----	48.3	1.2	8	-6.8
R27	75	1	0.0	51.6	66	51.6	10	----	50.5	1.1	8	-6.9
R28	76	1	0.0	52.2	66	52.2	10	----	51.0	1.2	8	-6.8
R29	77	1	0.0	58.5	66	58.5	10	----	57.1	1.4	8	-6.6
R30	78	1	0.0	59.7	66	59.7	10	----	58.0	1.7	8	-6.3
R31	79	1	0.0	60.2	66	60.2	10	----	58.5	1.7	8	-6.3
R32	80	1	0.0	55.4	66	55.4	10	----	53.2	2.2	8	-5.8
R33	81	1	0.0	58.7	66	58.7	10	----	56.8	1.9	8	-6.1
R34	82	1	0.0	59.5	66	59.5	10	----	57.8	1.7	8	-6.3
R35	83	1	0.0	51.1	66	51.1	10	----	51.1	0.0	8	-8.0
R36	84	1	0.0	53.6	66	53.6	10	----	53.5	0.1	8	-7.9
R37	85	1	0.0	54.7	66	54.7	10	----	54.6	0.1	8	-7.9
R38	86	1	0.0	61.7	66	61.7	10	----	60.0	1.7	8	-6.3
R63	117	1	0.0	67.4	66	67.4	10	Snd Lvl	60.7	6.7	8	-1.3
R64	118	1	0.0	69.3	66	69.3	10	Snd Lvl	62.4	6.9	8	-1.1
R65	119	1	0.0	69.8	66	69.8	10	Snd Lvl	63.1	6.7	8	-1.3
R66	121	1	0.0	62.2	66	62.2	10	----	60.3	1.9	8	-6.1
R67	122	1	0.0	63.4	66	63.4	10	----	61.2	2.2	8	-5.8
R68	123	1	0.0	64.2	66	64.2	10	----	61.9	2.3	8	-5.7
<b>Dwelling Units</b>		<b># DUs</b>	<b>Noise Reduction</b>									
			<b>Min</b>	<b>Avg</b>	<b>Max</b>							
			<b>dB</b>	<b>dB</b>	<b>dB</b>							
All Selected		43	0.0	2.5	6.9							
All Impacted		11	2.5	4.8	6.9							
All that meet NR Goal		0	0.0	0.0	0.0							



## **APPENDIX C: RESOURCE DATA**

The following resource data was used to support the US-89; 11400 South to 10600 South Environmental Assessment:

- Information for Planning and Consultation (IPaC) Resource List
- Threatened and Endangered Species and Wildlife Clearance Memorandum
- Determination of Eligibility and Finding of Effect (DOEFOE)
- Section 4(f) Finding Concurrence Request



## IPaC Information for Planning and Consultation U.S. Fish & Wildlife Service

# IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as trust resources) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

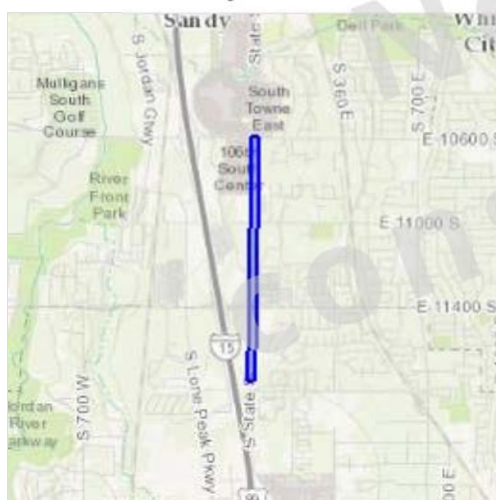
## Project information

### NAME

US-89 (State Street); 11400 S to 10600 S EA

### LOCATION

Salt Lake County, Utah



## Local office

Utah Ecological Services Field Office

☎ (801) 975-3330

📅 (801) 975-3331

2369 West Orton Circle, Suite 50  
West Valley City, UT 84119-7603

<http://www.fws.gov>

<http://www.fws.gov/utahfieldoffice/>

## Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species<sup>1</sup> are managed by the [Endangered Species Program](#) of the U.S. Fish and Wildlife Service.

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1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.

The following species are potentially affected by activities in this location:

## Birds

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NAME	STATUS
Yellow-billed Cuckoo <i>Coccyzus americanus</i> There is a <b>proposed</b> <a href="#">critical habitat</a> for this species. Your location is outside the proposed critical habitat. <a href="https://ecos.fws.gov/ecp/species/3911">https://ecos.fws.gov/ecp/species/3911</a>	Threatened

## Fishes

NAME	STATUS
June Sucker <i>Chasmistes liorus</i> There is a <b>final</b> <a href="#">critical habitat</a> designated for this species. Your location is outside the designated critical habitat. <a href="https://ecos.fws.gov/ecp/species/4133">https://ecos.fws.gov/ecp/species/4133</a>	Endangered

## Flowering Plants

NAME	STATUS
Ute Ladies'-tresses <i>Spiranthes diluvialis</i> No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/2159">https://ecos.fws.gov/ecp/species/2159</a>	Threatened

## Mammals

NAME	STATUS
Canada Lynx <i>Lynx canadensis</i> There is a <b>final</b> <a href="#">critical habitat</a> designated for this species. Your location is outside the designated critical habitat. <a href="https://ecos.fws.gov/ecp/species/3652">https://ecos.fws.gov/ecp/species/3652</a>	Threatened

## Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

## Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.



Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service<sup>3</sup>. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Conservation measures for birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Year-round bird occurrence data <http://www.birdscanada.org/birdmon/default/datasummaries.jsp>

The migratory birds species listed below are species of particular conservation concern (e.g. [Birds of Conservation Concern](#)) that may be potentially affected by activities in this location. It is not a list of every bird species you may find in this location, nor a guarantee that all of the bird species on this list will be found on or near this location. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To view available data on other bird species that may occur in your project area, please visit the [AKN Histogram Tools](#) and [Other Bird Data Resources](#). To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

NAME	SEASON(S)
American Bittern <i>Botaurus lentiginosus</i> <a href="https://ecos.fws.gov/ecp/species/6582">https://ecos.fws.gov/ecp/species/6582</a>	Breeding
Bald Eagle <i>Haliaeetus leucocephalus</i> <a href="https://ecos.fws.gov/ecp/species/1626">https://ecos.fws.gov/ecp/species/1626</a>	Wintering
Black Rosy-finch <i>Leucosticte atrata</i> <a href="https://ecos.fws.gov/ecp/species/9460">https://ecos.fws.gov/ecp/species/9460</a>	Year-round

Black Swift <i>Cypseloides niger</i> <a href="https://ecos.fws.gov/ecp/species/8878">https://ecos.fws.gov/ecp/species/8878</a>	Breeding
Brewer's Sparrow <i>Spizella breweri</i> <a href="https://ecos.fws.gov/ecp/species/9291">https://ecos.fws.gov/ecp/species/9291</a>	Breeding
Burrowing Owl <i>Athene cunicularia</i> <a href="https://ecos.fws.gov/ecp/species/9737">https://ecos.fws.gov/ecp/species/9737</a>	Breeding
Calliope Hummingbird <i>Stellula calliope</i> <a href="https://ecos.fws.gov/ecp/species/9526">https://ecos.fws.gov/ecp/species/9526</a>	Breeding
Cassin's Finch <i>Carpodacus cassinii</i> <a href="https://ecos.fws.gov/ecp/species/9462">https://ecos.fws.gov/ecp/species/9462</a>	Year-round
Eared Grebe <i>Podiceps nigricollis</i>	Breeding
Ferruginous Hawk <i>Buteo regalis</i> <a href="https://ecos.fws.gov/ecp/species/6038">https://ecos.fws.gov/ecp/species/6038</a>	Year-round
Flammulated Owl <i>Otus flammeolus</i> <a href="https://ecos.fws.gov/ecp/species/7728">https://ecos.fws.gov/ecp/species/7728</a>	Breeding
Fox Sparrow <i>Passerella iliaca</i>	Breeding
Golden Eagle <i>Aquila chrysaetos</i> <a href="https://ecos.fws.gov/ecp/species/1680">https://ecos.fws.gov/ecp/species/1680</a>	Year-round
Greater Sage-grouse <i>Centrocercus urophasianus</i> <a href="https://ecos.fws.gov/ecp/species/8159">https://ecos.fws.gov/ecp/species/8159</a>	Year-round
Lewis's Woodpecker <i>Melanerpes lewis</i> <a href="https://ecos.fws.gov/ecp/species/9408">https://ecos.fws.gov/ecp/species/9408</a>	Breeding
Loggerhead Shrike <i>Lanius ludovicianus</i> <a href="https://ecos.fws.gov/ecp/species/8833">https://ecos.fws.gov/ecp/species/8833</a>	Year-round
Long-billed Curlew <i>Numenius americanus</i> <a href="https://ecos.fws.gov/ecp/species/5511">https://ecos.fws.gov/ecp/species/5511</a>	Breeding

Olive-sided Flycatcher <i>Contopus cooperi</i> <a href="https://ecos.fws.gov/ecp/species/3914">https://ecos.fws.gov/ecp/species/3914</a>	Breeding
Peregrine Falcon <i>Falco peregrinus</i> <a href="https://ecos.fws.gov/ecp/species/8831">https://ecos.fws.gov/ecp/species/8831</a>	Year-round
Pinyon Jay <i>Gymnorhinus cyanocephalus</i> <a href="https://ecos.fws.gov/ecp/species/9420">https://ecos.fws.gov/ecp/species/9420</a>	Year-round
Sage Thrasher <i>Oreoscoptes montanus</i> <a href="https://ecos.fws.gov/ecp/species/9433">https://ecos.fws.gov/ecp/species/9433</a>	Breeding
Short-eared Owl <i>Asio flammeus</i> <a href="https://ecos.fws.gov/ecp/species/9295">https://ecos.fws.gov/ecp/species/9295</a>	Wintering
Snowy Plover <i>Charadrius alexandrinus</i>	Breeding
Swainson's Hawk <i>Buteo swainsoni</i> <a href="https://ecos.fws.gov/ecp/species/1098">https://ecos.fws.gov/ecp/species/1098</a>	Breeding
Virginia's Warbler <i>Vermivora virginiae</i> <a href="https://ecos.fws.gov/ecp/species/9441">https://ecos.fws.gov/ecp/species/9441</a>	Breeding
Western Grebe <i>Aechmophorus occidentalis</i> <a href="https://ecos.fws.gov/ecp/species/6743">https://ecos.fws.gov/ecp/species/6743</a>	Breeding
Williamson's Sapsucker <i>Sphyrapicus thyroideus</i> <a href="https://ecos.fws.gov/ecp/species/8832">https://ecos.fws.gov/ecp/species/8832</a>	Breeding
Willow Flycatcher <i>Empidonax traillii</i> <a href="https://ecos.fws.gov/ecp/species/3482">https://ecos.fws.gov/ecp/species/3482</a>	Breeding

**What does IPaC use to generate the list of migratory bird species potentially occurring in my specified location?**

#### Landbirds:

Migratory birds that are displayed on the IPaC species list are based on ranges in the latest edition of the National Geographic Guide, Birds of North America (6th Edition, 2011 by Jon L. Dunn, and Jonathan Alderfer). Although these ranges are coarse in nature, a number of U.S. Fish and Wildlife Service migratory bird biologists agree that these maps are some of the best range maps to date. These ranges were clipped to a specific Bird Conservation Region (BCR) or USFWS Region/Regions, if it was indicated in the 2008 list of Birds of Conservation Concern (BCC) that a species was a BCC species only in a particular Region/Regions. Additional modifications

have been made to some ranges based on more local or refined range information and/or information provided by U.S. Fish and Wildlife Service biologists with species expertise. All migratory birds that show in areas on land in IPaC are those that appear in the 2008 Birds of Conservation Concern report.

#### **Atlantic Seabirds:**

Ranges in IPaC for birds off the Atlantic coast are derived from species distribution models developed by the National Oceanic and Atmospheric Association (NOAA) National Centers for Coastal Ocean Science (NCCOS) using the best available seabird survey data for the offshore Atlantic Coastal region to date. NOANCCOS assisted USFWS in developing seasonal species ranges from their models for specific use in IPaC. Some of these birds are not BCC species but were of interest for inclusion because they may occur in high abundance off the coast at different times throughout the year, which potentially makes them more susceptible to certain types of development and activities taking place in that area. For more refined details about the abundance and richness of bird species within your project area off the Atlantic Coast, see the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other types of taxa that may be helpful in your project review.

About the NOANCCOS models: the models were developed as part of the NOANCCOS project: [Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#). The models resulting from this project are being used in a number of decision-support/mapping products in order to help guide decision-making on activities off the Atlantic Coast with the goal of reducing impacts to migratory birds. One such product is the [Northeast Ocean Data Portal](#), which can be used to explore details about the relative occurrence and abundance of bird species in a particular area off the Atlantic Coast.

All migratory bird range maps within IPaC are continuously being updated as new and better information becomes available.

#### **Can I get additional information about the levels of occurrence in my project area of specific birds or groups of birds listed in IPaC?**

##### **Landbirds:**

The [Avian Knowledge Network \(AKN\)](#) provides a tool currently called the "Histogram Tool", which draws from the data within the AKN (latest, survey, point count, citizen science datasets) to create a view of relative abundance of species within a particular location over the course of the year. The results of the tool depict the frequency of detection of a species in survey events, averaged between multiple datasets within AKN in a particular week of the year. You may access the histogram tools through the [Migratory Bird Programs AKN Histogram Tools](#) webpage.

The tool is currently available for 4 regions (California, Northeast U.S., Southeast U.S. and Midwest), which encompasses the following 32 states: Alabama, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin.

In the near future, there are plans to expand this tool nationwide within the AKN, and allow the graphs produced to appear with the list of trust resources generated by IPaC, providing you with an additional level of detail about the level of occurrence of the species of particular concern potentially occurring in your project area throughout the course of the year.

##### **Atlantic Seabirds:**

For additional details about the relative occurrence and abundance of both individual bird species and groups

of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS [Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project](#) webpage.

## Facilities

### Wildlife refuges

Any activity proposed on [National Wildlife Refuge](#) lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

### Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

### Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

#### Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work



conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

### **Data exclusions**

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

### **Data precautions**

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Not for  
consultation

# Memorandum



To: Elisa Sims Albury, NEPA Specialist  
Lochner Engineers

From: Paul W. West, Wildlife/Wetlands Biologist  
UDOT, Environmental Services

*P.W.W.*

Date: April 5, 2017

Re: F-0089(375)364 – U.S. 89, 11400 South to 10600 South Design, EA, Salt Lake County  
(12561)

CC: Craig Bown – UDOT, Region 2  
Ashley Green – UDWR, Headquarters  
Mark Farmer – UDWR, Central Region  
Matt Howard – UDWR, Central Region  
Lloyd Neeley – UDOT, Maintenance  
File

Encl:

I understand that the Utah Department of Transportation (UDOT), is proposing improvements to US-89 (State Street) from 11400 South to 10600 South to meet future (2040) travel demand. This section of State Street is located in the cities of Sandy and Draper, Salt Lake County, Utah. UDOT is preparing an Environmental Assessment (EA) to analyze any potential impacts that could occur to the natural and built environment as a result of the proposed improvements. The environmental review, consultation and other actions required by applicable federal environmental laws for this project are being or have been carried-out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.

The Build Alternative being evaluated would widen State Street from five to seven lanes, with three travel lanes in each direction from 11400 South to the current three-lane section just south of 10600 South largely within the existing Right-of-Way. Design elements would include: reducing existing travel lane widths from 12 feet to 11 feet; removing the existing shoulders (where present); installing continuous 2½-foot-wide curb and gutter throughout the study area; and installing park strips and sidewalks (where not currently present). A second southbound to westbound right-turn lane at the State Street and 11400 South intersection would be added and the lane configuration on State Street south of 11400 South would need to be shifted to the east to match the improvements on the north leg of this intersection. The project would also add a traffic signal at the Scheels driveway just north of 11400 South and install raised medians on select sections of State Street.

A review of the Utah Division of Wildlife Resources, Utah Natural Heritage Program

(UDWR/UNHP) 2016 database, U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC), GIS shapefile data and recent aerial imagery indicates that no federally listed, threatened, endangered or candidate species or any critical habitat would be affected by this project.

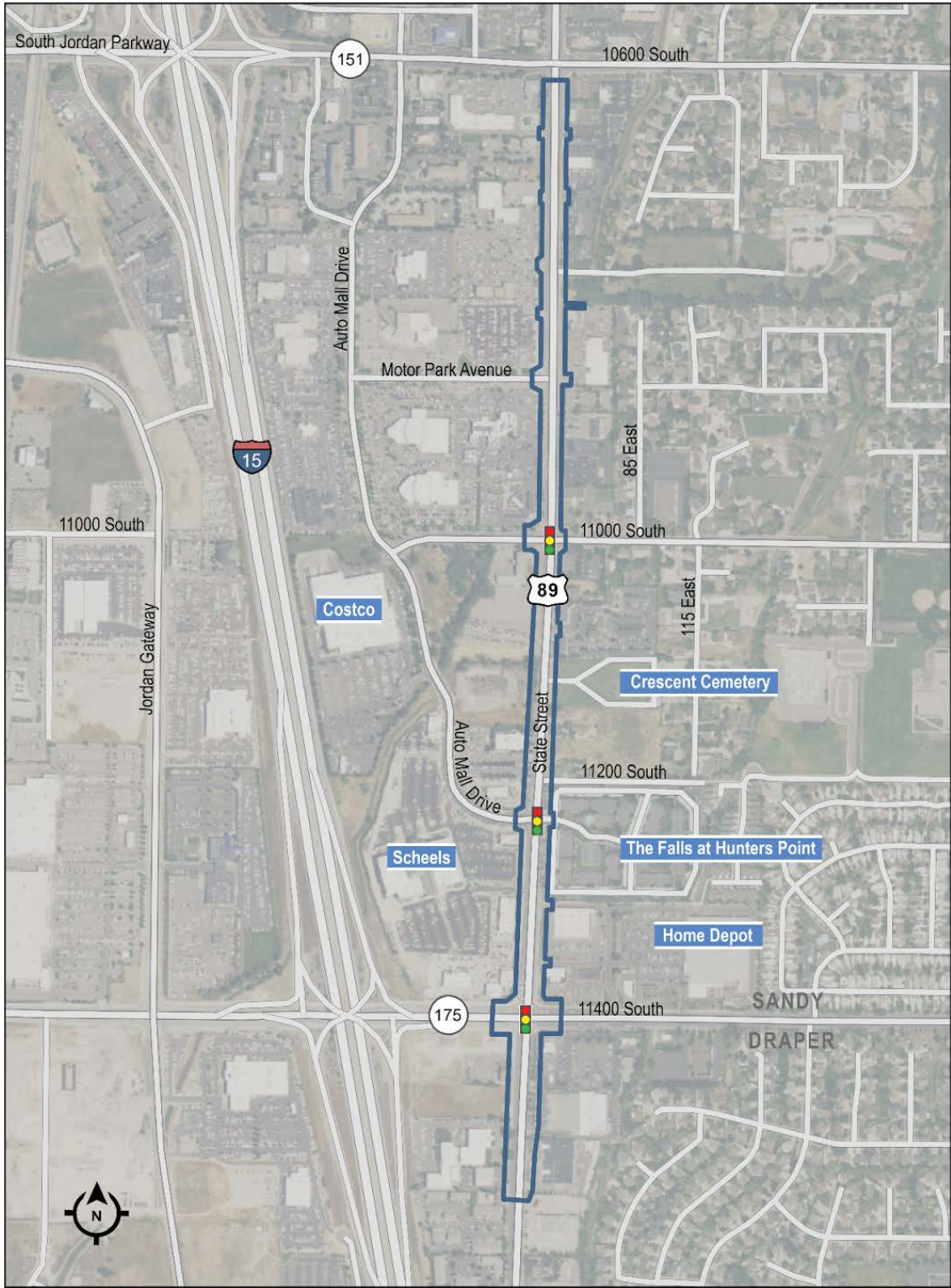
In accordance with the U.S. Fish and Wildlife Service memo dated January 27, 2006, they do not issue concurrence letters for “no-effect” determinations. Therefore, this memo is being issued in-lieu of their concurrence for your environmental documentation.

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In addition, I have evaluated the above-referenced project regarding Greater Sage Grouse (*Centrocercus urophasianus*) (GSG) as required by the Conservation Plan for Greater Sage-grouse MOU between UDWR and UDOT, and regarding migratory birds as required in the Migratory Bird Treaty Act of 1918 and the UDOT Environmental Manual of Instructions.

Based on the Greater Sage Grouse 2016 habitat mapping, and the UDWR/UNHP 2016 database, and it is my opinion that this project should not negatively affect Greater Sage Grouse or migratory birds.

If you have any questions, please call me at (801) 633-8747, or email me at [paulwest@utah.gov](mailto:paulwest@utah.gov).



17-0946



State of Utah

GARY R. HERBERT  
Governor

SPENCER J. COX  
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION

CARLOS M. BRACERAS, P.E.  
Executive Director

SHANE M. MARSHALL, P.E.  
Deputy Director

April 24, 2017

Mr. Cory Jensen  
Senior Historic Preservation Specialist  
Utah Division of State History  
300 Rio Grande  
Salt Lake City, UT 84101-1182

RE: UDOT Project No. F-0089(375)364, US-89;11400 South to 10600 South, Sandy City, Salt Lake County, Utah (PIN 12561).  
**Determination of Eligibility and Finding of No Adverse Effect.**

Dear Mr. Jensen:

The Utah Department of Transportation (UDOT) is preparing to undertake the subject federal-aid project. In accordance with Parts 3.1.1 and 3.2 of the *Memorandum of Understanding Between the Federal Highway Administration and the Utah Department of Transportation Concerning State of Utah's Participation in the Surface Transportation Project Delivery Program Pursuant to 23 USC §327* (executed January 17, 2017), the UDOT assumes responsibility, assigned by the Federal Highway Administration (FHWA), for ensuring compliance with Section 106 of the NHPA and with Section 4(f) of the DOT Act of 1966, as amended. In accordance with the *Second Amended Programmatic Agreement Among the Federal Highway Administration, the Utah Department of Transportation, the Utah State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding Section 106 Implementation for Federal-Aid Transportation Projects in the State of Utah* (executed June 3, 2013), Section 106 of the National Historic Preservation Act of 1966, as amended (54 U.S.C. § 300101 et seq.), and U.C.A.9-8-404, the UDOT has taken into account the effects of this undertaking on historic properties, and is affording the Advisory Council on Historic Preservation (ACHP) and the Utah State Historic Preservation Officer (SHPO) an opportunity to comment on the undertaking. Additionally, this submission is in compliance with Section 4(f) of the Department of Transportation Act of 1966, 23 U.S.C. § 138 (as amended) and 49 U.S.C. § 303 (as amended).

**PROJECT DESCRIPTION**

UDOT proposes to widen State Street to add capacity from five to seven lanes, with three travel lanes in each direction from 11400 South to the current three-lane section just south of 10600 South largely within the existing Right-of-Way. Design elements would include: reducing existing travel lane widths from 12 feet to 11 feet; removing the existing shoulders (where present); installing continuous 2½-foot-wide curb and gutter throughout the study area; and installing park strips and sidewalks (where not currently present). A second southbound to westbound right-turn lane at the State Street and 11400 South intersection would be added and the lane configuration on State Street south of 11400 South would need to be shifted to the east to match the improvements on the north leg of this intersection. A traffic signal at the Scheels driveway just north of 11400 South and raised medians on select sections of State Street would also be installed.



The area of potential affects (APE) has been defined as SR-89 from 10600 South (milepost 364.75) to 11400 South (MP 363.8) and 11400 South from MP 4.75 to MP 4.3. The APE has been surveyed by Sheri Ellis with Certus Environmental Solutions, under State Antiquities Project Number U16HY0944ps, and the results are reported in *Intensive-Level Archaeological Survey for the US-89; 11400 South to 10600 South Project, Salt Lake County, Utah, March 1, 2017* and *A Selective Reconnaissance-Level Historic Structure Assessment for the US-89; 11400 South to 10600 South Project, Salt Lake County, Utah, February 28, 2017* (see enclosed reports). An intensive level pedestrian survey was conducted using 15 meter transects to identify archaeological resources. A selective reconnaissance level survey was conducted to record architectural properties.

The survey has resulted in the identification of 2 archaeological sites and 11 architectural properties. Of these, 2 archaeological sites and 9 architectural properties are eligible to the National Register of Historic Places (NRHP). No known traditional cultural properties or paleontological resources are located in the APE. The Determinations of Eligibility and Findings of Effects (for both Section 106 and Section 4(f)) are provided in Table 1 for archaeological resources and in Table 2 for architectural properties. Please see attached notification letter regarding Section 4(f) *de minimis* impacts.

## ARCHAEOLOGICAL RESOURCES

Table 1. Determinations of Eligibility and Findings of Effect for Archaeological Resources.

Site	Name or Description	NRHP Eligibility	Finding of Effect	Warrants preservation in place	Section 4(f) Use
42SL214	The Jordan and Salt Lake City Canal	Eligible (Criterion A)	No Historic Properties Affected	No	No
42SL290	The East Jordan Canal	Eligible (Criterion A)	No Historic Properties Affected	No	No

**Description of Effect to Sites 42SL214 & 42SL290:** The proposed project will widen the pavement over the top of the canals. The project will avoid the canals and will not substantially impact or alter any contributing elements of the site or any of the character-defining features for which it was determined eligible for the NRHP. Thus, the proposed project will result in a finding of No Historic Properties Affected.

## ARCHITECTURAL PROPERTIES

Table 2. Determinations of Eligibility and Findings of Effect for Architectural Properties.

Address	Date	Style	NRHP Eligibility/ SHPO Rating	Finding of Effect	Section 4(f) Use
11145 S. State St.	1912	1-story Bungalow single-family dwelling: Arts and Crafts Style	EC/Eligible	No Adverse Effect	<i>de minimis</i>
11155 S. State St.	1927	1-story Other Residential Type single-family dwelling: other	EC/Eligible	No Adverse Effect	<i>de minimis</i>
11191 S. State St.	1932	1.5-story Period Cottage single-family dwelling: English Tudor Revival	EC/Eligible	No Adverse Effect	<i>de minimis</i>
11020 S. State St.	1930	1-story horizontal school exhibiting Art Deco & Post WWII: Other styles	ES/Listed	No Historic Properties Affected	N/A
11031 S. State St.	1912	1.5-story Bungalow single-family dwelling: Bungalow and Arts & Crafts	EC/Eligible	No Historic Properties Affected	N/A
10985 S. State St.	1935	2-story Bungalow	EC/Eligible	No Adverse Effect	<i>de minimis</i>
10975 S State St.	1935	1.5-story Ranch and Minimal traditional: residential other	NC/Ineligible	No Historic Properties Affected	N/A

43 E. 11000 S.	1954	1-story WWII-Era Cottage single-family dwelling: Minimal traditional	NC/Ineligible	No Historic Properties Affected	N/A
45 E. 11000 S	1956	1-story Early Ranch (w/carport) single-family dwelling: Minimal traditional	EC/Eligible	No Historic Properties Affected	N/A
10907 S. State St.	1931	1-story Period cottage single-family dwelling	EC/Eligible	No Historic Properties Affected	N/A
10831 S. State St.	1947	1-story Early ranch/Minimal traditional single-family dwelling	EC/Eligible	No Adverse Effect	<i>de minimis</i>

**Description of Effects:** This proposed project requires right of way acquisitions of approximately 2236 square feet from 5 properties eligible to the NRHP. The acquisitions and associated construction affect a relatively small portion of each property and will not substantially impact or alter any contributing elements of the properties or any of the character-defining features for which each were determined eligible for the NRHP. Thus, the proposed project will result in a finding of No Adverse Effect and a Section 4(f) *de minimis* impact for each property.

### CONSULTATION EFFORTS

Native American consultation was initiated through letters sent to the Eastern Shoshone Tribe of the Wind River Reservation, Shoshone-Bannock Tribes, Paiute Indian Tribe of Utah, Northwestern Band of Shoshone Nation, Uintah and Ouray Ute Tribes, and the Skull Valley Band of Goshute Indians (sent April 4, 2017). In addition, notification was also sent to those tribes with whom UDOT has Section 106 Programmatic Agreements: Cedar Band of Paiutes and Shivwits Band of Paiute Indian Tribe (sent April 4, 2017). To date, none of the tribes have responded to these notifications.

### SUMMARY

To summarize, the project will result in a finding of **No Adverse Effect** and Section 4(f) *de minimis* use for 5 architectural properties and a finding of **No Historic Properties Affected** for all remaining architectural properties and archaeological sites. Therefore, the Finding of Effect for the proposed UDOT Project No. F-0089(375)364, US-89;11400 South to 10600 South, Sandy City, Salt Lake County, Utah, is **No Adverse Effect**.

Please review this document and, providing you agree with the findings contained herein, sign and date the signature line at the end of this letter. Should you have any questions or need additional information, please feel free to contact Liz Robinson at 801-910-2035 or [lizrobinson@utah.gov](mailto:lizrobinson@utah.gov), or Elizabeth Giraud at 801-965-4917 or [egiraud@utah.gov](mailto:egiraud@utah.gov).

Sincerely,

*Liz Robinson*

Liz Robinson, M. A., RPA  
Cultural Resources Program Manager  
UDOT Environmental Services

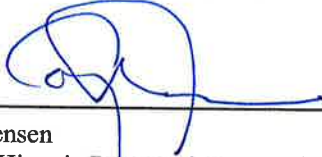
*Elizabeth Giraud*

Elizabeth Giraud, AICP  
Architectural Historian  
UDOT Central Environmental Services

Enclosures

cc: Oanh Le-Spradlin, Project Manager  
Craig Bown, Environmental Manager

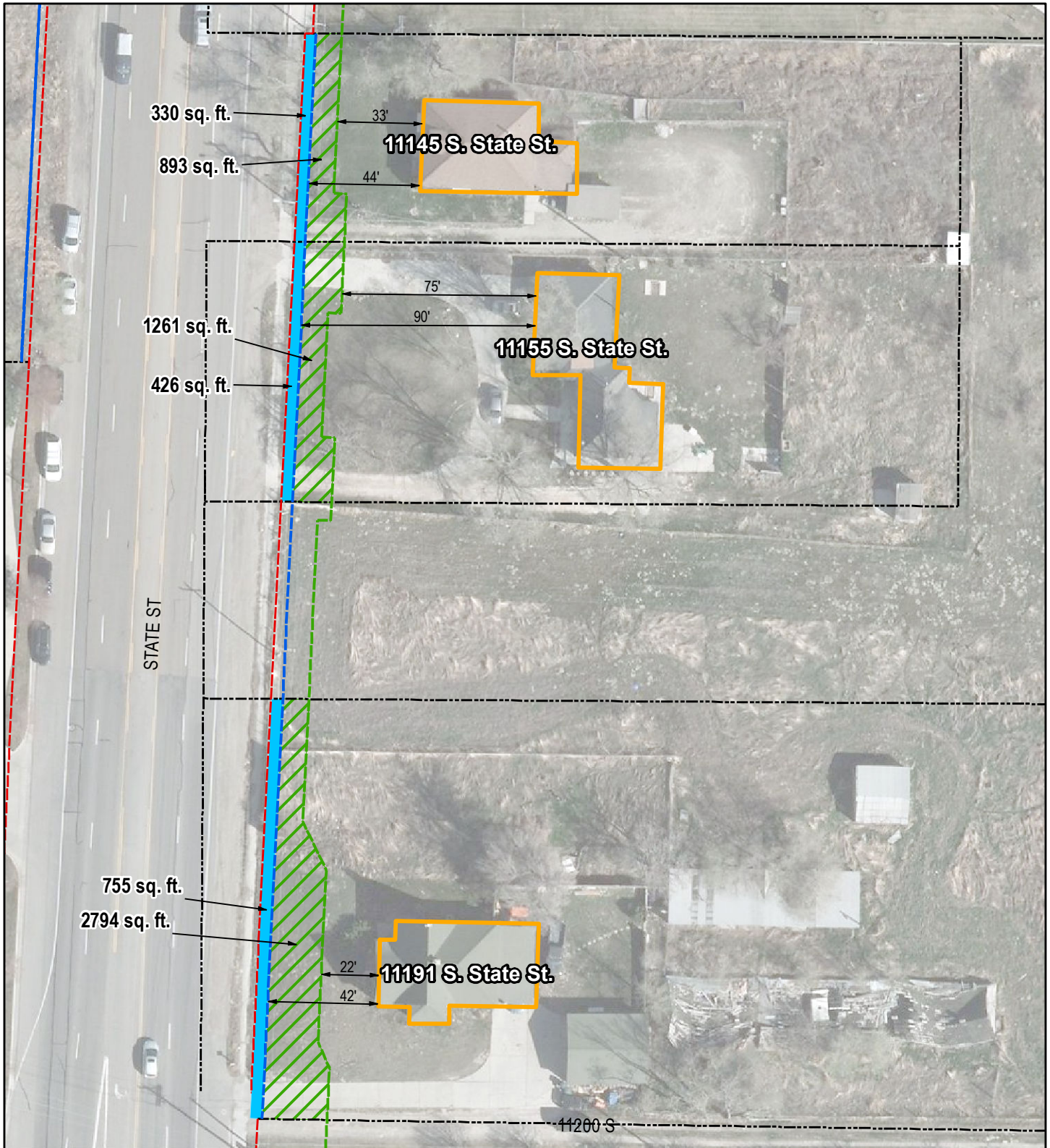
Regarding UDOT Project No. F-0089(375)364, US-89;11400 South to 10600 South, Sandy City, Salt Lake County, Utah, I concur with the Determination of Eligibility and Finding of Effect, submitted to the Utah State Historic Preservation Office in accordance with the *Second Amended Programmatic Agreement*, Section 106 of the NHPA, and U.C.A. 9-8-404, which states that the UDOT has determined that the finding is **No Adverse Effect**.



Cory Jensen  
Senior Historic Preservation Specialist

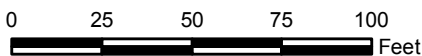
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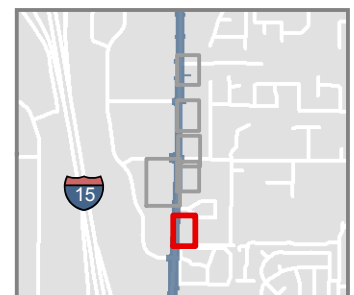


US-89; 11400 South to 10600 South Design/EA  
 Project No.: F-0089(375)364  
 PIN 12561

Determination of Eligibility  
 Finding of Effect



- Eligible Historic Building
- Temporary Construction Easement Line
- Proposed Right-of-Way Line
- Partial Acquisition
- Temporary Construction Easement
- Existing Right-of-Way Line
- Property Line

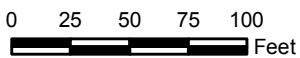




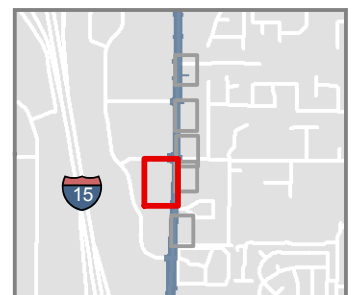


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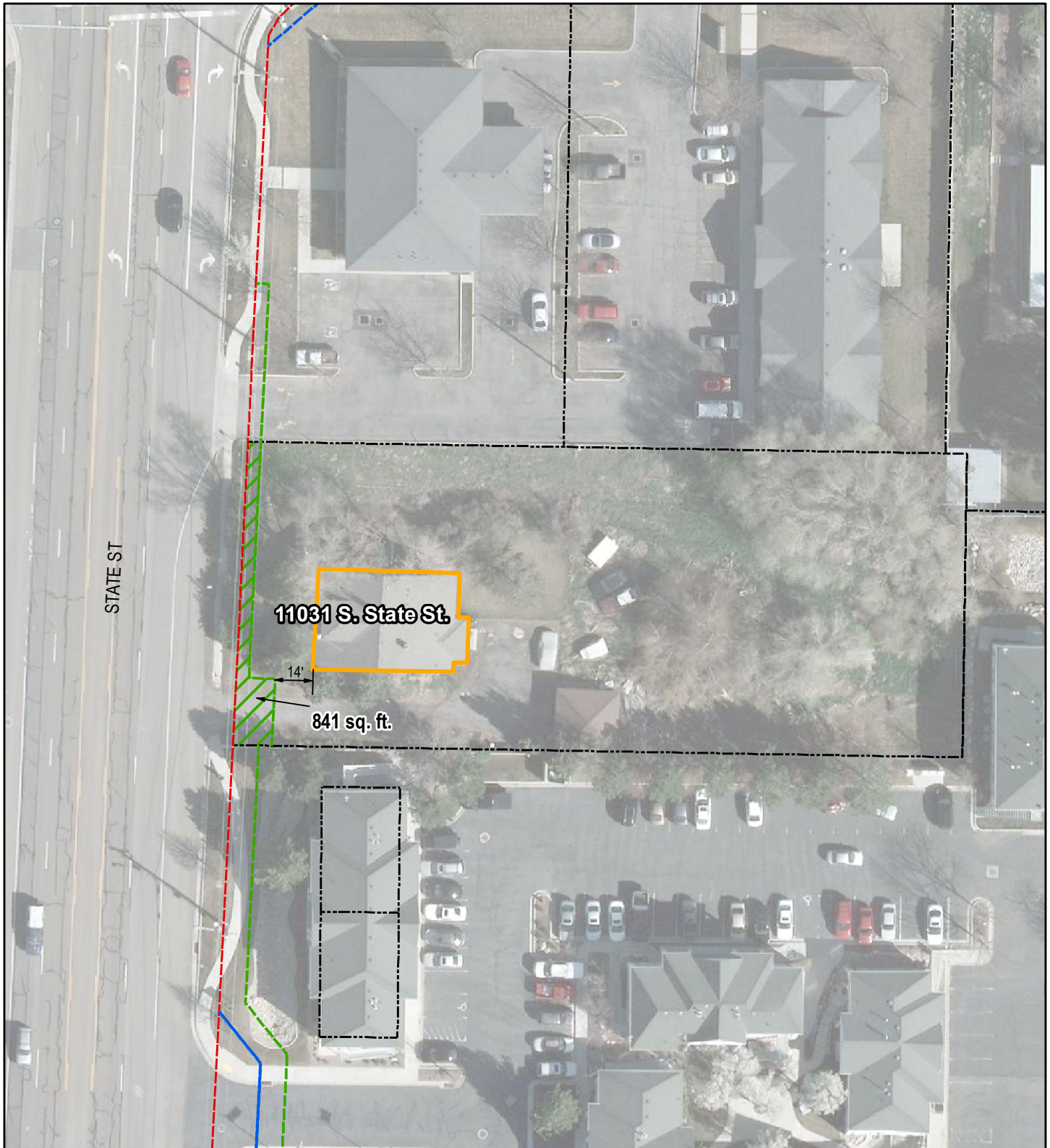
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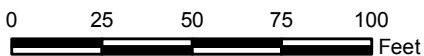




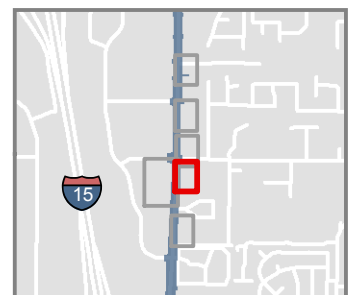


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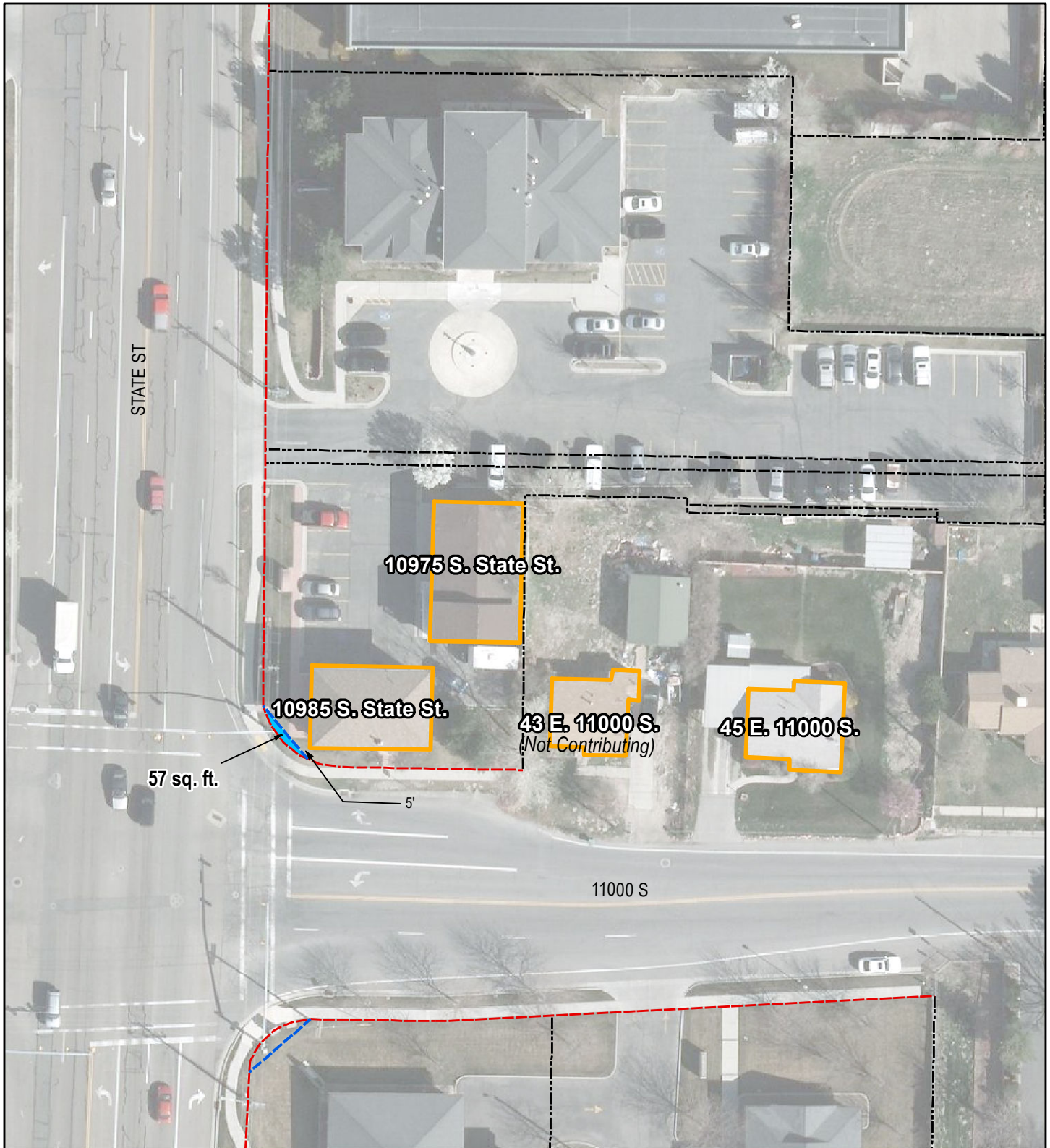
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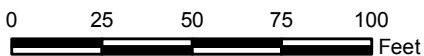




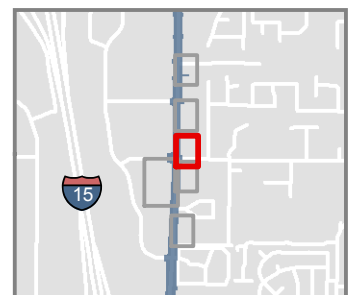


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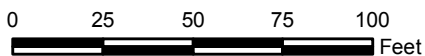
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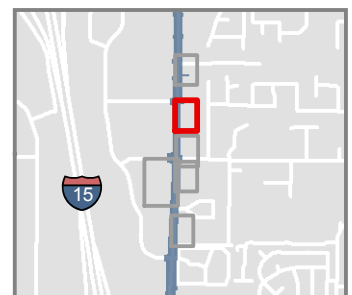


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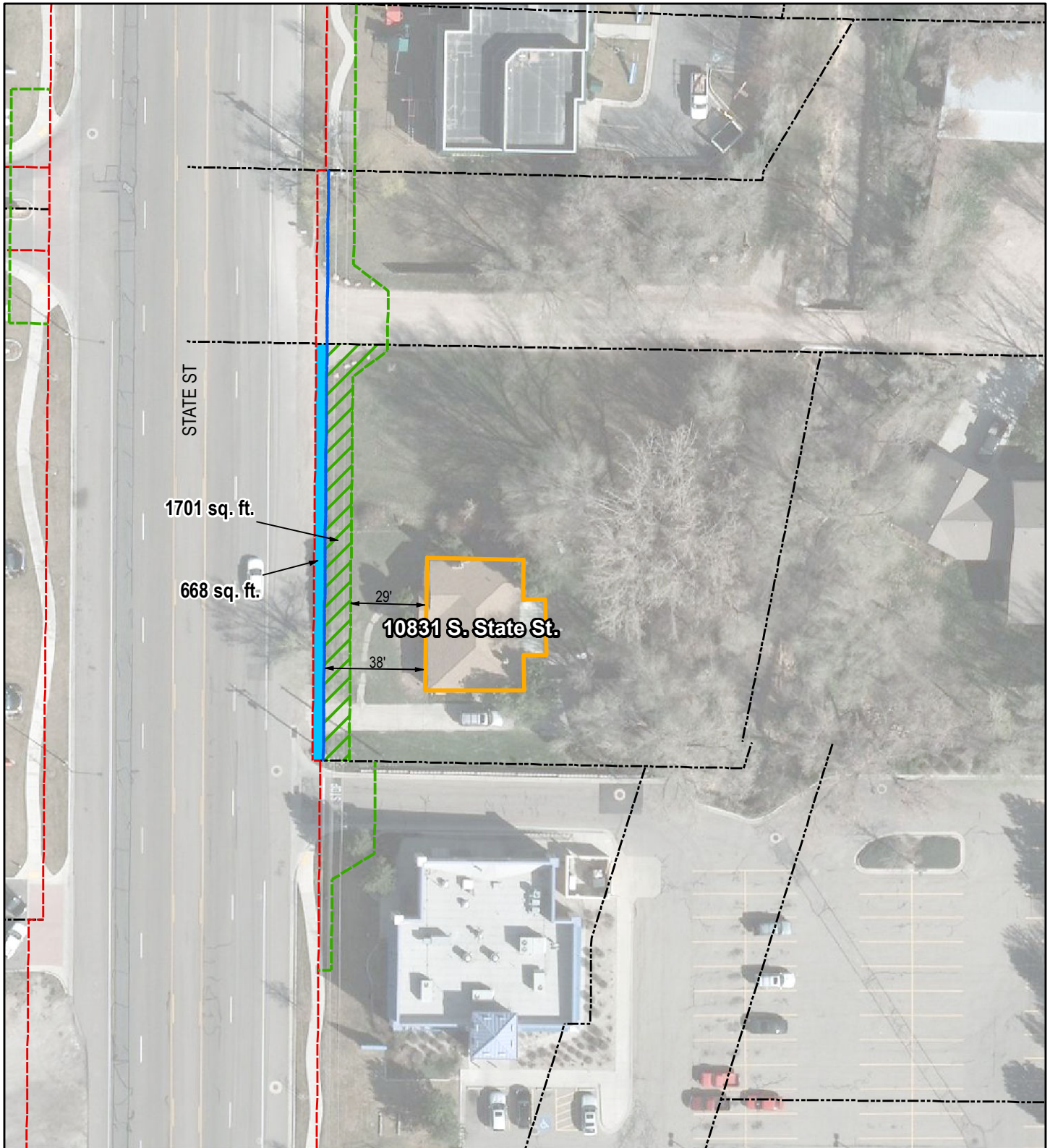
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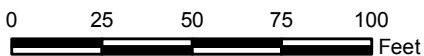











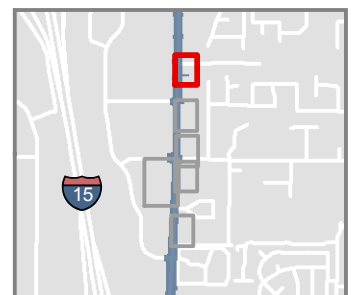


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State of Utah

GARY R. HERBERT  
Governor

SPENCER J. COX  
Lieutenant Governor

## DEPARTMENT OF TRANSPORTATION

CARLOS M. BRACERAS, P.E.  
Executive Director

SHANE M. MARSHALL, P.E.  
Deputy Director

May 4, 2017

Dan Medina  
Assistant Director, Sandy Parks and Recreation  
440 East 8680 South  
Sandy, UT 84070

RE: UDOT Project No. F-0089(375)364, US-89;11400 South to 10600 South, Sandy City, Salt Lake County, Utah (PIN 12561).

### **Notification of Section 4(f) *De Minimis* Impacts Finding.**

Dear Mr. Medina:

The Utah Department of Transportation (UDOT), in conjunction with Sandy City, is preparing to undertake the subject federal-aid project. The purpose of this letter is to notify you that UDOT intends to make a *de minimis* impact finding regarding the East Jordan Canal Multi-Purpose Trail, pursuant to Section 4(f) of the Department of Transportation Act of 1966, 23 CFR 774, and Section 6009 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). In accordance with Parts 3.1.1 and 3.2 of the Memorandum of Understanding Between the Federal Highway Administration and the Utah Department of Transportation Concerning State of Utah's Participation in the Surface Transportation Project Delivery Program Pursuant to 23 USC §327 (executed January 17, 2017), the UDOT assumes responsibility, assigned by the Federal Highway Administration (FHWA), for ensuring compliance with Section 106 of the NHPA and with Section 4(f) of the DOT Act of 1966, as amended. In accordance with Stipulation II, Part A and Appendix B of the *Memorandum of Understanding, State Assumption of Responsibility for Categorical Exclusions (23 USC §326)* (executed June 30, 2011), the UDOT assumes responsibility, assigned by the Federal Highway Administration (FHWA), for ensuring compliance with Section 4(f) of the Department of Transportation Act of 1966, 23 U.S.C. § 138 (as amended) and 49 U.S.C. § 303 (as amended).

UDOT, in conjunction with Sandy City, proposes to widen State Street to add capacity from five to seven lanes, with three travel lanes in each direction from 11400 South to the current three-lane section just south of 10600 South largely within the existing Right-of-Way. Design elements would include: reducing existing travel lane widths from 12 feet to 11 feet; removing the existing shoulders (where present); installing continuous 2½-foot-wide curb and gutter throughout the study area; and installing park strips and sidewalks (where not currently present). A second southbound to westbound right-turn lane at the State Street and 11400 South intersection would be added and the lane configuration on State Street south of 11400 South would need to be shifted to the east to match the improvements on the north leg of this intersection. A traffic signal at the Scheels driveway just north of 11400 South would also be installed in addition to raised medians on select sections of State Street.

Section 4(f) resource affected by this project is the East Jordan Canal Multi-Purpose Trail. The portion of the trail within the project study area begins on 11400 South and runs north along State Street as an 8-foot sidewalk (plus adjacent 2-foot stamped concrete) parallel to the roadway for approximately 575 feet, where it connects to the east-west running sidewalk behind Best Buy (at approximately 11200 South). The trail then runs east along a 10-foot multi-use path at 11200 South. It is presently managed by the Sandy Parks and Recreation Department. As a result of the project, the sidewalk/trail along State Street will be moved to the east approximately 8.5 feet on the segment between 11400 and 12000 South, immediately adjacent to its current location. The sidewalk will be replaced with an 8-foot path consistent with current conditions. The associated pedestrian ramps will also be replaced and designed to meet ADA design standards.





State of Utah

GARY R. HERBERT  
Governor

SPENCER J. COX  
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION

CARLOS M. BRACERAS, P.E.  
Executive Director

SHANE M. MARSHALL, P.E.  
Deputy Director

The transportation use of the trail, as summarized above, does not adversely affect any of the activities, features, and attributes that qualify the East Jordan Canal Multi-purpose Trail for protection under Section 4(f).

UDOT is affording Sandy City an opportunity to review and comment on the Section 4(f) evaluation for this project. UDOT is required to consult with the official with jurisdiction over Section 4(f) resources potentially affected by the undertaking.

Please review this document and, providing you agree with the findings contained herein, sign and date the signature line at the end of this letter. Should you have any questions concerning this matter, please contact me at 385-414-2066 or at [jdugmore@utah.gov](mailto:jdugmore@utah.gov).

Sincerely,

Jon Dugmore  
Archaeologist  
UDOT Region 2

Regarding the East Jordan Canal Multi-Purpose Trail, located in Sandy City, I concur with the Section 4(f) evaluation described above and with UDOT's intent to make a Section 4(f) *de minimis* impact finding.

Dan Medina  
Assistant Director, Sandy Parks and Recreation

Date

## **APPENDIX D: OUTREACH MATERIALS**

The following public outreach materials were used to support the US-89; 11400 South to 10600 South Environmental Assessment:

- Draft Public Involvement Report



**US-89; 10600 South to 11400 South  
Public Involvement Report  
April 7, 2017**

This public involvement (PI) report summarizes outreach activities conducted during the Environmental Assessment (EA), which took place between October 2016 and April 2017. The following stakeholder elements are included:

- Contact information/database
- Input, feedback and concerns
- Individual and public meetings schedule

**South Valley Improvements Brand**

In partnership with multiple area projects, UDOT developed an umbrella brand to improve and centralize stakeholder outreach and communication. The EA was included as part of the brand, and the associated outreach within the south end of the Salt Lake Valley. A central website, email and hotline were established and used to share information with area stakeholders.

Website: [udot.utah.gov/southvalleyimprovements](http://udot.utah.gov/southvalleyimprovements)

Email: [southvalley@utah.gov](mailto:southvalley@utah.gov)

Hotline: 801-228-0022

**Public Outreach**

A public involvement/scoping workshop was held with Sandy City on November 22, 2016, to determine city involvement throughout the EA process, as well as coordination with PI for potential outreach opportunities with the preliminary list of key stakeholders.

One-on-one meetings were scheduled with key stakeholders and property owners throughout the corridor to discuss the EA, individual needs and concerns, as well as timing and opportunities to provide public comments.

A list of the one-on-one meetings is outlined below:

Date	Stakeholder
10/06/16	Automall Association (Continuous monthly updates)
10/11/16	South Towne Expo Center

10/17/16	Larry H. Miller Real Estate
10/20/16	Real Salt Lake/Rio Tinto Stadium
10/20/16	The Thackery Company
10/20/16	Woodbury Corporation
11/22/16	Sandy City
11/22/16	IHOP Corporation
11/28/16	Liljenquist Utah/Scheels
12/09/16	Home Depot
12/13/16	Larry H. Miller Real Estate
12/14/16	Synergy Utah
12/ 14/16	Wadsworth Development
12/16/16	Liv Salon/Property Management
12/16/16	First Utah Bank
01/ 03/17	Sandy City Communication Team
01/25/17	Crescent Cemetery
01/25/17	The Falls at Hunter Point
02/03/17	Liljenquist Utah/Scheels
03/17/17	Michael Carlson (5 properties)
03/17/17	Crescent Office Complex

### Next Steps

A public hearing has tentatively been scheduled for June 2017, to review the EA and gather public comments. Key stakeholders and the general public will be invited to the public hearing and encouraged to provide input through formal comments. The comment period will extend for 30 days and written comments will be accepted at the public hearing, online, as well as through email. A court reporter will be available at the public hearing to transcribe verbal comments related to the EA. A copy of the environmental document will be available as a link on the project page during the comment period.

### Public Comments

Public comments received during the course of the EA have primarily come from verbal dialogue as part of the one-on-one meetings to-date. Comment themes include:

- General support and consensus for the need to improve State Street in this area
- Intersection congestion at State Street and 11400 South
- Concerns about new raised medians and possible access changes
- Potential construction impacts

### Summary

The potential improvements to State Street from 10600 South to 11400 South have generally been met with public support and understanding. Sandy City's role as a partner on the project has been key to outreach efforts so far and will continue to play a role as we progress towards a public hearing.