# CHAPTER 1 PURPOSE AND NEED

The Utah Department of Transportation (UDOT) proposes to construct approximately 1.3 miles of transportation capacity improvements on 5400 South (State Route [SR]-173), from 4800 West to Bangerter Highway, in Salt Lake County, Utah. The improvements would occur within Kearns Township and the City of Taylorsville.

*Chapter 1 presents the purpose and need for the proposed action. It describes the transportation problem to be solved and includes:*

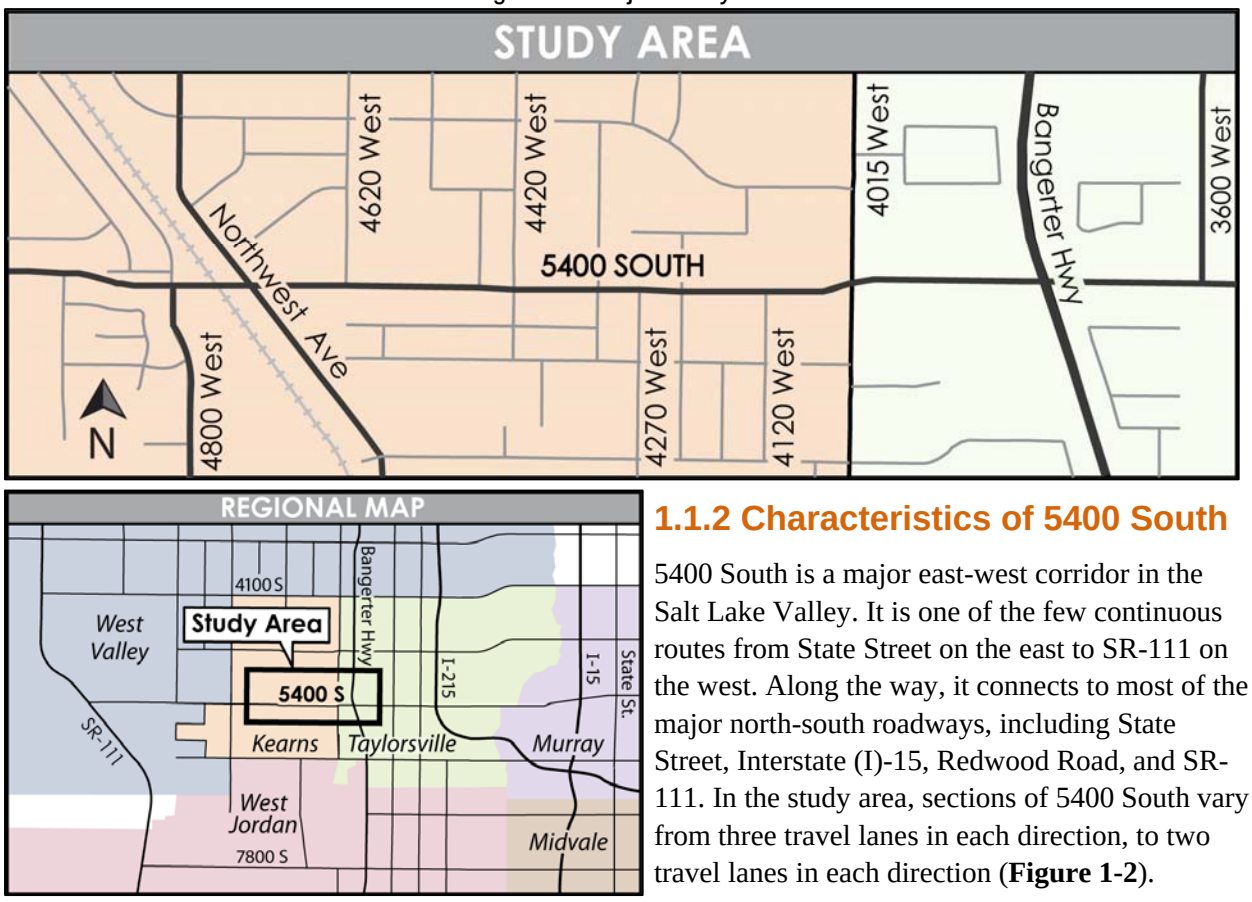
- *Background information about the study and the study area,*
- *Purpose for the proposed action, and*
- *Need defined as a set of transportation problems in the study area.*

## 1.1 STUDY BACKGROUND

### 1.1.1 Study Area

The study area extends along 5400 South from Bangerter Highway to 4800 West (**Figure 1-1**). The study area is primarily within the limits of Salt Lake County's Kearns Township, though a portion of the study area east of 4015 West is within the City of Taylorsville.

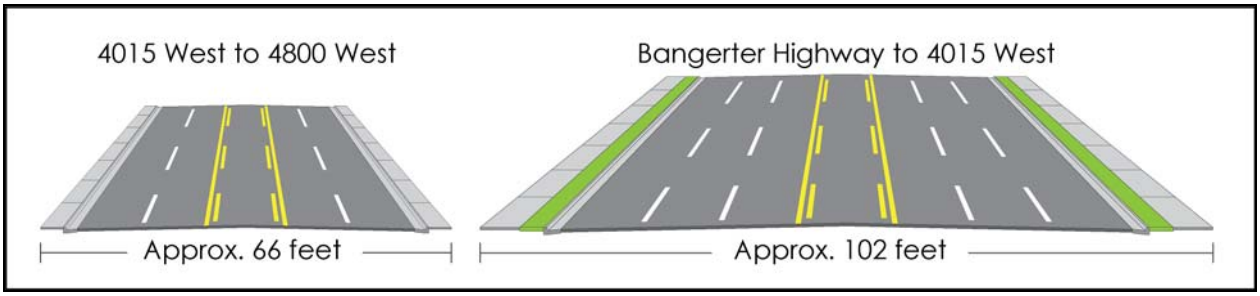
Figure 1-1: Project Study Area




### 1.1.2 Characteristics of 5400 South

5400 South is a major east-west corridor in the Salt Lake Valley. It is one of the few continuous routes from State Street on the east to SR-111 on the west. Along the way, it connects to most of the major north-south roadways, including State Street, Interstate (I)-15, Redwood Road, and SR-111. In the study area, sections of 5400 South vary from three travel lanes in each direction, to two travel lanes in each direction (**Figure 1-2**).

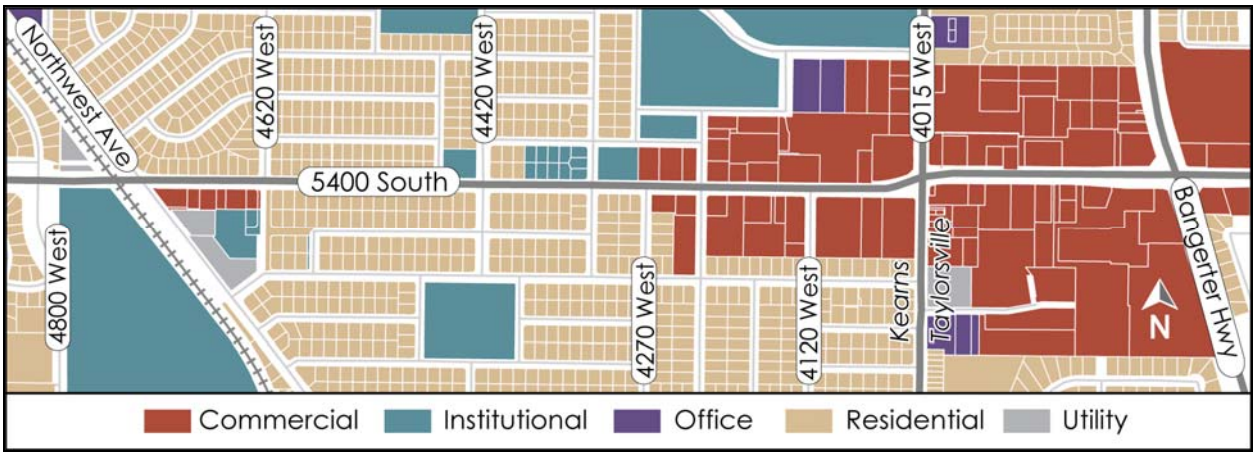
Figure 1-2: Existing 5400 South Roadway Widths




## 1.1.3 Land Uses within the Study Area

Land uses in Kearns Township and the City of Taylorsville are primarily residential, with pockets of commercial, industrial, and institutional development located along major roads like 5400 South (**Figure 1-3**). The current land use patterns generate a substantial number of vehicle trips since there are few employment centers and commercial services within walking distance of most residents.

Figure 1-3: Land Uses within the Study Area




Source: Taylorsville 2006 and Kearns 2009

## 1.1.4 Transportation Planning

The proposed project has been recommended on long-range transportation plans for a number of years. Most recently, the proposed action was formally recommended in the *Regional Transportation Plan*, 2007-2030 (2030 RTP) adopted by Wasatch Front Regional Council (WFRC) (WFRC 2007). In the year 2010, the proposed project was funded by the State of Utah's legislature as a priority project. Related contents of each transportation plan identifying the proposed project are summarized in **Table 1-1**.

Table 1-1: Regional and Local Transportation Plans

| Transportation Plan | Summary | Relationship to 5400 South |
|---|---|---|
| 2011 Statewide Transportation Improvement Program (STIP) (UDOT 2011) | The STIP is an annually published, five-year plan of highway and transit projects for the State of Utah. The STIP is UDOT's official work plan for the development of projects from conception through construction. | Widening 5400 South is included in the 2011 STIP as Project Number S-0173(16)5. |
| Wasatch Front Regional Council *Regional Transportation Plan*, 2007-2030 (2030 RTP) (WFRC 2007) | The 2030 RTP is a plan to identify, finance, and implement a coordinated system of transportation improvements to serve existing and forecasted population and employment growth throughout Salt Lake, Davis, and Weber counties between the years 2007 and 2030. | The 2030 RTP recommends widening 5400 South from I-15 to Mountain View Corridor (approximately 6400 West) during Phase I (years 2007 to 2015) of the plan. |
| Kearns Township General Plan (Kearns 2009) | The Kearns Township General Plan is used as a policy guide for making decisions and contains the community's official best practices. The plan notes that there have been considerable increases in traffic volumes on all of the major streets serving Kearns Township since 1995 (with the exception of 4700 South). A large percentage of this traffic consists of "pass through" trips generated in the surrounding communities. | The plan recommends a project along the 5400 South corridor to study how it can function more efficiently. |
| City of Taylorsville General Plan (Taylorsville 2006) | The City of Taylorsville General Plan identifies existing and future congestion on most of the city's major arterials (Redwood Road, 2700 West, Bangerter Highway, 4700 South, 5400 South, and 6200 South). The plan encourages alternative forms of transportation and supports a greater regional emphasis on transportation planning. | The plan includes two recommendations for 5400 South in the study area:<br>▪ Additional capacity and<br>▪ Access management |

Consistent with the above mentioned plans, a number of road construction projects are underway in and around the study area, all of which intend to improve operation of the roadway network. 5400 South Flex Lanes, Mountain View Corridor, and other mobility projects planned between the years 2010 and 2030 are shown on **Figure 1-4**. Implementation of these improvements, except for the proposed project, is assumed in the traffic analysis of 2040 No Build traffic conditions discussed in Section 1.3.

The traffic analysis assesses existing conditions (year 2010) and future conditions (year 2040). The year 2040 was selected for future conditions because the year:

- Is consistent with the calibrated and validated WFRC travel demand model,
- Allows for long-range planning that ensures the meaningful expenditure of public funds on projects with a 20+ year life span, and
- Allows for reasonable travel demand forecasting using industry standard practices.

Figure 1-4: Planned Transportation Improvement Projects


Source: WFRC 2007

## 1.2 PURPOSE OF THE PROJECT

The primary purpose of the proposed project is to accommodate travel demand on 5400 South through the design year 2040 and to improve the regional mobility of the corridor. A secondary purpose is to improve safety on 5400 South.

## 1.3 NEED FOR THE PROJECT

The following transportation needs have been identified on 5400 South.

- ***Travel Demand:*** Traffic volumes exceed capacity on 5400 South causing delays and congestion.

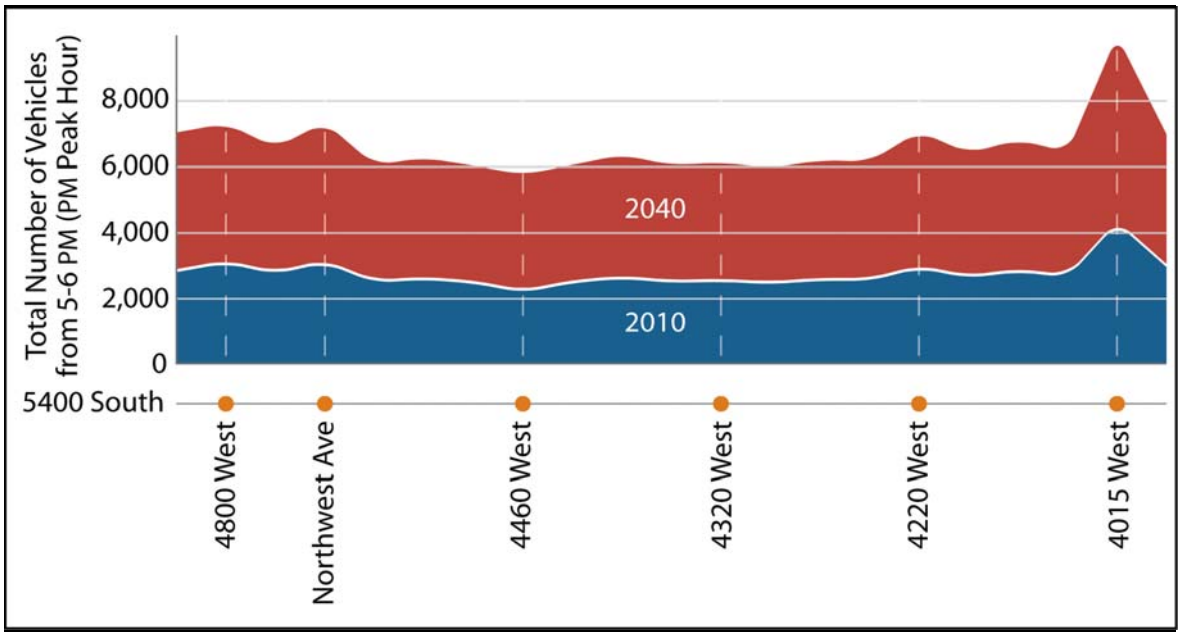
- ***Regional Mobility:*** Poor operational conditions on 5400 South adversely affect regional mobility since 5400 South is one of the primary east-west travel routes in the Salt Lake Valley.
- ***Safety:*** 5400 South has an accident rate double that of roadways with similar characteristics.

### 1.3.1 Travel Demand

Currently, there are two bottlenecks on 5400 South, at the intersection of 4015 West and 5400 South and at the intersection of 4800 West and 5400 South, that cause congestion and delay. Capacity is not sufficient at the intersection of 4015 West and 5400 South, and traffic backs up in both the eastbound and westbound directions during the PM peak hour.[1] Congestion also occurs at the 4800 West and 5400 South intersection, inhibiting westbound traffic along the corridor.

Daily traffic volumes are projected to increase substantially between the years 2010 and 2040 on 5400 South. Traffic increases are primarily associated with population growth and 5400 South's connectivity to major north-south regional transportation facilities. In the year 2010, approximately 3,000 vehicles travelled through this section of 5400 South during the PM peak hour. By the year 2040, this number is expected to more than double to approximately 6,500 vehicles (**Figure 1-5**). This trend also occurs during the AM (7:15 AM to 8:15 AM) peak hour but to a lesser degree. Increases in traffic volume exceed the region's transportation network capacity, causing increased congestion and decreased operational efficiency.

Figure 1-5: PM Peak Hour Traffic Volumes Comparison



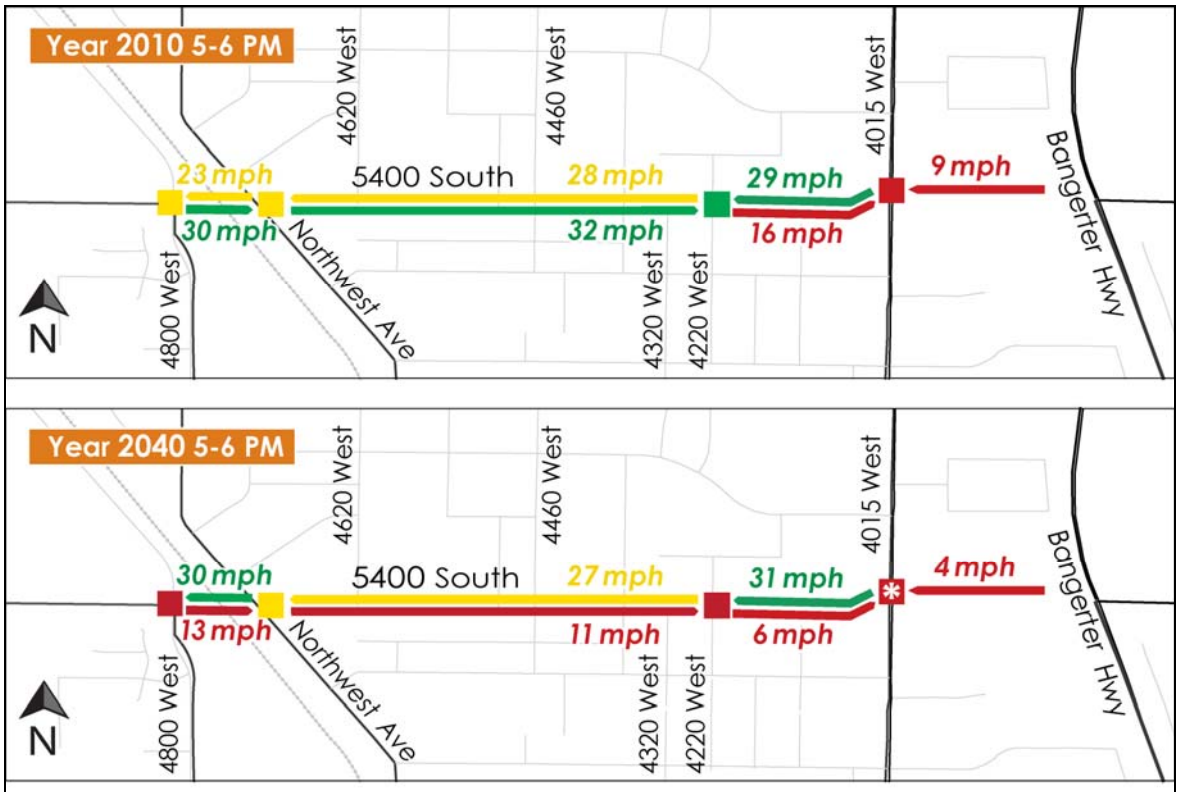

Source: Avenue Consultants 2011

**Figure 1-6** shows the existing and projected Level of Service (LOS) for the year 2040 No Build conditions on roadways and intersections in the study area during the PM peak hour. Roadway LOS is

[1] The PM peak hour (5:00 PM to 6:00 PM) is the hour of day with the greatest traffic volumes.

based on the average travel speed and roadway classification for the corridor. Intersection LOS is determined by the average number of seconds a vehicle waits at an intersection (i.e., vehicle delay). LOS A and B represent free-flow conditions with limited interruptions. LOS C and D represent moderate congestion. LOS E and F represent heavy congestion where delays and stopped conditions are common. UDOT generally tries to maintain a LOS of D or better for both roadways and intersections.

Figure 1-6: PM Peak Hour Level of Service




Source: Avenue Consultants 2011

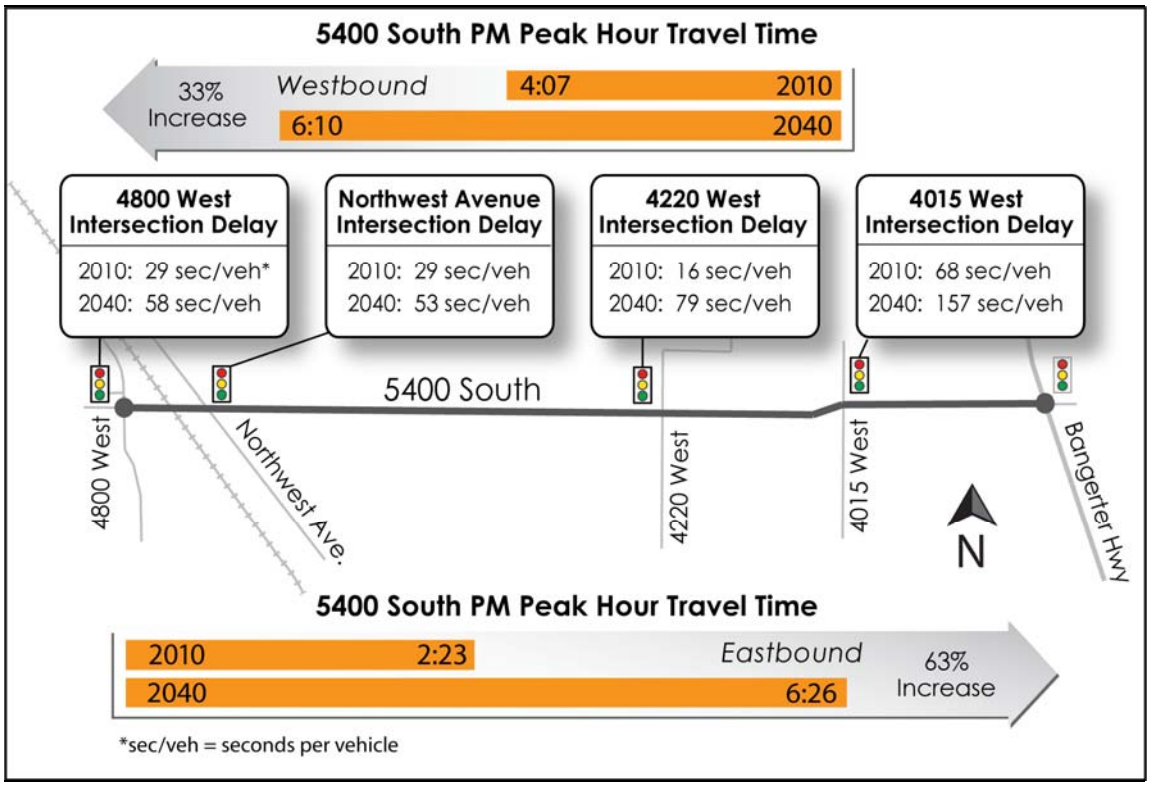
**Figure 1-6** shows that between the years 2010 and 2040 the roadway LOS on 5400 South will deteriorate for eastbound travelers between Northwest Avenue and 4220 West. This decline in service, from A/B to E/F, is due to increased traffic volumes and insufficient capacity at the 4015 West and 5400 South intersection. In the year 2040, 5400 South will have a large volume of east-west traffic, and 4015 West will have a large volume of north-south traffic. Where these roadways meet, the intersection will operate

at an unacceptable LOS because each roadway will require more green signal time to allow vehicles through the intersection than can be provided. Eastbound vehicles unable to get through the intersection will end up backing up on 5400 South to the 4220 West and 5400 South intersection, causing a chain reaction of delay and congestion along the corridor.

Westbound traffic demand will also increase by the year 2040, but the 4015 West and 5400 South intersection will act as a bottleneck and allow only 75 percent of westbound traffic through the intersection. Westbound traffic on 5400 South will back up from the 4015 West and 5400 South intersection past Bangerter Highway. **Figure 1-6** only illustrates acceptable westbound LOS on 5400 South between 4015 West and 4800 West because 25 percent of the traffic demand will not get through the 4015 West intersection. If future traffic demand could be served, the LOS along the corridor would be worse than current conditions. Additionally, the 4800 West and 5400 South intersection will operate at an unacceptable LOS due to the convergence of heavy through traffic and left turns from 5400 South onto 4800 West.

In the year 2010, vehicles waited more than one minute on average at the 4015 West and 5400 South intersection during the PM peak hour. The delay in the year 2040 is anticipated to average almost three minutes (**Figure 1-7**). By the year 2040, average travel times are expected to increase by 33 to 63 percent for this one mile section of 5400 South (**Figure 1-7**). This delay is a substantial increase over existing conditions, demonstrating a need for improvements to 5400 South.

Figure 1-7: PM Peak Travel Times and Intersection Delay




Source: Avenue Consultants 2011

## 1.3.2 Regional Mobility

There are two components of mobility: capacity and connectivity. Improvements to regional mobility can occur if new connections in the transportation network are made or if the capacity of the existing connections is increased to serve more vehicles.

WFRC traffic demand modeling shows a strong demand, both now and continuing into the future, for travel between the southwest and the northeast portions of the Salt Lake Valley. Currently, there are few high-capacity, east-west roadways on the west side of the Salt Lake Valley to accommodate these trips. 5400 South is one of the east-west roadways that provides a vital east-west link in the regional transportation network. Traffic is drawn to this section of 5400 South for two reasons.

- ***Lack of capacity on east-west routes:*** West of Bangerter Highway, I-80 and SR-201 are the only access controlled east-west roads with three or more lanes in each direction. These roads are more than five miles north of 5400 South. Since there are no east-west highways south of SR-201, east-west traffic in the Salt Lake Valley relies on arterials such as 3500 South, 4700 South, 5400 South, and 7800 South, which are generally spaced 1-2 miles apart. As previously shown on **Figure 1-4**, widening is planned for each arterial to accommodate future east-west traffic demand. However, even with the widening of other east-west arterials, the 2040 No Build conditions show 5400 South will also need to be widened to accommodate travel demand.
- ***Connectivity with major transportation facilities:*** 5400 South serves as an east-west connection between all of the major north-south transportation facilities on the west side of the Salt Lake Valley, including SR-111, Mountain View Corridor (which is anticipated to terminate at 5400 South by the year 2013 and continue north in future phases), Bangerter Highway, and I-15. Additionally, UDOT is completing the Flex Lanes project on 5400 South east of Bangerter Highway, which will provide more peak-hour, peak-direction capacity and serve regional east-west traffic. UDOT and Federal Highway Administration (FHWA) are also currently studying potential options to improve connectivity to I-215 in this area. This connectivity improves regional mobility.

## 1.3.3 Safety

The crash history on 5400 South in the study area was evaluated in an Operational Safety Report (OSR) completed by UDOT in 2010. Crash data for the years 2006, 2007, and 2008 indicate that the crash rate on 5400 South in the study area is double that of roadways with similar characteristics, though the severity of the crashes on 5400 South is low. The combination of the high crash rate and the low severity of the crashes are indicative of a road that experiences congestion. A reduction in congestion along the corridor would likely contribute to a reduction in accident rates and a safer roadway.