Chapter 1: Purpose and Need

1.1 INTRODUCTION

The Federal Transit Administration (FTA), the Utah Transit Authority (UTA), the Utah Department of Transportation (UDOT), and the Federal Highway Administration (FHWA), in cooperation with Mountainland Association of Governments (MAG), have partnered to study transit and roadway infrastructure improvements in Utah County, Utah. The Provo-Orem Bus Rapid Transit Project is a multi-modal project incorporating high-capacity, fixed-guideway transit and roadway infrastructure improvements. The project is needed because of growing population, employment, student enrollment, and travel demand in the study area; insufficient transit capacity to serve growing demand; poor transit reliability due to congested roadways; and lack of connectivity across Interstate 15 (I-15) and from I-15 to Orem and Provo.

UTA prepared a separate Alternatives Analysis (AA) report with input from MAG, Provo City, and Orem City. Consistent with FTA guidelines, the AA report will serve as a basis for a funding request for transit improvements under FTA's 5309 Small Starts program. FHWA and UDOT are involved in the project because the roadway and transit needs are functionally interdependent and within the same geographic proximity. FHWA and UDOT were added as lead agencies after the initiation of the project, as discussed in Section 2.1.4. Funding for the non-transit roadway improvements will be separate from the transit funding request.

Figures are included at the end of the chapter.

1.2 STUDY AREA

The study area for the Provo-Orem Bus Rapid Transit Project is approximately 1 mile wide and traverses two municipalities in Utah County (Orem City and Provo City) for approximately 10.5 miles, as shown on Figure 1-1: Study Area Existing Conditions. The northern terminus of the project is at the planned Orem Intermodal Center, at approximately 800 South and I-15. The southern terminus is at the junction of University Avenue and I-15, south of the Provo Intermodal Center and near a large commercial campus that houses Novell, a large employer in Provo. The Orem and Provo Intermodal Centers will serve the FrontRunner commuter rail, which is currently under construction and is anticipated to be operational in 2013. These termini were based on the need for a connection from FrontRunner to Utah Valley University (UVU), Brigham Young University (BYU), and downtown Orem and Provo.

Orem and Provo are approximately one hour south of Salt Lake City, Utah, and serve as a distinct metropolitan area along the Wasatch Front. Provo and Orem follow a north-south development pattern with the Wasatch Mountains on the east and Utah Lake on the west. I-15 is a north–south dividing feature on the west side of Provo and Orem, and FrontRunner parallels I-15. Most of the project study area lies east of I-15. The Union Pacific Railroad traverses both the northern portion of the study area and the southern portion near the Provo Intermodal Center.

Downtown Provo and downtown Orem are the densest residential, commercial, and employment areas in Utah County. Two major universities are located in the study area—BYU

and UVU. The Orem commercial district includes the University Mall, several large retail centers, restaurants, smaller shopping outlets, and the University of Utah Medical Clinic. University Mall includes more than 190,000 square feet of retail space and has more than 2,000 employees (Kallas 2009). The historic downtown center of Provo is a pedestrian-friendly walking district with commercial, retail, and professional land uses. Directly south of the Provo Central Business District is the Provo Towne Centre Mall, which is a 950,000-square-foot shopping mall that includes 90 retails stores.

The need for a connection from FrontRunner to UVU, BYU, and downtown Orem and Provo was identified through scoping as well as the results of the 1999 *Inter-Regional Corridor Alternatives Analysis*, the 2005 *Provo-Orem Rapid Transit Feasibility Study*, and MAG's 2030 Regional Transportation Plan. The previous plans all identified a need for transit investment on University Parkway in Orem and University Avenue in Provo. Therefore, the study area is focused on those corridors. The executive summaries for the *Inter-Regional Corridor Alternatives Analysis* and the *Provo-Orem Rapid Transit Feasibility Study* can be found at http://www.provo-oremrapidtransit.info/related.htm. In addition to I-15, transportation facilities within the study area consist of major arterials and a system of collector streets (see Insufficient Roadway Capacity discussion on page 1-4).

1.3 PROJECT PURPOSE

The purpose of the Provo-Orem Bus Rapid Transit Project is to increase transportation capacity to include higher-capacity, high-quality, reliable transit service. Specifically, the purpose is to:

- Increase transportation capacity to accommodate growing population, employment, student enrollment, and travel demand in the year 2030.
- Improve transit competitiveness with the automobile by improving transit reliability and reducing transit travel time.
- Improve transit connections to and from FrontRunner commuter rail.
- Improve multi-modal connectivity across I-15 and from I-15 to Orem and Provo.

1.4 STATEMENT OF PROJECT NEED

The Provo-Orem Bus Rapid Transit Project is needed because of growing population, employment, student enrollment, and travel demand in the study area; insufficient transit capacity to serve growing demand; poor transit reliability due to congested roadways; and lack of connectivity across I-15 and from I-15 to Orem and Provo. The travel demand needs of residents and commuters in the study area are expected to be greater than the capacity of the existing transportation system in 2030. Transportation needs were determined for the year 2030 based on the MAG Regional Travel Demand Model. Information on opening day conditions for any proposed improvement is required for the FTA Small Starts program. This information is included in the Provo-Orem Rapid Transit AA report. The needs result from the following problems:

- Increasing travel demand and insufficient roadway capacity
- Poor transit reliability and travel time
- Lack of high-quality alternatives to auto travel
- Insufficient transit capacity
- Lack of connectivity across I-15 and from I-15 to Orem and Provo

Increasing Travel Demand and Insufficient Roadway Capacity

Increasing Travel Demand

Population, employment, and student enrollment at universities in the study area are growing, increasing travel demand. The Wasatch Front, between Ogden and Provo, has been experiencing rapid population and employment growth for the past two decades, leading to increased development and traffic congestion. The population of Utah County is expected to almost double by 2030, growing from 450,000 to 805,000 (MAG 2007). The student population will grow from more than 50,000 to 70,000 students in 2030.

As a result of growing population and employment (see the Increasing Population and Employment section below), the demand for travel will also increase. Table 1-1: Local and Regional Travel Demand for 2005 and 2030 lists the local and regional trips projected for the year 2030 assuming all the projects on the MAG Long Range Plan are implemented with the exception of this project. Local and regional trips are expected to increase by almost 40 percent. More than 60 percent of the trips are generated locally (within the cities of Provo and Orem) and these trips are expected to grow in the future. However, the greatest growth will stem from regional trips, which are expected to grow by more than 70 percent. Currently, regional trip patterns are from within the cities of Provo and Orem to Salt Lake City for employment. As discussed in the Increasing Population and Employment section below, employment is anticipated to grow at a faster rate than population in Provo and Orem, creating more regional travel demand for jobs. Another factor in regional travel demand growth is the increasing student enrollment at UVU, which is a commuter college.

Table 1- 1: Local and Regional Travel Demand for 2005 and 2030

Area	2005		2030		% Change
	Daily Trips	% of Total Trips	Daily Trips	% of Total Trips	
Local - within cities of Provo and Orem	753,000	69%	934,000	62%	25%
Regional - to the north	224,000	21%	392,000	26%	75%
Regional - to the south	111,000	10%	188,000	12%	69%
Total Regional Trips	335,000	31%	580,000	38%	73%
Total Trips	**1,088,000**		**1,514,000**		39%

Source: MAG Regional Travel Demand Model, Version 6.1

Figure 1-2: Travel Demand within the Study Area shows trips within the study area. As shown on the figure, travel demand is evenly distributed, suggesting several trip generators and important destinations throughout the study area. This travel pattern indicates strong demand for travel to the Orem commercial district, UVU, BYU, and downtown Provo.

Travel Demand Projection Methods

The following sections provide data that support the need for the Provo-Orem Bus Rapid Transit Project. All travel demand (trip) projections in this document were projected using the MAG Travel Demand Model Version 6.1. The MAG Travel Demand Model Version 6.1 has incorporated the most recent updates to land use and demographic information and is the latest regionally accepted version. The travel demand model is calibrated to the year 2005. It has been used on recent Utah projects such as the Draper Transit Corridor, and the inputs (such as the

mode-specific constants) that FTA approved for the Draper project have not been changed. The travel demand model estimates the number of trips and the associated mode (auto, transit, or walking) for 2005 and 2030 based on land use, demographic data, and the road and transit network. For this document, the No-Action scenario was assumed in the model for the purpose of demonstrating the need for this project. Since the model is calibrated to the year 2005, 2005 travel demand numbers are presented in this document for consistency unless otherwise stated.

Increasing Population and Employment

Utah County is one of the fastest growing counties in the state. In 2005, the Utah County population was 450,000 with 200,000 jobs. By 2030, the population will reach approximately 805,000 residents with approximately 390,000 jobs (MAG 2007). Population and employment projections also predict substantial growth in Provo and Orem by 2030. The number of jobs in these two cities is expected to increase by approximately 38 percent by 2030, and together these cities comprise 44 percent of all jobs in the county. Table 1-2: Population and Employment Growth shows population and employment growth in Orem, Provo, and Utah County.

Table 1- 2: Population and Employment Growth (Orem and Provo)

Area	Population			Employment		
	2005	2030	% Change	2005	2030	% Change
Orem	91,000	104,000	14%	53,000	73,000	38%
Provo	112,000	138,000	23%	72,000	99,000	38%
Utah County	450,000	805,000	79%	200,000	390,000	95%

Source: MAG Regional Transportation Plan 2007–2030

Student Enrollment

The combined student population of UVU and BYU is more than 50,000 and will grow to 70,000 in 2030, resulting in a strong school market (see Table 1-3: University Populations). UVU is expanding its programs, and is anticipating the student body to grow to approximately 35,000 in 2030 at the Orem campus (MAG 2007). BYU does not plan to grow beyond 35,000 students.

Table 1- 3: University Populations

University	Students		Employees	Total Transit Passes
	2008	2030	2008	
UVU	24,000	35,000	4,700	
BYU	30,000	35,000	14,000	
Total	**54,000**	**70,000**	**18,700**	**11,000**

Source: MAG 2007, UVU 2008

Insufficient Roadway Capacity

Roadways in the study area are congested and do not have sufficient capacity to serve growing travel demand. The volume-to-capacity (V/C) ratio is the ratio of automobile trips projected in 2030 divided by the capacity of the roadway. The MAG Travel Demand Model is used to project automobile trips in 2030; this model shows that the volume of automobile trips will exceed the capacity of many roads in the study area, as shown on Figure 1-3: Volume-to-Capacity Ratio 2030.

Many of the major arterials in the study area (with the exception of the diagonal segment of University Avenue) are already built out to their planned cross-sections. Also, adding general purpose travel lanes is not feasible or supported by local communities, as shown on Figure 1-4: Roads in the Study Area. University Parkway and University Avenue, the main arterials in the study area, will be failing by 2030 with V/C ratios ranging from 90 percent to more than 110 percent. Both University Parkway and University Avenue (the routes recommended by the 2005 study) are currently built out with respect to general purpose travel lanes (University Parkway is built out from I-15 to State Street). University Parkway already has six general purpose travel lanes through Orem, and adding general purpose travel lanes would not be effective in increasing capacity. Neither Provo City nor UDOT, the owner of University Avenue, are supportive of adding general purpose lanes to University Avenue.

An intersection analysis using Synchro software produced results indicating that intersections will also struggle to meet anticipated demand for travel. Figure 1-5: Future Intersection Level of Service (2030 for the PM Peak Hour) shows the future level of service (LOS) at key intersections through the study area. LOS E or F indicates that automobiles will experience significant delays, sometimes up to one minute at each intersection, and LOS F is considered failing. Figure 1-5 shows that several key intersections in the study area will be failing in 2030, including at the I-15 interchange with University Parkway, a gateway into the community of Orem.

Poor Transit Reliability and Travel Time

Increasingly congested roadways jeopardize reliability and travel time, resulting in poor transit service quality. An improved transit system offering high-speed, frequent, reliable service is needed to distribute FrontRunner passengers to and from Provo and Orem and to increase transit circulation and overall desirability of transit travel. The reliability and travel time of local bus service is inadequate to serve FrontRunner commuter rail and local trips, as shown in Table 1-4: Transit Reliability and Travel Times. The reliability and travel time of local bus service will worsen in the future as roads become more congested. Mixed-flow operating conditions are subject to peak-hour and accident-related congestion and result in unreliable arrival times, stacking at bus stops, long wait times, and slow bus speeds. Current headways are inadequate to serve demand, and more frequent headways cannot be practically achieved with local bus service. These conditions decrease the desirability of transit service.

Table 1- 4: Transit Reliability and Travel Times

Transit Service	Reliability	
	Current	Desired
Local Transit Service Reliability	84%	95%
Transit Travel Time from SLC to BYU	120 minutes	Approaching auto travel time of 56 minutes

Reliability

The reliability of the local bus service is inadequate to serve FrontRunner commuter rail. As shown in Table 1-4, the reliability of the local bus service is 84 percent, meaning that buses are critically late or early 16 percent of the time (Anson 2009). Because the current Bus Route 830 operates in mixed-flow, buses are often caught in traffic and arrival times at bus stops are unpredictable. The

length of Route 830 is more than 10 miles; longer routes have been shown to be detrimental to achieving a high level of reliability due to interruption to scheduled service and overall delay.

While the reliability of the current Bus Route 830 is only 84 percent, the FrontRunner commuter rail reliability is estimated to be more than 95 percent. This results in the potential to increase transit trip times by up to 30 minutes. For example, if the local bus arrives at the FrontRunner station after the FrontRunner leaves, the delay will be almost 30 minutes until the next train is scheduled to depart. To provide a reliable connection to commuter rail, the reliability of the connecting transit service should approach 95 percent. Current bus service cannot practically meet this reliability goal in mixed-flow operating conditions.

Travel Time

Even if buses are reliable and arrive and depart on time, the travel time for the local bus is inadequate to serve FrontRunner commuter rail. For example, a typical transit trip on FrontRunner would be from Salt Lake City to BYU. The travel time on FrontRunner from Salt Lake City to the Orem Intermodal Center, a distance of 40 miles, would be 47 minutes. The time to travel the remaining 5 miles from the Orem Intermodal Center to BYU would be more than 33 minutes (assuming average connection time is half of headway time). The total trip time from Salt Lake City to BYU would be 1 hour and 20 minutes compared to 56 minutes by car. Any delay in local bus service would increase the transit trip time. The time to connect and travel to Provo and Orem from FrontRunner on transit needs to be reduced.

Efficient Transit Connections

During scoping, stakeholders and policy makers identified the need for the project to integrate into the existing and future transit system by providing efficient transit-to-transit connections. UTA is already planning to restructure the bus service to adequately provide connections to FrontRunner when it goes into service. Current and future UTA bus routes are shown on Figures 1-6 and 1-7, respectively.

Lack of High-Quality Alternatives to Auto Travel

High-quality alternatives to auto travel are needed within the study area to serve transit-dependent populations including students and low-income populations.

Low-income populations include family units with annual incomes below the poverty threshold determined by the U.S. Department of Health and Human Services. The 2000 Census total population for the study area was 61,994, of which 20,874 (33.67 percent) fell below the poverty threshold. In comparison, only 8.53 percent of the total population in the UTA service area (including Salt Lake City and surrounding areas) was living below the poverty threshold in 2000.

As previously mentioned the combined student population of UVU and BYU is more than 50,000 and is expected to grow to 70,000 by 2030. Approximately 22,176 BYU students (67 percent of the BYU student population in 2007) and 6,002 UVU students (29 percent of the UVU student population in 2007) lived within the study area in 2007. See Figure 1-8: UVU Student Transit Proximity and Figure 1-9: BYU Student Transit Proximity.

Often students and low-income individuals do not own personal vehicles. High-quality transportation alternatives available at a low-cost are needed to provide additional mobility options and allow access to essential services and employment opportunities.

Insufficient Transit Capacity

The existing transit service on the corridor consists of Bus Route 830; this route will not have sufficient capacity to serve travel demand in the year 2030. Bus Route 830 (shown on Figure 1-1: Study Area Existing Conditions), is the most heavily used route within the study area and carried an average of 3,600 daily passengers in 2007 (UTA 2008b). Buses on this route are full at peak hours, as shown on Figure 1-10: Passenger Loads on Route 830. Route 830 operates in mixed traffic on University Avenue and University Parkway. It provides 15-minute service between 6:00 a.m. and 7:00 p.m., and 30-minute service between 7:00 p.m. and 10:00 p.m. A peak-hour capacity can be estimated by assuming four buses in each direction carrying 41 seated passengers or 55 passengers with standing capacity. Therefore, the peak-hour capacity of the current Route 830 can be assumed to be approximately 164 seated riders or up to 220 riders in one direction assuming standing capacity. The peak-hour, peak-direction demand from the MAG Travel Demand Model is projected to be more than 550 in 2030. Simply adding more buses to the current bus route would not adequately increase capacity because buses could not practically meet scheduled headways in mixed-flow operating conditions.

Existing and Future Transit Markets

A strong transit market already exists in the corridor, and it is expected to grow substantially. The demand for transit trips that include an origin or destination in the study area is estimated to increase from 107,300 trips to 225,900 transit trips (111 percent increase), as shown in Table 1-5: Regional Transit Trips. This demand is expected to exist even if no transit improvements are made. The demand for transit is generated by two universities, existing and planned student housing, two retail malls, two planned major regional intermodal transit centers, historic downtown Provo, the Orem commercial district, and several employment centers. Existing student housing is located near the Orem Intermodal Center (e.g., Wolverine/Parkway Crossing), on the south side of UVU, near BYU, and along 700 North in Provo. Housing for approximately 1,250 new students are planned in Provo from 500 North to 800 North and from University Avenue to 900 East. Major trip generators are shown on Figure 1-1: Study Area Existing Conditions.

Table 1- 5: Regional Transit Trips

	2005	2030	% Growth
Total Daily Transit Trips	107,300	225,900	111%
Total Daily Transit Trips Made for Work	53,300	107,100	101%
% of Total Transit Trips Made for Work	**50%**	**47%**	
Source: MAG Travel Demand Model Version 6.1			

Travel forecasts divide trips into standard categories to express the different purposes for travel. Categories include work-related trips, school-related trips, and 'other'. Special event trips are included in the 'other' category. Trips are either home-based, meaning originating at home, or non-home-based, meaning neither end of the trip originates at home. New and improved transit services are needed to serve the work market, school market, and special event market, as described in the following sections.

Work Market

Because work schedules typically begin and end at the same time each day and require traveling from destinations that remain constant, the associated work trips generate predictable travel patterns and consistent ridership.

The commuter market for transit is evident in the number and percentage of total transit trips made for work purposes in the study area, which is shown in Table 1-5: Regional Transit Trips. In 2005, there were a total of 107,300 regional transit trips made daily, of which 53,300 were made for home-based work purposes. In 2030, forecasts predict regional trips will grow to 225,900, of which an estimated 107,100 will be made for home-based work purposes. The number of transit work trips is predicted to grow by 101 percent even without improved transit service (under No-Action conditions).

As mentioned above, home-based work trips comprise a significant portion of total transit trips on a regional basis, and this is consistent in the local market. Within the local market (Provo and Orem), home-based work trips comprise the highest percentage of local transit trips in current and future conditions. In 2030, approximately 44 percent of all local (Provo and Orem) transit trips will be made for work purposes (11,500 trips). In addition, overall transit use for all trip purpose types is expected to grow by 80 percent, from 14,600 transit trips in 2005 to 26,200 transit trips in 2030. Table 1-6: Local (Provo and Orem) Transit Trip Types shows current and projected transit use in Provo and Orem, which reflects the local market for transit.

Table 1- 6: Local (Provo and Orem) Transit Trip Types

Trip Type	2005		2030		% Growth
	Daily Trips	% of Total Trips	Daily Trips	% of Total Trips	
Home-based Work Trips	5,800	40%	11,500	44%	98%
Home-based School Trips	5,100	35%	7,800	30%	53%
Home-based Other Trips	2,500	17%	5,300	20%	112%
Non Home-based Trips	1,200	8%	1,600	6%	33%
Total Local Transit Trips	**14,600**		**26,200**		**80%**

Source: MAG Travel Demand Model Version 6.1

Major employers along the corridor in Orem include both UVU with 4,700 employees (UVU 2008) and the University Mall with approximately 2,000 employees (Kallas 2009). Major employment centers in Provo include BYU with 14,000 employees (Reese 2009); the Novell Provo campus, which employs more than 1,000 people; Provo Towne Centre mall, which has more than 90 retail stores; the county government building, which employs 500 people; and Nu Skin International, which employs more than 500 people (MAG, no date). Nu Skin is going to add 400 employees with their expansion. A new commercial development, the Southgate Center, is also being planned at the southern terminus of the project.

School Market

The study area has a strong school market resulting from the presence of BYU and UVU. The combined student population of UVU and BYU is more than 50,000 and will grow to 70,000 in 2030, as discussed on page 1-4. UVU and BYU participate in the Education (Ed) Pass program offered by UTA, which discounts the cost of transit passes to students and employees. A total of 11,000 students from these two schools received Ed passes in 2006.

According to the MAG Regional Travel Demand Model, home-based school transit trips within Provo and Orem are projected to reach 7,800 daily in 2030, which constitutes 38 percent of all transit trips. Transit use is highest when school is in session. UVU is a regional commuter campus and many students commute to UVU from Salt Lake City, a distance of approximately 30 miles, and from smaller communities south of Provo and Orem. Approximately 29 percent of the UVU student population lives within the study area (see Figure 1-8: UVU Student Transit Proximity). Alternatively, most BYU students live near the BYU campus. Approximately 67 percent of BYU students live within the study area (see Figure 1-9: BYU Student Transit Proximity).

Special Event Market

Both BYU and UVU hold special events that draw traffic locally and regionally. Sporting events generate the highest number of trips, and traffic worsens during loading and unloading of the events. The McKay Events Center at UVU holds approximately 300 events a year including concerts and sports events (UVU 2009). This facility holds between 12,000 and 15,000 spectators. Typically, BYU holds six football games per year in addition to other special events such as a 4th of July celebration at a stadium that accommodates 63,000 spectators. The BYU Museum of Art also has regionally significant exhibits. The Marriott Center is on campus and accommodates 20,000 spectators at more than 20 events per year. Education Week at BYU brings thousands of people from around the country for two weeks in August each year.

Lack of Connectivity Across I-15 and From I-15 to Orem and Provo

There is a lack of multi-modal connectivity across I-15 and from I-15 to Orem and Provo. Because there is not an adequate number of interchanges on I-15 to serve Orem and Provo, the University Parkway interchange is projected to be 50 percent over capacity in 2030. The University Parkway Single Point Urban Interchange is currently the only connection to and from the Orem Intermodal Center and FrontRunner commuter rail on the west side of I-15 to Orem and its commercial core, UVU, BYU, and Provo on the east side of I-15. Adjacent interchanges are Orem Center Street, approximately 1.6 miles north of University Parkway, and Provo Center Street, approximately 3.4 miles south of University Parkway. There are no other roadways that cross I-15 in this area.

The University Parkway interchange is congested and is not a safe or convenient pedestrian/bicycle route. The interchange congestion affects the reliability of the current bus routes. The freight rail lines and FrontRunner lines paralleling I-15 will also create a barrier. There is currently an at-grade crossing of the railroad on 800 South just west of I-15.

An additional multi-modal connection is needed across I-15 to serve the Orem Intermodal Center, FrontRunner commuter rail, Orem and Provo commercial cores, UVU, and BYU.

1.5 PROJECT HISTORY

Several plans are in place to support the proposed project, as described below.

Previous Plans and Studies

Inter-Regional Corridor Alternatives Analysis (1999)

In 1999, MAG, Wasatch Front Regional Council, UTA, and UDOT initiated the *Inter-Regional Corridor Alternatives Analysis*. The study was a collaborative effort to develop a comprehensive plan for the best mix of transportation solutions to meet the long-term (30-year) inter-regional mobility needs. The Locally Preferred Alternative (LPA) resulting from this study included bus rapid transit (BRT) between Orem and Provo to serve local transportation needs and provide circulation and distribution between the intermodal centers and FrontRunner commuter rail. The executive summary for the *Inter-Regional Corridor Alternatives Analysis* can be found at http://www.provo-oremrapidtransit.info/related.htm.

Provo-Orem Rapid Transit Feasibility Study (2005)

In 2005, MAG completed the *Provo-Orem Rapid Transit Feasibility Study*, which recommended BRT on University Parkway and University Avenue. The purpose of the project identified in the study was to serve local, commuter, and student trips; link key activity centers in the Provo/Orem area; and provide connections to a long-term regional commuter rail line. The executive summary for the 2005 *Provo-Orem Transit Feasibility Study* can be found at http://www.provo-oremrapidtransit.info/related.htm.

Evaluation Measures

The study used various evaluation measures, including the following:

- Effectiveness of the alternative in improving accessibility and travel conditions
- Ability of the alternative to be integrated with the surrounding community and neighborhoods, and impacts to traffic operations and the natural environment
- Cost-effectiveness of the alternative in terms of benefits generated per dollar of investment in capital costs, operations, and maintenance of new facilities
- User benefit per dollar cost
- Distribution of costs, benefits, and impacts on various population groups

Public Involvement

The study included a significant public and stakeholder involvement effort, including partnering with affected communities and agencies, and educating and discussing the purpose and function of transit options with the community. The following public involvement activities took place: stakeholder interviews, newspaper articles/releases, public meetings, a public Website, newsletters, e-mail alerts, utility bill inserts, cable access information spots, and community group meetings.

Modes Considered

The study considered a broad range of alternatives for technology and alignment. Technology options included streetcar, trolley, light rail transit (LRT), heavy rail, monorail, and BRT. Monorail was eliminated primarily due to high capital cost. Streetcars and trolleys were eliminated due to high capital cost, limited flexibility, and lower capacity. LRT and BRT were compared for ridership and cost. BRT was recommended because the forecast ridership for LRT was only 20 percent higher than BRT, but the cost was four times that of BRT.

Alignments Considered

A broad range of alignments was considered, including: State Street, University Parkway, 500 West, Freedom Boulevard, University Avenue, and a route that served the Seven Peaks Golf Course and Ice Arena on the east side of Provo. The recommended alignment was from the Orem Intermodal Center along Geneva Road, to University Parkway, to 1650 North, to Campus Drive through BYU, to 800 North to University Avenue, terminating at the Provo Towne Centre Mall.

The alignment recommendation was based on the evaluation measures above, with a focus on ridership and community support. The report states that in November 2004, Provo City, Orem City, UTA, UVU (formerly Utah Valley State College, UVSC), BYU, UDOT, MAG, and Utah County agreed to advance the recommended alternative for further environmental analysis.

MAG Regional Transportation Plan (2007)

In June 2007, MAG (a Metropolitan Planning Organization) updated its Regional Transportation Plan for 2030. The plan is part of UDOT's Statewide 2030 Long Range Plan. Under Title 23 of the Code of Federal Regulations (CFR) and the Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU), federally funded projects cannot be approved unless those projects are in a fiscally constrained and conforming regional transportation plan and a statewide transportation improvement program. FHWA and FTA concurred with the MAG Regional Transportation Plan in July 2007, and it is a conforming plan with regards to air quality. It is valid until July 2011.

The 2007 MAG plan includes BRT on or near University Parkway and University Avenue to connect Orem and Provo. The plan also includes a new interchange at 800 South and I-15 in Orem.

Orem City General Plan (amended 2008)

The Orem City General Plan (amended 2008) identifies policies that encourage transit and alternative modes of transportation, as well as efficient movement of traffic. The following policies are included in the plan:

- Encourage and promote opportunities for safe, convenient, and environmentally sensitive modes of transportation.
- Work with UTA to maintain and expand the bus system to serve the growing needs of Orem.
- Encourage plans for commuter rail or other transit systems to the Utah Valley region to meet the needs of Orem.

Provo City General Plan (amended 2009)

The Provo City General Plan (amended 2009) outlines several strategies to improve transportation in the city. The plan acknowledges the *Provo-Orem Rapid Transit Feasibility Study* to determine feasibility of a BRT system to connect major destinations in the city. The plan also states the importance of bicycle and pedestrian connections for the success of bus transit. As stated in Section 1.2 of this document, Provo City is planning a high-density transit-oriented development (TOD) for the area between approximately 450 South and 920 South, centered on the future Provo Intermodal Center.

Provo City Code (updated 2009)

In 2009 the Provo City Code was updated to include a new interim TOD zone. This zone's primary use is "for residential and residential/support mixed-use development which is intended to provide housing and business opportunities adjacent to public transit and thereby

facilitate increases in the use of public transit and reduce city-wide traffic and congestion elsewhere" (Provo City 2009b).

Utah Statewide Transportation Improvement Program (2009–2014)

The Utah 2009–2014 Statewide Transportation Improvement Program has programmed funds for the study of the Provo-Orem Bus Rapid Transit Project and an interchange at 800 South and I-15 in Orem. Funding for construction has not been programmed.

I-15 Corridor Environmental Impact Statement (2008)

A new interchange at 800 South was considered during the I-15 Corridor Environmental Impact Statement (EIS), Lehi to Provo, Project. It was not selected as a part of the preferred alternative for the I-15 EIS Record of Decision, signed in August 2008.

800 South Interchange History

The 2005 *Provo-Orem Rapid Transit Feasibility Study* considered a BRT alignment over the planned interchange at 800 South because it provided better connectivity to the planned intermodal center, and had the potential to serve UVU better than University Parkway. The 800 South alignment has been part of the study area since the inception of this project in 2007; however, it was assumed at that time that the interchange would be constructed as part of the I-15 project. After the decision was made to exclude the 800 South interchange from the I-15 EIS in 2008, the lead agencies (FTA, UTA, and MAG), in consultation with the relevant cooperating and participating agencies (UDOT and FHWA), determined that providing a new connection across I-15 to the Orem Intermodal Center, as well as relieving traffic congestion at the University Parkway interchange, were critical needs in the study area. Because the I-15 EIS project did not address these needs, the agencies decided in spring 2009 to address these needs under the Provo-Orem Bus Rapid Transit Project. At that time, FTA, UTA, and MAG, as the lead agencies, invited UDOT and FHWA to be joint lead agencies for the project.

1.6 OTHER PROPOSED ACTIONS IN THE STUDY AREA

The MAG 2030 Regional Transportation Plan includes the following projects near the proposed action:

- Commuter rail (FrontRunner) – Salt Lake to Provo; Under construction and expected to open in 2013.
- Expansion and redesign of the current bus system – Expected to be complete when FrontRunner opens.
- I-15 corridor widening and reconstruction – Lehi to Provo; EIS is complete and construction began in 2010.
- Geneva Road widening – Provo to Pleasant Grove; UDOT recently selected a design-build contractor, and construction is expected to begin in spring 2011.
- Provo Intermodal Center – Environmental Assessment (EA) is complete and construction is expected to begin in 2011.
- Orem Intermodal Center – EA is complete and construction is expected to begin in 2011.

The UTA FrontRunner commuter rail project is expected to open in 2013 and will connect Utah County and Salt Lake County. The FrontRunner project has two stops in the study area at the Orem Intermodal Center and the Provo Intermodal Center. These intermodal centers will serve FrontRunner, local bus service, and this BRT project. Park-and-ride and drop-off facilities will be provided at both intermodal centers. Projected daily ridership associated with the FrontRunner is

1,700 at the Provo Intermodal Center and 3,000 at the Orem Intermodal Center. The Provo and Orem Intermodal Centers are separate projects from the Provo-Orem Bus Rapid Transit Project. A new bus network is planned to feed into the new intermodal centers and FrontRunner. The new bus network is shown on Figure 1-7: Future UTA Bus Routes.

1.7 FTA SMALL STARTS PROGRAM AND NEPA

The Provo-Orem Bus Rapid Transit Project is a multi-modal project that addresses transit and roadway infrastructure needs. For the transit improvements, UTA intends to request funding under FTA's Section 5309 Small Starts program. As such, this project must comply with FTA Small Starts requirements as well as FTA and FHWA National Environmental Policy Act (NEPA) requirements.

FTA Small Starts Program

FTA's Section 5309 Small Starts program is the federal government's primary financial resource for supporting capital investment in locally planned, implemented, and operated fixed-guideway transit systems. Small Starts is a discretionary FTA grant program regulated in 49 United States Code (USC) 5309. Projects eligible for Small Starts funding include any fixed-guideway system that utilizes and occupies a separate right-of-way, or rail line, for the exclusive use of mass transportation and other high occupancy vehicles, or uses a fixed-catenary (overhead electric) system and a right-of-way usable by other forms of transportation. This includes, but is not limited to, rapid rail, LRT, commuter rail, automated guideway transit, people movers, and exclusive facilities for buses (such as BRT) and other high occupancy vehicles. FTA proposed new funding guidelines in January 2010; the guidelines state that funding for major transit projects will be based on livability issues such as economic development opportunities and environmental benefits, in addition to cost and time saved, which are currently the primary criteria.

The NEPA Process and Project Development

The Council on Environmental Quality has developed regulations for implementing NEPA. These federal regulations, set forth in Title 40 CFR Parts 1500 to 1508, require an evaluation of alternatives and a discussion of the expected impacts of a proposed federal action as part of the NEPA process. The Council on Environmental Quality regulations direct the respective federal agencies to implement procedures for complying with NEPA (40 CFR 1500.6). The regulations that establish both FTA's and FHWA's process for implementing NEPA are set forth in 23 CFR 771 and 23 CFR 774. This EA has been prepared according to those regulations as required under NEPA. In addition, as part of this NEPA review, the requirements of other environmental laws and executive orders are addressed as they apply to specific parts of this EA.

This EA serves as the primary document to facilitate review by federal, state, and local agencies, as well as by the general public, of the proposed Provo-Orem Bus Rapid Transit Project. This EA documents the purpose of and need for the project and presents a discussion of the alternatives considered. It addresses in detail the expected social, economic, environmental, and transportation-related impacts of the alternatives and describes the potential mitigation measures that could offset unavoidable impacts. The information presented in this EA is based on engineering studies and reflects attention given to comments received during public review and coordination that was carried out during the public scoping process, evaluation of alternatives, and definition of the project.

This EA is being circulated for review to interested parties including private citizens, community groups, the business community, elected officials, and public agencies according to federal and state requirements. UTA will continue engineering and environmental studies and will prepare responses to address the comments offered during the review period.

In accordance with federal NEPA regulations, the environmental effects of a project must be fully disclosed. These environmental effects must be fully considered before the project can advance to the federal funding stage, which includes the final design of the project, acquisition of right-of-way, acquisition of equipment, and construction of the project facilities and system. FTA and FHWA will decide if a Finding of No Significant Impact determination is appropriate based on this EA, or if an EIS and Record of Decision must be prepared.

DRAFT

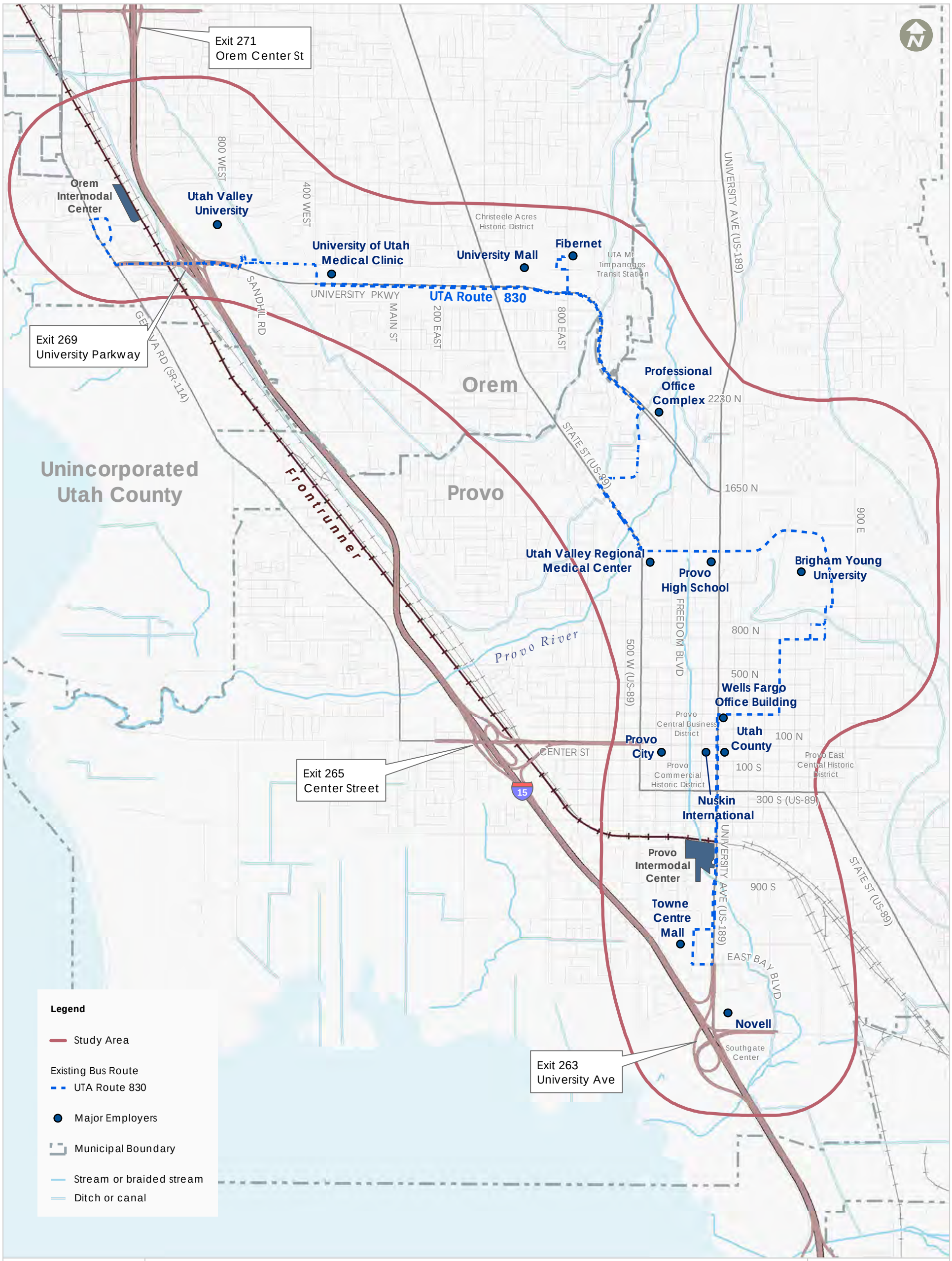
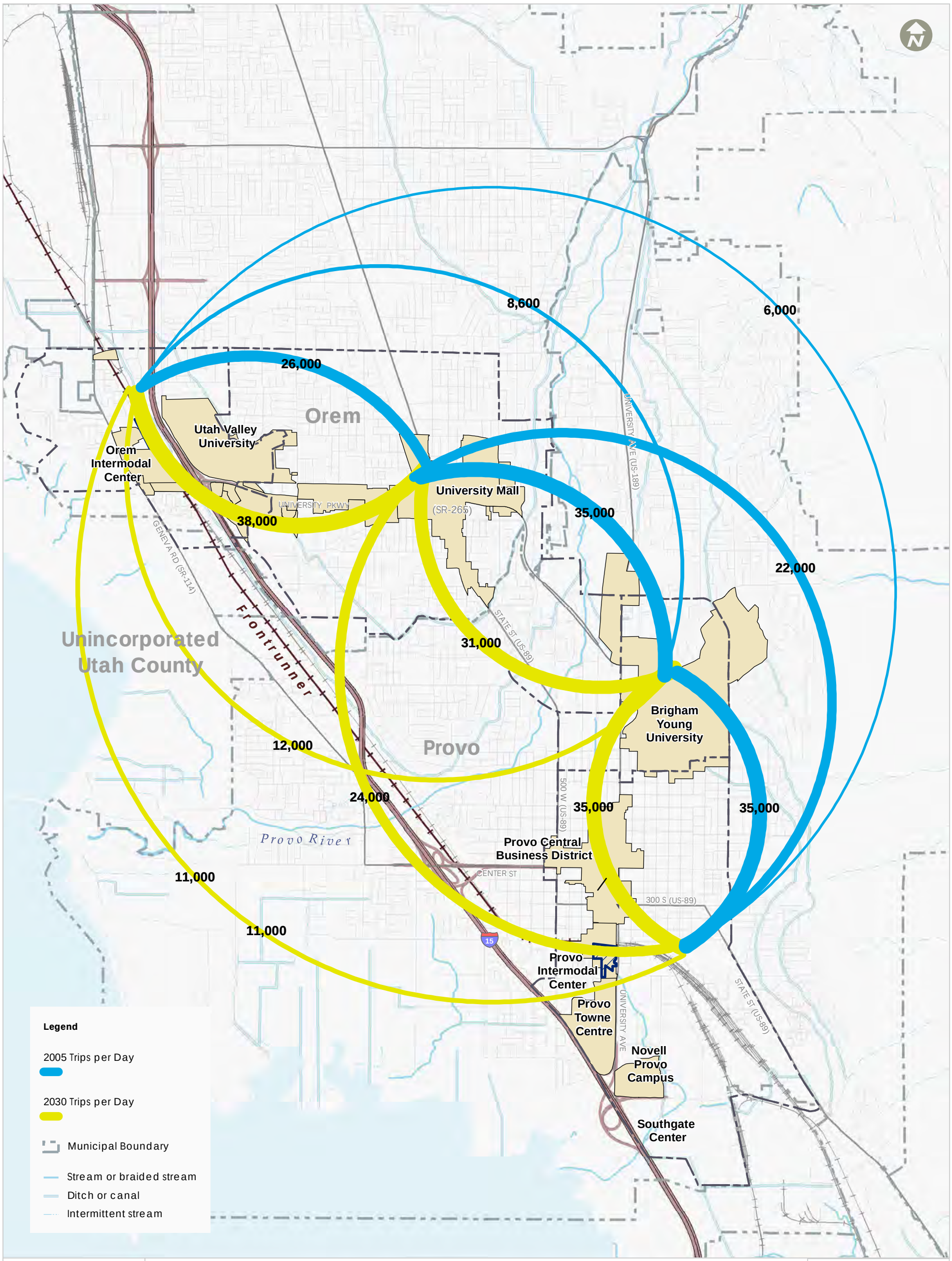


Figure 1-1 Study Area Existing Conditions

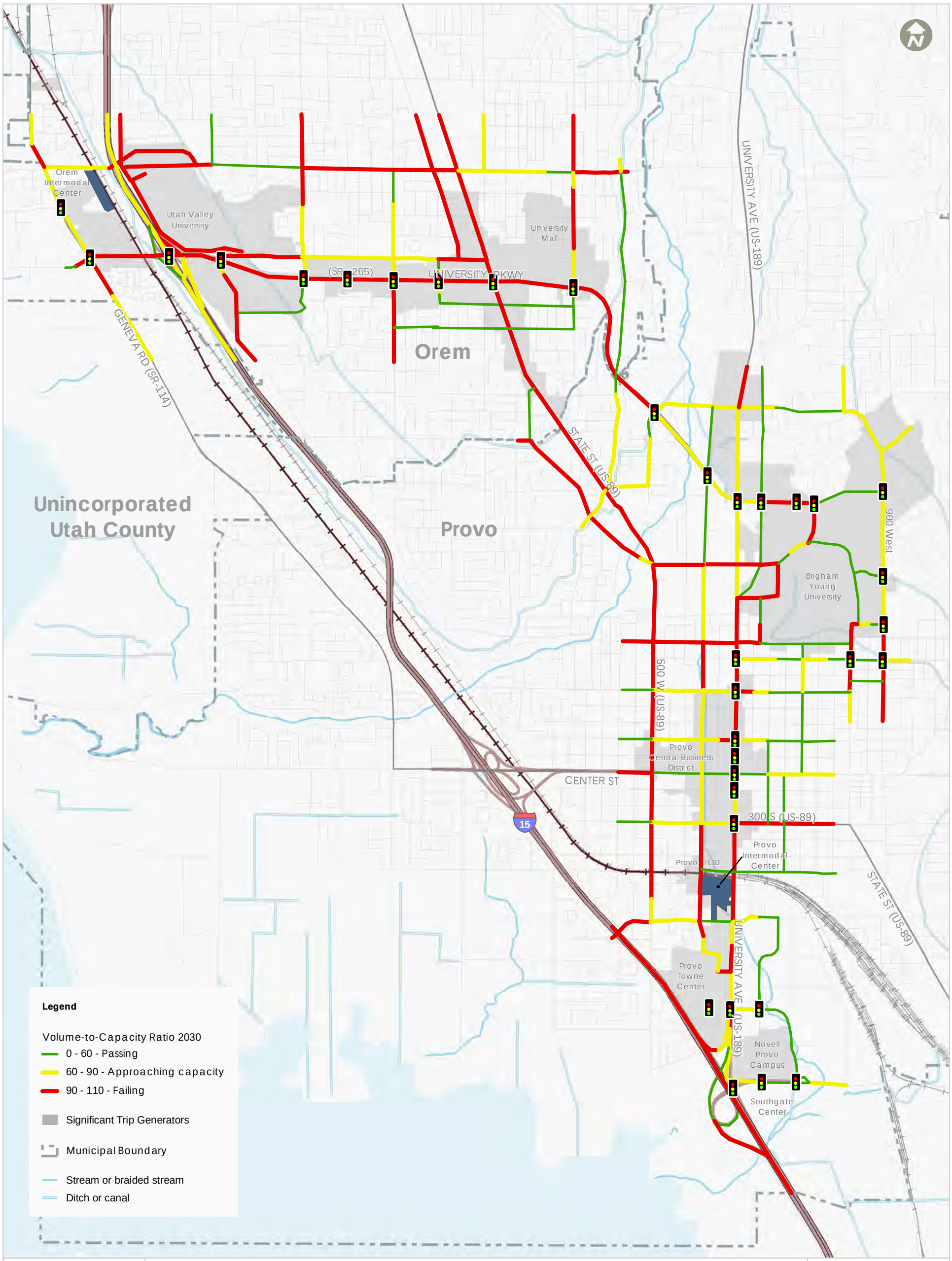


Project Location

Map projection is UTM12N NAD83. Base data layers from the State of Utah Automated Geographic Reference Center (AGRC) and from municipal zoning plans..

0 0.5 1 Mile
0 0.5 1 Kilometers

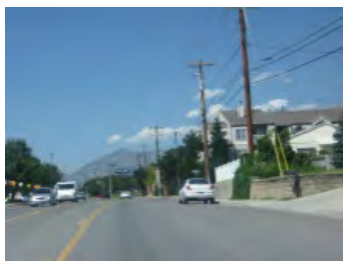
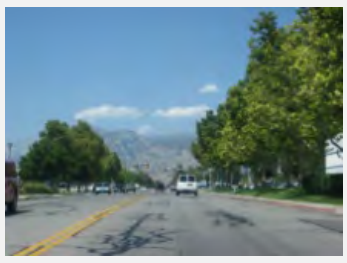
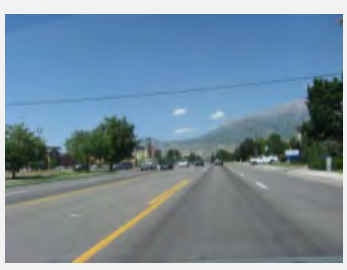
Figure 1-2 Travel Demand within the Study Area



Map projection is UTM12N NAD83. Base data layers from the State of Utah Automated Geographic Reference Center (AGRC) and from municipal zoning plans.

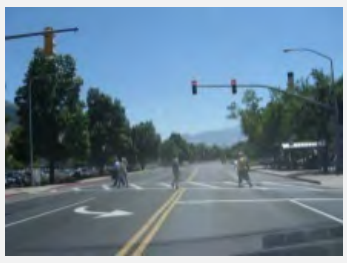
Figure 1-3
Volume-to-Capacity Ratio 2030

Figure 1-4: Roads in the Study Area

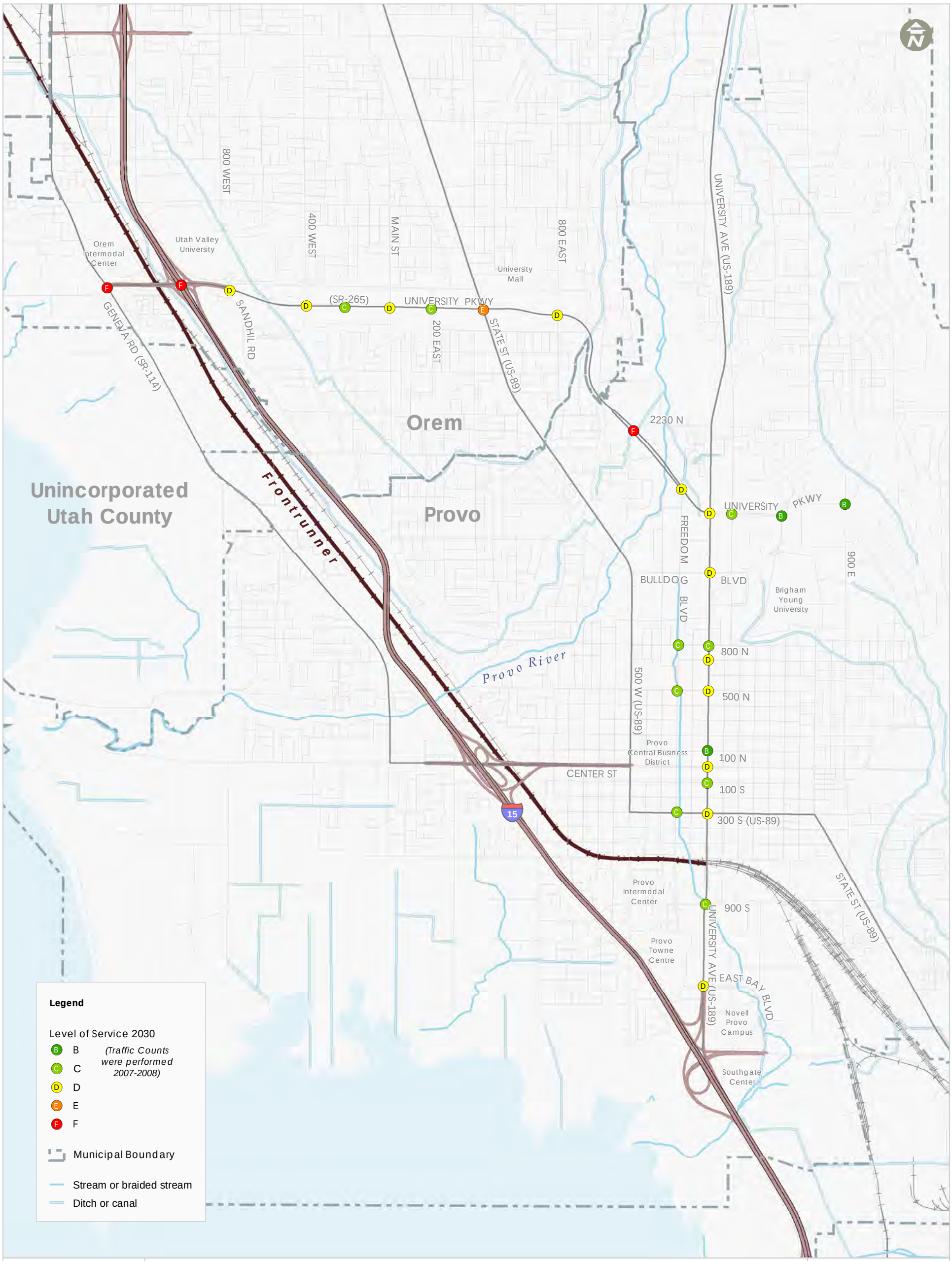
Roadway	# Lanes	Posted Speed	Ownership	Signal Spacing (All At-Grade)	Functional Class	Average Annual Daily Traffic	Capacity/Constraints	Photo
Geneva Road (State Route (SR)-114)	5	45	UDOT	0.5 miles	Urban Arterial	13,215	UDOT securing contractor to expand facility to 7 lanes	
Sandhill Road	5	35	Orem City	0.6 Miles	Urban Arterial	21,700[1]	At capacity due to right-of-way constraints	
Main Street	3	25	Orem City	0.6 Miles	Urban Collector	16,900[1]	At capacity due to right-of-way constraints	
University Parkway (SR-265)	7	45	UDOT	0.4 Miles	Urban Arterial	45,090	At planned/ effective arterial capacity except on the diagonal segment, which is only 4 lanes	
1200 South	2	25	Orem City	0.4 Miles	Urban Collector	6,735	Available space for widening	
State Street (U.S. 89)	7	40	UDOT	0.5 miles	Urban Arterial	44,460	At planned/ effective arterial capacity	
800 East	5	40	Orem City	0.3 Miles	Urban Arterial	22,500[1]	At capacity due to right-of-way constraints	
2230 North	5	30	Provo City	0.2 Miles	Urban Collector	15,975	At capacity due to right-of-way constraints	
Freedom Boulevard	5	35	Provo City	0.2 Miles	Urban Arterial	16,345	At planned capacity	

1. Average Annual Daily Traffic was provided by municipality
2. Average Annual Daily Traffic is not available for roadway

Figure 1-4: Roads in the Study Area (cont'd)

Roadway	# Lanes	Posted Speed	Ownership	Signal Spacing (All At-Grade)	Functional Class	Average Annual Daily Traffic	Capacity/Constraints	Photo
University Avenue (U.S. 189)	5	35	UDOT	0.2 Miles	Urban Arterial	32,760	Provo City does not support adding any additional general purpose lanes. The right-of-way is not wide enough to add lanes while keeping the center turn lane.	
Canyon Road	5	30	Provo City	0.5 miles	Urban Collector	21,710	At capacity due to right-of-way constraints	
900 East	5	35	Provo City	0.3 Miles	Urban Arterial	25,030	At capacity due to right-of-way constraints	
700 North	2	25	Provo City	0.4 Miles	Urban Collector	10,150	Available space for widening	
Campus/ College Drive (UVU)	3	25	UVU	N/A	Urban Collector	9,700[1]	Available space for widening	
College Drive (BYU)	5	25	BYU	0.1 Miles	Urban Collector	14,180	At capacity due to right-of-way constraints	
100 West	2	25	Provo City	0.2 Miles	Urban Collector	1,500[1]	Available space for widening	
Eastbay Boulevard	5	30	Provo City	0.3 Miles	Urban Collector	Not available[2]	At planned capacity	
1860 South	5	35	Provo City	0.3 Miles	Urban Arterial	Not available[2]	Available space for widening	

1. Average Annual Daily Traffic was provided by municipality
2. Average Annual Daily Trafaic is not available for roadway



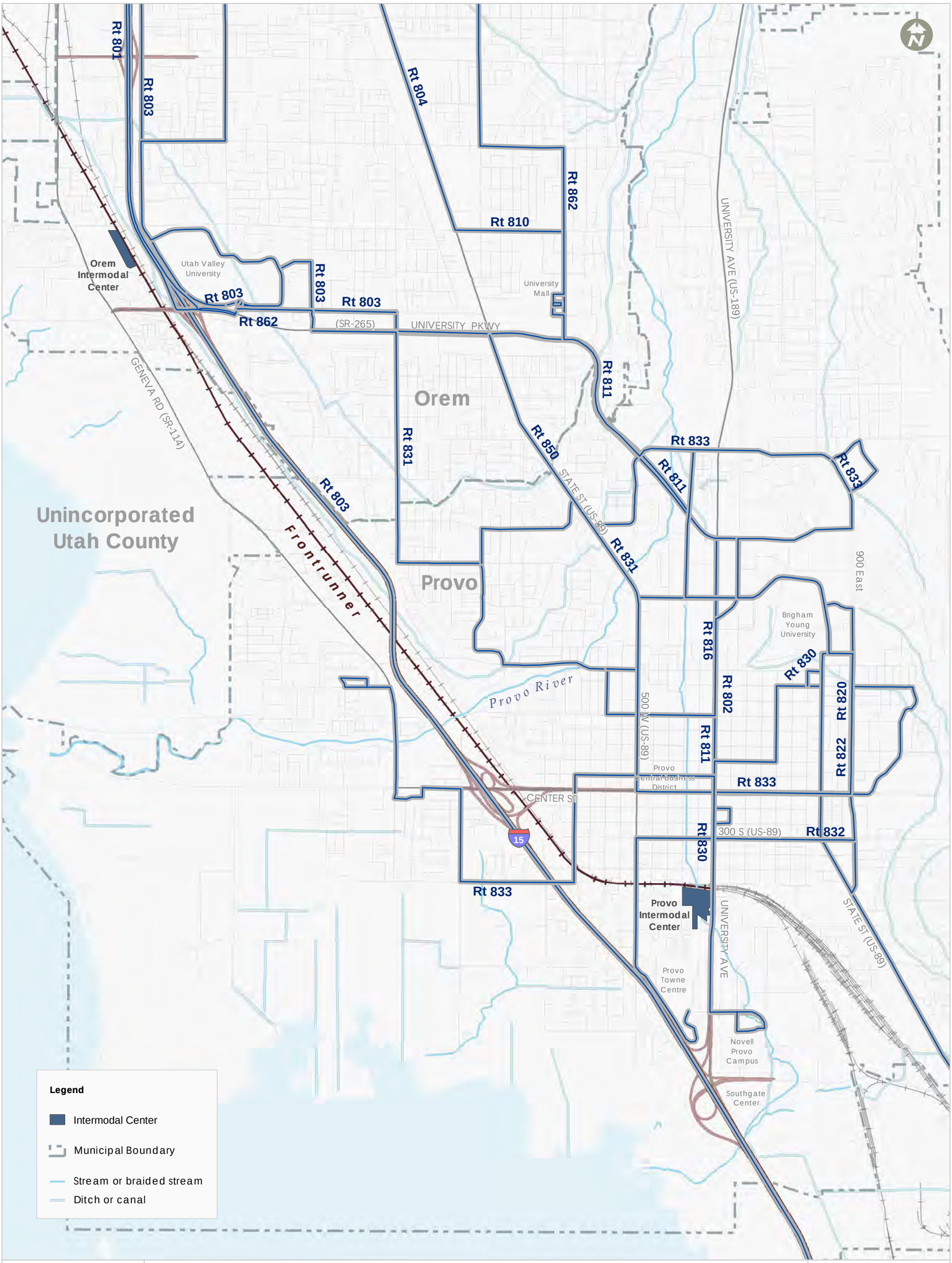
Project Location

Map projection is UTM12N NAD83. Base data layers from the State of Utah Automated Geographic Reference Center (AGRC) and from municipal zoning plans.

0 0.5 1 Mile

0 0.5 1 Kilometers

Figure 1-5
Future Intersection Level of Service 2030 for PM Peak Hour



Map projection is UTM12N NAD83. Base data layers from the State of Utah Automated Geographic Reference Center (AGRC) and from municipal zoning plans.

Figure 1-6
Existing UTA Bus Routes

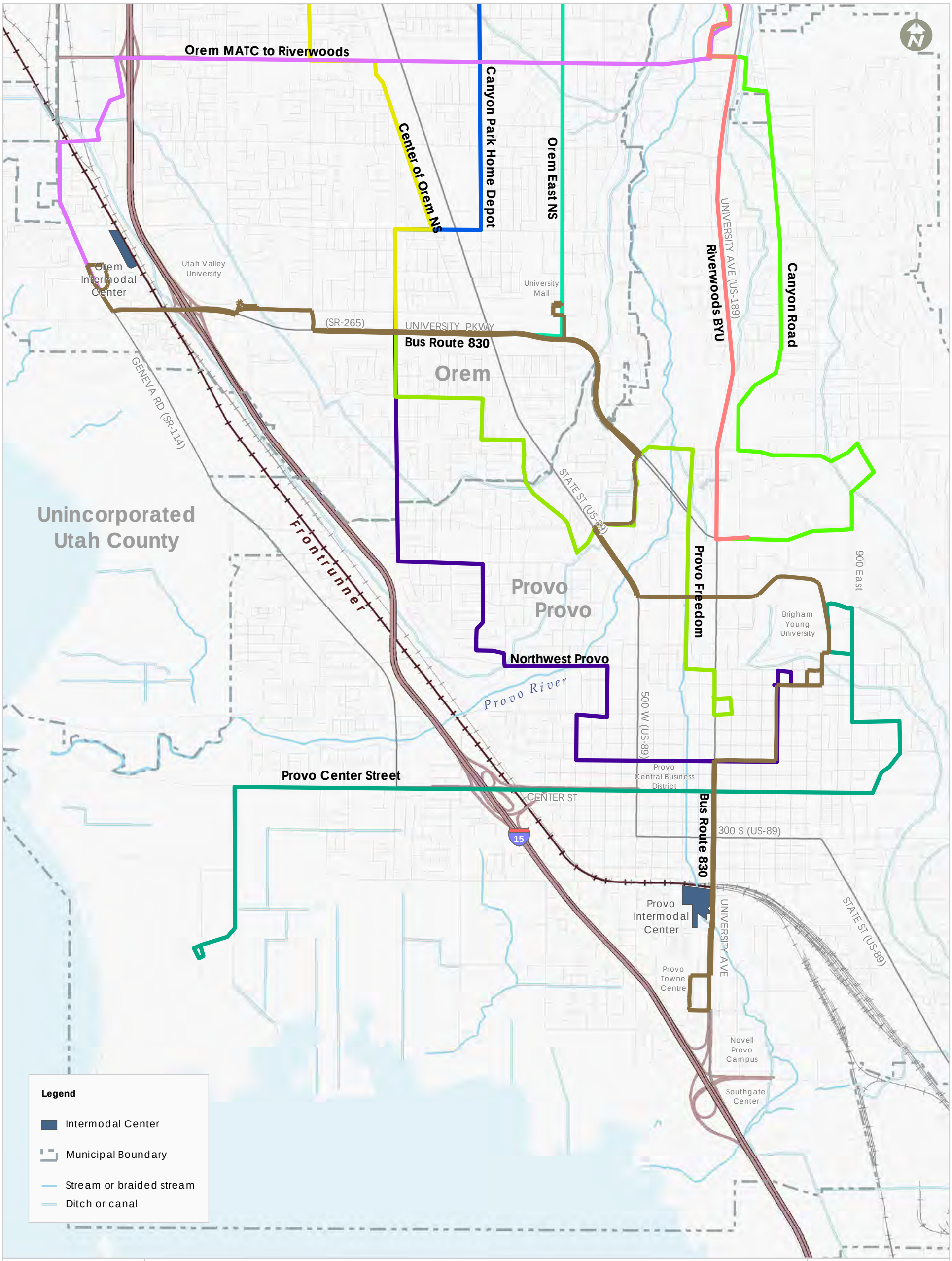


Figure 1-7 Future UTA Bus Routes

Figure 1-8: UVU Student Transit Proximity

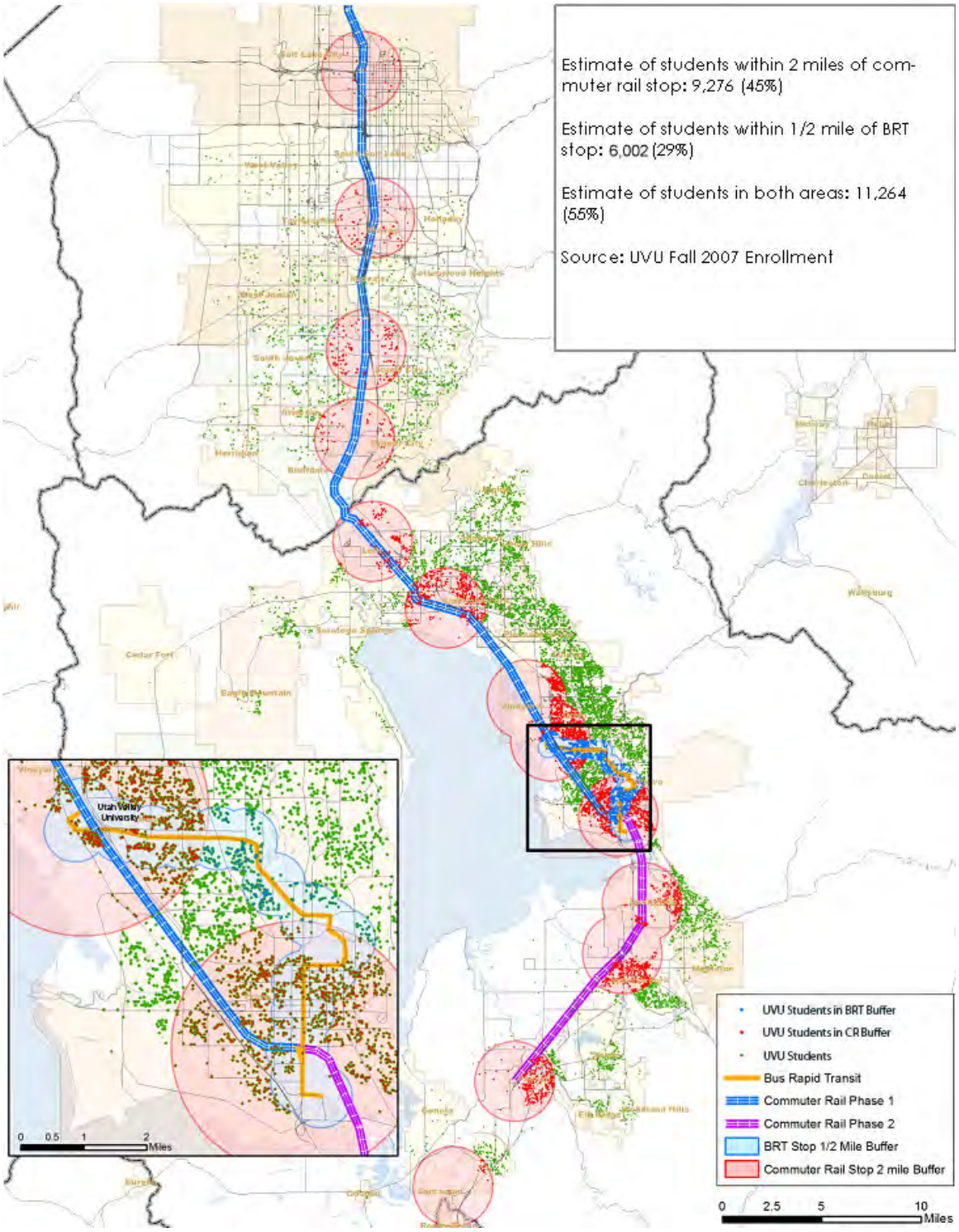


**Figure was prepared by MAG based on the Preferred Alternative from the 2005 study.*

Figure 1-9: BYU Student Transit Proximity

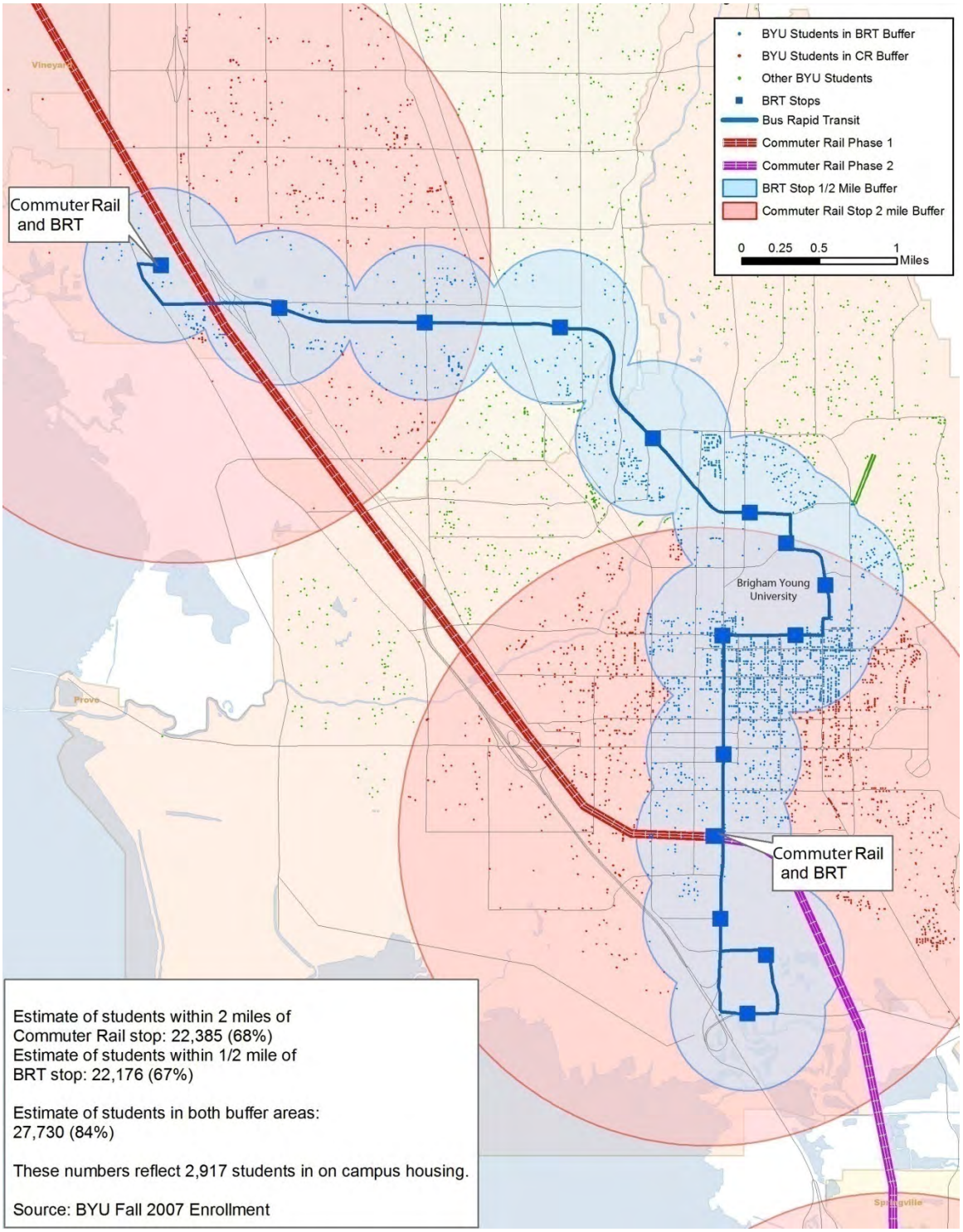
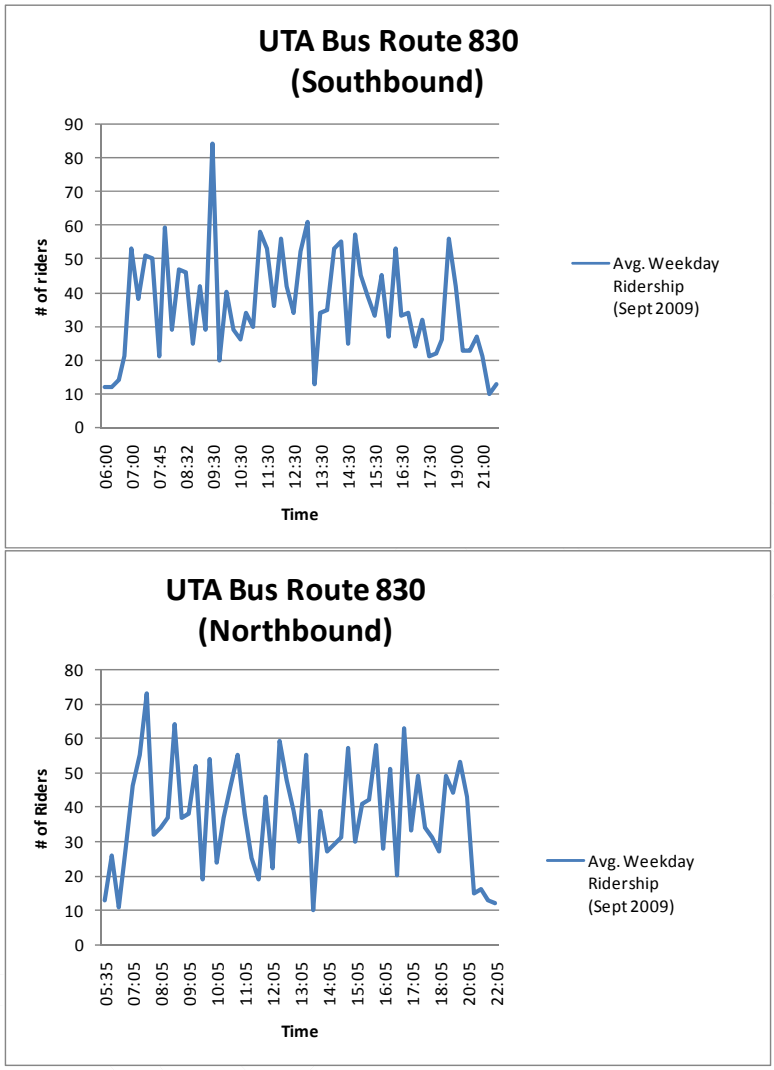


**Figure was prepared by MAG based on the Preferred Alternative from the 2005 study.*

Figure 1- 10: Passenger Loads on Route 830



Source: UTA Operations Performance Office, Regular Bus Service Manual Passenger Counts (Route 830), September 2009