Los Alamos Comprehensive Transit Study/ Updated Service Plan


LSC TRANSPORTATION CONSULTANTS, INC.

Prepared for

ATOMIC CITY TRANSIT

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Los Alamos Comprehensive Transit Study and Updated Five-Year Service Plan

Final Report

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March 3, 2015

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Executive Summary

INTRODUCTION

Atomic City Transit (ACT) contracted with LSC Transportation Consultants, Inc. to prepare a Comprehensive Transit Study and Five-Year Transit Service Plan in Los Alamos County, New Mexico. Los Alamos County is taking a proactive effort to respond to challenges of providing public transit service in an environment of dramatically increasing demand for services. This study not only provides an evaluation of existing transit service, but looks at underserved and unserved markets and establishes appropriate types of service based on demand for the next five years.

STUDY APPROACH

Development of the recommended plan began with an inventory of existing transportation services and a detailed analysis of ACT. The analysis of ACT included a review of operations, schedules, and financial factors. Individual routes were analyzed and compared using performance measures including passengers per hour and cost per passenger-trip. A boarding and alighting count was completed to determine the number of passengers using each bus stop by route. The number of passengers boarding and alighting by stop was mapped to give a visual depiction of passenger activity and to help identify both stops with high activity and stops with little or no passenger activity.

Community participation was sought through several channels. An onboard survey was completed giving passengers the opportunity to provide input for the plan. In addition to collecting information about the passengers and travel patterns, passengers were asked to provide input regarding any desired changes. A public meeting was held with the Transportation Board on May 1, 2014 and a public open house was held in White Rock on July 15, 2014. Information was posted on the Los Alamos website and interim reports were posted on the LSC website with links from the Los Alamos website. In addition to the community input, meetings were held with drivers four times during the process to obtain any feedback from drivers and staff.

A demand analysis was completed to determine if there are areas of high need which are not served. A demand model was developed to estimate the impact on ridership of proposed service changes.

A variety of service options were considered for the system as a whole and for individual routes. The system-wide options included developing a 20-minute pulse system compared with a 30-minute pulse system. The service options were evaluated in terms of how well they would meet goals, improve ridership, and enhance efficiency. Recommendations were developed based on the evaluation of the options, feedback from ACT drivers, and community input. Financial constraints were also considered in the development of the recommended service plan.

Options for the transit vehicle fleet were evaluated. These included the types of fuel which are available and could be used as well as the vehicle type and size. Recommendations for vehicles were provided based on levels of demand and fleet requirements.

GOALS

Goals were developed for ACT based on previous plans, community input, and ACT staff input. The following are the goals that were developed. Objectives for each goal are provided in Chapter II.

Goal #1: Provide mobility opportunities for residents and visitors in Los Alamos

Goal #2: Continue to enhance the environmental sustainability of the transit system

Goal #3: Provide high-quality, customer-oriented service

Goal #4: Provide efficient, effective, and safe services

Goal #5: Transportation services will be flexible and adaptable to meet changing conditions and needs in Los Alamos County

Goal #6: Promote the transit service

SERVICE RECOMMENDATIONS

The proposed service plan is based on restructuring the routes and schedules to operate on either a 30-minute or 60-minute headway with a timed-transfer pulse at the transit center. This approach will accomplish several things. First is that transfers between routes will be much easier than with the current system. All routes will have a scheduled layover at the transit center to allow all buses to meet at the scheduled time, allowing passengers to transfer between all routes. During peak times, most routes will operate with a 30-minute headway and the frequency will be reduced to a 60-minute headway during off-peak times. The longer running time will improve schedule adherence on routes which currently have inadequate running times. Regular times, every half-hour or hour, make the schedule easy to understand and for passengers to remember.

The proposed routes are shown in Figure ES-1. One of the more substantial changes in the routes is the modification of the White Rock – Main Hill route. Two routes will continue to serve White Rock on the Truck Route and Main Hill. In White Rock, the route will follow the current loop through the community with a short layover at the Visitor Center. The Truck Route bus will then retrace the loop as shown on the way back to the transit center and Los Alamos. This route will have a 60 minute scheduled time with a short layover in White Rock and a layover at the transit center. It is recommended that this route interline with Route 3 to provide the connection between Los Alamos and White Rock without requiring a transfer. The Main Hill route will turn around at Diamond in Los Alamos and will not serve the Transit Center.

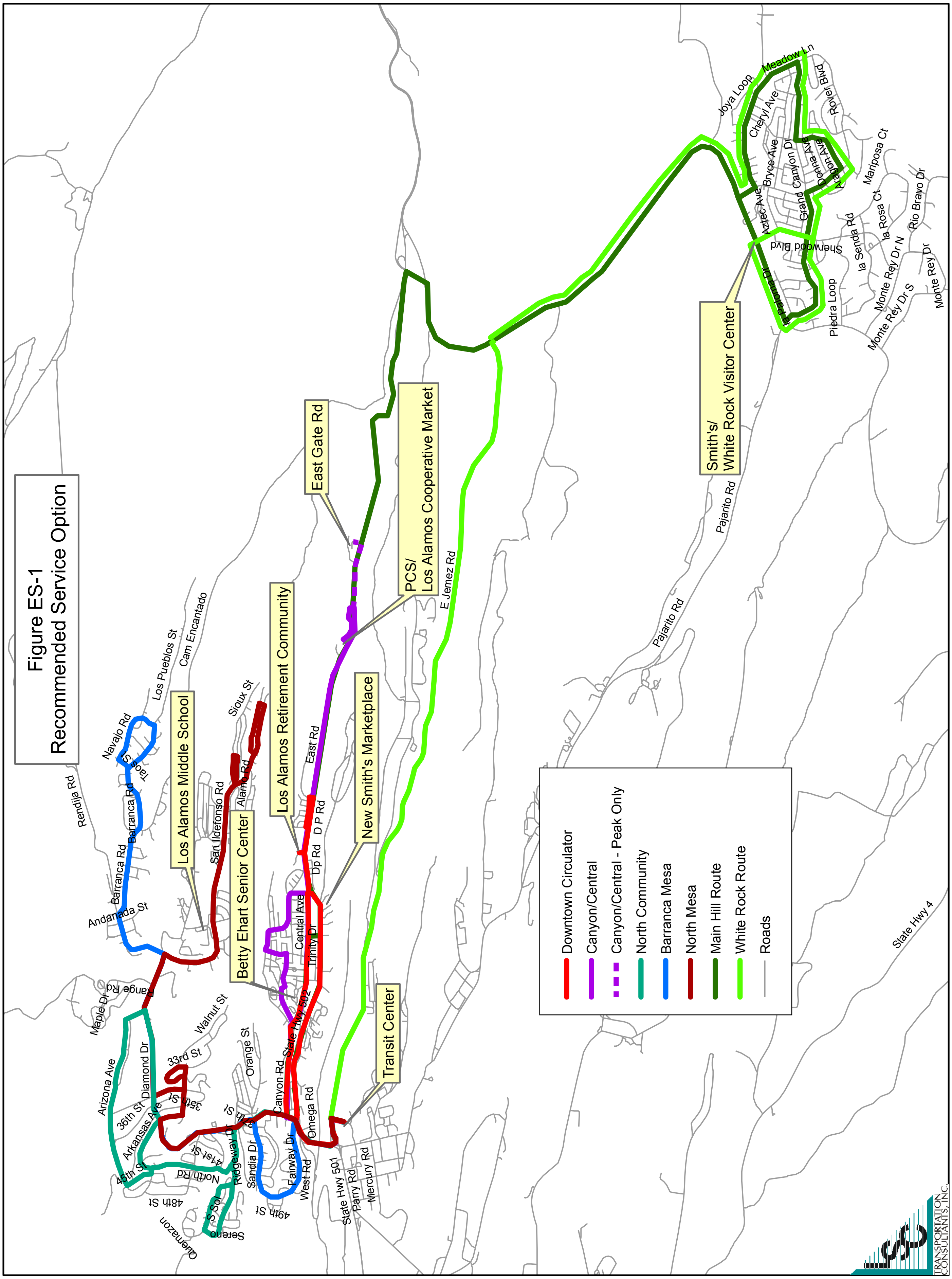
What was Route 3 has been modified to extend to the area by the Holiday Inn Express and the Coop with an extension to the East Gate area on request. This covers portions of the corridor which had been served by the Main Hill route.

The proposed service on the Downtown Circulator will operate every 30 minutes during the morning and afternoon peak periods with a second bus added to provide service every 15 minutes during the middle of the day. This will allow workers at LANL to have frequent access to and from downtown during lunch hours.

The former Route 4 has been modified to include service along Arizona. By adding time to this route, it can be extended to this area and serve residents in this neighborhood.

The recommended service includes adding demand-response service in the evening for all passengers. This will allow passengers to connect from the later New Mexico Park-and-Ride buses as well as those who may work later or need later service.

Figure ES-1
Recommended Service Option



The estimated operating cost in current dollars is shown in Table ES-1 for the propose service plan. By reducing the number of buses traveling to White Rock, the resources can be reallocated and the service implemented without a major budgetary impact.

The existing transit center is located near the intersection of Diamond Drive and West Jemez Road, near the Los Alamos National Laboratory (LANL). Presently, all of ACT routes (Routes 1 through 6), NCRTD, and the NMDOT Park-and-Ride bus provide a stop at this transit center. This transit center lacks proper amenities and needs to be developed. There should be separate lanes for ACT, NMDOT Park-and-Ride, and private cars at the transit center so there is free flow of traffic entering and exiting the transit center. A break room, along with restrooms, must be available for drivers in the transit center. The passenger shelters at the transit center should be improved so that they protect passengers from rain and winter weather and make the public transit experience a pleasant one. Finally, a stop signal should be installed for the traffic leaving LANL, so that the buses can turn left across existing traffic. This signal should be an actuated signal which would be activated by the presence of a bus approaching the transit center. This is both a safety issue and an operational effectiveness issue. Figure ES-2 illustrates modifications to the proposed transit center based on the LANL Project Initiation and Site Services (May 2009) plan. A separate lane was added to accommodate four more buses—three NMDOT Park-and-Ride buses (Purple Route, Green Route, and Blue Route), and one NCRTD bus (Espanola-Los Alamos-Pojoaque Bus Route).

Table ES-1
Proposed Service Plan

Option	Service Description	Actual roundtrip Time	# of Vehicles (maximum)	Total Daily		Total Annual		Operating Days	Annual Operating Cost	Cost per Passenger
				Vehicle - Miles	Vehicle - Hours	Vehicle - Miles	Vehicle - Hours			
Downtown Circulator	M-F 6:00 am to 7:00 pm; 30 mins, 15 mins mid-day	26 minutes	2	198.00	16.50	49,698	4,142	251	$381,440	$ 3.18
White Rock	M-F 6:30 am to 7:00 pm; 60 mins	54 minutes	1	306.25	12.50	76,869	3,138	251	$361,412	$ 10.63
Main Hill	M-F 6:00 am to 7:30 pm, 60 mins	59 minutes	1	344.25	13.50	86,407	3,389	251	$396,583	$ 9.91
Canyon/Central	M-F 6:00 am to 7:00 pm; 60 mins	50 minutes	1	132.60	13.00	33,283	3,263	251	$289,679	$ 9.66
North Community	M-F 6:00 am to 7:00 pm; 30 mins (all day)	26 minutes	1	234.00	13.00	58,734	3,263	251	$336,691	$ 10.20
Barranca Mesa	M-F 6:00 am to 7:00 pm; 60 mins (all day)	50 minutes	1	169.00	13.00	42,419	3,263	251	$306,556	$ 9.58
North Mesa	M-F 6:00 am to 7:00 pm; 60 mins, 30 mins peak	54 minutes	2	234.00	18.00	58,734	4,518	251	$424,461	$ 4.24
Evening Demand-Response Service	M-F 6:00 pm to 9:00 pm	varies	2	72.00	6.00	18,072	1,506	251	$138,705	$ 13.87
			11			**424,215**	**26,481**	**251**	**$2,635,528**	$ 6.61

Source: LSC, 2014.

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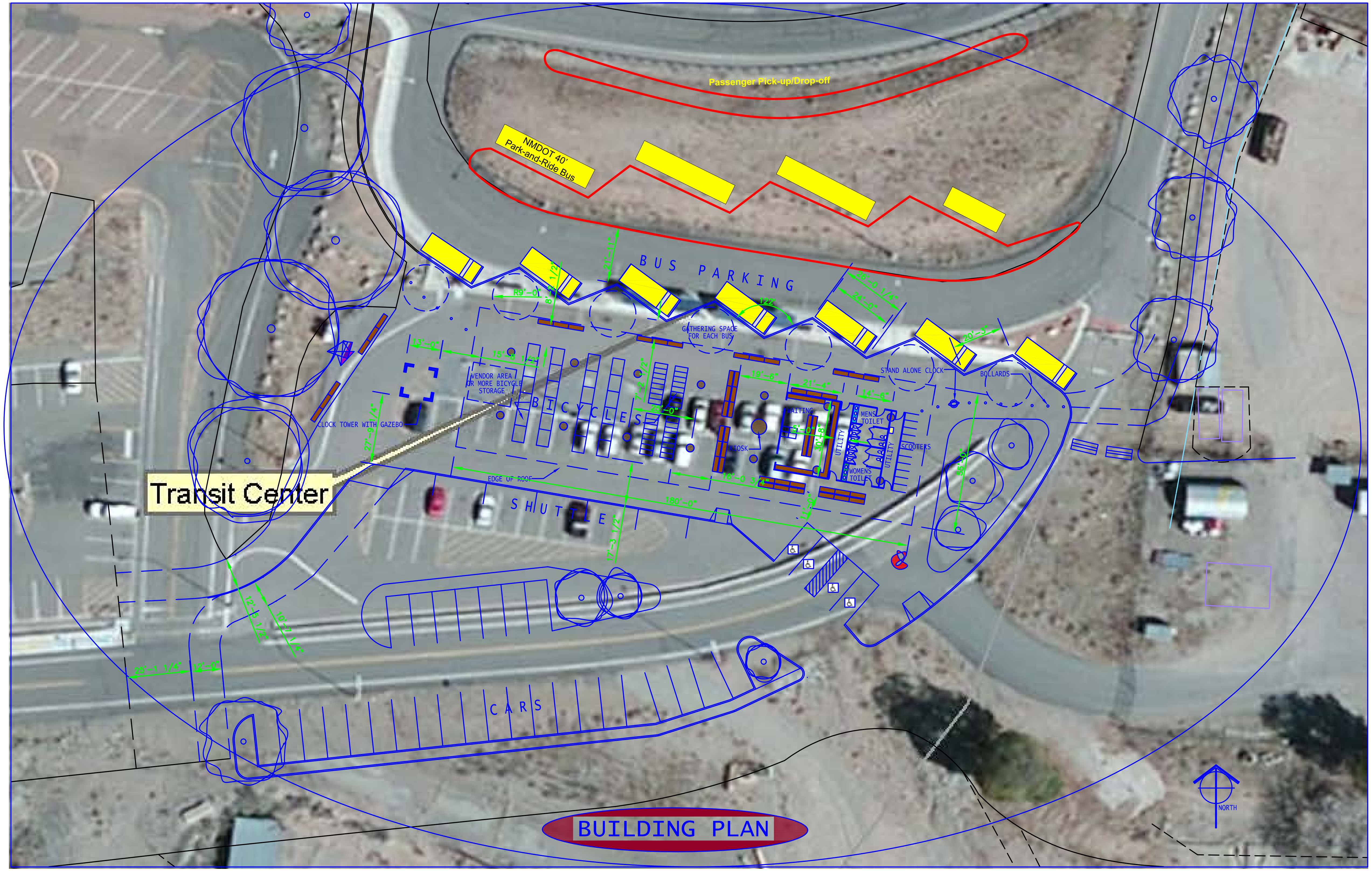
Figure ES-2
Proposed Transit Center Modifications



Infrastructure Planning

LANL Project Initiation & Site Services

Drawing modified by LSC Transportation Consultants, Inc.

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Table ES-2 presents a five-year transit plan, with the assumption of an annual five percent inflation rate.

Recommendations were also provided for the vehicle fleet. The analysis of vehicle fleet needs indicate that a small heavy-duty bus is the most appropriate for ACT. It has the capacity to serve all of the routes with the exception of some afternoon trippers. However, using two buses on these tripper routes provides flexibility for the service and the use of the vehicles on other routes. Consideration should be given to larger 40-foot buses if ACT continues to operate the shuttle service for Bandelier National Monument. If this service continues, additional larger buses will be needed and could then be used on the afternoon trippers if needed. The life-cycle cost of the medium-duty bus is only slightly lower than the heavy-duty bus and may be comparable depending on the specific vehicles. A heavy-duty bus has a longer expected life and will likely have better endurance and lower maintenance costs in the Los Alamos environment. There are also advantages to maintaining consistency within the fleet. Feedback from drivers indicated a preference for a small heavy-duty bus. Therefore, it is recommended that purchase of new buses should consider vehicles comparable to the El Dorado XHF or New Flyer MiDi for the fixed-route service. The trolleys should be replaced with the same buses as the rest of the fleet. This will increase flexibility for use of the vehicles. The trolley type bus is attractive as a shuttle in tourist locations, but the practicality for use in a system like ACT is limited. Riders would be better served if the bus was the same as others in the fleet. For demand-response service offered in the evening and the ADA complementary transit service, a smaller body-on-chassis vehicle will be appropriate.

Finally, recommendations were provided for marketing strategies and performance monitoring. Performance measures were recommended to monitor how well ACT meets the established goals and objectives.

Table ES-2
Transit Financial Plan, 2015-2020 (assumed 5% inflation)

	2015	2016	2017	2018	2019	2020
EXPENSES						
OPERATING						
Restructured Routes	$2,767,380	$2,905,749	$3,051,036	$3,203,588	$3,363,768	$3,531,956
School Tripper Service	$136,500	$143,325	$150,491	$158,016	$165,917	$174,212
ADA Complementary Paratransit	$472,500	$496,125	$520,931	$546,978	$574,327	$603,043
Marketing Program*	$8,000	$8,400	$8,820	$9,261	$9,724	$10,210
Subtotal	**$3,384,380**	**$3,553,599**	**$3,731,279**	**$3,917,843**	**$4,113,735**	**$4,319,422**
Capital						
Transit Facility		$1,000,000				
Vehicles- 30' heavy duty buses, 15-passenger cutaways, and a minvan	$940,000	$1,500,000	$300,000	$1,240,000	$600,000	$1,200,000
Subtotal	**$940,000**	**$2,500,000**	**$300,000**	**$1,240,000**	**$600,000**	**$1,200,000**
TOTAL EXPENSES	**$4,324,380**	**$6,053,599**	**$4,031,279**	**$5,157,843**	**$4,713,735**	**$5,519,422**
REVENUES						
REVENUES						
Operation						
FTA 5311 Operational Funding^	$1,390,090	$1,459,595	$1,532,574	$1,609,203	$1,689,663	$1,774,146
Subtotal	**$1,390,090**	**$1,459,595**	**$1,532,574**	**$1,609,203**	**$1,689,663**	**$1,774,146**
Capital						
FTA 5310/5311 Grant Funding*	$752,000	$2,000,000	$240,000	$992,000	$480,000	$960,000
Subtotal	**$752,000**	**$2,000,000**	**$240,000**	**$992,000**	**$480,000**	**$960,000**
Local Revenues						
Operational (Local Match)	$1,974,290	$2,084,005	$2,188,705	$2,298,640	$2,414,072	$2,525,276
Capital (Local Match)	$188,000	$500,000	$60,000	$248,000	$120,000	$240,000
Advertising	$20,000	$10,000	$10,000	$10,000	$10,000	$20,000
Subtotal	**$2,182,290**	**$2,594,005**	**$2,258,705**	**$2,556,640**	**$2,544,072**	**$2,785,276**
TOTAL REVENUES	**$4,324,380**	**$6,053,599**	**$4,031,279**	**$5,157,843**	**$4,713,735**	**$5,519,422**

*An 80% federal share was estimated.

**This is based on a portion of the money already spent on transportation. It is used to leverage more federal funds.

^A 50% federal share was estimated for operations.

Source: LSC, 2014.

Chapter I

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CHAPTER I

Introduction

Atomic City Transit (ACT) contracted with LSC Transportation Consultants, Inc. to prepare a Comprehensive Transit Study and Five-Year Transit Service Plan in Los Alamos County, New Mexico. Los Alamos County is taking a proactive effort to respond to challenges of providing public transit service in an environment of dramatically increasing demand for services. This study will not only provide an evaluation of existing transit service, but will look at underserved and unserved markets and will establish appropriate types of service based on demand for the next five years.

PURPOSE OF THE STUDY

The purpose of this study is to analyze the existing transit service of Atomic City Transit and recommend changes that will affect the delivery of public transit services over the next five years. More specifically, current service will be evaluated and compared to the current demand and need in the study area to determine how service enhancements should be structured. The final plan will recommend changes to ACT's transit service, including recommended modifications to existing service, as well as any proposed new service. The plan will also include recommended modifications or changes to current practices to provide more reliable and efficient operations and organizational approaches that contribute to overall effectiveness of transit management.

STUDY APPROACH

As in many regions, ACT is re-examining its public transit services and is seeking to find the most effective means of providing those services. A key element in the plan is to clearly evaluate the needs of the local residents throughout the study area and determine whether or not the existing service can meet this unmet need in a cost-effective manner. The overall approach will include the collection of data, evaluation of current operations, development of alternatives to improve service, public involvement, development of funding options, and recommendation of specific system improvements with a detailed implementation plan. Feedback from ACT staff, the Transportation Board, and the public is a key element in creating an effective transit plan and will be focused on heavily throughout the study process.

REPORT CONTENTS

This report includes a summary of the existing community conditions, analysis of existing transportation providers that provide services in the surrounding areas of Los Alamos County, service evaluation of Atomic City Transit, analysis of boarding and alighting counts, onboard survey results, analysis of the needs and demand for transit services, summary of service options, vehicles, and the preferred service plan.

Chapter II presents the goals and objectives for transit service within Los Alamos County. These goals and objectives will provide guidance to the organization and the Transportation Board in the development of enhanced transit service for the county. These goals and objectives were refined through discussion with the public, ACT staff and the Transportation Board.

Chapter III presents an inventory of the existing transit services within the service area and surrounding areas of Los Alamos County. The chapter looks in detail at the existing services provided in Los Alamos County and the adjoining areas, days and time of service, fare if applicable, and interregional connection with other transit providers.

Chapter IV provides an analysis of onboard counts that were conducted on April 15 and 16, 2014. These data show patterns regarding the location of boardings and alightings by route to help determine the most productive locations and bus routes.

Chapter V presents an analysis of data collected from the onboard survey. An onboard survey was given to passengers to gather information from current riders, their demographics, trip characteristics, and service perceptions.

Chapter VI presents an analysis of the afternoon express survey.

Chapter VII presents an evaluation of Atomic City Transit services. The chapter looks at the current service, performance, and ridership for ACT. A current financial review—looking at revenues and expenses—is included in this section of the report. A peer review is also included to better understand Atomic City Transit in comparison to similar transit agencies serving similar types of population.

Chapter VIII presents a summary of community demographics and economics. This chapter specifically looks at various market segments that use transit such as older adults, people with disabilities, zero-vehicle households, low-income population, and youth. It also looks at means of transportation used to commute to work and commuter patterns to and from Los Alamos County.

Chapter IX presents a review of transit needs and demand for the area which will be used to evaluate service options. The greatest transit need model helps identify the areas that need transit and whether those areas are served by the existing transit services. Multiple techniques were used to help determine potential transit need within the county including the mobility gap analysis, fixed-route model, ADA paratransit model, commuter demand, and program trip demand model.

Chapter X presents the evaluation of transit service options along with their potential costs. The options were identified from a variety of sources. Input included comments from the onboard survey, comments from drivers and operators, and the evaluation of the existing service. There are many different options presented in this chapter, many of which are independent of the other options. The evaluation considers the operating costs of the options, potential ridership, number of vehicles required for this service, and the impact on productivity. Driver input was received on preliminary route restructuring, and these changes have been incorporated into the proposed changes presented.

Chapter XI presents different vehicle types required to provide the service and factors used to choose the appropriate size for the transit demand. The type, size, cost, seating capacity, and general description of different types of vehicles are discussed and the life cycle cost for each type of vehicle is also evaluated for cost comparison.

Chapter XII presents the implementation plan with the preferred service plan for Atomic City Transit. This chapter also has vehicle requirements for implementing the preferred service plan. Costs and ridership data are also presented. This chapter also presents a conceptual layout for the transit center. This chapter includes funding alternatives, financial plan, organizational recommendations, marketing program, monitoring program, and an implementation schedule to implement the preferred service plan.

Chapter II

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CHAPTER II

Goals and Objectives

INTRODUCTION

The basis for any transit plan is the development of a vision for transit services in the local community. Passenger needs, travel patterns, and funding often dictate the type of service to be provided in an area. The goals and priorities of the local community are significant factors to determine the type, level, and quality of service to be provided. The following discussion outlines the mission, goals, and objectives for transit service and provides analysis of the preferred options.

The Mission Statement, Goals, and Objectives typically form a hierarchical structure with the Mission Statement being the most general. Goals support the achievement of the mission, objectives support the goals, and so on until the most specific element is reached—the standards.

MISSION STATEMENT

The Mission Statement establishes the overarching direction of an agency and enumerates the most generalized set of actions to be achieved by that agency. The mission statement also establishes the overall direction of the planning effort, transit services to be implemented, and strategies to coordinate various transportation providers in the county. The mission of Atomic City Transit is as follows:

> The mission of Atomic City Transit is to meet the needs of the residents of Los Alamos County by operating a safe, reliable, and efficient transit service that will be flexible and adaptable to meet the changing needs of the community.

Goals and Objectives

Based on the mission statement, review of the existing service, and results of the survey efforts, LSC has formulated draft goals and objectives for Atomic City Transit. For transportation planning purposes, a goal is defined as a purpose or need that should be attained to address a transportation issue. An objective is a specific method or activity that is designed to achieve an identified goal. The goals and objectives are very important parts of developing a comprehensive transit study and future services plans as they set the overall direction. The goals and objectives must reflect the values and desires of the community.

Goal #1: Provide mobility opportunities for residents and visitors in Los Alamos

Objective 1.a: Serve elementary schools, the middle school, and high school; and key activity centers within Los Alamos County including major employers, government buildings, medical clinics, hospitals, nursing homes, and shopping centers.

Objective 1.b: Serve the elderly, people with disabilities, low-income, minority, and non-English-speaking individuals as well as those that cannot drive or cannot afford a vehicle.

Objective 1.c: Provide connections to regional services for commuters to and from Los Alamos County.

Goal #2: Continue to enhance the environmental sustainability of the transit system

Objective 2.a: Use smaller vehicles where appropriate, more fuel efficient vehicles, and alternative energy vehicles to reduce the carbon footprint of the entire transit system.

Objective 2.b: Pursue federal funding through all available programs to help offset the cost of new alternative fuel vehicles.

Objective 2.c: Develop sustainable local funding sources.

Goal #3: Provide high-quality, customer-oriented service

Objective 3.a: Operate 30-minute frequency service during peak periods.

Objective 3.b: Operate fixed routes with a 95 percent on-time rate as defined by never leaving a scheduled stop early and being no later than five minutes behind the scheduled arrival time at each stop along the route.

Objective 3.c: Distribute a rider survey once a year to obtain input from system users on the adequacy of Atomic City Transit services and any unmet needs.

Objective 3.d: Distribute a rider survey once a year to parents to obtain input from student users on the unmet needs of Atomic City Express services.

Objective 3.e: Implement Intelligent Transportation System (ITS) applications to monitor system performance and provide real-time information to users.

Goal #4: Provide efficient, effective, and safe services

Objective 4.a: Coordinate transportation services with the other transportation providers in the area to meet regional needs.

Objective 4.b: Provide service to 90 percent of the population in the areas with the greatest transit needs.

Objective 4.c: Implement weekend services.

Objective 4.d: Increase ridership to 600,000 passengers in FY2015.

Objective 4.e: Increase system performance to a systemwide average of 21 passengers per hour.

Objective 4.f: Improve individual routes to achieve a productivity level of 16 passengers per hour.

Objective 4.g: Ensure operations have fewer than 2.5 preventable accidents per 100,000 vehicle-miles.

Objective 4.h: Provide convenient timed transfers between routes.

Goal #5: Transportation services will be flexible and adaptable to meet changing conditions and needs in Los Alamos County

Objective 5a: Conduct an annual review of goals, objectives, accomplishments, new needs, and performance.

Objective 5c: Complete an annual review of system performance and adjust service to improve performance.

Goal #6: Promote the transit service

Objective 6.a: Develop a public education program on the benefits of transit services and the need to maintain/improve the overall transportation system in Los Alamos.

Objective 6.b: Work with local employers to promote the use of the transit system, especially for employers that are expected to attract employees from outside of the area.

Chapter III

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CHAPTER III

Existing Transportation Providers

This chapter reviews the existing transportation providers that provide services in the surrounding areas of Los Alamos County. A brief summary of each provider is presented. The main objective of this effort was to determine what transportation resources exist in and around the study area, and the necessary transportation connections that are important to make to avoid duplications in existing services.

There are intercity bus and rail carriers in the region that are available in Santa Fe and the towns of Taos and Espanola, approximately 45-minute, 85-minute, and 30-minute drives from Los Alamos. The nearest air transport available is the Los Alamos County Airport (LAM). LAM offers convenient service to and from the Albuquerque airport, where connections can be made to other destinations in the United States.

EXISTING TRANSPORTATION SERVICES

- Atomic City Transit (ACT)
- Los Alamos National Laboratory (LANL) service
- North Central Regional Transit District (NCRTD)
- New Mexico Department of Transportation (NMDOT) Park-and-Ride service
- New Mexico Rail Runner Express
- Santa Fe Trails
- Town of Taos Chile Line service
- Los Alamos Senior Centers

Atomic City Transit (ACT)

Atomic City Transit is a general public transportation service for the Los Alamos County area and the communities of Los Alamos and White Rock. This agency provides service Monday through Friday from approximately 6:00 a.m. to 7:00 p.m. This agency does not provide any weekend service or service on any federal holidays.

ACT is a fare-free bus system and the routes connect all the residential areas, shopping areas, the Los Alamos National Lab, and the Los Alamos Airport. ACT provides five fixed-routes, one downtown circulator (trolley), dial-a-ride para-transit service, five afternoon express routes, county-related events and safe-ride-home service, and Bandelier seasonal fixed-route services. All dial-a-ride and fixed-route vehicles are equipped with wheelchair lifts. Some of the older vehicles which are used as spares do not have the lifts. Bike racks are available on all Atomic City Transit buses. Figure III-1 presents the ACT routes that operate all day during the service hours.

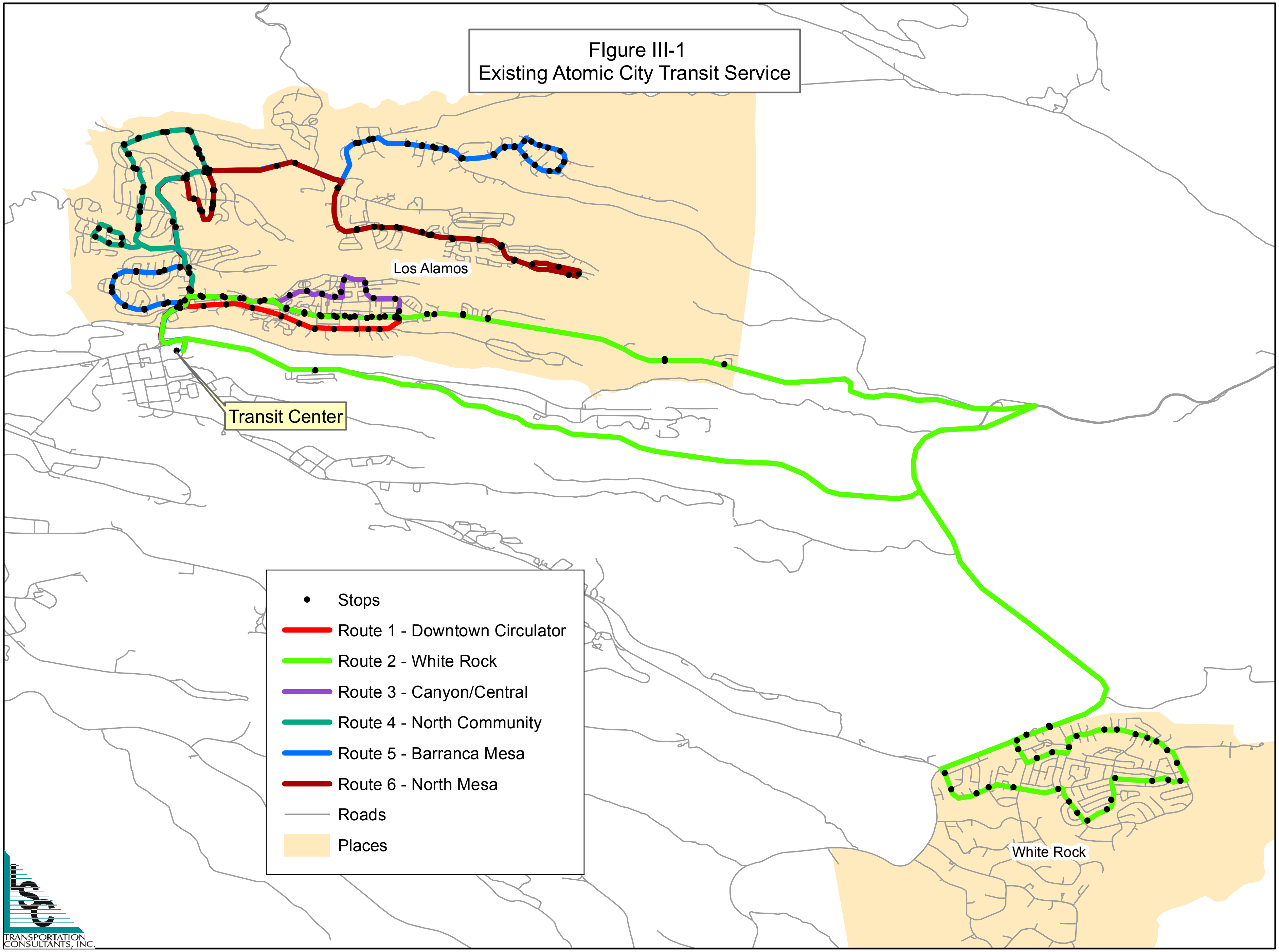

FIgure III-1
Existing Atomic City Transit Service

The following sections describe the services provided by Atomic City Transit.

Route 1 (Downtown Circulator): This is a downtown circulator route and travels east along Trinity Drive and serves the businesses around downtown including the Visitors Center, the Mesa Public Library, the Aquatic Center, and the medical center on its way back through Central Avenue to the Transit Center located at the Diamond/West Jemez Road intersection. The service for the circulator route is every 20 minutes, and it starts and ends at the Transit Center at 5:48 a.m. and 7:22 p.m. respectively.

Routes 2M and 2T (Main Hill Road and Truck Route to White Rock): Route 2 travels clockwise and counter-clockwise to White Rock from the Transit Center. Route 2M travels along the Main Hill Road to White Rock. The service starts at 5:50 a.m. from Sherwood Boulevard and Longview Drive (Smith's) and ends at Highway 4 and Sherwood at 7:09 p.m. The service for Route 2M is approximately every 30 minutes during peak hours in the morning and evening, and hourly all day.

Route 2T travels along the Truck Route to White Rock. The service starts at 5:40 a.m. from Sherwood Boulevard and Longview Drive (Smith's). In the evening, the last two trips departing Highway 4 and Sherwood Boulevard at 7:00 and 7:30 p.m., respectively, turn into dial-a-ride upon request and deliver riders into the White Rock community not served by regular fixed-route service, including Pajarito Acres. Riders requesting dial-a-ride drop-off need to inform the drivers when they board the bus. The two last trips end their service at NM502 and East Gate Drive without going to Los Alamos or the Transit Center. The service for Route 2M is approximately every 30 minutes during peak hours in the morning and evening, and hourly all day.

Route 2 serves the Los Alamos Airport on passenger request. The rider is required to inform the driver of the airport terminal building destination when boarding the bus. Passengers must call (505) 661-RIDE to request a Route 2 pick-up upon arriving at the airport terminal building.

Route 3 (Canyon/Central): This route travels east along Central Avenue and serves the Central/Canyon area which includes the Senior Condominiums, University of New Mexico student housing, Los Alamos Family Council, and Las Cumbres Child and Family Service on its way back through Rose Street to the Transit Center. The service for this fixed-route is every 30 minutes during peak hours in the morning and evening, and hourly the rest of day. The route starts and ends at the Transit Center at 6:28 a.m. and 7:12 p.m. respectively.

Route 4 (North Community): Route 4 serves the northern portion of Los Alamos by traveling along Diamond Drive between 35th Street and North Road and serves Los Alamos High School, the University of New Mexico-Los Alamos, and Mountain Elementary School. This route has a counter-clockwise loop in the morning traversing along 35th Street, Arizona Avenue, and North Road and a clockwise loop in the evening along the same roads. The service for this route is every 30 minutes during peak hours in the morning and evening, and hourly the rest of the day. The route starts and ends at the Transit Center at 6:06 a.m. and 7:24 p.m.

Route 5 (Barranca Mesa): This route serves part of the southwest portion and a major northeast portion of Los Alamos neighborhoods. It travels along Diamond Drive, Sandia Drive, and Barranca Road and serves Barranca Mesa Park and Barranca Mesa Elementary School, and a western neighborhood of Los Alamos. The service for this route is every 30 minutes during peak hours in the morning and evening, and hourly the rest of the day. The route starts at the Transit Center at 5:47 a.m. and ends at Los Pueblos Street and the Navajo Road bus stop at 7:02 p.m.

Route 6 (North Mesa): This route serves part of the northern portion of Los Alamos, south of Diamond Drive, and a major northeast portion of Los Alamos neighborhoods along San Ildefonso Road. It travels along Diamond Drive, 38th Street, 35th Street, and San Ildefonso and serves Los Alamos Middle School and the Los Alamos Municipal Golf Course. The service for this route is every 30 minutes during peak hours in the morning and evening, and hourly the rest of the day. The route starts at the Transit Center at 5:27 a.m. and ends at Big Rock Loop and the Stoneview Drive bus stop at 7:11 p.m.

Afternoon Express: Figure III-2 presents the five Afternoon Express routes. There are five express routes which serve five elementary schools and one middle school in Los Alamos and White Rock. Route 7 is the North Mesa Express and serves the Los Alamos Middle School Monday through Friday at approximately 3:10 p.m. Route 8 is the North Mesa Express and serves Mountain Elementary School on Monday, Tuesday, Thursday, and Friday at approximately 3:20 p.m. and has an early pick up on Wednesday at approximately 12:05 p.m. Route 9 is the Aspen Area Express and serves Aspen Elementary School on Monday, Tuesday, Thursday, and Friday at approximately 3:28 p.m. and has an early pick up on Wednesday at approximately 12:08 p.m. Route 10 is the Barranca Mesa Express and serves Barranca Elementary School on Monday, Tuesday, Thursday and Friday at approximately 3:25 p.m. and has an early pick up on Wednesday at approximately 12:05 p.m. Route 11 is the White Rock Express and serves Pinon and Chamisa Elementary Schools in the White Rock neighborhood on Monday, Tuesday, Thursday, and Friday at approximately 3:05 p.m. and has an early pick up on Wednesday at approximately 12:05 p.m.

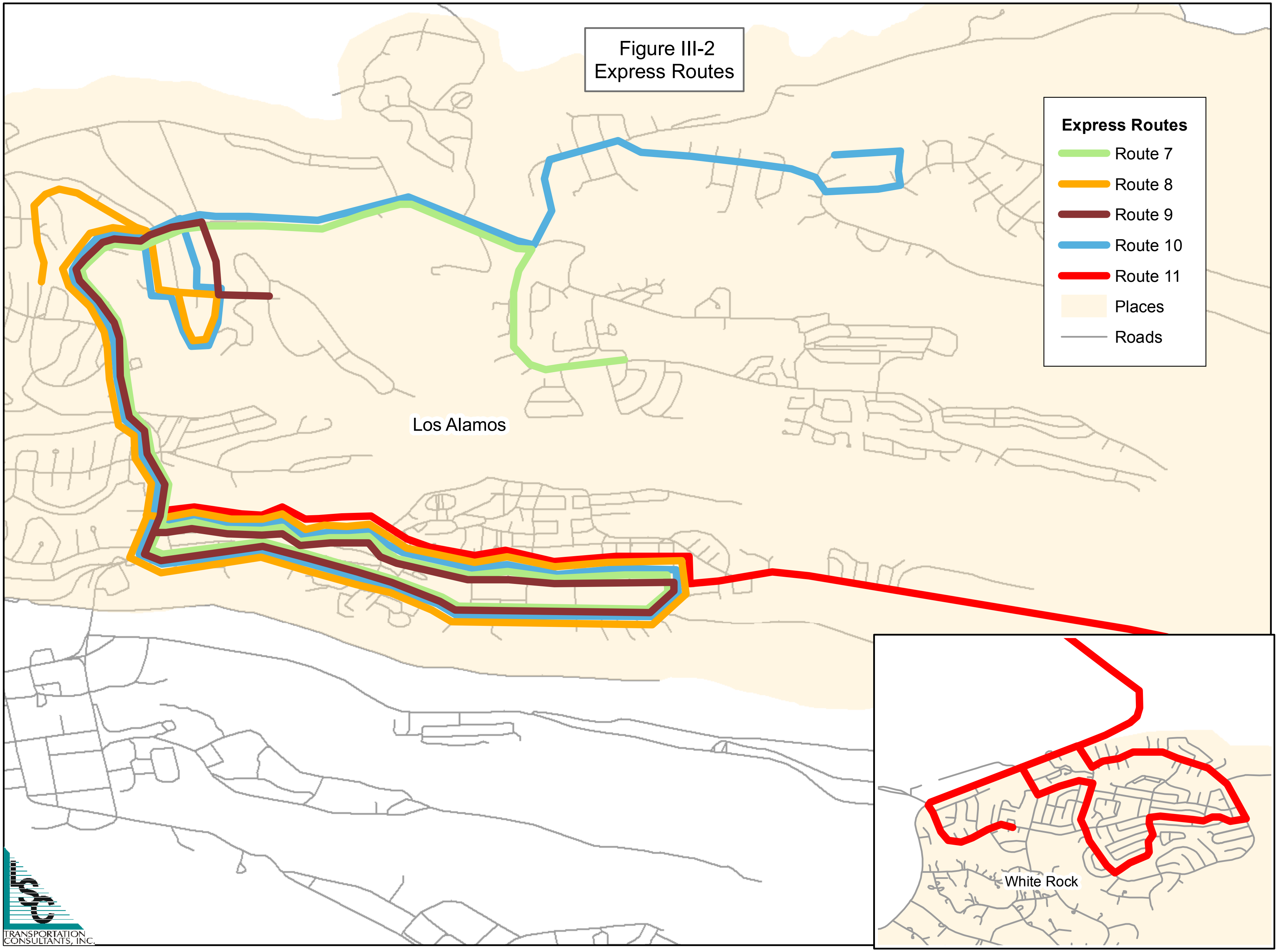
Figure III-2
Express Routes
Express Routes
Route 7
Route 8
Route 9
Route 10
Route 11
Places
Roads
Los Alamos
White Rock
LSC
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Dial-a-Ride: Atomic City Transit provides dial-a-ride paratransit service in the Los Alamos service area. This service is a "curb-to-curb" service for riders who have a documented disability or are ages 60 and over. This service operates from 6:00 a.m. to 7:00 p.m. Riders need to call (505) 661-RIDE during normal business hours up to three days in advance to book their ride. The general public can also use this service, but the ride is not guaranteed and will be accommodated only if scheduling allows. All dial-a-ride vehicles are equipped with wheelchair lifts to accommodate disabled and elderly passengers.

Bandelier Seasonal Fixed Routes: The Bandelier shuttle service operates seven days a week from the end of May to the end of October. Bandelier visitors can park their car at the White Rock Visitor Center and take the mandatory shuttle that runs from the White Rock Visitor Center to the Bandelier National Monument.

Los Alamos National Laboratory (LANL) Service

LANL provides a free taxi service between laboratory sites. This service is available to the laboratory employees during normal work hours and will not transport students or provide service to home or non-business locations. The taxi service is for official business only and sometimes it may require a combination of taxi and ACT services to reach destinations.

North Central Regional Transit District (NCRTD)

The NCRTD provides public transportation connecting pueblos and communities throughout the counties of north-central New Mexico. The NCRTD offers midday service to Los Alamos. The Los Alamos route connects the Transit Center with the park-and-ride lot at Espanola. The RTD buses are ADA-accessible, equipped with bike racks, and provide free service Monday through Friday. NCRTD has the Espanola-Los Alamos-Pojoaque Bus Route that serves the Los Alamos ACT center (formerly TA-3) departing at 10:27 a.m., 11:47 a.m., and 1:07 p.m. NCRTD services is looking at modifying their Espanola-Los Alamos-Pojoaque Bus Route by modifying the NCRTD Bus Route times based on the 2014 NCRTD Transit Service Plan Update, to provide better service into Los Alamos so that it can also connect with

Española. The modification also includes adding a number of stops to Los Alamos so people can get the NCRTD bus directly without having to transfer. New stops proposed for Los Alamos include the airport, the hospital, Mari Mac Village Shopping Center, the Trinity Site, downtown, and the Trinity/Diamond Drive intersection. In FY2013 (July 1, 2012 through June 30, 2013), all NCRTD-operated routes and those NCRTD funds operated by Los Alamos Atomic City Transit and Santa Fe Trails were 461,587 annual passenger-trips. In FY2013, annual ridership on NCRTD-operated routes only was 193,027 annual passenger-trips.

New Mexico Department of Transportation (NMDOT) Park-and-Ride Service

The New Mexico Department of Transportation developed a multimodal transportation vision for the state. Park-and-ride service is one of the integral components of the multimodal transportation vision. NMDOT operates three types of express bus services to Los Alamos from different locations.

The Purple Route connects with three morning northbound arriving and three evening southbound departing New Mexico Rail Runner Express trains at the NM 599 Station. Also, other than connection with the Rail Runner Express, the Purple Route provides an early morning service from downtown Albuquerque to Los Alamos. The Purple Route provides a northbound connection from NM 599 Station to Los Alamos at TA-3 arriving at 6:11 a.m., 6:55 a.m., 8:31 a.m., and 8:03 p.m., and a southbound connection from TA-3 in Los Alamos to NM 599 Station departing at 6:16 a.m., 3:27 p.m., 4:15 p.m., and 5:55 p.m.

The Green Route connects Espanola with Los Alamos at TA-3 (lot located south of Jemez Road and east of Diamond Drive), the Los Alamos Medical Center, and the Mesa Public Library. The route starts and ends at Espanola at 5:12 a.m. and 6:10 p.m. respectively. The Green Route comes westbound from Espanola to Los Alamos at TA-3 arriving at 5:42 a.m., 6:12 a.m., 6:42 a.m., 7:02 a.m., 7:22 a.m., 8:02 a.m., 3:00 p.m., 3:10 p.m., 3:30 p.m., 4:00 p.m., 4:30 p.m., 4:50 p.m., and 5:20 p.m. and departs eastbound from Los Alamos at TA-3 to Espanola at 6:02 a.m., 6:12 a.m., 7:02 a.m., 7:22 a.m., 7:30 a.m., 7:42 a.m., 8:22 a.m., 3:30 p.m., 3:50 p.m., 4:20 p.m., 4:50 p.m., 5:10 p.m., and 5:40 p.m.

The Blue Route connects with three morning northbound arriving and three evening southbound departing New Mexico Rail Runner Express trains at the South Capitol Station. The route starts and ends at South Capitol Station at 5:25 a.m. and 9:10 p.m. respectively and also provides service to Pojoaque and Santa Fe from Los Alamos. The Blue Route comes northbound from South Capitol Station in Santa Fe to Los Alamos at TA-3 arriving at 6:20 a.m., 6:34 a.m., 7:02 a.m., 7:50 a.m., 8:42 a.m., 3:39 p.m., 3:53 p.m., 4:13 p.m., 4:50 p.m., 5:18 p.m., 5:33 p.m., and 6:23 p.m. and departs southbound from Los Alamos at TA-3 to South Capitol Station in Santa Fe at 6:40 a.m., 6:34 a.m., 7:23 a.m., 8:11 a.m., 9:03 a.m., 3:39 a.m., 4:34 p.m., 5:11 p.m., 5:39 p.m., 6:23 p.m., and 8:20 p.m.

The Average Daily Ridership (ADR) through State Fiscal Year 2013 on the Purple Route was 127.1, the Green Route was 211.2, and the Blue Route was 278.1.

NMDOT Park-and-Ride operates on all weekdays except for designated state holidays. The fare for the Purple and Blue Routes is $3.00 one-way and $90 monthly. The fare for the Purple Route from Albuquerque to Los Alamos is $6.00 one-way and $150 monthly. The fare for the Green Route is $2.00 one-way and $60 monthly.

New Mexico Rail Runner Express

The Rail Runner Express is the commuter rail system that connects the Santa Fe depot and Belen and serves the Albuquerque and Santa Fe metropolitan areas. The residents of Los Alamos can connect with Rail Runner Express at NM 599 Station and South Capitol Station by availing the Purple and Blue Routes bus service provided by NMDOT Park-and-Ride. The Rail Runner operates seven days a week and has limited services on the weekends. There are six zones to calculate the fare, and the fare to ride the train depends on the number of zones in which the rider is traveling. There are one-way, day pass, monthly pass, annual pass, and reduced fares available. The reduced fares are available to students, youth (10-17 years of age), seniors (age 62 and above), and people with disabilities.

Santa Fe Trails

Santa Fe Trails provides transit service in the City of Santa Fe and parts of Santa Fe County. The residents of Los Alamos can connect with Santa Fe Trails at the South Capitol Rail Runner Express station. Los Alamos riders can take the NMDOT Park-and-Ride-operated Blue Route and transfer to Santa Fe Trails at the South Capitol Station. Santa Fe Trails provides weekday bus service and limited weekend service, and riders can choose one-way passes, one-day passes, monthly passes, or four-month passes to ride the system.

Town of Taos Chile Line Service

The Town of Taos Chile Line is the public transportation service which serves visitors and citizens. The Chile Line provides Taos Express service from Taos to Santa Fe, Chile Line fixed-route service, Taos Ski Valley service, and ADA door-to-door service. The residents of Los Alamos can connect with the Taos Express route at the South Capitol Rail Runner Express station only on Friday. Los Alamos riders can take the NMDOT Park-and-Ride-operated Blue Route and transfer to the Taos Express at the South Capitol Station to go to Taos. Riders have to wait quite awhile to transfer between Taos Express and the NMDOT Park-and-Ride Blue Route. The fare to ride the Taos Express is $10 round-trip; children under ten ride for free.

Los Alamos Senior Centers

The Los Alamos senior centers provides transportation to retired and senior residents age 55 years and older both at the Betty Ehart Senior Center in Los Alamos and the White Rock Senior Center. In Los Alamos, the Senior Center provides transportation Monday through Saturday. On Monday and Tuesday, transportation is provided from 10:00 a.m. to 4:00 p.m. On Wednesday, Thursday and Friday, transportation is provided from 10:00 a.m. to 7:00 p.m., and on Saturday transportation is provided from 10:00 a.m. to 1:00 p.m.

In White Rock, the Senior Center provides transportation Monday through Saturday. On Monday through Friday, transportation is provided from 10:00 a.m. to 4:00 p.m., except on Thursday where transportation is provided from 10:00 a.m. to 7:00 p.m. On Saturday transportation is provided from 10:00

a.m. to 1:00 p.m. In March, both Los Alamos senior centers provided 800 one-way passenger-trips. Since Atomic City Transit (ACT) Dial-A-Ride has no ADA application and serves seniors, the Los Alamos senior centers focus on medical appointments as their number one priority. Seniors that need trips need to make reservations 24 hours in advance of the trip, except for unexpected medical needs. Non-medical requests that are called in with less than 24 hours notice are filled on a space-available basis. Los Alamos senior centers each have their own dispatcher that handles all trips to/from lunches as well as other rides. The White Rock Senior Center does not serve meals at its center. The Los Alamos County provides the vehicles for the Senior Center. Atomic City Transit provides door-to-door transportation but the Los Alamos senior center's transportation provides passenger assistance. Wheelchair transportation is available through a cooperative arrangement between LA Bus and the Betty Ehart Center. Passengers that need a wheelchair are asked to inform the dispatcher they need a wheelchair-equipped van at the time of their reservation.

SUMMARY

Atomic City Transit provides public transportation to the residents of Los Alamos during the weekday. The pitfall to this system is that there is no week-end service. Also, connections to Taos, Santa Fe, or Albuquerque can be made through Taos Express, Santa Fe Trails, Rail Runner express, and NMDOT Park-and-Ride bus services only on weekdays.

Chapter IV

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CHAPTER IV

Boarding and Alighting Counts

INTRODUCTION

Boarding and alighting counts were conducted on April 15 and 16, 2014 in conjunction with the onboard survey. Information about the onboard survey is detailed in Chapter IV. This was scheduled to be a two-day effort covering 100 percent boarding and alighting counts on all routes (except the afternoon express routes). Passenger boarding and alighting patterns are illustrated in the following maps.

BOARDING/ALIGHTING ACTIVITY

Boarding and Alighting Maps

Detailed daily boarding and alighting maps for the system and for each route are presented in Figures IV-1 through IV-16. Each map shows a scaled dot representing the number of passenger boardings and alightings at each bus stop along the route. This information will also be provided to Atomic City Transit in ArcView GIS format for further analysis. The busiest stops for passengers boarding include the following:

- Atomic City Transit Center (481 boardings)
- Mesa Public Library (46 boardings)
- Diamond Drive and Orange Street (39 boardings)
- Gold Street Apartments (33 boardings)
- Canyon Road and 39th Street - High School Gymnasium (32 boardings)
- Central Avenue and 6th Street (28 boardings)
- Mountain Vista Apartments (27 boardings)
- San Ildefonso Road and Hawk Road (near the Los Alamos Middle School) (26 boardings)
- Post Office (23 boardings)
- Diamond Drive and Canyon Road - High School Gymnasium (22 boardings)

The busiest stops for passengers alighting include the following:

- Atomic City Transit Center (351 alightings)
- San Ildefonso Road and Hawk Road (near the Los Alamos Middle School) (46 alightings)
- Canyon Road and 39th Street - High School Gymnasium (43 alightings)
- Diamond Drive and Sandia Drive (37 alightings)
- Mesa Public Library (34 alightings)
- Sherwood Boulevard and Longview Drive at Smith's (34 alightings)
- Mountain Vista Apartments (23 alightings)
- Post Office (22 alightings)
- Central Avenue and Central Park Square (20 alightings)
- Central Avenue and 9th Street (20 alightings)

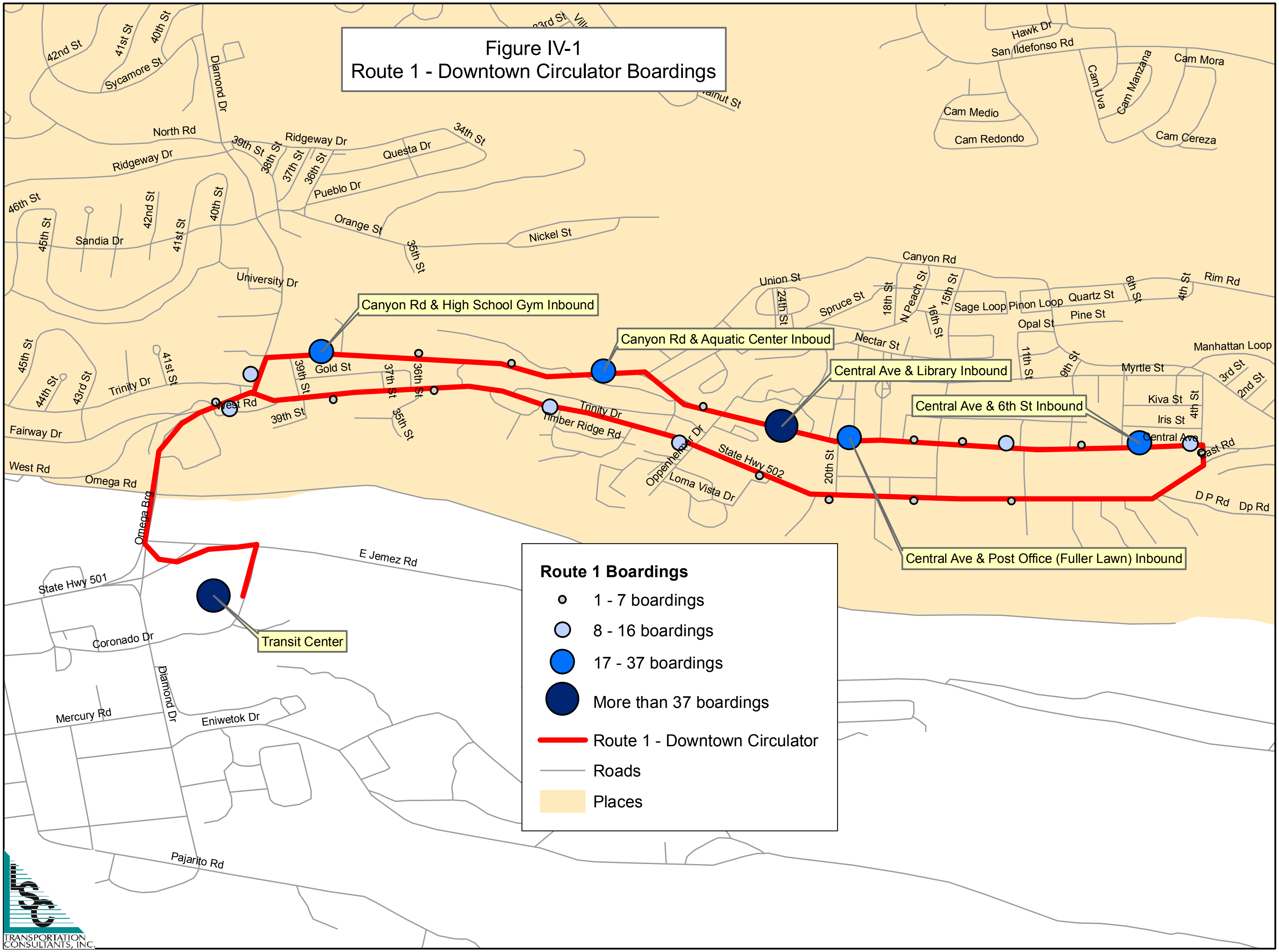
PEAK BUS LOADS

The boarding and alighting counts were used to determine the peak passenger loads on each route. These peak loads will be used to determine the appropriate vehicle sizes to be used by Atomic City Transit for each of the service. The peak loads based on the counts are shown in Table IV-1.

Table IV-1
Peak Passenger Loads

Route	Peak Passenger Load
Route 1	28
Route 2M	19
Route 2T	15
Route 3	10
Route 4	27
Route 5	8
Route 6	38

Figure IV-1
Route 1 - Downtown Circulator Boardings



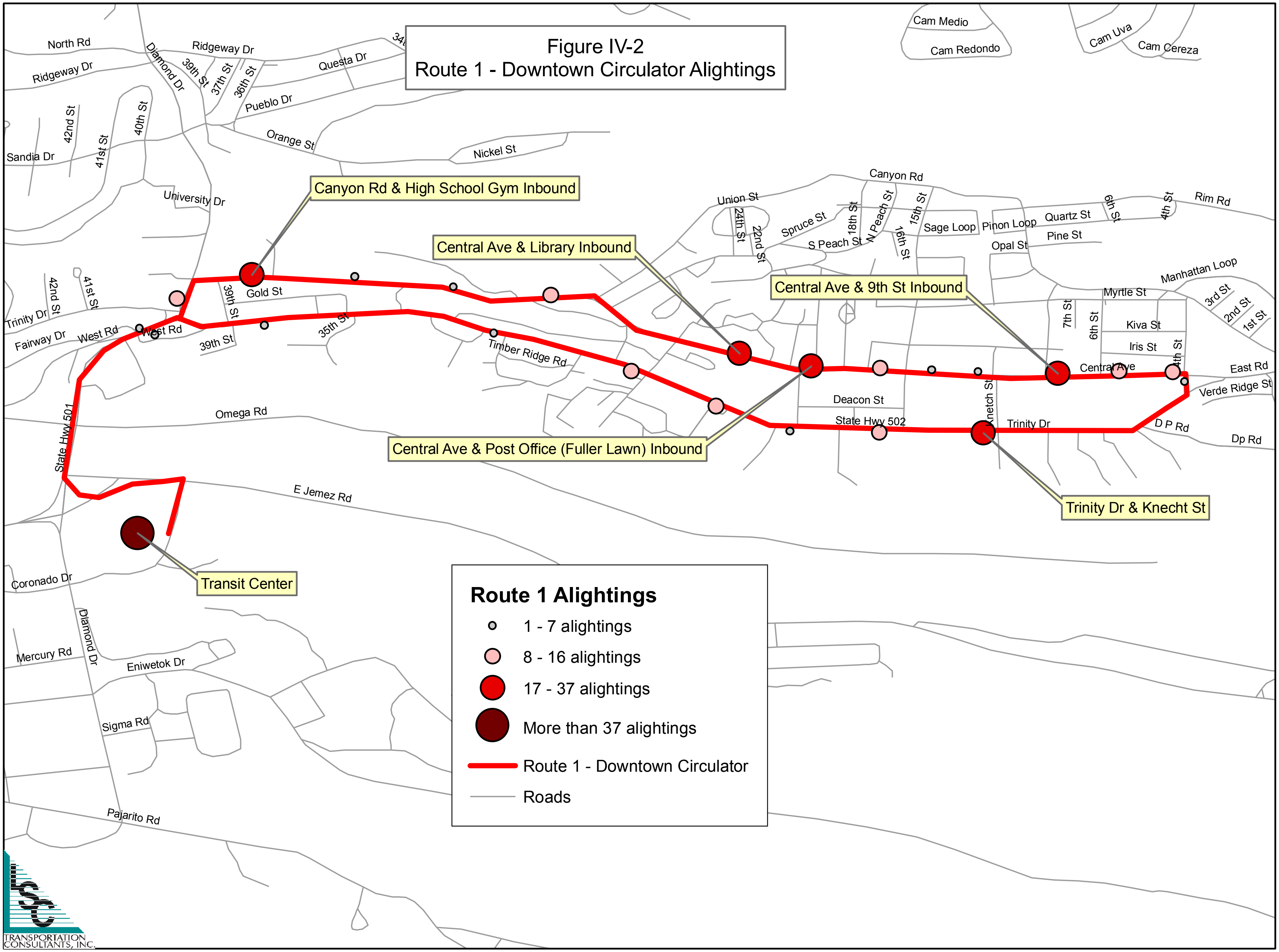
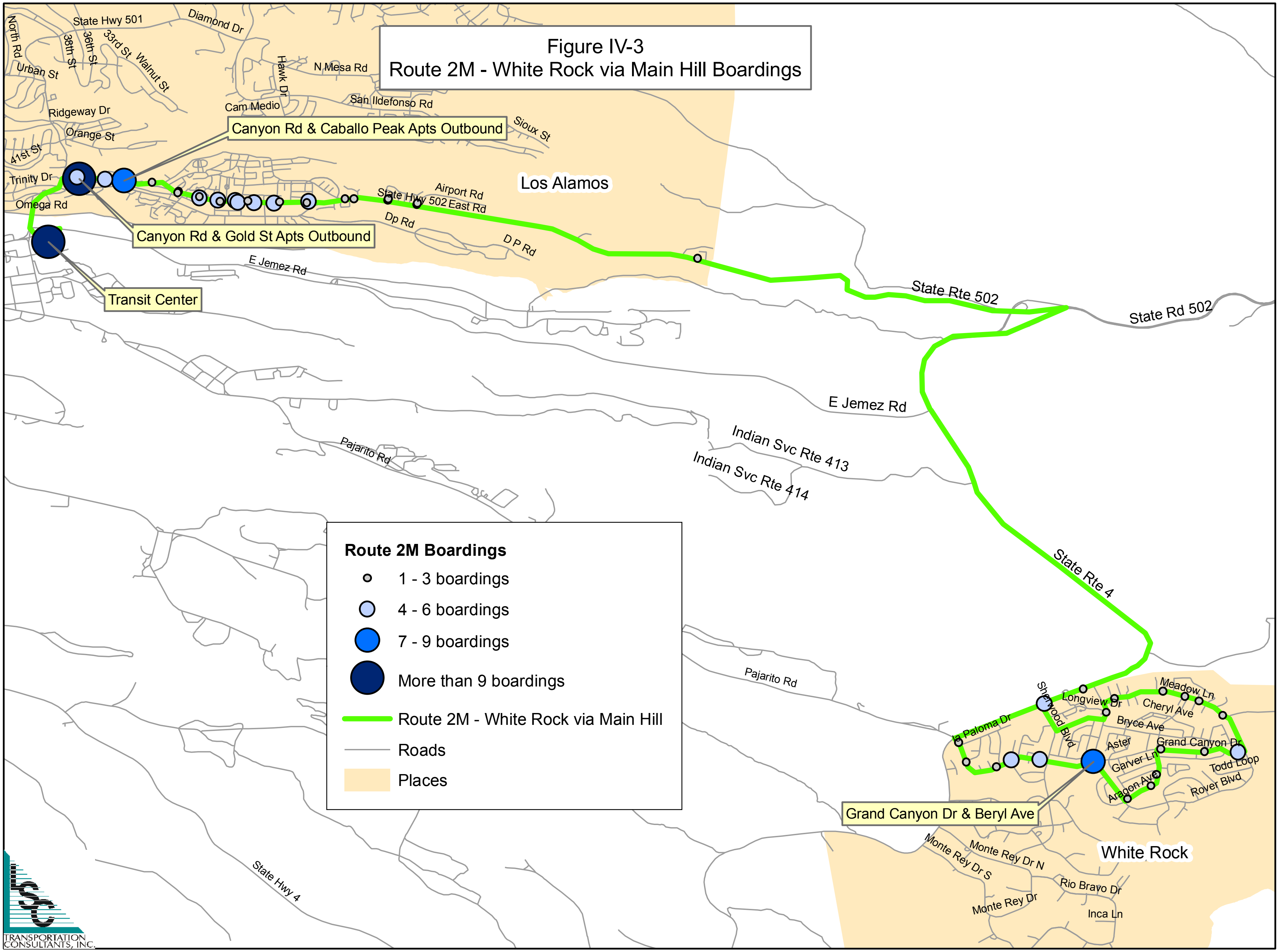


Figure IV-2
Route 1 - Downtown Circulator Alightings

Figure IV-3
Route 2M - White Rock via Main Hill Boardings



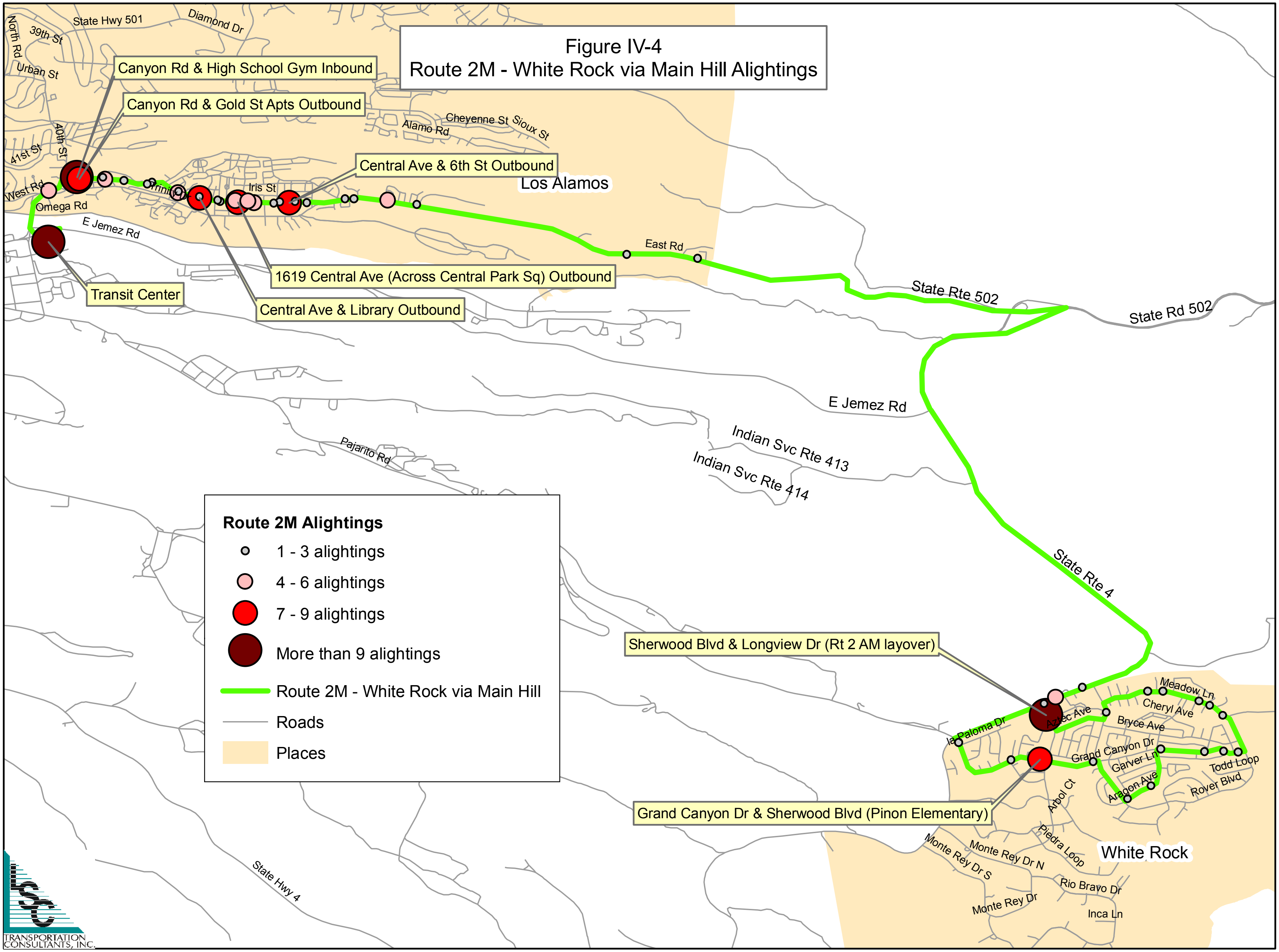


Figure IV-4
Route 2M - White Rock via Main Hill Alightings
Canyon Rd & High School Gym Inbound
Canyon Rd & Gold St Apts Outbound
Central Ave & 6th St Outbound
Los Alamos
1619 Central Ave (Across Central Park Sq) Outbound
Transit Center
Central Ave & Library Outbound
Sherwood Blvd & Longview Dr (Rt 2 AM layover)
Grand Canyon Dr & Sherwood Blvd (Pinon Elementary)
White Rock
Route 2M Alightings
1 - 3 alightings
4 - 6 alightings
7 - 9 alightings
More than 9 alightings
Route 2M - White Rock via Main Hill
Roads
Places
State Hwy 501
Diamond Dr
North Rd
39th St
Urban St
40th St
41st St
West Rd
Omega Rd
E Jemez Rd
Trinity
Iris St
Cheyenne St
Sioux St
Alamo Rd
East Rd
State Rte 502
State Rd 502
E Jemez Rd
Indian Svc Rte 413
Indian Svc Rte 414
Pajarito Rd
State Rte 4
State Hwy 4
La Paloma Dr
Aztec Ave
Meadow Ln
Cheryl Ave
Bryce Ave
Grand Canyon Dr
Garver Ln
Todd Loop
Aragon Ave
Rover Blvd
Arbol Ct
Piedra Loop
Monte Rey Dr N
Monte Rey Dr S
Monte Rey Dr
Rio Bravo Dr
Inca Ln
LSC
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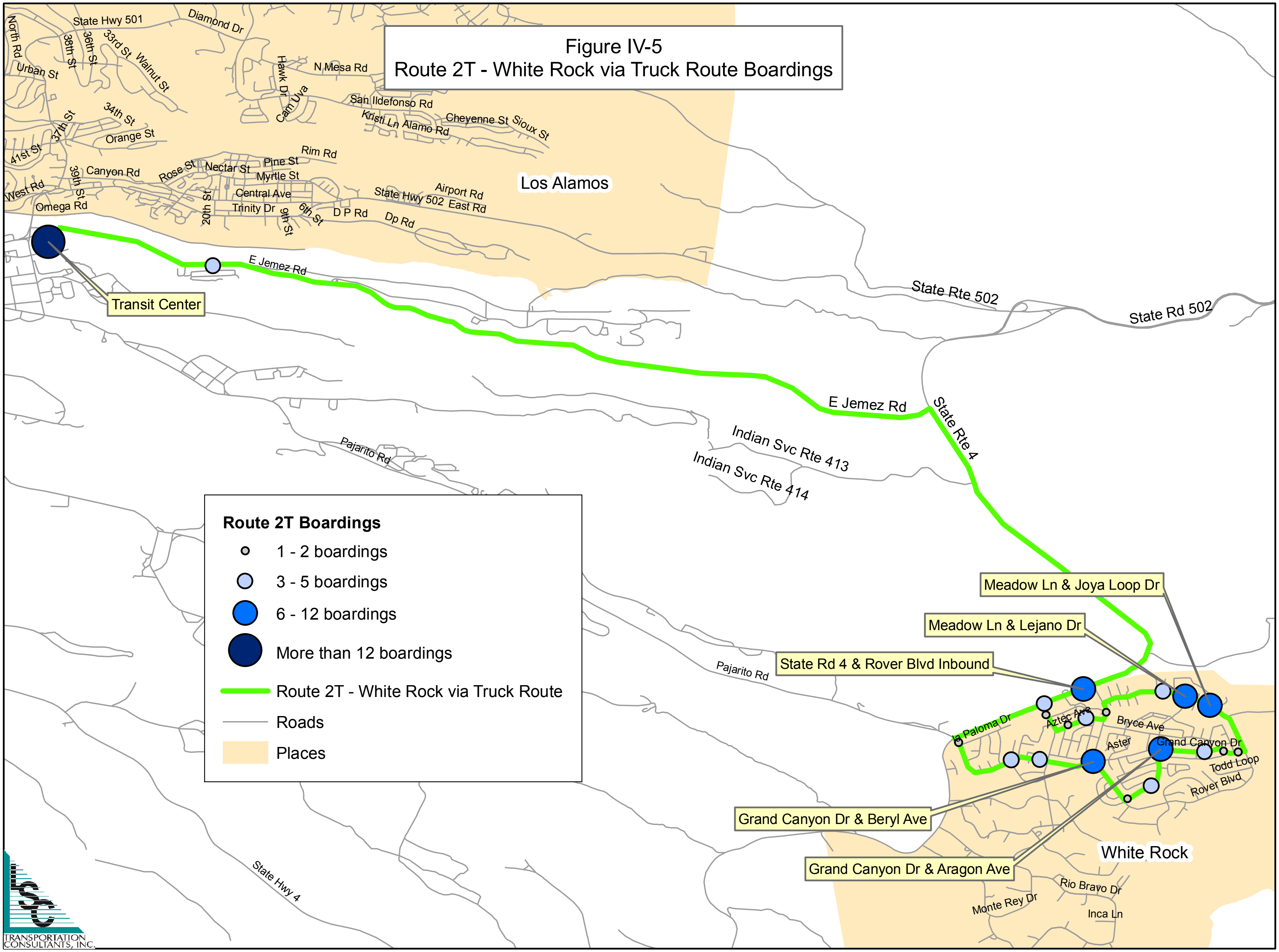

Figure IV-5
Route 2T - White Rock via Truck Route Boardings
Route 2T Boardings
1 - 2 boardings
3 - 5 boardings
6 - 12 boardings
More than 12 boardings
Route 2T - White Rock via Truck Route
Roads
Places
Los Alamos
White Rock
Transit Center
Meadow Ln & Joya Loop Dr
Meadow Ln & Lejano Dr
State Rd 4 & Rover Blvd Inbound
Grand Canyon Dr & Beryl Ave
Grand Canyon Dr & Aragon Ave
E Jemez Rd
State Rte 502
State Rd 502
State Rte 4
Indian Svc Rte 413
Indian Svc Rte 414
Pajarito Rd
State Hwy 4
State Hwy 501
Diamond Dr
North Rd
Urban St
38th St
36th St
33rd St
Walnut St
Hawk Dr
N Mesa Rd
Cam Uva
San Ildefonso Rd
Kristi Ln
Alamo Rd
Cheyenne St
Sioux St
34th St
37th St
Orange St
41st St
Canyon Rd
Rose St
Nectar St
Pine St
Myrtle St
Rim Rd
West Rd
39th St
Omega Rd
20th St
Central Ave
Trinity Dr
9th St
6th St
D P Rd
Dp Rd
State Hwy 502
Airport Rd
East Rd
La Paloma Dr
Aztec Ave
Bryce Ave
Aster
Grand Canyon Dr
Todd Loop
Rover Blvd
Rio Bravo Dr
Monte Rey Dr
Inca Ln
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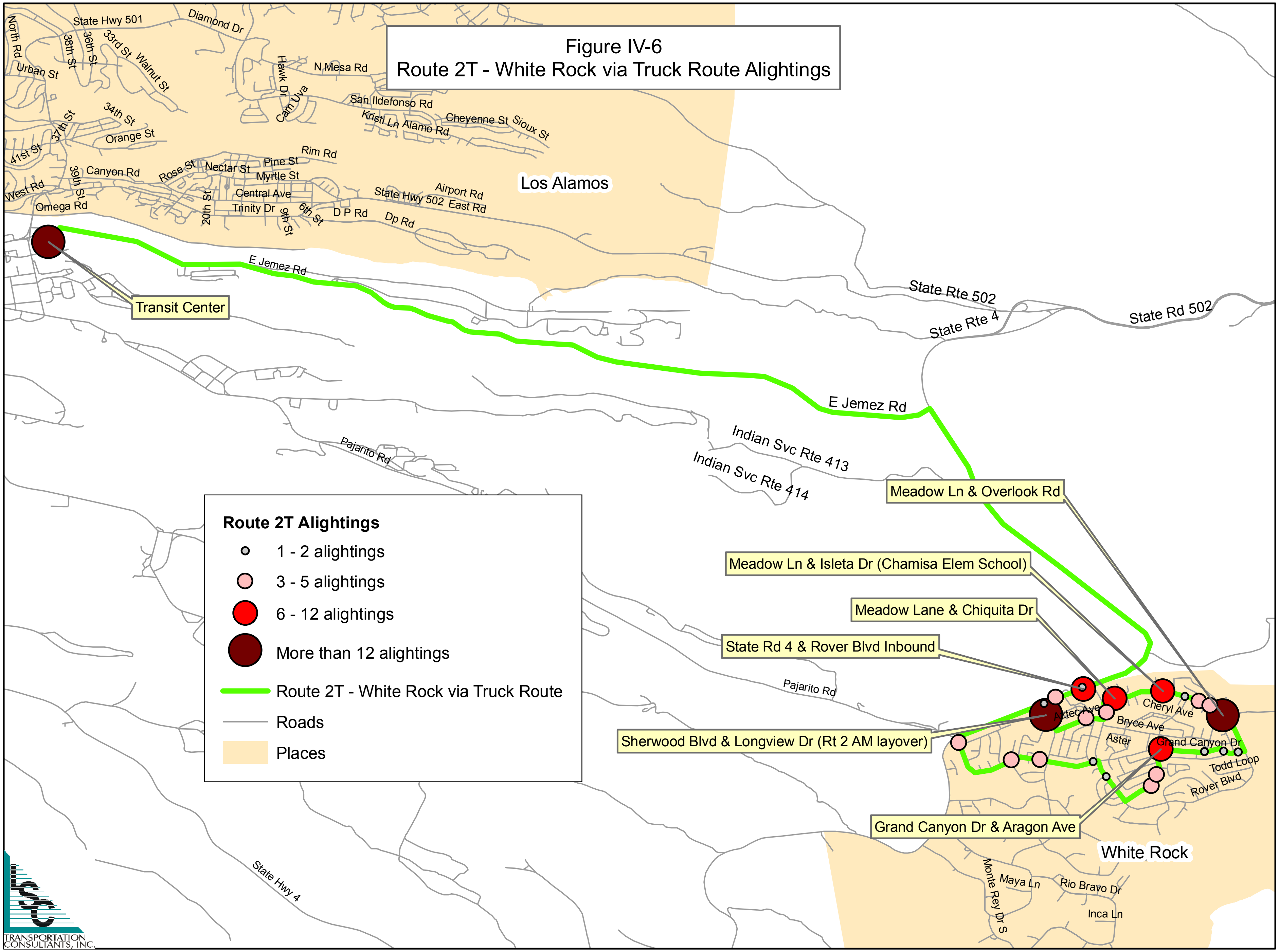
Figure IV-6
Route 2T - White Rock via Truck Route Alightings
Route 2T Alightings
1 - 2 alightings
3 - 5 alightings
6 - 12 alightings
More than 12 alightings
Route 2T - White Rock via Truck Route
Roads
Places
Transit Center
Meadow Ln & Overlook Rd
Meadow Ln & Isleta Dr (Chamisa Elem School)
Meadow Lane & Chiquita Dr
State Rd 4 & Rover Blvd Inbound
Sherwood Blvd & Longview Dr (Rt 2 AM layover)
Grand Canyon Dr & Aragon Ave
Los Alamos
White Rock
E Jemez Rd
State Rte 502
State Rte 4
State Rd 502
Indian Svc Rte 413
Indian Svc Rte 414
Pajarito Rd
State Hwy 4
State Hwy 501
Diamond Dr
N Mesa Rd
San Ildefonso Rd
Cheyenne St
Sioux St
Kristi Ln
Alamo Rd
Rim Rd
Pine St
Myrtle St
Nectar St
Rose St
Central Ave
Trinity Dr
Canyon Rd
Orange St
West Rd
Omega Rd
Airport Rd
State Hwy 502
East Rd
D P Rd
Dp Rd
Cheryl Ave
Bryce Ave
Aztec Ave
Aster
Grand Canyon Dr
Todd Loop
Rover Blvd
Maya Ln
Rio Bravo Dr
Inca Ln
Monte Rey Dr S
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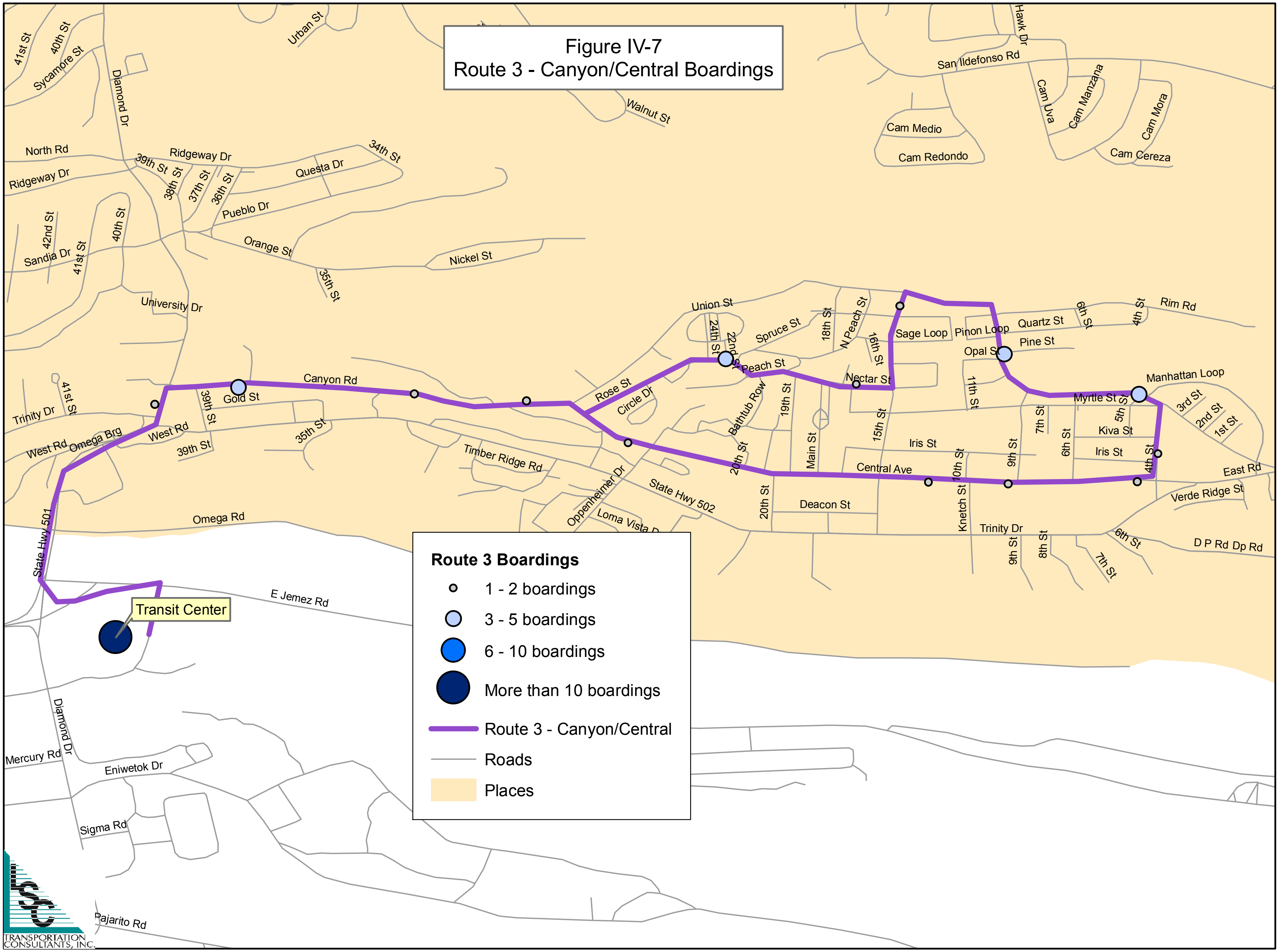

Figure IV-7
Route 3 - Canyon/Central Boardings

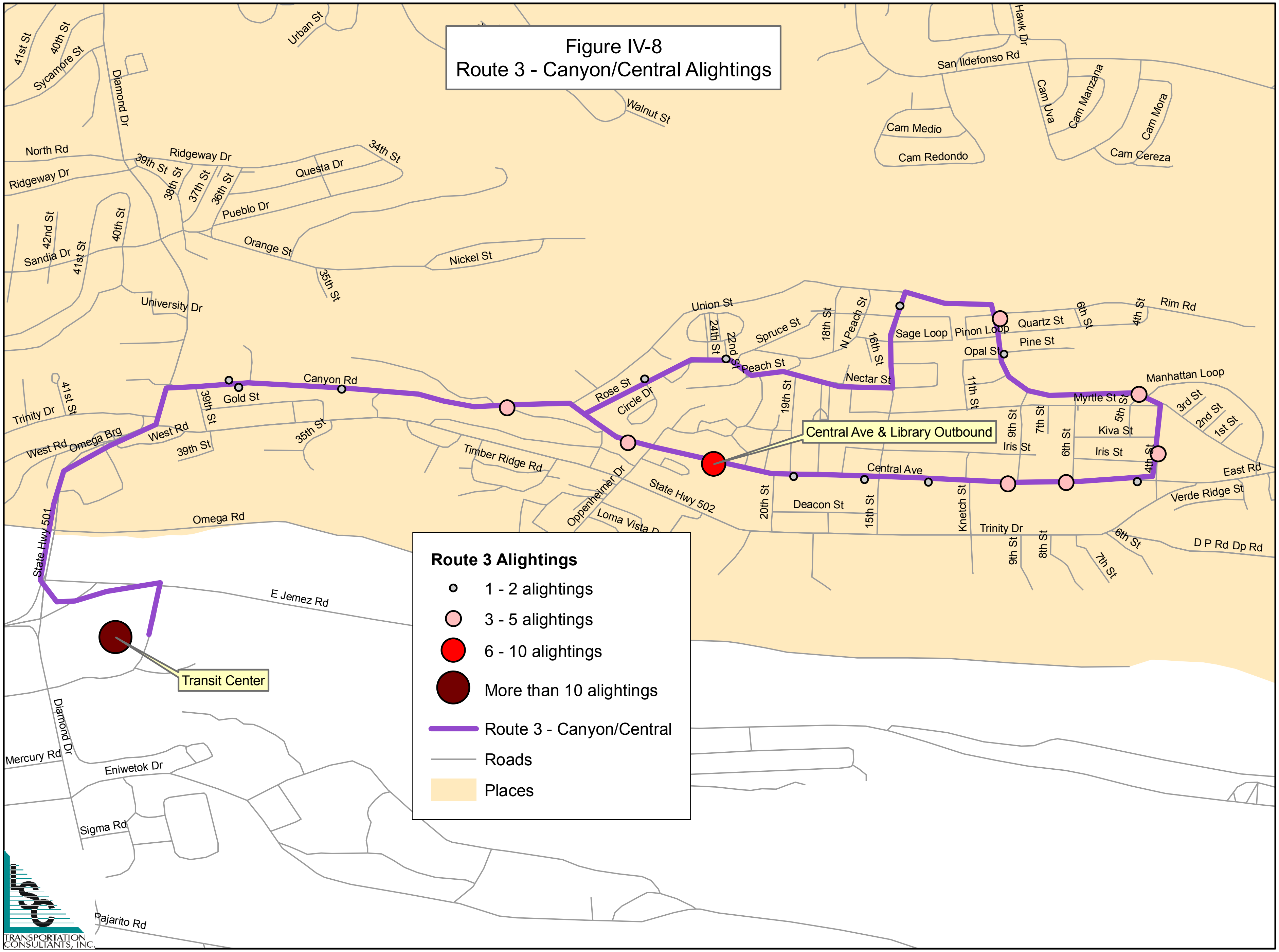
Figure IV-8
Route 3 - Canyon/Central Alightings
Route 3 Alightings
1 - 2 alightings
3 - 5 alightings
6 - 10 alightings
More than 10 alightings
Route 3 - Canyon/Central
Roads
Places
Central Ave & Library Outbound
Transit Center
Canyon Rd
Central Ave
Trinity Dr
State Hwy 502
State Hwy 501
E Jemez Rd
Diamond Dr
Omega Rd
Timber Ridge Rd
Rose St
Circle Dr
Peach St
Nectar St
Sage Loop
Pinon Loop
Quartz St
Pine St
Opal St
Manhattan Loop
Myrtle St
Kiva St
Iris St
Deacon St
East Rd
Verde Ridge St
Rim Rd
Union St
Spruce St
Gold St
West Rd
Omega Brg
Trinity Dr
North Rd
Ridgeway Dr
Pueblo Dr
Orange St
Nickel St
University Dr
Questa Dr
Walnut St
San Ildefonso Rd
Cam Medio
Cam Redondo
Cam Cereza
Oppenheimer Dr
Loma Vista Dr
Knetch St
D P Rd Dp Rd
Mercury Rd
Eniwetok Dr
Sigma Rd
Pajarito Rd
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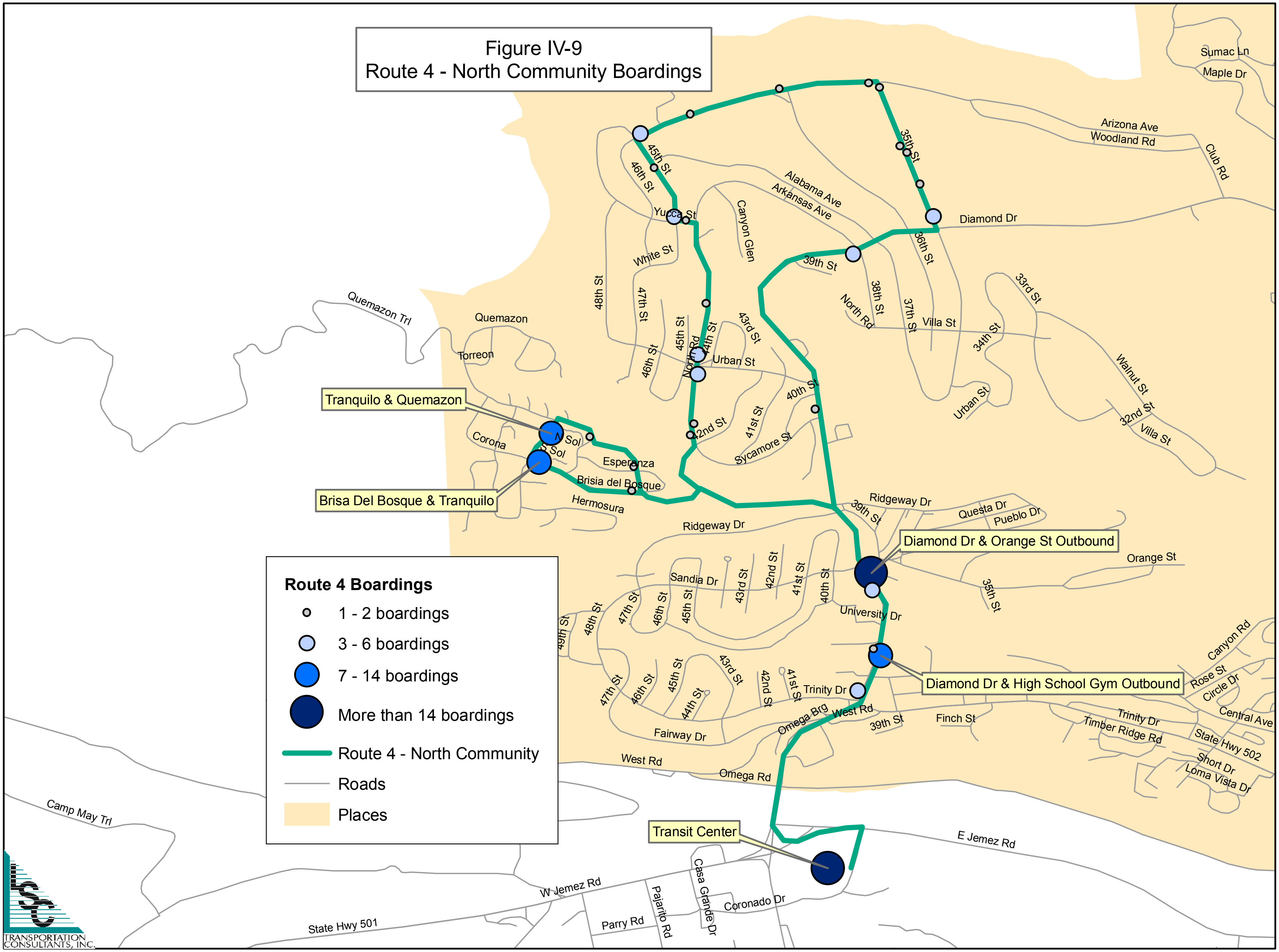
Figure IV-9
Route 4 - North Community Boardings



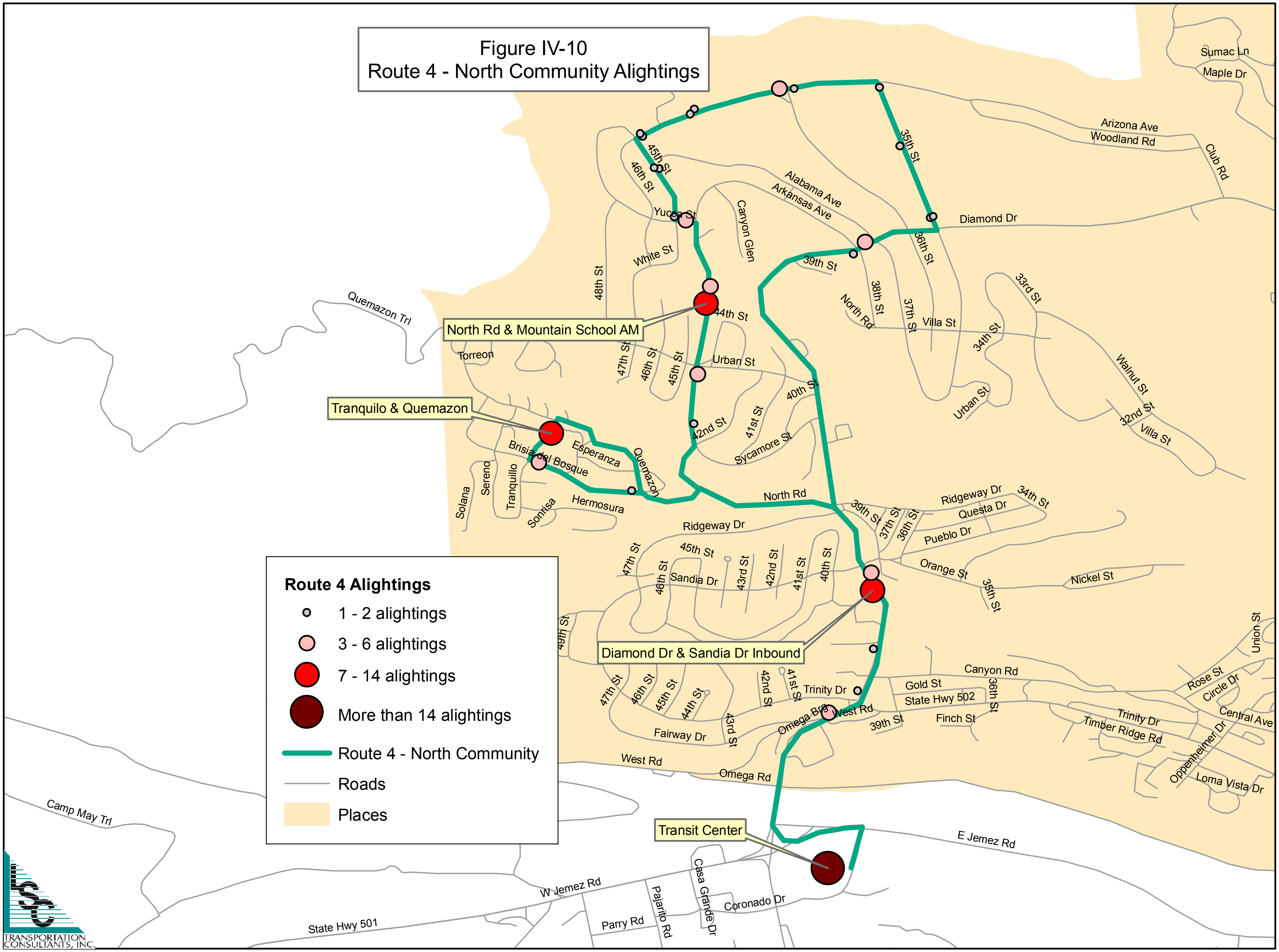


Figure IV-10
Route 4 - North Community Alightings

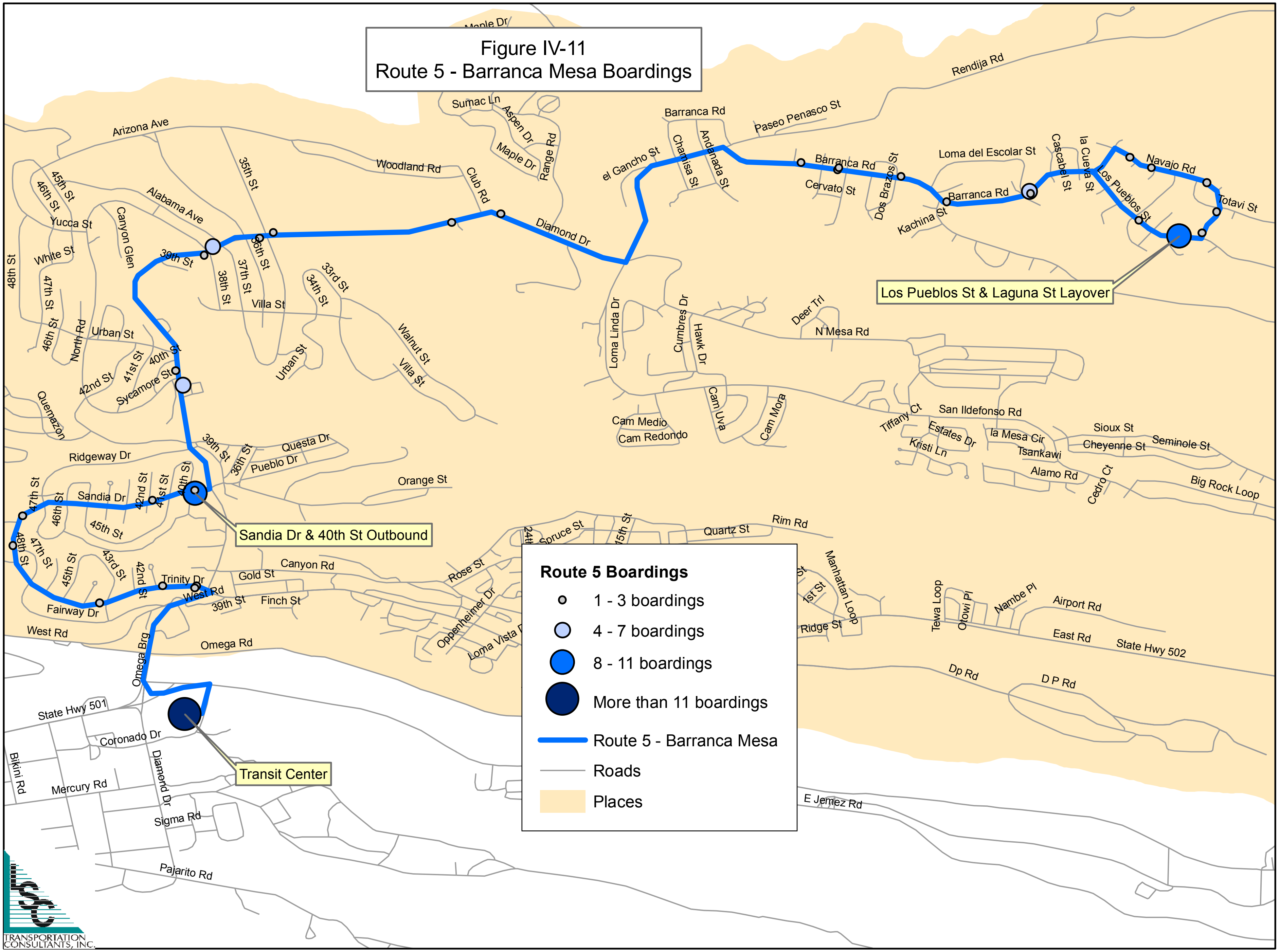


Figure IV-11
Route 5 - Barranca Mesa Boardings

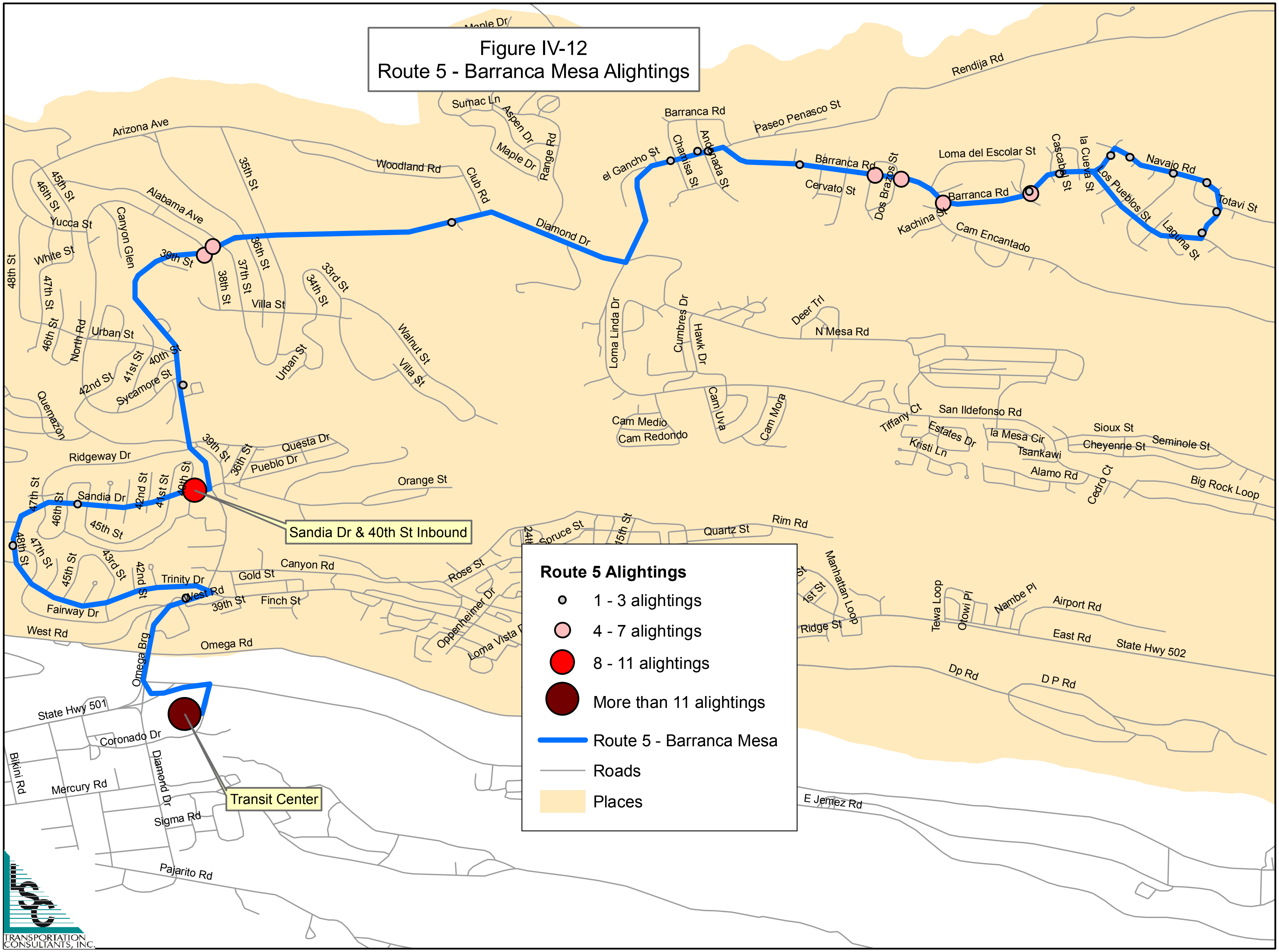


Figure IV-12
Route 5 - Barranca Mesa Alightings
Route 5 Alightings
1 - 3 alightings
4 - 7 alightings
8 - 11 alightings
More than 11 alightings
Route 5 - Barranca Mesa
Roads
Places
Sandia Dr & 40th St Inbound
Transit Center
Arizona Ave
Woodland Rd
Club Rd
Diamond Dr
Alabama Ave
Barranca Rd
Paseo Penasco St
Rendija Rd
Loma del Escolar St
Navajo Rd
Totavi St
Laguna St
Los Pueblos St
Cam Encantado
Kachina St
Cervato St
N Mesa Rd
Deer Trl
San Ildefonso Rd
Big Rock Loop
Orange St
Ridgeway Dr
Sandia Dr
Trinity Dr
Canyon Rd
West Rd
Fairway Dr
Omega Rd
State Hwy 501
Coronado Dr
Mercury Rd
Sigma Rd
Pajarito Rd
Diamond Dr
E Jemez Rd
East Rd
State Hwy 502
Airport Rd
Dp Rd
D P Rd
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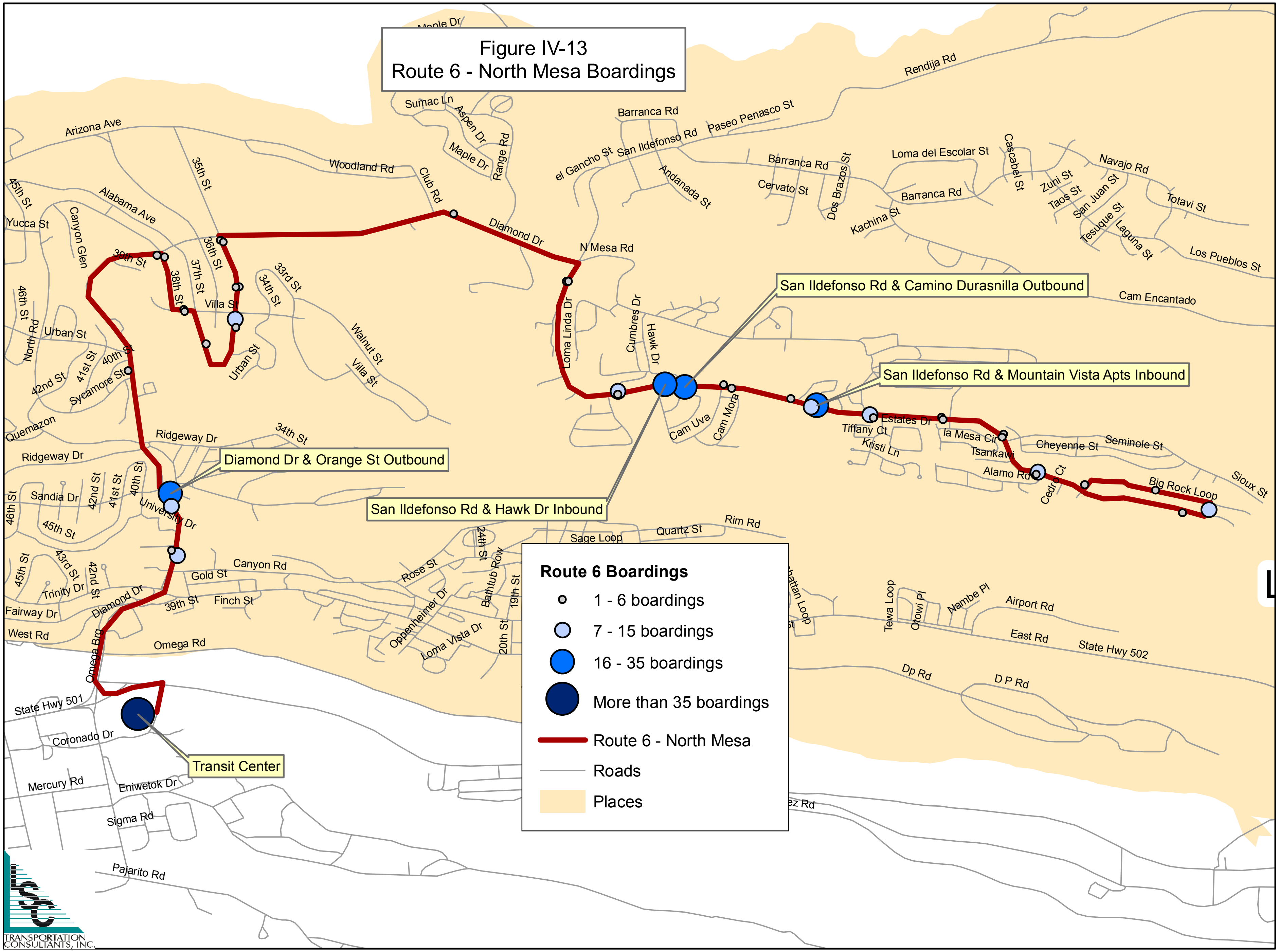
Figure IV-13
Route 6 - North Mesa Boardings
San Ildefonso Rd & Camino Durasnilla Outbound
San Ildefonso Rd & Mountain Vista Apts Inbound
Diamond Dr & Orange St Outbound
San Ildefonso Rd & Hawk Dr Inbound
Transit Center
Route 6 Boardings
1 - 6 boardings
7 - 15 boardings
16 - 35 boardings
More than 35 boardings
Route 6 - North Mesa
Roads
Places
Arizona Ave
Woodland Rd
Diamond Dr
N Mesa Rd
Barranca Rd
San Ildefonso Rd
Paseo Penasco St
Rendija Rd
Loma del Escolar St
Navajo Rd
Los Pueblos St
Cam Encantado
Loma Linda Dr
Cumbres Dr
Hawk Dr
Estates Dr
Cheyenne St
Seminole St
Big Rock Loop
Sioux St
Ridgeway Dr
University Dr
Canyon Rd
Gold St
Finch St
Omega Rd
State Hwy 501
Coronado Dr
Mercury Rd
Eniwetok Dr
Sigma Rd
Pajarito Rd
Airport Rd
East Rd
State Hwy 502
Quartz St
Rim Rd
Sage Loop
Trinity Dr
Fairway Dr
West Rd
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Figure IV-14
Route 6 - North Mesa Alightings

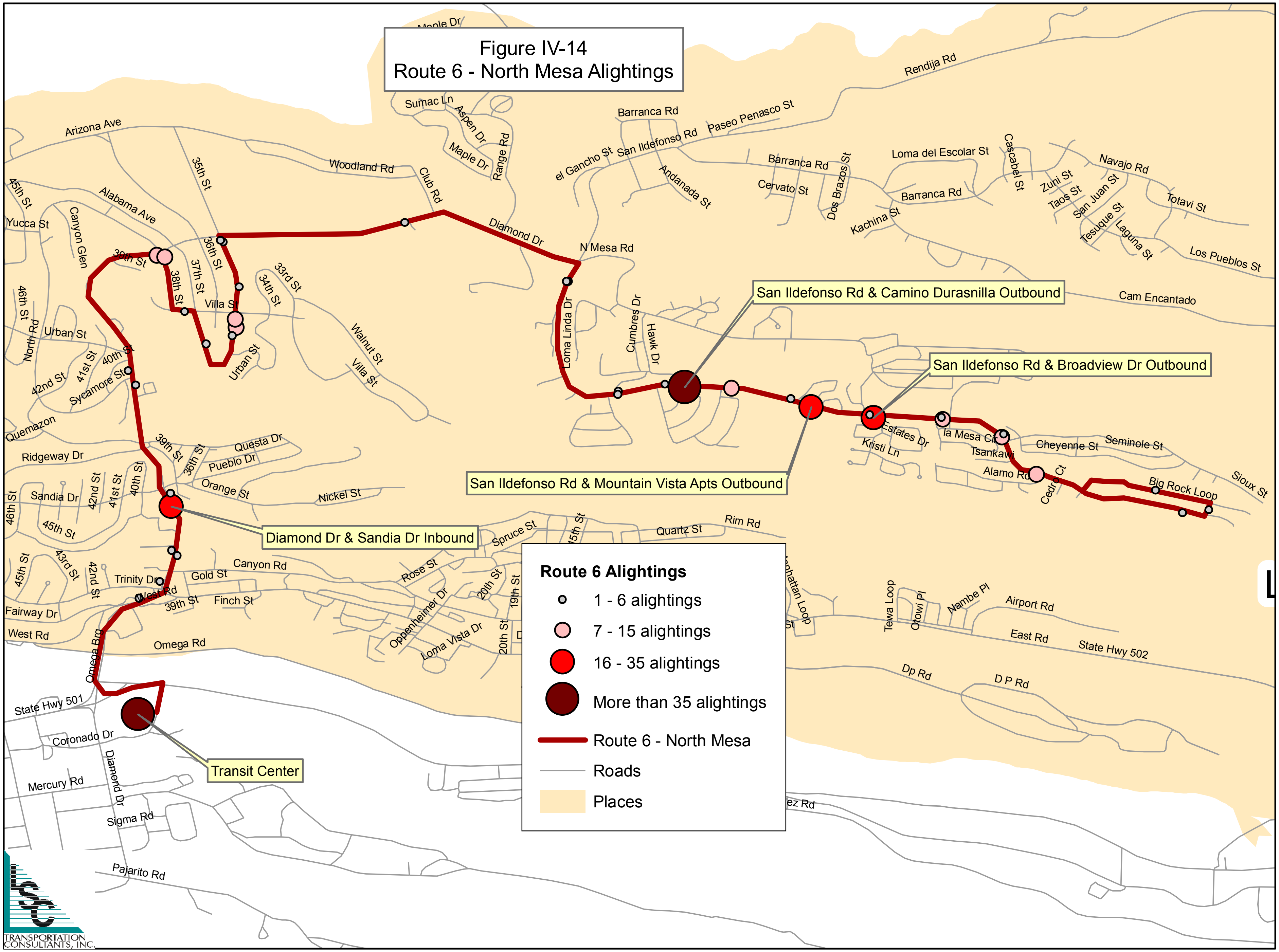
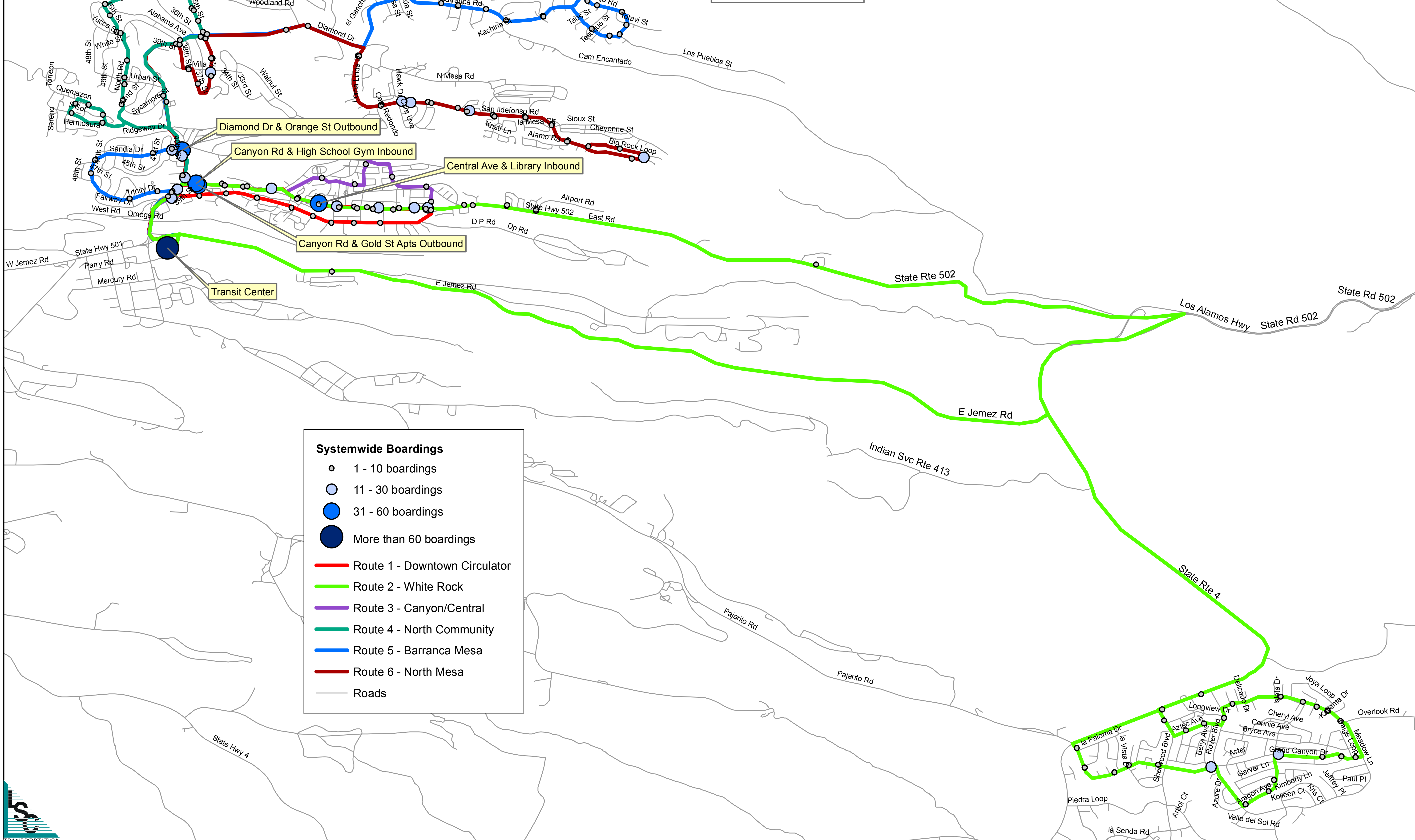


Figure IV-15
Systemwide Boardings



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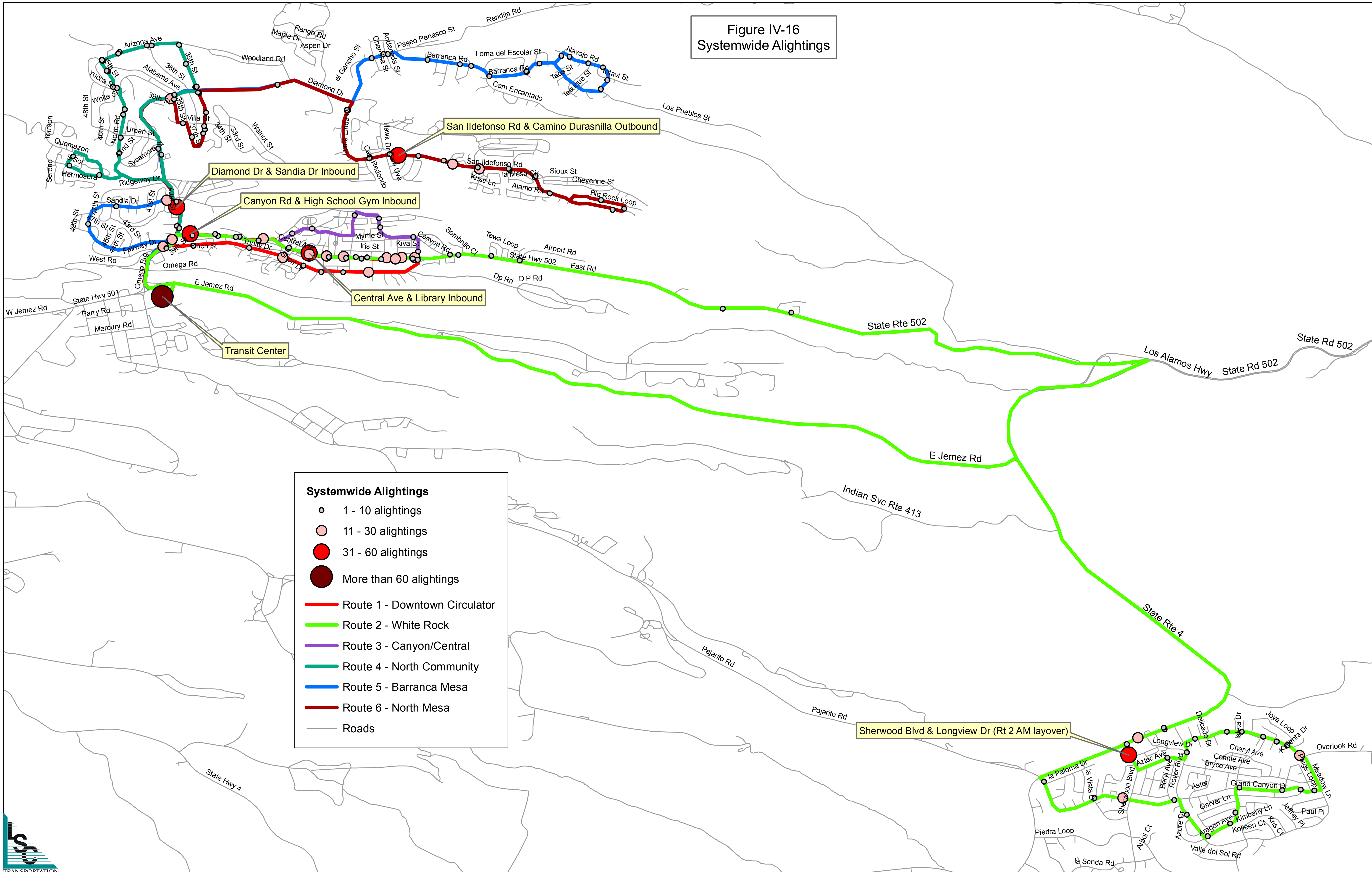

Figure IV-16
Systemwide Alightings
Systemwide Alightings
1 - 10 alightings
11 - 30 alightings
31 - 60 alightings
More than 60 alightings
Route 1 - Downtown Circulator
Route 2 - White Rock
Route 3 - Canyon/Central
Route 4 - North Community
Route 5 - Barranca Mesa
Route 6 - North Mesa
Roads
San Ildefonso Rd & Camino Durasnilla Outbound
Diamond Dr & Sandia Dr Inbound
Canyon Rd & High School Gym Inbound
Central Ave & Library Inbound
Transit Center
Sherwood Blvd & Longview Dr (Rt 2 AM layover)
State Rte 502
Los Alamos Hwy
State Rd 502
E Jemez Rd
Indian Svc Rte 413
State Rte 4
Pajarito Rd
State Hwy 4
State Hwy 501
W Jemez Rd
Diamond Dr
Los Pueblos St
Rendija Rd
Airport Rd
East Rd
Canyon Rd
Arizona Ave
Barranca Rd
San Ildefonso Rd
Piedra Loop
Overlook Rd
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Chapter V

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CHAPTER V

Onboard Survey Results

INTRODUCTION

This chapter provides the analysis of data collected through the onboard survey. Information is provided about passenger demographics, trip characteristics, and perceptions of the quality of service. This survey was conducted April 15 and 16, 2014. All passengers boarding the bus were asked to fill out the questionnaire. This survey was not conducted on the afternoon express routes and dial-a-ride buses. A separate survey was handed to riders of the afternoon express routes or was completed by the parents of afternoon express route riders.

The survey instrument collects essential information for the evaluation of current services. The Atomic City Transit survey was designed to include transit trip characteristics, trip purposes, socioeconomic data, and attitudes toward Atomic City Transit. A draft survey instrument was prepared by the LSC team and submitted to Atomic City Transit staff for review and comment. The survey was printed in both English and Spanish on both sides of 8½ x 11 cardstock. Appendix A includes the survey instrument in both English and Spanish.

Preparation and Training

The LSC team employed the services of a temporary employment agency—The Hire Firm based in Santa Fe—to assist with the survey. Training of employees for the onboard survey was conducted a day prior to the data collection. Workers were instructed on the proper procedures for administering the survey and were led in role-playing exercises to familiarize themselves with the process.

SURVEY FINDINGS

Responses from the usable questionnaires were entered into a database and an analysis was performed in a spreadsheet program. In addition to the individual responses, route and broad time periods were included for each response to permit detailed analysis by route or time of day. The responses are summarized in the following sections.

For the routes surveyed on April 15 and 16, 2014, total average daily ridership on the two days was 1,440 passengers. There were 429 usable responses of 1,440 boardings with a survey response rate of approximately 30 percent. The rate is calculated based upon the number of patrons boarding the bus compared with those who filled out a questionnaire. Table V-1 shows the response rate by bus route.

Table V-1
Response Rate by Route

Route #	Route	Survey Respondents	Boardings	Response Rate
1	Downtown Circulator	18	422	4%
2M	Main Hill	141	225	63%
2T	Truck Route	73	140	52%
3	Canyon/ Central	41	64	64%
4	North Community	27	126	21%
5	Barranca Mesa	56	98	57%
6	North Mesa	66	365	18%
	Unknown	7		
	TOTAL	429	1,440	30%

Source: LSC Onboard Survey, 2014.

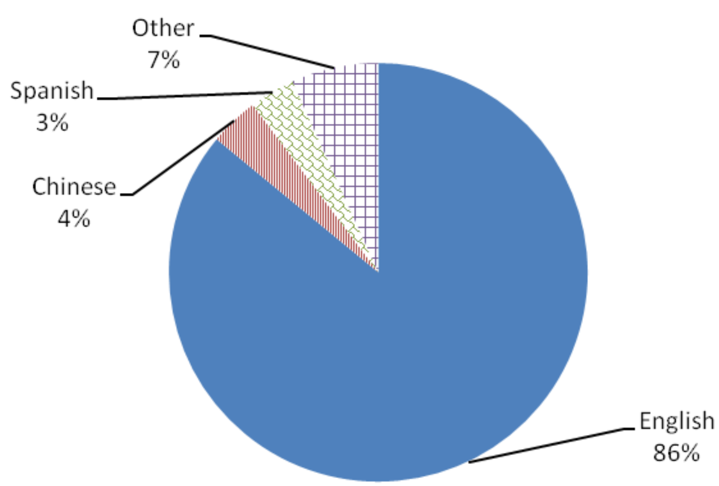
Demographic Characteristics

There were a number of questions asked to determine demographic characteristics of transit riders on Atomic City Transit. Respondents were asked to complete information on every trip which they took regarding the characteristics of the trip. The demographic information is summarized from unduplicated individuals responding to the questions. There were 378 unduplicated individual responses. This sample provides an error range of +/-4 percent at the 95 percent confidence level. Most of the surveys received were in English (428 surveys); only one survey received was in Spanish.

Primary Language

English was indicated as the primary language by 86 percent of the respondents. The primary language of respondents is shown in Figure IV-1. Chinese and Spanish were indicated by four percent of respondents in each category. Of those that indicated Spanish as their primary language (12 responses), there were four respondents who indicated that they spoke both English and Spanish. The remaining seven percent of respondents indicated "other" as their primary language. Among those who indicated "other" as the primary language, the responses included those who spoke German (four responses), Russian (three responses) and Korean (two responses). The survey shows that a majority of the respondents indicated English as their primary language (86 percent) followed by Chinese (four percent), Spanish (four percent), and "other" languages (seven percent) as their primary language.

Figure V-1
Primary Language



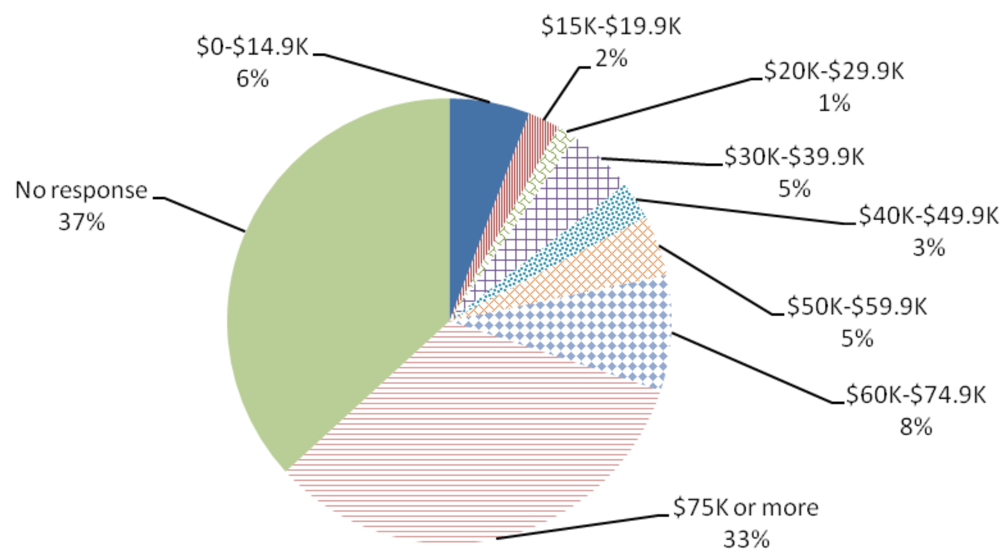
Age

The average age of the respondents in this survey was 30 years, ranging from 10 to 70 years. School-age children (ranging from 10 to 18 years) were the most frequent age range of the respondents with 36 percent of the respondents. Approximately 12 percent of the passengers are seniors (60 years and above).

Annual Household Income

The annual household incomes of respondents on Atomic City Transit are shown in Figure V-2. The figure shows that 37 percent of respondents chose not to report their annual household income. This is possibly because school children don't know their annual household income or people chose not to report their household income. Thirty-three percent of the patrons indicated a household income of over $75,000. This was followed by eight percent of the respondents who indicated that their annual income was between $60,000 and $74,999. There were six percent of respondents that reported an annual household income of less than $14,999.

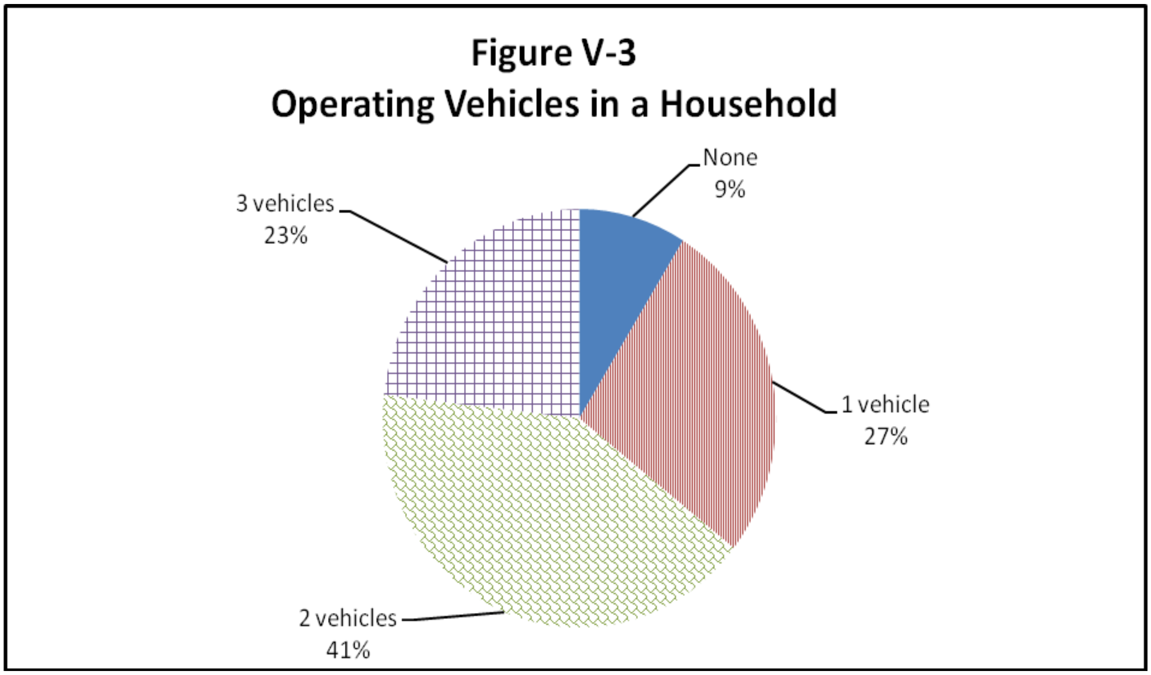
Figure V-2
Annual Household Income



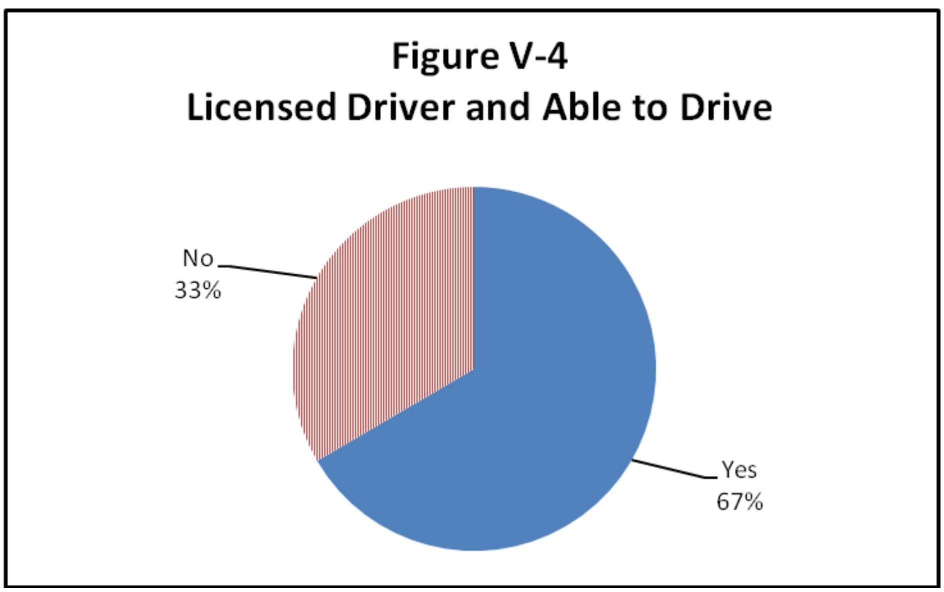
Vehicle Availability and Licensed Driver

Vehicle availability, being a licensed driver, and the ability to drive generally play key roles in the demand for public transportation. This comparison provides an indication of the number of *choice riders* compared to those who are transit-dependent.

Figure V-3 shows the proportion of passengers with operating vehicles available in their household. As illustrated, the largest percent of respondents (41 percent) live in households with two vehicles. This is followed by 27 percent of respondents who live in single-vehicle households. Only nine percent of respondents lived in households with no vehicles.



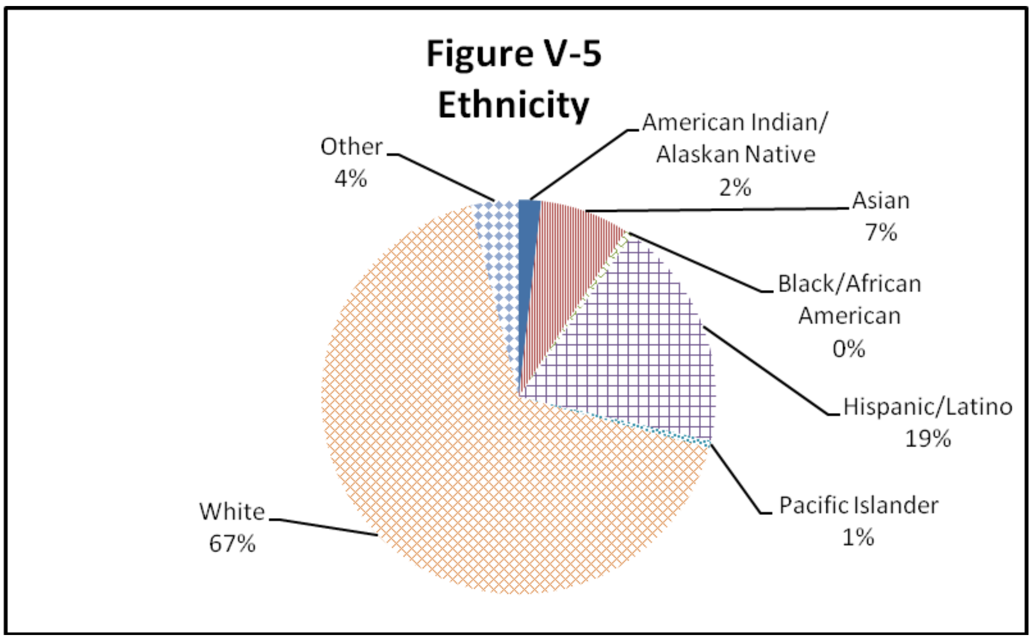
Thirty-three percent of the passengers do not have a driver's license or are not able to drive, as shown in Figure V-4. This shows that a majority of the riders (67 percent of the respondents) have a driver's license or are able to drive.



Passengers were also asked if they had a vehicle available to use on this trip instead of taking the bus. There was an equal split on those who had a vehicle available and those that did not have a vehicle available to use on this trip. This shows that Atomic City Transit has an equal number of people who are choice riders who choose to use transit even though they have other means of transportation and those that are transit-dependent individuals that rely on the bus for their transportation needs.

Ethnicity

Ethnicity is shown in Figure V-5. Whites made up about 67 percent of the passengers, and Hispanic/Latino was about 19 percent. Seven percent of the respondents reported being Asian. The remaining riders reported being American Indian/Alaskan Native, African American/Black, Pacific Islander, or other ethnic groups.



Source of Information

Passengers were asked to indicate how they get information about Atomic City Transit. The responses are shown in Table V-2. As shown in Table V-2, the primary sources of information are the Internet or Atomic City Transit's website and information from the driver. Other sources of information include bus stop signs/shelters and being told by someone. Newspapers and shopping centers/

stores were identified by far fewer respondents as the way they receive information about Atomic City Transit.

Table V-2
Source of Information

Source	Respondents	Percentage
From the driver	147	34%
Internet	189	44%
Atomic City Transit Facebook page	13	3%
Shopping center/store	1	0%
Transit Center	33	8%
Bus stop sign/shelter	48	11%
Newspaper	16	4%
Someone told me	72	17%
Other	38	9%

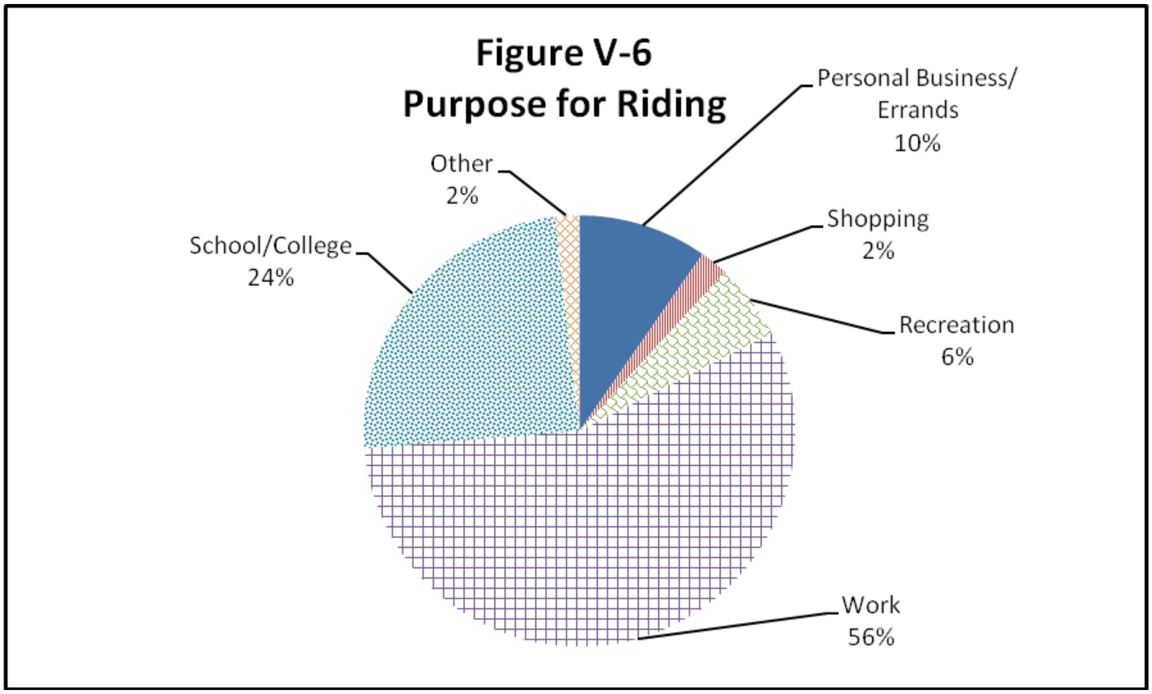
Source: LSC Onboard Survey, 2014.

Trip Characteristics

The survey asked passengers to provide information about the individual trip they were making on Atomic City Transit. Passengers were asked to provide this information each time they were on a run that was sampled.

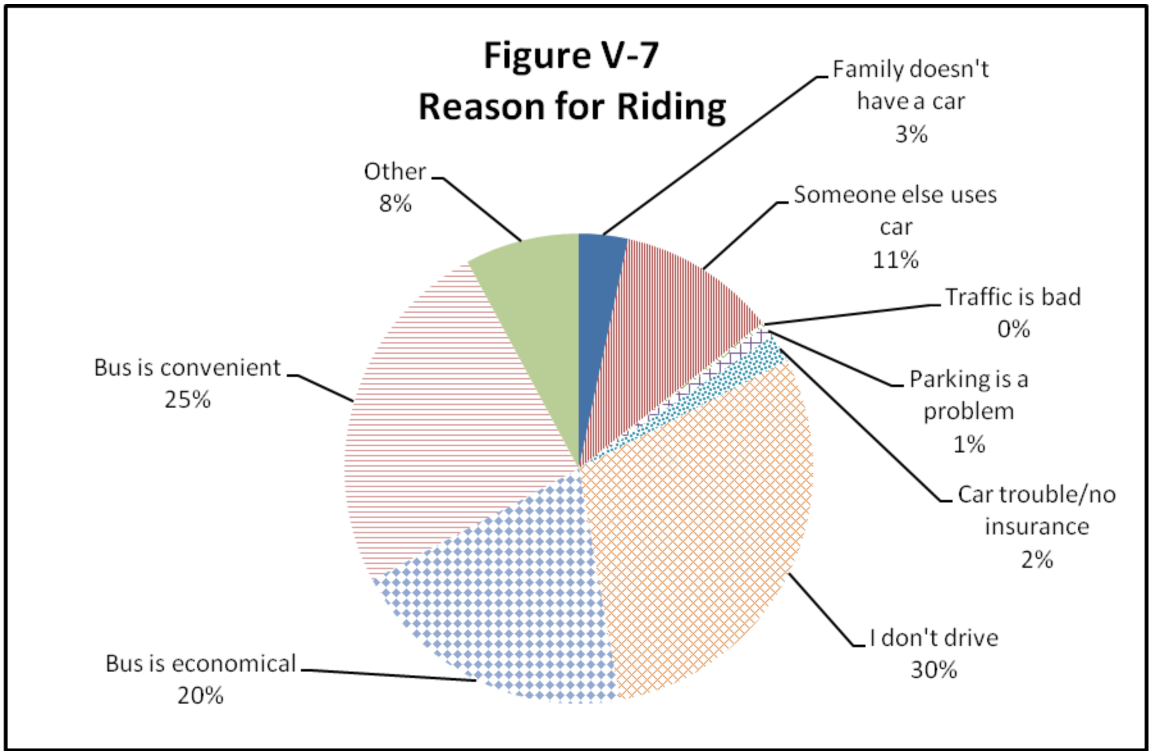
Purpose for Riding

Passengers were asked the one purpose for which they **most often** ride the bus. Responses are shown in Figure V-6. The primary riding purpose (56 percent) was to go to and from work. The second most common (24 percent) purpose was for school/college. The third most common trip purpose reported was for personal business/errands (10 percent). Not surprisingly, shopping, recreational, and other trips were ranked low by respondents.



Reason for Riding

Passengers were asked the single **most important** reason they ride the bus. As shown in Figure V-7, the top reasons for riding the bus are passengers who don't drive a car (30 percent) and that the bus is convenient (25 percent). Twenty percent indicated that the bus is economical, and another 11 percent indicated that someone else uses the car. This indicates that while some users are relying on transit because they don't drive, there is another segment of the population that uses transit because the bus service is convenient.

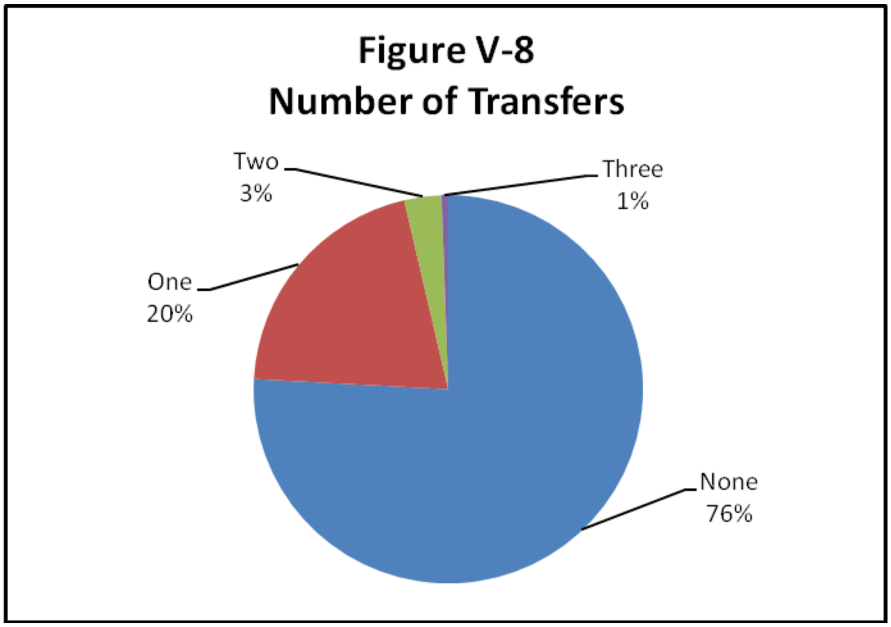


Trip Purpose and Reasons for Riding

Trip purpose and the most important reason for riding were cross-tabulated to better understand the reasons riders use Atomic City Transit. Those who ride to work indicated that they most frequently ride the bus because it is convenient (19 percent of the total respondents) and because the bus is economical (17 percent of the total respondents). Another 12 percent of respondents who use the bus for work indicated that the reason they use the bus is because someone else was using the car. Those who ride to school/college reported that they most frequently ride the bus because they do not drive (17 percent). This section makes it clear that people who use transit for work use it because it is convenient. On the other hand, school children use the bus because they don't drive.

Transfers

Figure V-8 illustrates the number of transfers required by a patron to complete his or her trip. A majority of riders (76 percent) reported that they would not require a transfer to reach their final destination. Twenty-one percent of respondents indicated that they needed to transfer once to complete their trip.



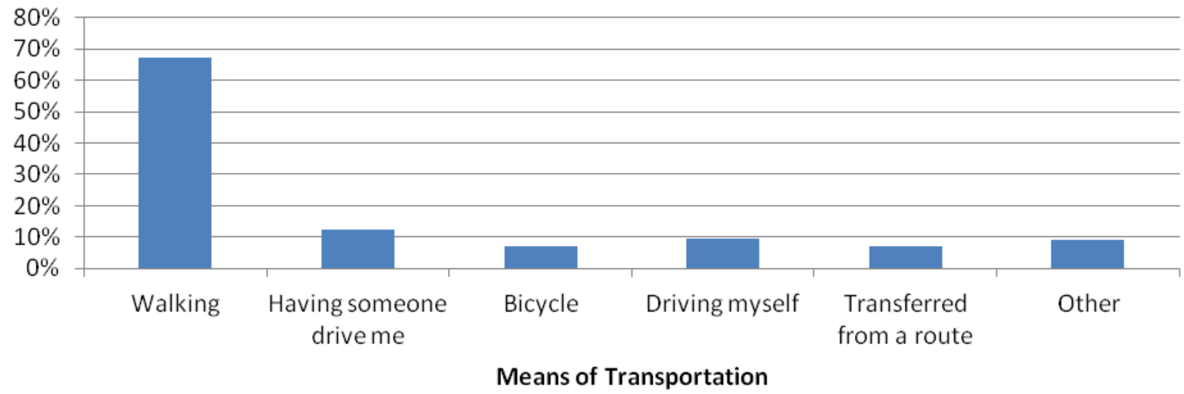
Means of Transportation Used on this Trip

Passengers were asked what other means of transportation they were using in addition to the bus they were currently riding—walking, driving themselves, riding a bike, transferring to another bus, or other means. Passengers were allowed to select multiple responses. Sixty-seven percent reported that they walked, as shown in Figure V-9. Twelve percent responded that they had someone drive them, and another 10 percent responded that they drove themselves to/from the bus. Nine percent reported that they used "other" means of transportation. Among those who indicated "other" as their means of transportation, the responses included those who used the park-and-ride (16 responses), the LANL shuttle services (seven responses), the LANL taxi (three responses), and the NCRTD bus (two responses).

Survey respondents that indicated that they transferred to/from another bus were asked to specify the route that they were traveling from or to. The reported transfers between Atomic City Transit routes were very small. The greatest number of transfers reported were on Route #1 Downtown Circulator (six responses) and Route #6 North Mesa (five responses).

Survey respondents that indicated that they walked were asked the number of blocks they walked. The largest percent of respondents walked one block to reach their destination from the bus. The average number of blocks walked by respondents on their reported trip was three blocks.

Figure V-9
Means of Transportation Used on this Trip



Final Trip Destinations

This section helps identify existing patrons' trips final destination, and whether they are consistent with the existing route structure. After analyzing the data, final destinations of survey respondents reported were the transit center (74 responses), LANL/TA 3 (32 responses), and the Los Alamos High School (16 responses).

Temporal Analysis

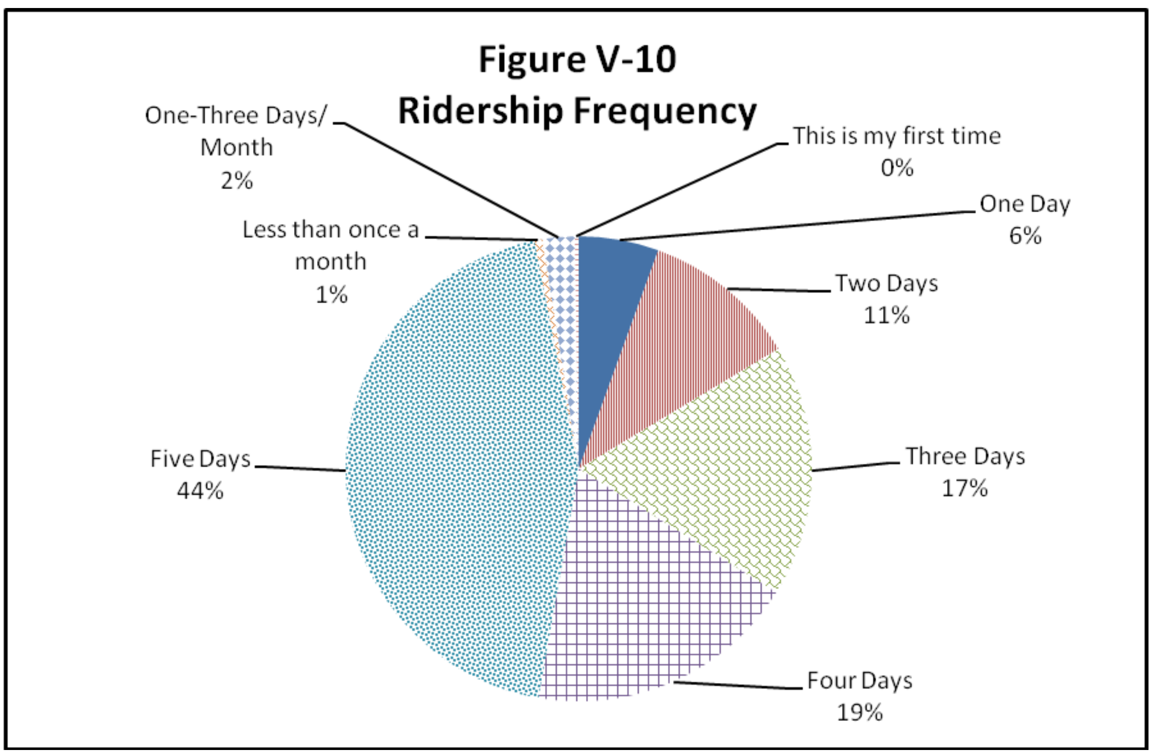
Patrons were asked the average amount of time they spent to get from their point of origin to get to their final destination.

Table V-3 shows the average amount of time spent to get from their point of origin to their destination. The largest percentage of respondents (39 percent) reported taking 15-29 minutes from their point of origin to their final destination. Twenty-nine percent reported taking 30-59 minutes from their point of origin to their final destination. The average amount of time spent by respondents to get from their point of origin to their destination was 26 minutes.

Table V- 3 Average Amount of Time Spent From the Point of Origin to the Point of Destination		
Time in Minutes	**Responses**	**Percentage**
Less than 15 minutes	103	26%
15-29 minutes	158	39%
30-59 minutes	118	29%
More than 60 minutes	24	6%
Source: LSC Onboard Survey, 2014.		

Ridership Frequency

Passengers were asked how often they ride the bus during the typical week. Figure V-10 shows the results. Forty-four percent of the passengers reported using Atomic City Transit's service five days per week. Nineteen percent reported using the service four days per week. Thirty-four percent use the service three or fewer days a week. This shows that a majority of riders (63 percent) are frequent riders and use the service at least four days a week.



Perceptions About Atomic City Transit

Passengers were asked to rate the quality of service provided by Atomic City Transit. The choices were poor, fair, good, very good, and don't know. Each category was given a numerical value from one to four, and the average response was then calculated for each attribute. The middle point of responses would be 2.5, so an average score of 3.0 or higher would indicate positive perceptions for that particular attribute. The responses from the survey are shown in Table V-4. Atomic City Transit got a score of 3.4 or more on all the attributes. The attributes having the highest scores were condition of buses (score of 3.64), overall service quality (score of 3.63), and service frequency (score of 3.53). The attributes scoring a low score were service hours (score of 3.30) and ATC bus system website (score of 3.35).

Table V-4
Quality of Service

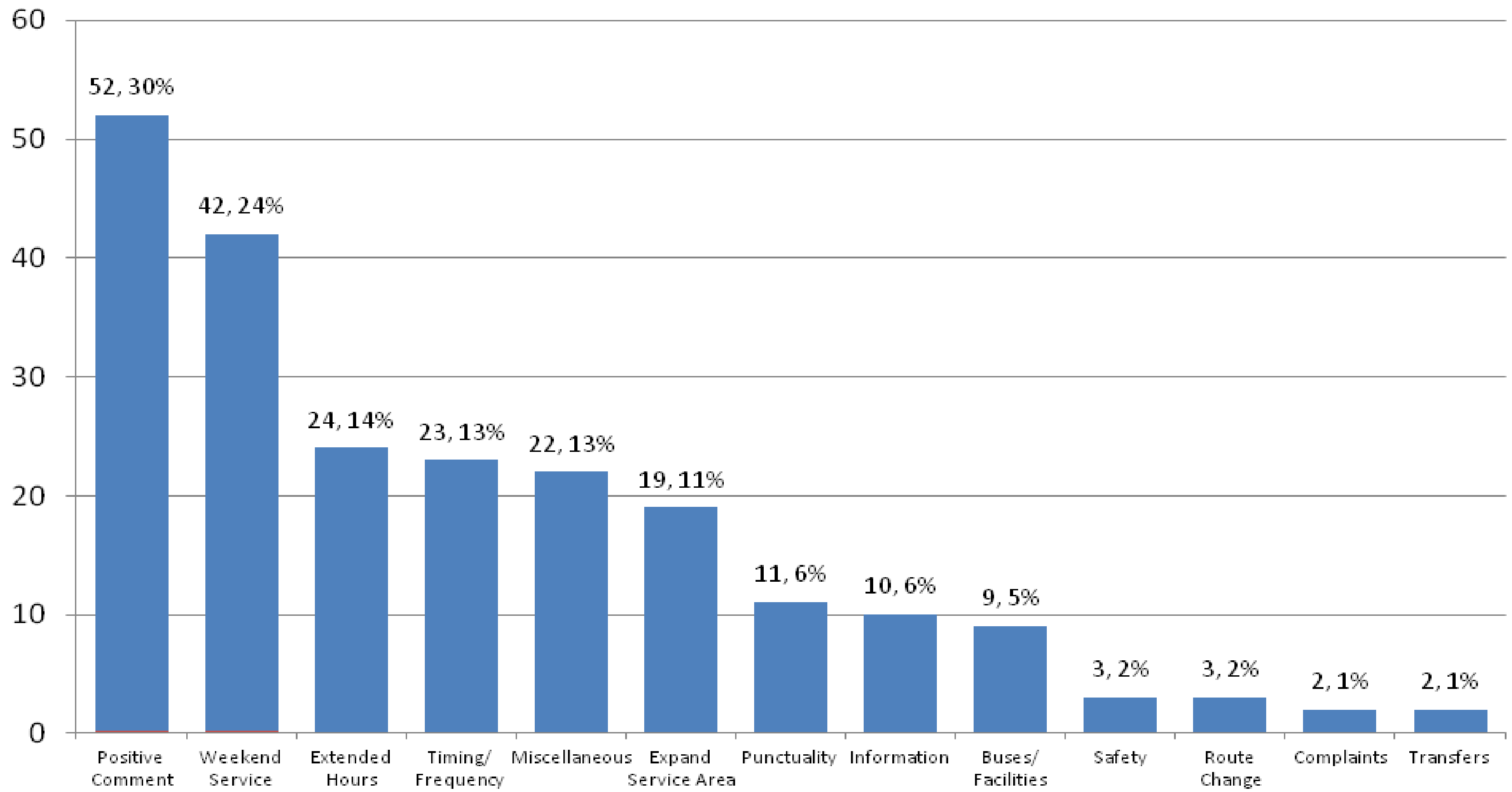
Attribute	Average Score
Condition of Buses	3.64
Overall Service Quality	3.63
Service Frequency	3.53
Bus Routes/Area Served	3.50
ACT Facebook Page	3.50
Transfer Convenience	3.46
ATC Bus System Website	3.35
Service Hours	3.30

Source: LSC Onboard Survey, 2014.

Additional Comments

Passengers were given the opportunity to include additional comments regarding Atomic City Transit service. The actual comments are included in Appendix B. General categories were used to group the comments based on concerns mentioned. Figure V-11 categorizes the various comments received. If multiple subjects were addressed in one comment, the comment was counted in each of the relevant categories. As shown in the figure, the majority of the comments (30 percent) were positive praising Atomic City Transit for the wonderful service provided and its great drivers. This was followed by comments that addressed the need for weekend service (24 percent) and extended hours (14 percent). Thirteen percent of the comments were regarding timings and the need for increased frequency on some routes. Another 13 percent of comments were categorized as miscellaneous.

Figure V-11
Comment Categories



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Chapter VI

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CHAPTER VI

Analysis of Afternoon Express Survey

INTRODUCTION

This chapter provides the analysis of data collected through the afternoon express riders or parents of these riders. The questionnaire was distributed to afternoon express service riders on Routes 7-North Mesa Express, Route 8-North Community Express, Route 9-Aspen Area Express, Route 10-Barranca Mesa Express, and Route 11-White Rock Express. Riders were encouraged to have their parents complete the questionnaire and return it to the Atomic City Transit (ACT) afternoon express drivers. The survey was conducted for one complete week from Tuesday, April 15 through Monday, April 21, 2014.

The survey instrument collected essential information for the evaluation of current services provided on the afternoon express service. The Atomic City Transit afternoon express survey was designed to gather suggestions to improve afternoon express service. A survey instrument was prepared by the LSC team and submitted to Atomic City Transit staff for review and comment. The survey was printed in English on an 8½ x 11 cardstock. The survey instrument is located in Appendix C. A total of 38 usable responses were received. Responses from the usable questionnaires were entered into a database and an analysis was performed in a spreadsheet program. The responses are summarized in the following sections.

This survey was not based on a representative sample of the afternoon express service riders. The results should be interpreted as information about those who completed the questionnaire. The results should be used with care and should not be considered as representative of all Atomic City Transit's afternoon express riders.

Table VI-1 shows the responses by afternoon express route.

Table VI-1 Responses by Afternoon Express Route		
Route #	**Route**	**Survey Respondents**
7	North Mesa Express	5
8	North Community Express	1
9	Aspen Area Express	9
10	Barranca Mesa Express	7
11	White Rock Express	14
	TOTAL	**36**

Important Service Characteristics

The survey asked respondents to rate the quality of service for their child's current school bus service. The choices were "very good," "good," "fair," "poor," and "don't know." Each category was given a numerical value from one to four, and the average response was then calculated for each attribute. The middle point of responses would be 2.5, so an average score of 3.0 or higher would indicate positive perceptions for that particular attribute. The responses from the survey are shown in Table VI-2. Atomic City Transit's afternoon express service got a score of 2.5 or more on all the attributes. The attributes having the highest scores were condition of buses (score of 3.16) followed by transfer convenience (score of 3.14). The attributes with a low score was overall service quality (score of 2.92).

Table VI-2 Quality of Service	
Attribute	**Average Score**
Condition of Buses	3.16
Transfer Convenience	3.14
Overall Service Quality	2.92

Source: LSC Afternoon Express Rider/Parent Survey, 2014.

Coloring and Activity Book and Discuss Bus Safety Basics

The survey asked respondents whether they reviewed the Coloring and Activity Book available on Atomic City Transit's website and discussed bus safety basics with their children to ensure they understand bus safety tips before they ride. There was an equal split between those who reviewed the Coloring and Activity Book and discussed bus safety basics with their children and those who didn't review the activity book and discuss bus safety issues.

Volunteer as an Onboard Express Route Monitor

The survey asked parents of afternoon express riders if they would volunteer to be an onboard express route monitor at least one day per month. Those parents who were willing to volunteer as onboard express route monitors were encouraged to contact Atomic City Transit for details. Eight percent of the respondents (three responses) agreed to volunteer as onboard express route monitors.

Trip Origin and Destination

Respondents were asked two questions to determine their trip origin and trip destination. One question asked respondents their school name or trip origin and the second question asked their final destination. The largest responses on the school name or trip origin were from Aspen Elementary (24 percent of respondents) followed by Chamisa Elementary (seven responses) and Piñon Elementary (seven responses). This was followed by Barranca Mesa Elementary (six responses).

For the final destination, few responses were home destinations. Most of them listed going to the library, post office, White Rock Activity Center, or participation in some after school activities or program, indicating that most of these children stayed in Los Alamos and possibly waited for their parents to pick them up and take them home.

Suggestions to Improve Atomic City Transit Afternoon Express Service

Passengers were given the opportunity to suggest ways to improve Atomic City Transit afternoon express service or include any other comments they may have. The actual comments are included in Appendix D. Most of the comments were positive; there were a few respondents, especially on Route 7-North Mesa Express that thought there was need for a bigger bus, more buses, and the buses need to be on time.

Chapter VII

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CHAPTER VII

Service Evaluation

Chapter VII presents an analysis of route operations and financial information for the Atomic City Transit (ACT). In addition, information on current system ridership is presented. This information is used to develop service recommendations presented later in the planning process. Information is organized as follows:

- Operations
- Ridership
- Financial Performance

Prior to reviewing the performance of Atomic City Transit, it is important to point out some key terminology, including:

Cost per Passenger-Trip (One-Way) - Total system costs (all operating expenses plus administrative costs plus capital costs on a depreciation schedule) divided by the number of passenger-trips. Costs and trips must be recorded over the same period of time.

Cost per Vehicle-Hour - Total system costs divided by the sum of the number of hours that each vehicle is operated in service. The typical usage is vehicle revenue-hours.

Cost per Vehicle-Mile - Total system costs divided by the total distance traveled by all vehicles in the system when they are in service. The typical usage is vehicle revenue-miles.

Effectiveness - For a transportation system, the effect is that people are moved from one place to another (i.e., trips). Measures of the effectiveness of a transportation system are, for example, the number of trips taken on it or the number of individual persons that it serves. Or a transportation system can be evaluated in terms of its effectiveness toward a social goal; for example, the number of persons who can take advantage of a particular social service because of the transportation system.

Efficiency - The efficiency of a transportation system will be some measure of the relationship of system inputs to system outputs. Transit planning has generally expressed this efficiency measure in terms of the ability to minimize an input (i.e., costs) to produce a unit of output. The most often used measures are cost per passenger or cost per vehicle-mile.

Fixed Costs - Typically those costs that are less (or not at all) sensitive to changes in service. They include such items as general supervision, overhead and administration, rents, and debt service. Fixed costs are differentiated from variable costs because they represent those costs that must be met whether the service operates or not. If the project runs into operating problems (e.g., loss of passengers), fixed costs will continue.

Level of Service - In transportation literature, level of service is generally defined as a measure of the convenience, comfort, safety, and utility of a system or system component (vehicle, facility, etc.) from the passenger's point of view. A variety of measures can be used to determine a particular component's level of service. In transit, level of service measures incorporate such factors as availability and frequency. Level of service is typically designated in six ranges from A (best) to F (worst) for a particular service measure based on the passenger's perception of a particular aspect of the transit service.

One-Way Passenger-Trips - Refers to the total number of boarding passengers carried on all routes.

Passenger-Miles - The sum of the trip distances traveled by all passengers.

Passenger-Trips - The number of one-way trips by persons using the system. Each passenger counts as an individual trip even if there is group boarding and alighting at common points.

Passengers per Vehicle-Hour - The number of passenger-trips divided by the sum of the number of hours that each vehicle is operated.

Passengers per Vehicle-Mile - The number of passenger-trips divided by the number of vehicle-miles provided by all vehicles.

Productivity - The basic performance parameter that describes transit and paratransit service, defined as the number of passenger-trips per vehicle-hour of service. This is typically defined in terms of the number of revenue-hours.

Productivity = Passenger-Trips/Vehicle Service-Hours

Revenue-Hours and Miles - Those vehicle-hours and miles during which the transit vehicle is actively providing service to passengers. For fixed-route service, this includes all the time spent on routes when passengers may board the vehicle. For demand-response service, this includes all time spent in actively providing passenger service. It includes the time and miles between dropping off one passenger and picking up another even though there may be no passengers onboard at the time.

Variable Costs - Those costs that are sensitive to changes in the actual level of service. They are usually affected by the vehicle-miles, vehicle-hours, or some other measure of level of service. Variable costs typically include such items as fuel, oil, tires and tubes, drivers' wages, and other items of expense that are sensitive to the level of operation. Vehicles and equipment items purchased have life expectancies which require that a depreciation factor be included when figuring costs. Most typically, depreciation is figured on a straight-line basis with a 10 percent residual salvage value at the end of that time. The length of time depends on the type of vehicle.

Vehicle-Hour - The operating time for a vehicle—either the time the engine is running or the time a driver is assigned to a vehicle. Revenue-hours are the hours when the vehicle is operating and available for passenger service.

Vehicle-Miles - The total number of miles driven on all vehicles used to provide passenger service. Revenue-miles are the miles operated by vehicles available for passenger service.

OPERATIONAL REVIEW

Vehicle Inventory

The current inventory of buses that Atomic City Transit (ACT) owns for fixed-route and dial-a-ride service is listed in Table VII-1. This table provides details about the buses including model year, capacity, and vehicle type. As seen in the table, there are currently 24 fixed-route vehicles and four dial-a-ride vehicles. The majority of the fixed-route vehicles are manufactured by El Dorado and ARBOC and are between 26 and 34 feet in length. The New Flyer and Blue Bird buses which are used for fixed-route and Afternoon Express service are 45 feet in length and have higher seating capacities. All the dial-a-ride and new fixed-route buses are equipped with wheelchair lifts; however, some of the old fixed-route buses which are used as spares do not have wheelchair lifts. Three buses, one cutaway, one van, and one minivan have exceeded their useful life by one to three years. As a general rule, a transit system should have about 20 percent of the maximum vehicles operated in daily service as spares. ACT currently operates 14 fixed-route buses in maximum service and has a total of 24. The higher spare ratio may reflect the age of the vehicle fleet.

Table VII-1
Atomic City Transit Vehicle Fleet

Unit Number	Category	Make/ Model	Model Year	Estimated Replacement Year	Replacement Due or Overdue	Years Overdue for Replacement	Length (In Feet)	Seated Capacity	Lift / Ramp	Wheel-chair Spaces	Regular / Spare	Fuel
Fixed-Route Fleet												
4012	School	Blue Bird	2001	2011	Yes	3	45	36	No	0	Regular	Gas
4013	School	Blue Bird	2001	2011	Yes	3	45	44	No	0	Regular	Gas
4022	School	Blue Bird	2002	2012	Yes	2	45	52	No	0	Regular	Gas
4081	Cutaway	Elkhart	2008	2015	No		27	19	Yes	2	Regular	Gas
4085	Trolley	KK Trolley	2008	2017	No		33	34	Yes	2	Regular	Gas
4087	Cutaway	Glaval	2008	2019	No		27	19	Yes	2	Regular	Gas
4091	Cutaway	El Dorado	2009	2019	No		34	28	Yes	2	Regular	Diesel
4092	Cutaway	El Dorado	2009	2016	No		34	28	Yes	2	Regular	Diesel
4093	Cutaway	ARBOC	2009	2016	No		26	23	Yes	2	Regular	Gas
4094	Cutaway	ARBOC	2009	2016	No		26	23	Yes	2	Regular	Gas
4101	Cutaway	El Dorado	2010	2020	No		34	28	Yes	2	Regular	Diesel
4102	Cutaway	El Dorado	2010	2020	No		34	28	Yes	2	Regular	Diesel
4103	Cutaway	El Dorado	2010	2020	No		34	28	Yes	2	Regular	Diesel
4104	Cutaway	El Dorado	2010	2020	No		34	28	Yes	2	Regular	Diesel
4106	Bus	New Flyer	2010	2022	No		45	39	Yes	2	Regular	Diesel
4111	Cutaway	Glaval	2011	2016	No		26	19	Yes	2	Regular	Gas
4112	Trolley	KK Trolley	2011	2018	No		33	34	Yes	2	Regular	Gas
4113	Cutaway	ARBOC	2011	2018	No		26	23	Yes	2	Regular	Gas
4114	Cutaway	ARBOC	2011	2016	No		26	23	Yes	2	Regular	Gas
4116	Trolley	KK Trolley	2011	2018	No		33	34	Yes	2	Spare	Gas
4122	Cutaway	El Dorado	2014	2023	No		34	28	Yes	2	Regular	Diesel
4123	Cutaway	El Dorado	2014	2023	No		34	28	Yes	2	Regular	Diesel
4124	Bus	New Flyer	2012	2025	No		45	39	Yes	2	Regular	Diesel
4125	Bus	New Flyer	2012	2025	No		45	39	Yes	2	Regular	Diesel
Dial-A-Ride Fleet												
4084	Cutaway	Startrans	2008	2013	Yes	1	22	13	Yes	2	Regular	Gas
4115	Cutaway	ARBOC	2011	2017	No		21	13	Yes	2	Regular	Gas
4121	Minivan	Caravan	2012	2020	No		18	5	Yes	1	Regular	Gas
4141	Cutaway	ARBOC	2014	2024*	No		22	12	Yes	1	Regular	Gas
Employee Shuttle												
4082	Minivan	Braun	2008	2012	Yes	2	18	3	Yes	2	Regular	Gas
4095	Van	Ford Van	2009	2013	Yes	1	19	11	No	0	Regular	Gas
4105	Minivan	Braun	2010	2014	No		18	3	Yes	1	Regular	Gas

* Based on standard procedure, LSC estimate it to be replaced after 10 years

Source: ACT and LSC, 2014.

Fixed-Route Services

Atomic City Transit operates one downtown circulator route—Route 1; five regular fixed routes—Route 2 (includes 2M and 2T), Routes 3, 4, 5, and 6; five Afternoon Express routes—Routes 7, 8, 9, 10, and 11; along with two seasonal fixed routes which are given names corresponding to the geography. The fixed routes operate from roughly 6:00 a.m. to 7:00 p.m. on weekdays only. There is no service for fixed routes during the weekend except the seasonal routes. Five of the six routes—with the exception of Route 1-Downtown Circulator—operate on 30-minute headways during the morning and afternoon peaks, with 60-minute headways throughout the rest of the day. Route 1-Downtown Circulator operates with a 20-minute headway throughout the day. The Afternoon Express routes have only one pick up in the evening on Monday, Tuesday, Thursday, and Friday and have an early pick up in the afternoon on Wednesday.

Passenger Facilities

Atomic City Transit has a transit center located at the Diamond/West Jemez intersection. This transit center is shared between ACT, the KSL shuttle, and NMDOT Park-and-Ride buses. The facility includes passenger waiting areas and a portable toilet cabin for drivers. The transfer center provides shelter and amenities such as benches and trash cans for passengers of ACT, which is especially important when it is raining or during the winter. To make the public transit experience a pleasant one, amenities such as benches and shelters are placed on all routes except Route 3 for ACT riders. Additionally each shelter is ADA-accessible and most have benches and solar lights. Figure VII-1 illustrates the location of the amenities on ACT fixed routes.

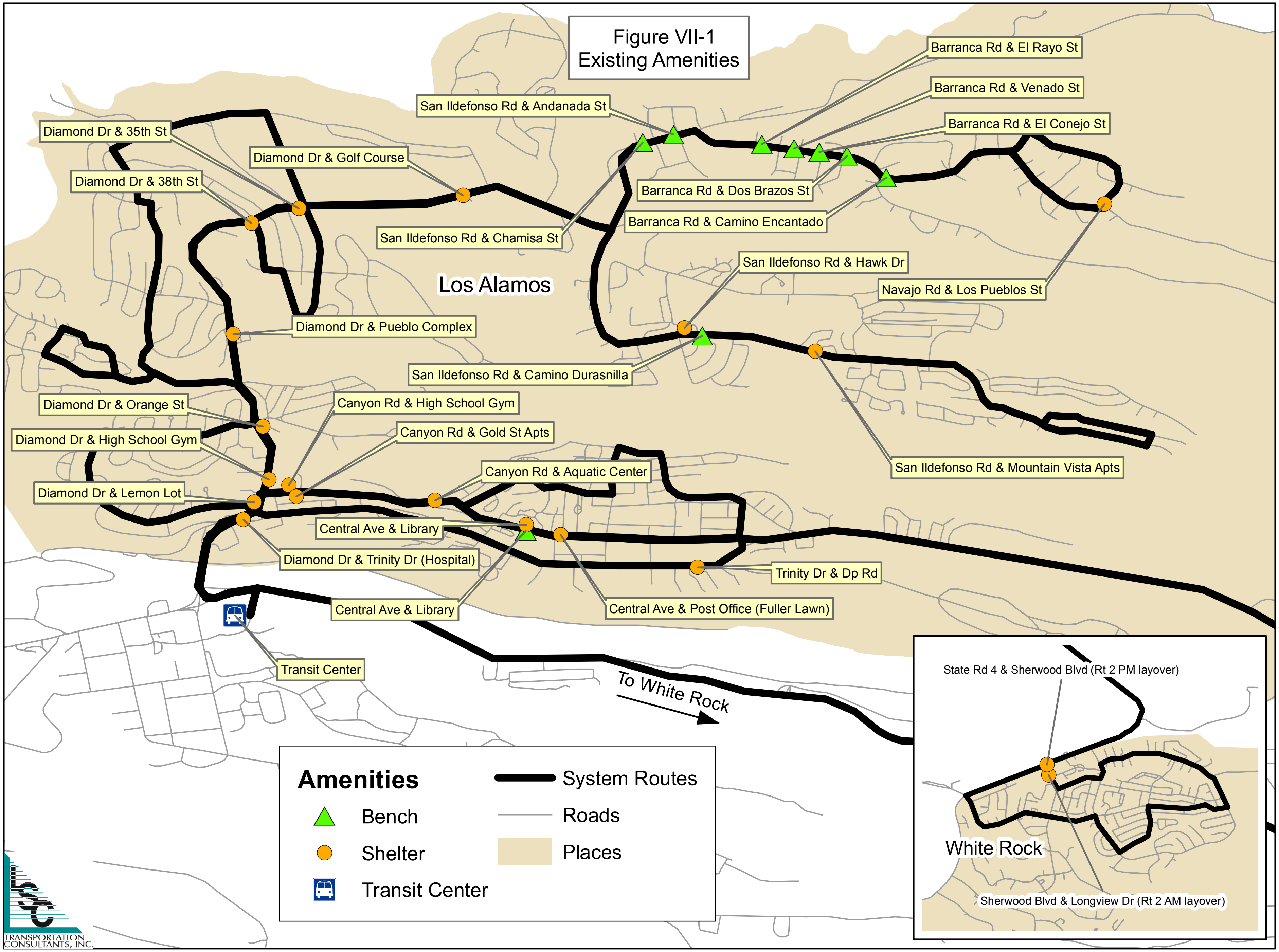


Figure VII-1
Existing Amenities
Los Alamos
Diamond Dr & 35th St
Diamond Dr & Golf Course
Diamond Dr & 38th St
San Ildefonso Rd & Andanada St
Barranca Rd & El Rayo St
Barranca Rd & Venado St
Barranca Rd & El Conejo St
Barranca Rd & Dos Brazos St
Barranca Rd & Camino Encantado
San Ildefonso Rd & Chamisa St
San Ildefonso Rd & Hawk Dr
Navajo Rd & Los Pueblos St
Diamond Dr & Pueblo Complex
San Ildefonso Rd & Camino Durasnilla
Diamond Dr & Orange St
Canyon Rd & High School Gym
Canyon Rd & Gold St Apts
Diamond Dr & High School Gym
San Ildefonso Rd & Mountain Vista Apts
Canyon Rd & Aquatic Center
Diamond Dr & Lemon Lot
Central Ave & Library
Diamond Dr & Trinity Dr (Hospital)
Trinity Dr & Dp Rd
Central Ave & Library
Central Ave & Post Office (Fuller Lawn)
Transit Center
To White Rock
State Rd 4 & Sherwood Blvd (Rt 2 PM layover)
White Rock
Sherwood Blvd & Longview Dr (Rt 2 AM layover)
Amenities
Bench
Shelter
Transit Center
System Routes
Roads
Places
TRANSPORTATION CONSULTANTS, INC.

System Performance

Operating effectiveness and financial efficiency of the transit system are two important factors to the success of the system. The operating effectiveness is the ability of the transit service to generate ridership. Financial efficiency is the ability of the transit system to provide service and offer passenger-trips in a cost-efficient manner. Table VII-2 presents the systemwide characteristics for fixed routes for Atomic City Transit's 2013 fiscal year. The summary table includes information about the number of passenger-trips per hour, passenger-trips per mile, cost per passenger, and other performance indicators.

Table VII-2
Fixed-Route System Performance
Fixed-Route Services

ACT	FY2013
Operating Cost	$3,655,959
Ridership	504,997
Revenue-Miles	746,815
Revenue-Hours	32,551
Operating Effectiveness	
Passenger-Trips/Mile	0.68
Passenger-Trips/Hour	15.51
Financial Efficiency	
Cost/Trip	$7.24
Cost/ Vehicle-Hour	$112.31

Source: ACT and LSC, 2014.

Route Effectiveness

The route performance section presents the current passengers, passengers per hour, and passengers per mile, shown in Table VII-3. As shown, there are routes that are very effective at providing service and those that perform relatively poorly. We have analyzed the scenario by two ways to measure the route effectiveness. In one analysis we have considered all the fixed routes from Routes 1 to 11 including the school routes which are known as Afternoon Express. In the other analysis we have separated the school routes (Route 7 to Route 11) and the other fixed routes (Route 1 to Route 6).

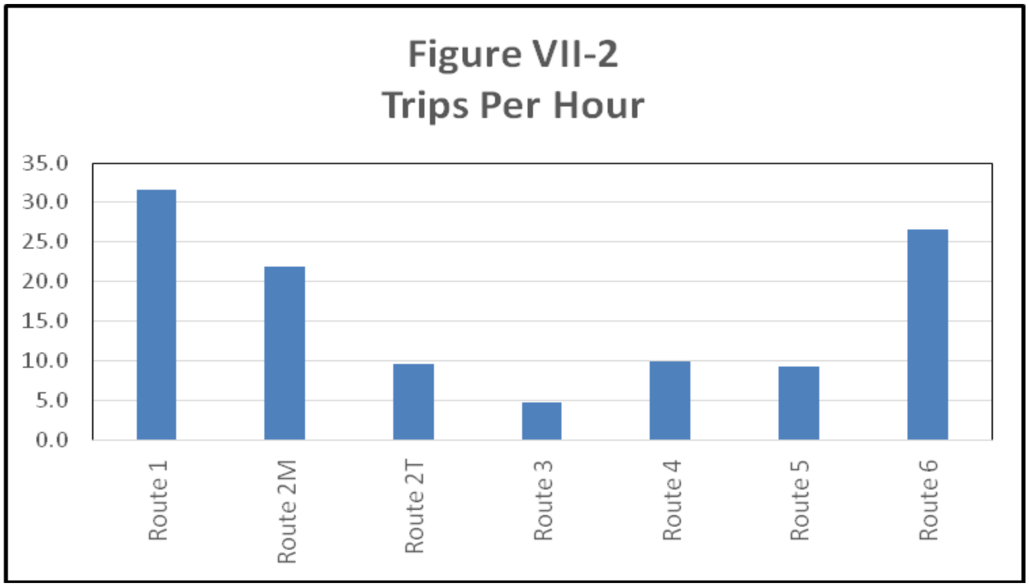
When we have considered all the fixed routes, results show that the school Routes 7, 8, 9, and 10 are the most effective routes, averaging approximately between 117 and 249 passenger-trips per revenue-hour, nearly 46 trips per hour or more than the systemwide average. Additionally, nearly three trips per mile are provided. When we separate the express routes (Route 7 to Route 11) from the other fixed routes (Route 1 to Route 6) and carry out the analysis, we have different results. The most effective routes are Routes 1 and 6, averaging approximately 32 and 27 passenger-trips per revenue-hour, nearly 16 and 11 trips per hour higher than the fixed route (Route 1 to Route 6) average.

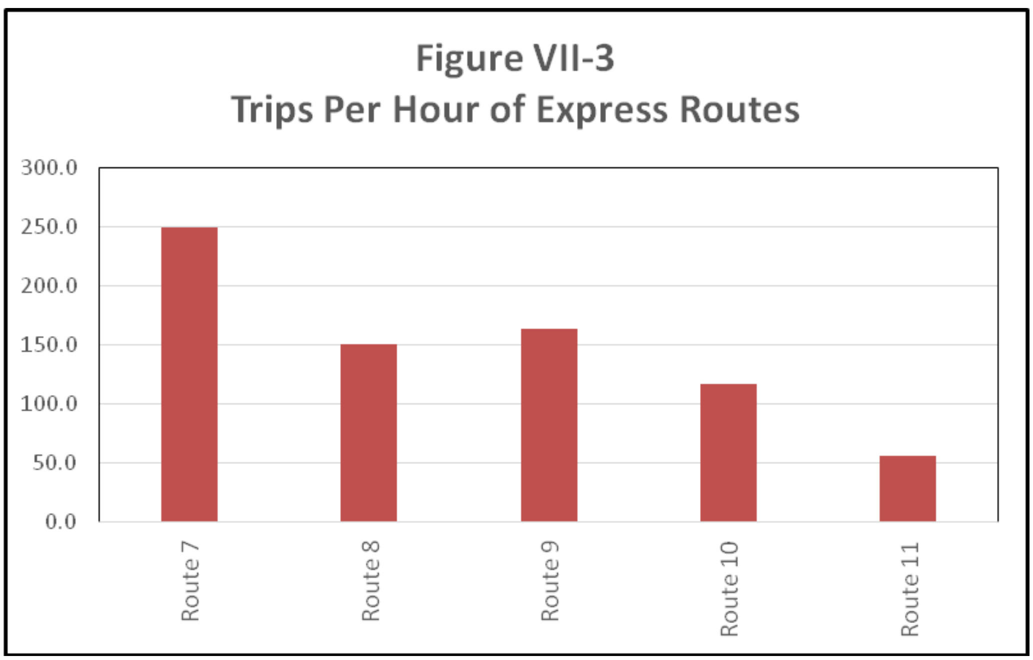
Table VII-3
Route Effectiveness

Route	Average Daily Miles	Average per Round-Trip Route-Miles	Average Annual Revenue-Miles	Annual Passenger-Trips	Passenger per Mile	Hours	Passenger per Hour
Route 1	205	5	51,455	107,929	2.10	3,406	31.7
Route 2M	525	25	131,775	73,364	0.56	3,343	21.9
Route 2T	588	28	147,588	33,041	0.22	3,431	9.6
Route 3	100	5	25,100	15,444	0.62	3,198	4.8
Route 4	147	7	36,897	33,110	0.90	3,338	9.9
Route 5	267	13	66,892	30,758	0.46	3,326	9.2
Route 6	280	13	70,155	91,593	1.31	3,449	26.6
Route 7	6	6	1,168	12,377	10.59	50	249.1
Route 8	6	6	1,130	8,322	7.37	55	150.8
Route 9	5	5	916	7,229	7.89	44	163.7
Route 10	7	7	1,347	7,519	5.58	64	116.8
Route 11	16	16	2,867	6,218	2.17	110	56.3
Total	2,151		537,289	426,902	40	23,815	850
Average		11	44,774		3.31	1,985	71
			Route 1 to 6		0.88		16
			Route 7 to 11- Express Routes		6.72		147

Source: ACT and LSC, 2014.

The most ineffective route is Route 3. This route operates at five passengers per hour, far below the fixed-route average of 16. Additionally, Routes 2T and 5 have less than 0.5 passenger-trips per mile. Figures VII-2 and VII-3 show the number of trips per hour for the fixed-route (Route 1 to Route 6) and Express service (Route 7 to Route 11) of Atomic City Transit system.





ORIGIN AND DESTINATION ANALYSIS ON ACT'S DIAL-A-RIDE

This section presents maps that detail the origins and destinations of trips on the Atomic City Transit (ACT) curb-to-curb dial-a-ride service. The information presented on the maps is based on the transit manifests of 16 business days. There were 368 entries from the 16 days analyzed. The pick-up and drop-off locations were used to analyze the existing ridership on the dial-a-ride service and to determine if there are locations that have the greatest demand and could possibly be incorporated into ACT'S fixed-route service. There are two maps—one showing ACT dial-a-ride pick-up locations and one showing ACT's dial-a-ride drop-off locations.

Figure VII-4 presents the pick-up locations for ACT dial-a-ride service. As shown in Figure VII-4, the major pick-up locations for the transit service are the Betty Ehart Senior Center, the Transit Center, the Los Alamos Medical Center, Smith's, the library, the Los Alamos County Aquatic Center, and the Los Alamos Research Park.

Figure VII-5 presents the drop-off locations for ACT dial-a-ride service. As shown in Figure VII-5, the major drop-off locations for the transit service are the Transit Center, the Betty Ehart Senior Center, the Los Alamos Medical Center, Smith's, the library, and the Los Alamos County Aquatic Center.

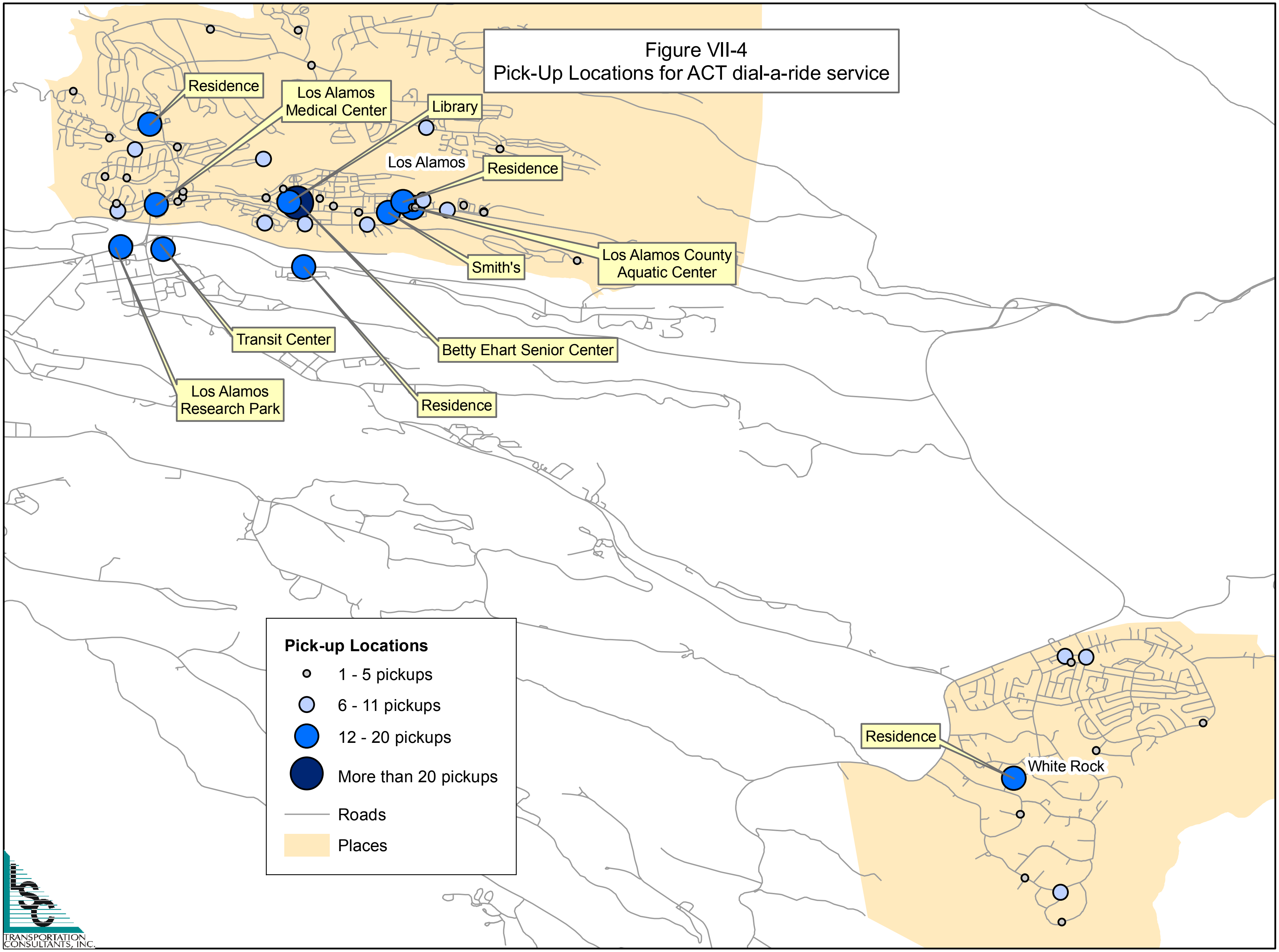


Figure VII-4
Pick-Up Locations for ACT dial-a-ride service

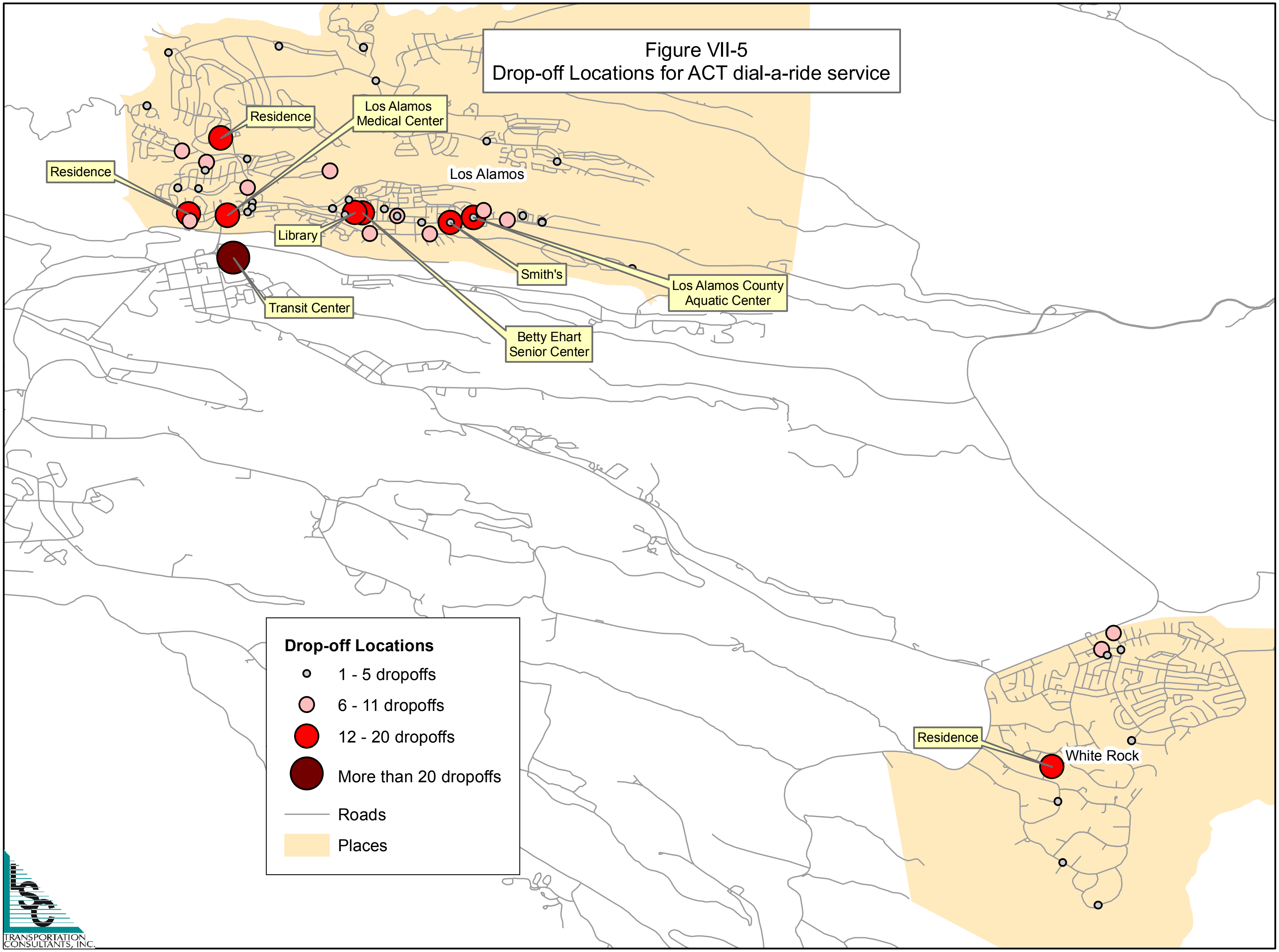


Figure VII-5
Drop-off Locations for ACT dial-a-ride service

RIDERSHIP REVIEW

Ridership Trend

It is important to look at ridership trends in the last five to seven years as this can help identify ridership changes based upon a variety of events such as route changes, economic influences such as gas price increases, or increases in things such as unemployment or overall economic downturn, or community changes in development. Annual ridership by fiscal year (FY) was provided from 2008 through 2013. Figure VII-6 provides a graphic of the ridership trend of the above-mentioned years. Ridership has shown a steady increase during this time period with a sharp increase during FY2009 and FY2012.

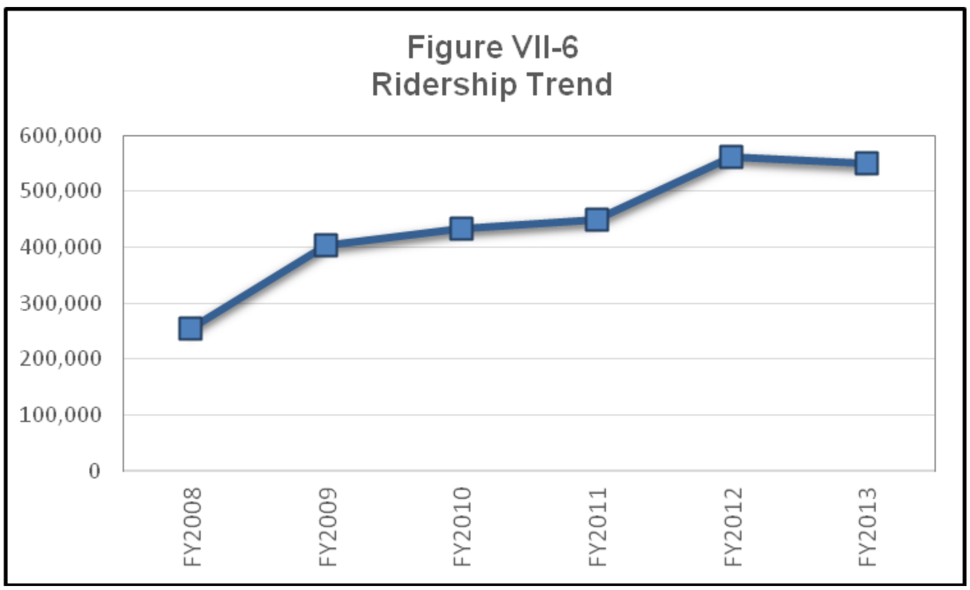


Figure VII-7 provides a monthly analysis of fixed-route ridership for the previous year (FY2013). July had the highest ridership with over 65,400 passengers. The chart shows the variation in ridership with more passenger-trips in the summer months (June to September) than in the winter months. Table VII-4 shows monthly ridership for the previous five years. These data allow for averages to be tabulated by month to show seasonal variation. The data show that July is historically the best month for ridership, with December being the lowest. The difference between these months is almost 25,750 average passengers, a significant disparity.

Figure VII-7
FY2013 Fixed-Route Ridership by Month

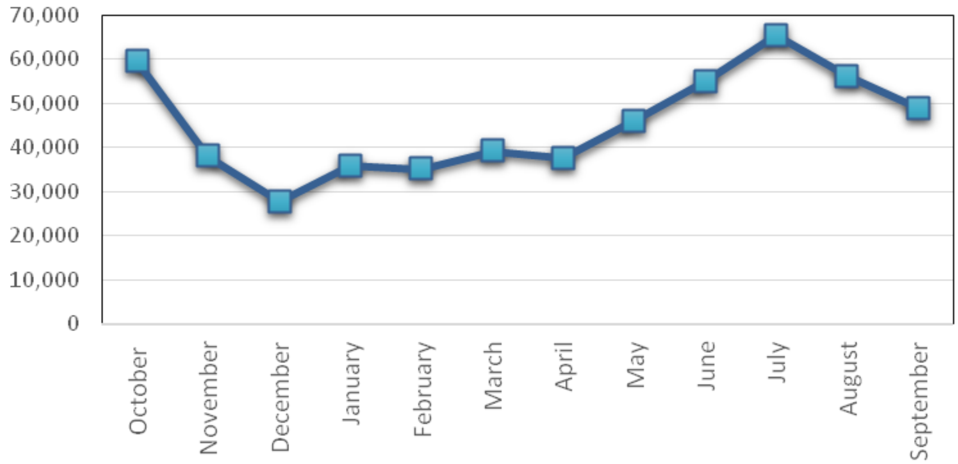
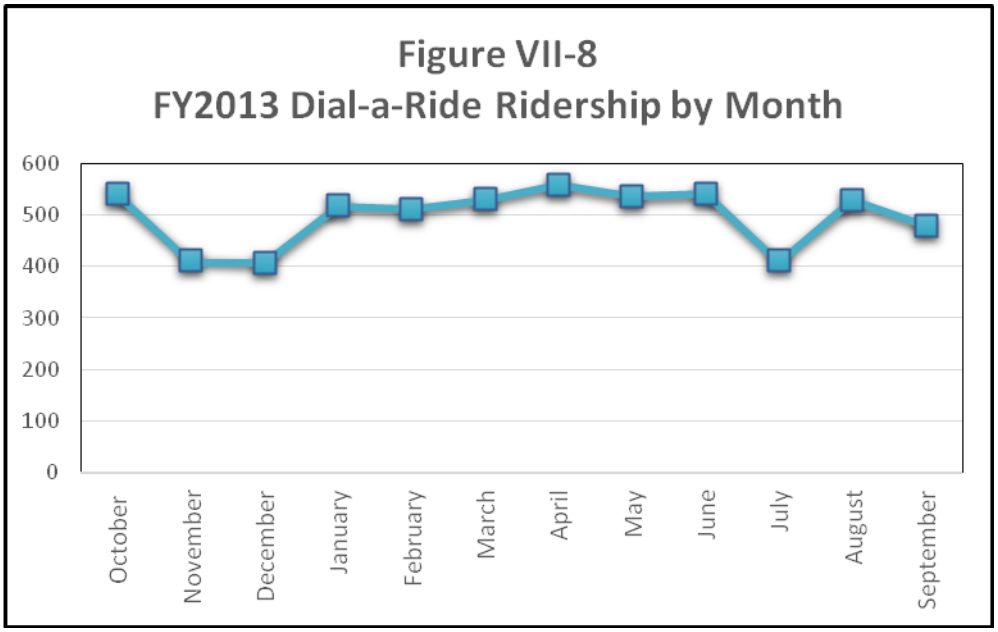


Table VII-4
Monthly Ridership Previous Five Years

Month	FY2009	FY2010	FY2011	FY2012	FY2013	Average
October	30,364	35,720	35,563	51,883	59,459	42,598
November	24,153	30,626	32,582	32,302	38,052	31,543
December	23,508	27,216	28,285	26,416	27,723	26,630
January	27,131	28,119	35,241	34,238	35,975	32,141
February	28,283	29,744	32,858	34,634	35,208	32,145
March	31,603	36,872	39,898	39,538	39,253	37,433
April	32,017	35,142	38,533	34,555	37,572	35,564
May	33,224	35,391	41,252	41,709	45,999	39,515
June	44,376	46,286	37,058	67,261	55,004	49,997
July	45,229	44,003	36,609	70,733	65,466	52,408
August	40,127	41,010	45,384	67,766	56,238	50,105
September	37,006	38,039	40,765	55,202	48,883	43,979
Total	**397,021**	**428,168**	**444,028**	**556,237**	**544,832**	**474,057**

Source: ACT and LSC, 2014.

Figure VII-8 depicts ridership by month for dial-a-ride service in FY2013. The trend in the last five years is similar to that of fixed-route services, with one of the summer months between April and August having the greatest ridership. The winter months—especially November and December—have the lowest ridership in the last five years, although this difference is much less than it is for fixed-route service.



FINANCIAL REVIEW

One important aspect of operating and sustaining transit services is a review of the financial capabilities of the system. This section provides a review of the financial characteristics of Atomic City Transit.

Revenues

The revenue required to operate Atomic City Transit comes from a variety of sources including federal grants, NCRTD Regional Transit Gross Receipts Tax (GRT), interest income, the Los Alamos County General Fund, and funding from Bandelier. The total revenue in FY2013 for both fixed-route services and dial-a-ride services was $4,973,440. Table VII-5 presents existing revenue sources. Approximately 39 percent of revenues came from federal grants, 30 percent came from the Los Alamos County General Fund, while an additional 27 percent came from NCRTD Transit GRT. These three sources made up a total of 96 percent of funding for the system. Bandelier services funding—which came from the Federal Lands Recreation Enhancement Act (FLREA)—accounted for almost three percent of total revenue for the system.

Table VII-5 Atomic City Transit 2013 Revenue Sources		
Source	**Budgeted Revenues**	**Percentage of Budget**
Federal Grants	1,941,335	39%
NCRTD Regional Transit GRT	1,332,081	27%
Los Alamos County General Fund	1,520,000	30%
Bandelier Service	150,000	3%
Interest Income	30,024	1%
TOTAL REVENUES	**4,973,440**	
Source: ACT and LSC, 2014.		

Expenses

The other half of the total equation is, of course, expenditures. Total expenditures for FY2013 were $3,665,959 for fixed-route service and an additional $445,480 for Dial-a-Ride service. The primary expenses for ACT (and all other transit agencies across the United States) are salaries and benefits. Table VII-6 presents existing expenditures for the fixed-route service.

Table VII-6 Atomic City Transit 2013 Fixed-Route Expenses		
Expenditure	**Amount**	**Percentage of Total**
Administration	340,344	9%
Operation	2,534,857	69%
Maintenance	780,758	21%
TOTAL	**3,655,959**	
Source: ACT and LSC, 2014.		

Cost Allocation Model

Financial, ridership, and service information can be used to develop internal evaluation tools for ACT. A cost allocation model provides base information against which current operations can be judged. In addition, the model is useful for estimating the cost ramifications of any proposed service alternative. The ACT fixed-route cost allocation model is shown in Table VII-7.

Table VII-7 Fixed-Route Cost Allocation Model					
Fixed-Route Services					
PROPOSED ACCOUNT	Actual 2013		Vehicle-Hours	Vehicle-Miles	Fixed Cost
Administration	$340,344				$340,344
Regular Wages	$1,293,338		$1,293,338		
Overtime	$67,571		$67,571		
Benefits	$637,123		$637,123		
Contractual Costs	$120,251			$120,251	
Other Services	$91,654			$91,654	
IDC: Building	$27,120				$27,120
IDC: Equip Replacement	$217,564			$217,564	
IDC: General Insurance	$79,740				$79,740
I/F and Hourly Charges	$497			$497	
Supplies and Materials	$77,535			$77,535	
IDC: Fuel	$281,039			$281,039	
IDC: Equip Maintenance	$422,184			$422,184	
TOTAL OPERATING COSTS	**$3,655,959**		**$1,998,032**	**$1,210,724**	**$447,204**
Service Variable Quantities			veh-hrs	veh-mls	Fixed-Cost
Used for Planning Purposes			32,551	746,815	Factor
			$61.38	**$1.62**	**1.14**
Source: ACT Statement of Revenue and Expenses, 2014.					

Cost information from FY2013 was used to develop a two-factor cost allocation model of the current Atomic City Transit operations. In order to develop such a model, each cost line item is allocated to one of two service variables—hours and miles—and fixed costs. Fixed costs are those costs that are identified/ defined as being constant. These costs do not increase or decrease based on the level of service. This is a valid assumption for the short term, although fixed costs could change over the long term (more than one or two years). Examples of the cost allocation methodology include allocating fuel costs to vehicle-miles and allocating operator salaries to vehicle-hours. The total costs allocated to each variable are then divided by the total quantity (i.e., total revenue-miles or hours) to determine a cost rate for each variable.

The allocation of costs for ACT FY2013 operations yields the following cost equation for existing fixed-route bus operations:

Total Cost = \$447,204 + (\$1.62 x Revenue-Miles) + (\$61.38 x Revenue-Hours)

OR

Total Cost = (\$1.62 x Revenue-Miles + \$61.38 x Revenue-Hours)
x Fixed-Cost Factor (1.14)

Incremental costs such as the extension of service hours or service routes/ areas are evaluated considering only the mileage and hourly costs:

Incremental Costs = (\$1.62 x Revenue-Miles) + (\$61.38 x Revenue-Hours)

COMMUNITY COMPARISON

To better understand Atomic City Transit (ACT), a peer comparison analysis was performed with other transit systems across the country similar to ACT. Table VII-8 provides a comparison with the following communities:

- Bristol Virginia Transit, VA
- City of Kingston Citibus, NY
- City of Rome Transit Department, GA
- Twin Cities Area Transportation Authority, MI
- Butte-Silver Bow Transit, MT
- Cortland Transit, NY
- Eco Transit, CO

While no two communities are exactly alike in terms of population and area, certainly general comparisons can be made between Atomic City Transit operations and these other communities.

Twin Cities Area Transportation Authority (TCATA) has a lower than average number of passengers per hour compared to the other systems—the average for the other systems is 15.6 passengers per hour, while for TCATA it is around 4.4. ACT is above the average of the other systems with 15.51 passengers per hour of service.

Atomic City Transit is not performing well when compared to other communities in terms of cost per hour and cost per mile. When discussing cost per hour, TCATA has a lower cost than all other systems. The system operates at nearly $36 per hour less than the average of the other systems. The cost per hour for ACT is higher than any of the other peer systems. The cost per passenger-trip for ACT is above the average of the other systems. This is largely due to the high operating cost of ACT.

Table VII-8
National Peer Community Analysis For Fixed-Route Service
Performance Measures

Transit System - Location	Service Area Population	No. of Vehicles	Annual Miles	Annual Hours	Annual Ridership	Operating Budget	Passengers per Hour	Passengers per Mile	Cost per Passenger	Cost per Hour	Cost per Mile	Trips per Capita
Bristol Virginia Transit (BVT), VA	17,835	4	90,791	7,000	91,060	$439,343	13.01	1.00	4.82	$62.76	$4.84	5.11
City of Kingston Citibus, NY	24,135	6	127,593	4,096	93,835	$172,313	22.91	0.74	1.84	$42.07	$1.35	3.89
City of Rome Transit Department (RTD), GA	36,159	26	438,984	29,093	1,029,272	$2,387,765	35.38	2.34	2.32	$82.07	$5.44	28.47
Twin Cities Area Transportation Authority (TCATA), MI	27,000	2	210,173	12,817	56,540	$352,954	4.41	0.27	6.24	$27.54	$1.68	2.09
Butte-Silver Bow Transit (Bus), MT	32,949	7	157,085	10,552	110,356	$662,841	10.46	0.70	6.01	$62.82	$4.22	3.35
Cortland Transit, NY	49,254	17	272,178	16,240	164,426	$1,101,115	10.12	0.60	6.70	$67.80	$4.05	3.34
Eco Transit, CO	52,000	31	1,410,909	61,323	786,806	$6,362,612	12.83	0.56	8.09	$103.76	$4.51	15.13
AVERAGE	**34,190**	**13**	**386,816**	**20,160**	**333,185**	**$1,639,849**	**15.59**	**0.89**	**5.14**	**$64.12**	**$3.73**	**8.77**
Atomic City Transit, Los Alamos	*18,146*	*24*	*746,815*	*32,551*	*504,997*	*$3,655,959*	*15.51*	*0.68*	*7.24*	*$112.31*	*$4.90*	*27.83*

Source: LSC, 2014.

Chapter VIII

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CHAPTER VIII

Community Conditions

Chapter VIII consists of two elements. The first element presents the community conditions and demographics for Los Alamos County. The second element is a description of the economy of Los Alamos County and local travel patterns. Where appropriate, maps and tables are used to demonstrate pertinent information regarding the characteristics being discussed.

DEMOGRAPHIC CHARACTERISTICS

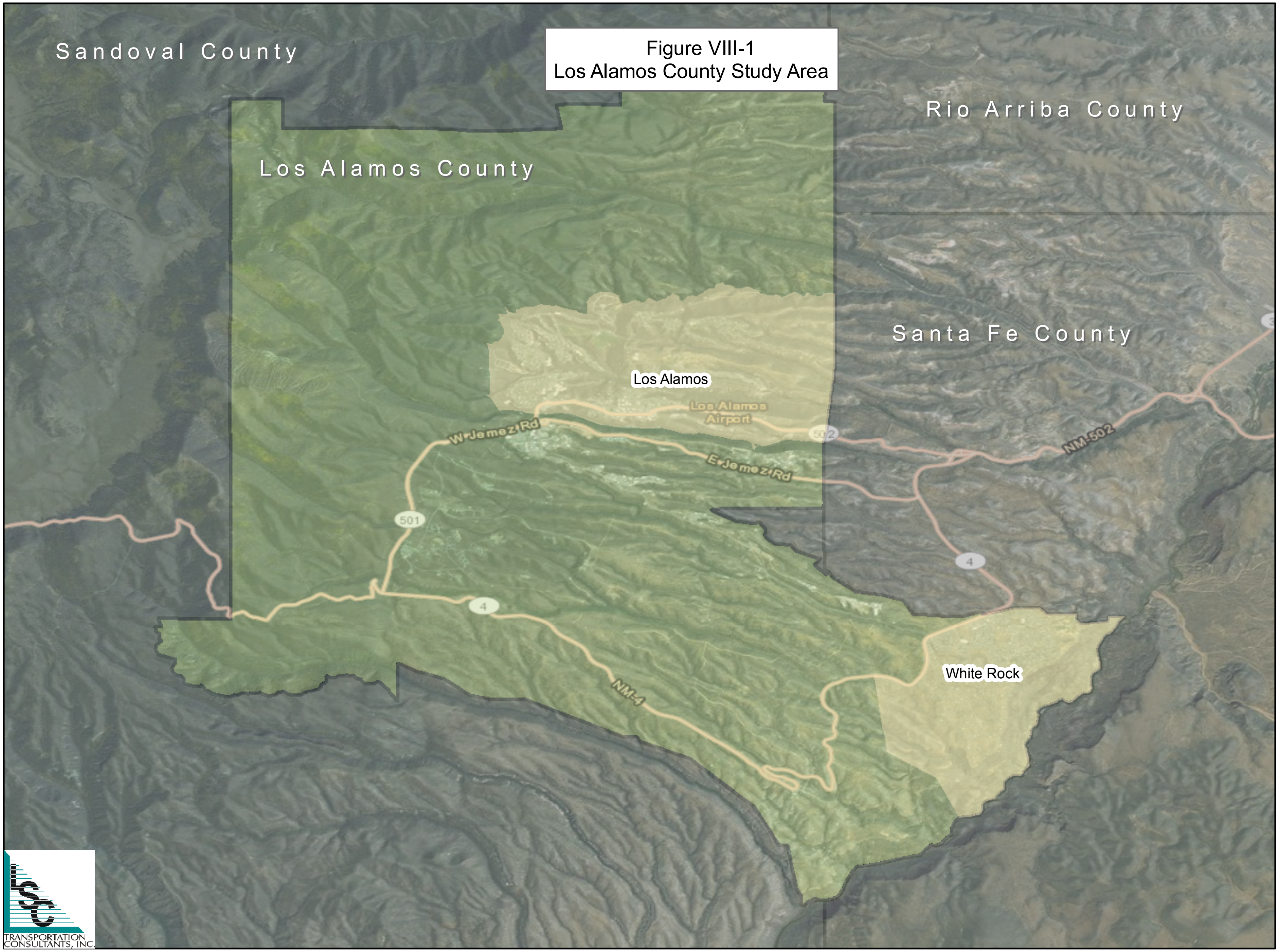
Study Area Location

Los Alamos County, shown in Figure VIII-1, is located in north-central New Mexico. It is the smallest county in New Mexico, covering a total of 109 square miles. The county seat, Los Alamos, is built on four mesas of the Pajarito Plateau and the adjoining White Rock Canyon. It is approximately 20 miles southwest of Española along NM-30 and NM-502. From Santa Fe, it is approximately 38 miles northwest along US-84 and NM-502. The other population center in Los Alamos County is White Rock which lies just ten miles southeast of Los Alamos by way of East Jemez Road and NM-4.

Much of Los Alamos County consists of the Los Alamos National Laboratory (LANL) which part of the Department of Energy.

The demographic analysis was done by block group, which is a census-defined boundary. These boundaries do not necessarily denote neighborhoods or communities, but rather act as a standardized means for analysis.

Figure VIII-1
Los Alamos County Study Area



Population Density

Data were taken from the 2008-2012 American Community Survey (2012 ACS) five-year estimates for most of this demographic analysis. While the low-income population data were available in the 2008-2012 ACS data, the smallest geographical unit for which information was available was at the tract level. The information from the tract level was then apportioned to the block group level based on the population of the block group compared to the total population in the tract.

Figure VIII-2 shows the population density for Los Alamos County by census block groups using the 2012 ACS data. The size of the census blocks skews the location of population concentrations. Population density is used to determine where population is concentrated. Transit is generally more successful in areas with greater concentrations of population. As shown in Figure VIII-2, the population is centered in the towns of Los Alamos and White Rock. The areas with the densest population are the area to the northwest of the Pueblo Complex in Los Alamos and the central area of White Rock.

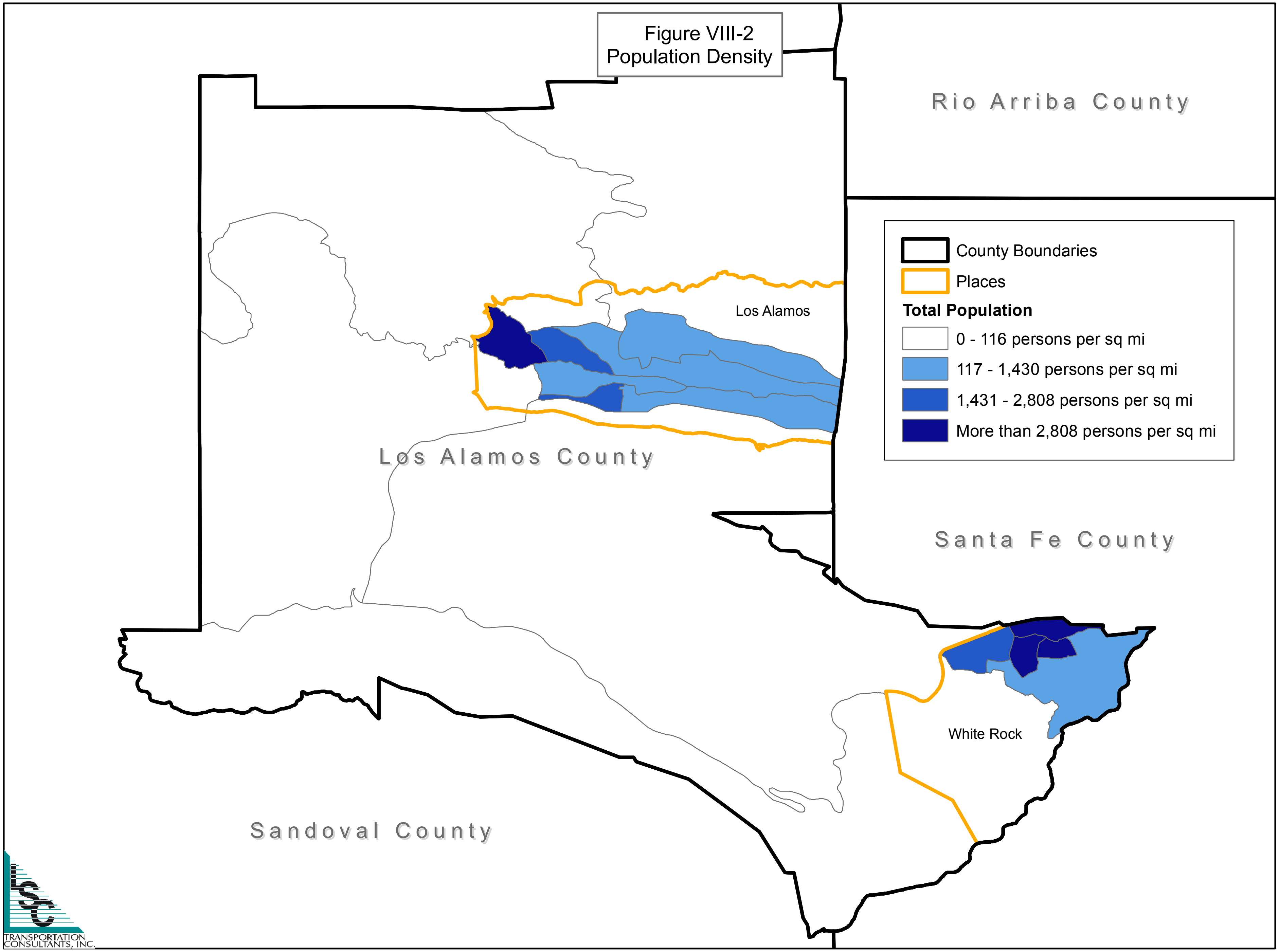


Figure VIII-2
Population Density

Transit-Dependent Population Characteristics

This section provides information on the individuals considered by the transportation profession to be dependent upon public transit. In general, these population characteristics preclude most such individuals from driving, leaving carpooling and public transit as the only motorized forms of available transportation.

The four types of limitations that preclude people from driving are physical limitations, financial limitations, legal limitations, and self-imposed limitations. Physical limitations may include everything from permanent disabilities such as frailty due to age, blindness, paralysis, or developmental disabilities to temporary disabilities such as acute illnesses and head injuries. Financial limitations essentially include those persons unable to purchase or rent their own vehicle. Legal limitations refer to such limitations as persons who are too young to drive (generally under age 16). Self-imposed limitations refer to those people who choose not to own or drive a vehicle (some or all of the time) for reasons other than those listed in the first three categories.

The US Census is generally capable of providing information about the first three categories of limitation. The fourth category of limitation is typically a relatively small portion of transit ridership, particularly in smaller communities such as Los Alamos County. However, as evidenced by data from the onboard survey, this is higher in Los Alamos than many other similar-sized communities Table VIII-1 presents the study area's US Census statistics regarding the older adult population, ambulatory disability population, low-income population, and zero-vehicle households. These data are important to various methods of transit demand estimation.

Table VIII-1
Estimated Population Characteristics using American Community Survey 2012
Los Alamos County, NM

Census Tract	Census Block Group	Total Number Population 2012 ACS	Land Area (sq. miles)	Total of Households 2012 ACS	Zero-Vehicle Households 2012 ACS		Youth Population 10-19 years 2012 ACS		Total Number of Older Adults 65 and Over 2012 ACS		Ambulatory Disablity Population 2012 ACS		Low-Income Population 2012 ACS	
				#	#	%	#	%	#	%	#	%	#	%
000100	1	1,106	17.4	392	0	0.0%	119	10.8%	194	17.5%	40	3.6%	37	3.3%
000100	2	1,971	1.4	766	0	0.0%	267	13.5%	230	11.7%	71	3.6%	65	3.3%
000100	3	902	1.5	344	16	4.7%	103	11.4%	191	21.2%	32	3.6%	30	3.3%
000200	1	725	16.7	330	0	0.0%	164	22.6%	14	1.9%	21	2.9%	28	3.9%
000200	2	967	0.4	470	23	4.9%	74	7.7%	131	13.5%	28	2.9%	38	3.9%
000200	3	1,489	0.5	533	10	1.9%	356	23.9%	131	8.8%	43	2.9%	58	3.9%
000200	4	1,962	17.0	778	36	4.6%	342	17.4%	172	8.8%	57	2.9%	77	3.9%
000400	1	1,028	1.1	514	20	3.9%	183	17.8%	264	25.7%	37	3.6%	85	8.3%
000400	2	573	0.2	358	19	5.3%	20	3.5%	150	26.2%	21	3.6%	48	8.3%
000400	3	962	29.1	484	18	3.7%	96	10.0%	89	9.3%	35	3.6%	80	8.3%
000400	4	633	0.6	334	21	6.3%	44	7.0%	122	19.3%	23	3.6%	52	8.3%
000500	1	1,030	0.3	354	0	0.0%	170	16.5%	82	8.0%	42	4.1%	52	5.0%
000500	2	691	0.1	274	0	0.0%	113	16.4%	92	13.3%	28	4.1%	35	5.0%
000500	3	1,099	1.7	375	0	0.0%	174	15.8%	191	17.4%	45	4.1%	55	5.0%
000500	4	812	20.5	323	0	0.0%	74	9.1%	289	35.6%	33	4.1%	41	5.0%
000500	5	1,036	0.4	439	42	9.6%	215	20.8%	120	11.6%	42	4.1%	52	5.0%
000500	6	1,022	0.2	430	0	0.0%	190	18.6%	167	16.3%	42	4.1%	51	5.0%
TOTALS		**18,008**	**109.17**	**7,498**	**205**	**2.7%**	**2,704**	**15.0%**	**2,629**	**14.6%**	**640**	**3.6%**	**883**	**4.9%**

Source: US Census Bureau, American Community Survey - 2012, LSC 2014.

Older Adult Population

The older adult population represents a significant number of the national transit-dependent population and represents 14.6 percent (2,629 individuals) of the total population in Los Alamos County. The older adult population includes individuals over the age of 65 years. Figure VIII-3 illustrates the density of older adults in Los Alamos County using the 2012 ACS data. The highest density of older adults is in the area to the southwest of the Los Alamos County Municipal Golf Course as well as the area bordered by Canyon Road, 15th Street, Trinity Drive, and Diamond Drive in Los Alamos. In White Rock, the area with the highest density of older adults is in the central part of the community.

Population of Persons with Ambulatory Disability

Figure VIII-4 presents the 2012 ACS population of persons with an ambulatory disability in terms of people-per-square-mile density. An individual is classified as having "ambulatory disability" if they have serious difficulty walking or climbing stairs. Approximately 3.6 percent of the population in Los Alamos County has some type of ambulatory disability. The areas with the greatest concentration of individuals with ambulatory disability are the area bounded by Canyon Road, 15th Street, State Highway 502, and Diamond Drive in Los Alamos, and the northwest portion of White Rock.

Low-Income Population

The low-income population tends to depend upon transit to a greater extent than the wealthy population or those with a high level of disposable income. Figure VIII-5 illustrates the density of the low-income population in Los Alamos County using the 2012 ACS data. Low-income population, as defined by the FTA, includes persons whose household income is at or below the Department of Health and Human Services' poverty guidelines. The low-income population used in the tables and GIS maps includes those individuals who are living below the poverty line using the Census Bureau's poverty threshold. The areas with the highest density of low-income persons are the area bounded by Canyon Road, 15th Street, State Highway 502, and Diamond Drive in Los Alamos, and the northwest portion of White Rock. Approximately 4.9 percent of the population of the study area is considered low income.

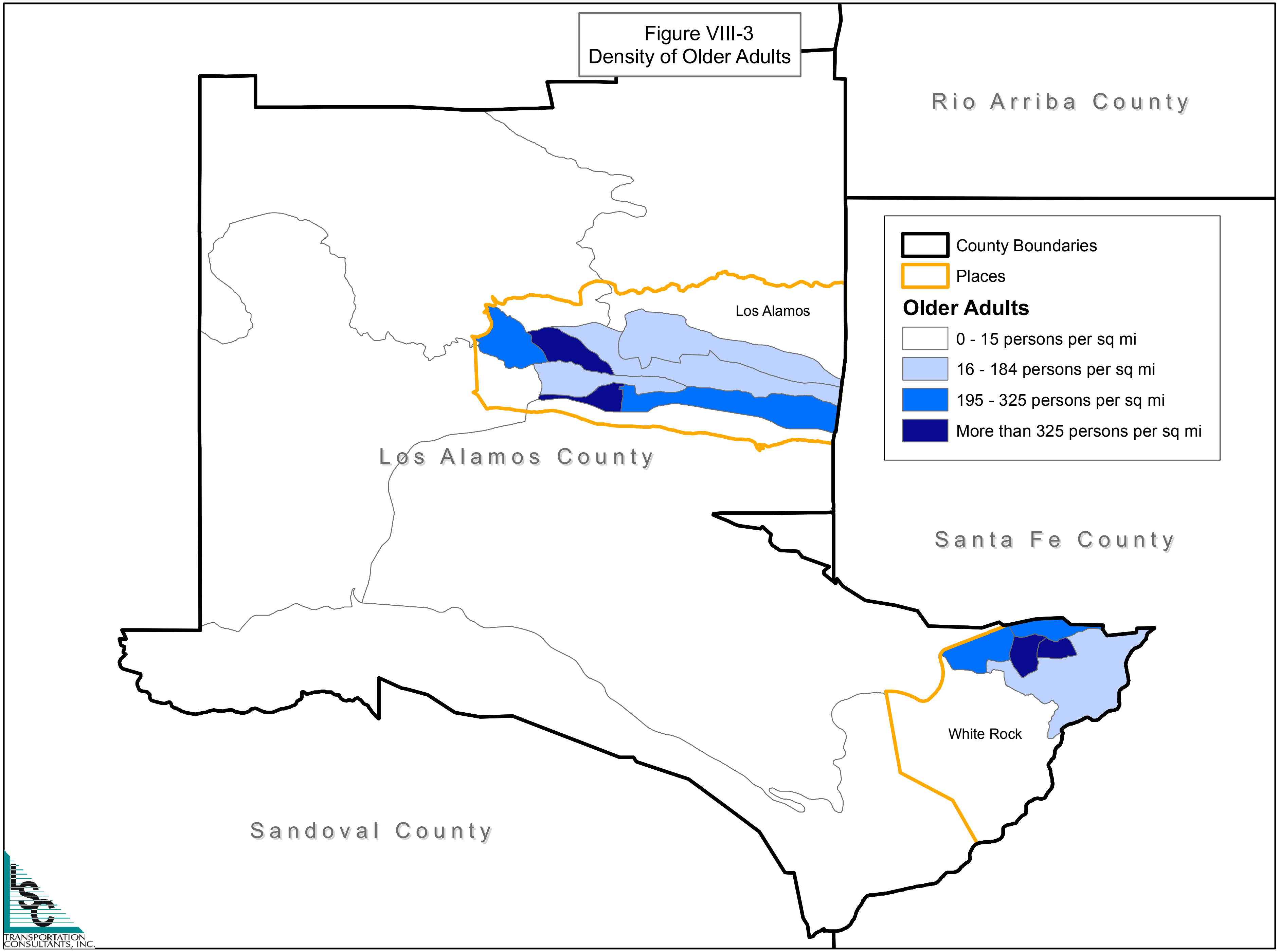
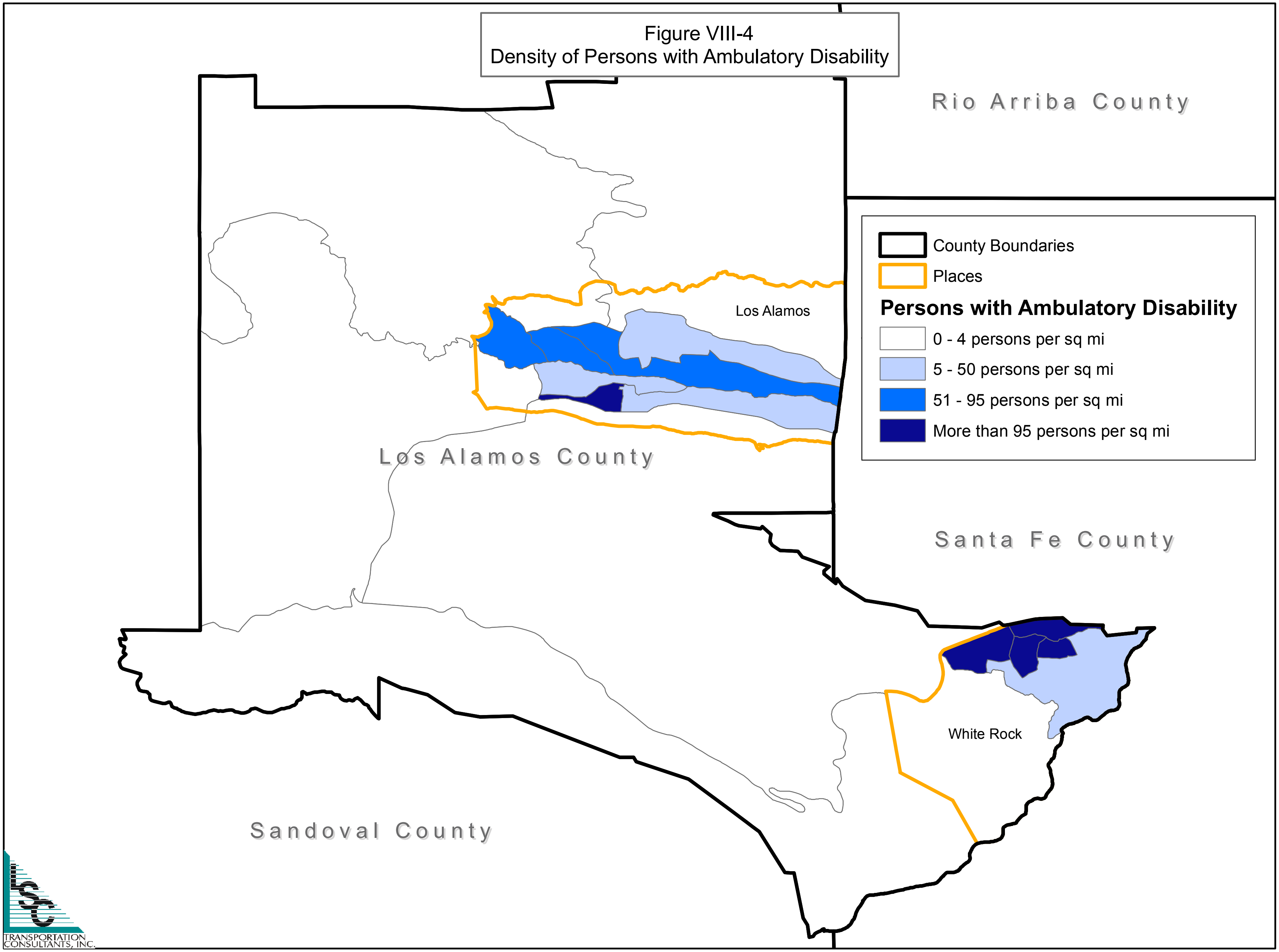


Figure VIII-3
Density of Older Adults

Figure VIII-4
Density of Persons with Ambulatory Disability



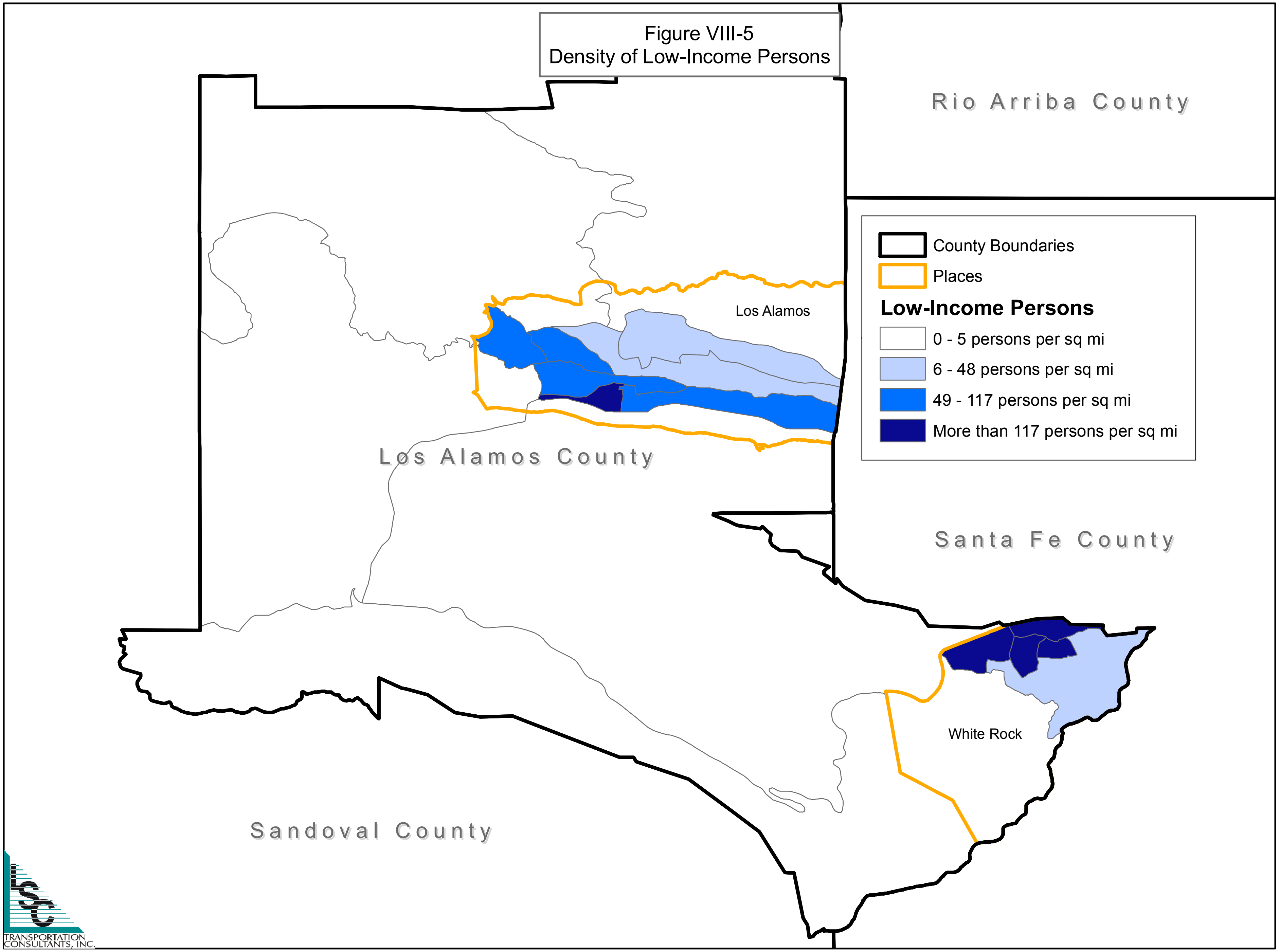


Figure VIII-5
Density of Low-Income Persons
Rio Arriba County
Los Alamos
Los Alamos County
Santa Fe County
White Rock
Sandoval County
County Boundaries
Places
Low-Income Persons
0 - 5 persons per sq mi
6 - 48 persons per sq mi
49 - 117 persons per sq mi
More than 117 persons per sq mi
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Zero-Vehicle Households

People who do not own or have access to a private vehicle are also considered transit-dependent. A zero-vehicle household is defined as a household in which an individual does not have access to a vehicle. These individuals are generally transit-dependent as their access to private automobiles is limited. Approximately 2.7 percent (205 households) of the study area's households reported no vehicle available for use. The density of zero-vehicle households for the study area using the 2012 ACS data is shown in Figure VIII-6. The ranges for the density of zero-vehicle households are quite low due to the size of the block groups, combined with the small number of zero-vehicle households in the study area. The areas with the highest density of zero-vehicle households are the area bound by Canyon Road, 15th Street, State Highway 502, and Diamond Drive, as well as the area to the southwest of the Los Alamos County Municipal Golf Course in Los Alamos, and the northwest portion of White Rock.

Youth Population

The population density of youth (10-19 years of age) for Los Alamos County using the 2012 ACS data is shown in Figure VIII-7. The area with the largest youth population in the study area is the northwest portion of White Rock followed by the southeast and north-central portions of Los Alamos. Approximately 15 percent (2,704 individuals) of the population of the study area are youth.

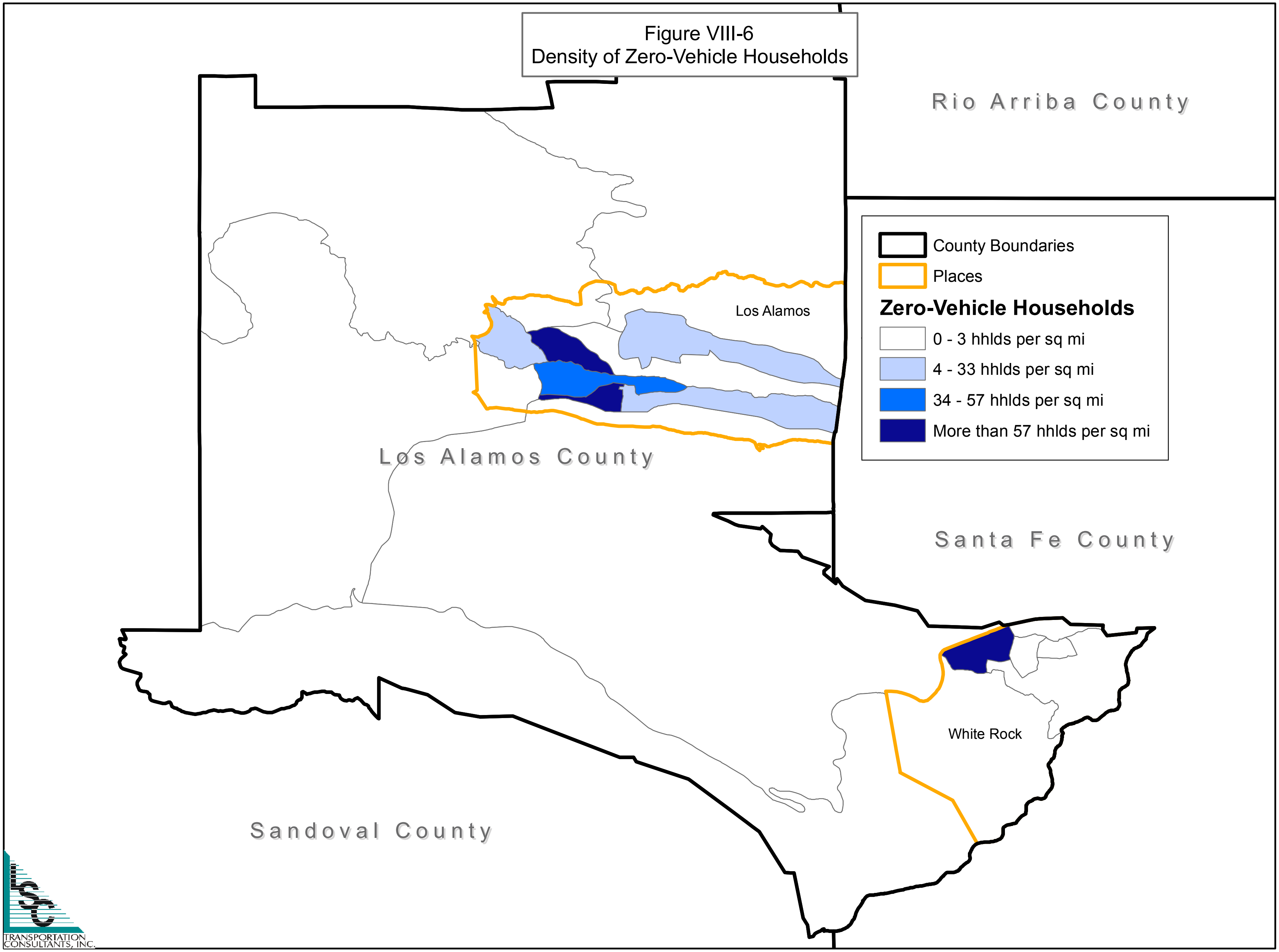
Figure VIII-6
Density of Zero-Vehicle Households
Rio Arriba County
County Boundaries
Places
Zero-Vehicle Households
0 - 3 hhlds per sq mi
4 - 33 hhlds per sq mi
34 - 57 hhlds per sq mi
More than 57 hhlds per sq mi
Los Alamos
Los Alamos County
Santa Fe County
White Rock
Sandoval County
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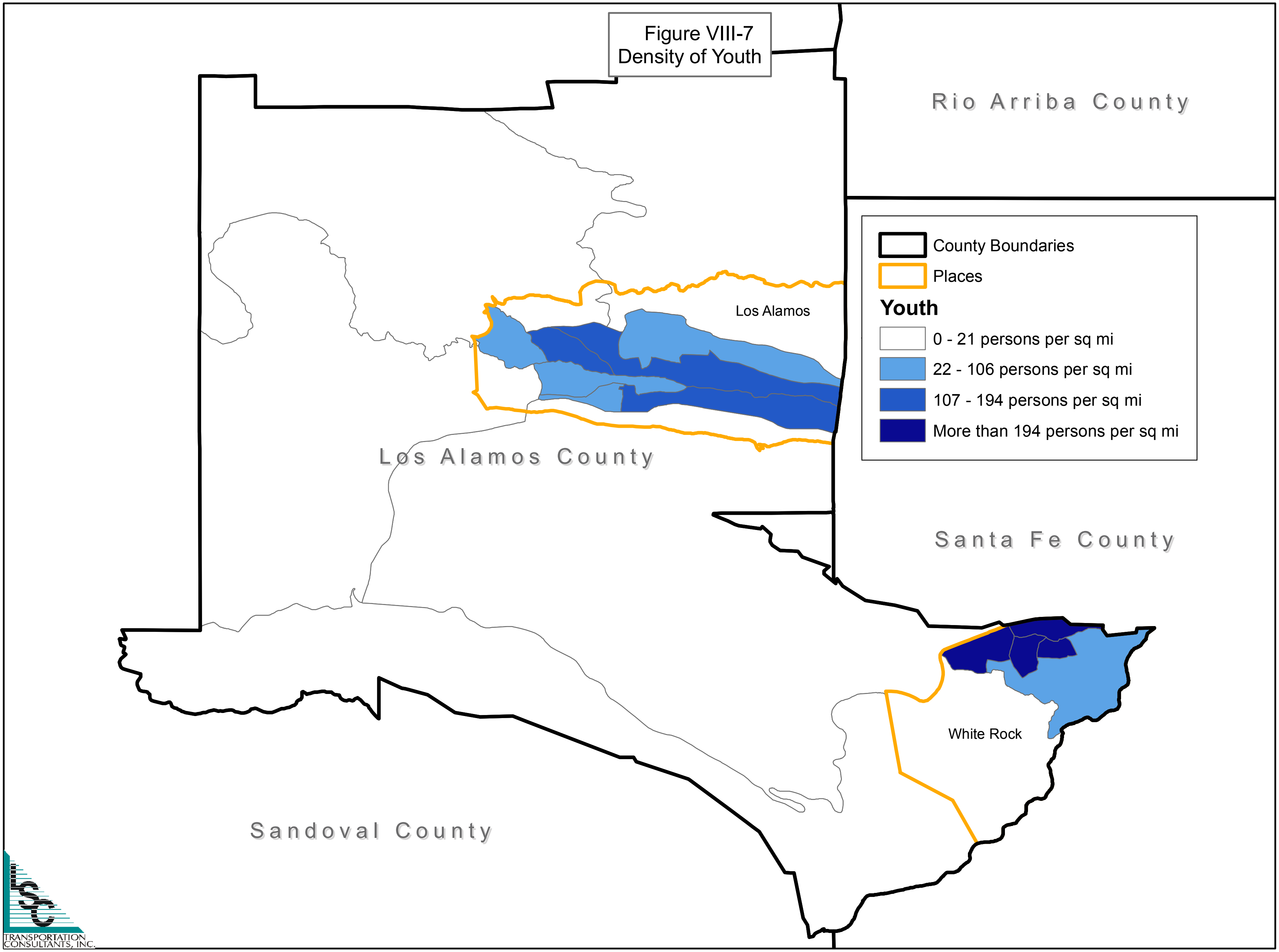
Figure VIII-7
Density of Youth



COMMUNITY ECONOMIC CHARACTERISTICS

According to the 2008-2012 American Community Survey five-year estimates, Los Alamos County has a civilian labor force of 9,543 with 393 unemployed (approximately 2.8 percent). This is significantly lower than the unemployment percentage for the State of New Mexico (six percent).

Employment Sectors

Table VIII-2 shows the available 2008-2012 American Community Survey five-year estimates of employment by sector for Los Alamos County. The Professional/ Scientific/Management/and Administrative and Waste Management Services sector is the largest sector, accounting for approximately 54 percent of employment and reflecting employment at LANL. The next highest industry sector is Educational/Health/Social Services (17.1 percent). The employment numbers reflect a five-year average and do not necessarily reflect current conditions. Levels of employment in several sectors, such as construction, have decreased in recent years.

Table VIII-2
Employment by Sector for Los Alamos County, NM

Industry	Employees	Percent
Educational services, and health care and social assistance	1,558	17.1%
Arts, entertainment, and recreation, and accommodation and food services	446	4.9%
Public administration	391	4.3%
Retail trade	516	5.7%
Agriculture, forestry, fishing and hunting, and mining	66	0.7%
Transportation and warehousing, and utilities	137	1.5%
Information	123	1.3%
Professional, scientific, and management, and administrative and waste management services	4,907	53.8%
Construction	225	2.5%
Other services, except public administration	187	2.1%
Manufacturing	167	1.8%
Finance and insurance, and real estate, rental, and leasing	361	4.0%
Wholesale trade	35	0.4%
TOTAL	**9,119**	**100%**

Source: US Census Bureau, American Community Survey - 2012, LSC 2014.

Major Employers and Activity Centers

Major transit activity centers are important in terms of land use, trip generation, and the ability to be served by public transit. Many of these points of interest are clustered together into what can be referred to as "activity centers." Activity centers are locations that are typically shown to generate transit trips because they are prime origins or prime destinations. There is no set formula that is used to derive a list of activity centers as the process is subjective. Activity centers generally include a wide variety of land uses including shopping/retail areas, as well as commercial, hospital, and education centers. These are the most critical land uses for individuals who use transit. Figure VIII-8 shows the locations of possible transit generators within Los Alamos County. Places that have been identified as major transit trip generators within the study area include Los Alamos National Laboratory (LANL) (which employs 10,227 employees on 36 square miles of DOE-owned property[1]), the University of New Mexico-Los Alamos, Los Alamos County Aquatic Center, Smiths, various senior centers and museums, as well as the Mesa Public Library in Los Alamos and the White Rock Branch Library in White Rock.

[1] http://www.lanl.gov/about/facts-figures/index.php

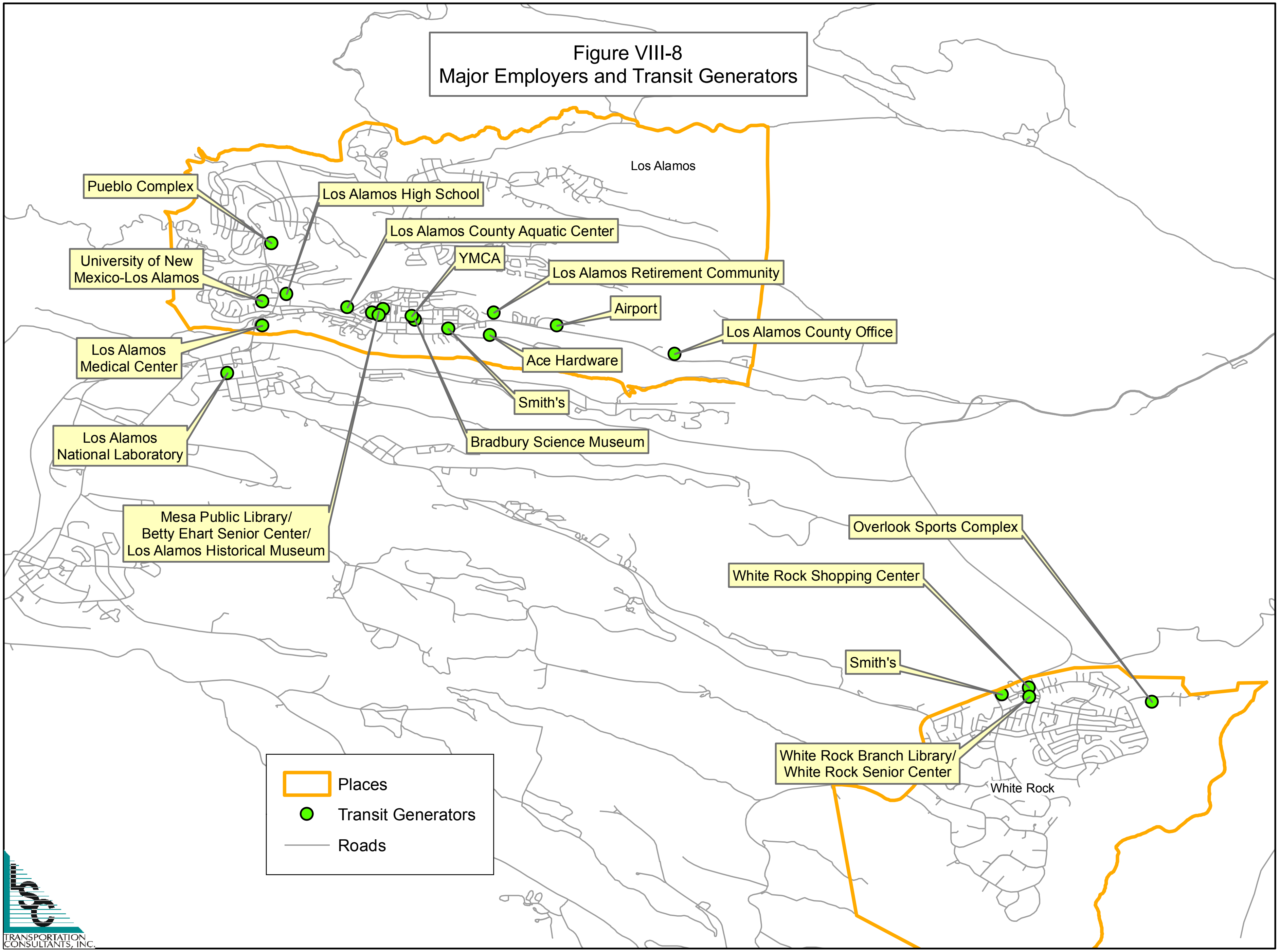


Figure VIII-8
Major Employers and Transit Generators

TRAVEL PATTERNS

Work Transportation Mode

The 2012 American Community Survey from the US Census Bureau yields information useful to the study area regarding the means of transportation to and from work for the study area's residents. Table VIII-3 shows the number of people in Los Alamos County's workforce and their modes of travel. These data were tabulated for employees 16 years of age and older who were at work when the American Community Survey questionnaire was completed.

Table VIII-3
Means of Transportation to Work
Los Alamos County, NM

Means of Transportation	Workers	Percent
Drove alone	6,718	75.3%
Carpooled	930	10.4%
Worked at home	333	3.7%
Walked	448	5.0%
Taxicab, motorcycle, bicycle, or other means	290	3.3%
Public transportation (excluding taxicab)	200	2.2%

Note*: Workers 16 years and over

Source: US Census Bureau, 2008-2012 American Community Survey 5-Year Estimates

The majority of the workforce drives alone to work (6,718 people or 75.3 percent). Carpooling (930 people or 10.4 percent) is the next highest mode of transportation to work, followed by walking (448 persons or five percent). Only 2.2 percent of employees (200 people) reported using public transportation.

Table VIII-4 shows that the mean commute time for Los Alamos County residents was 15.6 minutes. The most frequent responses for residents' travel time to work were 10-14 minutes and 15-19 minutes (28 percent of the respondents) followed by 5-9 minutes with 16 percent of the respondents. This is followed by workers commuting between 20 and 24 minutes (12 percent of residents).

Table VIII-4
Travel Time to Work
Los Alamos County, NM

Travel Time	Workers	Percent
Less than 5 minutes	321	4%
5 to 9 minutes	1,415	16%
10 to 14 minutes	2,363	28%
15 to 19 minutes	2,380	28%
20 to 24 minutes	1,038	12%
25 to 29 minutes	195	2%
30 to 34 minutes	301	4%
35 to 39 minutes	66	1%
40 to 44 minutes	73	1%
45 to 59 minutes	258	3%
60 or more minutes	176	2%
Mean travel time to work	15.6	minutes

Source: 2008-2012 American Community Survey Five-Year Estimates.

Table VIII-5 shows the time ranges for Los Alamos County residents leaving home to go to work. The most frequent response was between 7:30 and 7:59 a.m., with 22 percent of the residents leaving home during that time. The next most frequent response was between 7:00 and 7:29 a.m. (18 percent). This was followed by residents leaving between 8:00 and 8:29 a.m. (17 percent), and 6:30 and 6:59 a.m. (12 percent).

Table VIII-5 Time Leaving Home to Go to Work Los Alamos County, NM		
Time Ranges	**Workers**	**Percent**
12:00 midnight. to 4:59 a.m.	30	0%
5:00 a.m. to 5:29 a.m.	141	2%
5:30 a.m. to 5:59 a.m.	112	1%
6:00 a.m. to 6:29 a.m.	594	7%
6:30 a.m. to 6:59 a.m.	1,014	12%
7:00 a.m. to 7:29 a.m.	1,582	18%
7:30 a.m. to 7:59 a.m.	1,883	22%
8:00 a.m. to 8:29 a.m.	1,448	17%
8:30 a.m. to 8:59 a.m.	576	7%
9:00 a.m. to 9:59 a.m.	476	6%
10:00 a.m. to 10:59 a.m.	150	2%
11:00 a.m. to 11:59 a.m.	27	0%
12:00 noon to 3:59 p.m.	330	4%
4:00 p.m. to 11:59 p.m.	223	3%
Total	**8,586**	**100%**
US Census Bureau, 2008-2012 American Community Survey 5-Year Estimates		

Commute Patterns

Commuter patterns were analyzed to and from Los Alamos County using Longitudinal Employer-Household Dynamics (LEHD) data. In the absence of a better source of commuter pattern data, it is worthwhile to include these data as a general indicator of commute patterns to and from the study area. However, it should be noted that LEHD data represent estimates of commute patterns, synthesized from several sources of US Census residential locations, business locations, and commute data. These figures exclude federal, railroad, and self-employed employees, and include trips that are not made each workday. As such, these data should be used to provide only a general commuting pattern.

Table VIII-6 shows where Los Alamos County residents are employed. The table shows a variety of counties within New Mexico that Los Alamos County residents are traveling to for work. The table shows that approximately 75 percent of Los Alamos County residents are employed within Los Alamos County itself, followed by approximately nine percent being employed in Bernalillo County

(Albuquerque), and approximately five percent being employed in Santa Fe County (Santa Fe).

Table VIII-6 Residents in Los Alamos County are Employed		
County of Work	**Los Alamos County Residents**	
	#	**%**
Los Alamos County, NM	6,900	74.9%
Bernalillo County (Albuquerque), NM	783	8.5%
Santa Fe County (Santa Fe), NM	446	4.8%
Doña Ana County (Las Cruces), NM	168	1.8%
Rio Arriba County (Española), NM	109	1.2%
Taos County (Taos), NM	77	0.8%
All Other Locations	735	8.0%
Source: LEHD; LSC, 2014.		

Table VIII-7 shows where Los Alamos County workers live. The table shows 44 percent of Los Alamos County workers are from Los Alamos County itself. Approximately 21 percent are from Santa Fe County (Santa Fe), 12 percent are from Rio Arriba County (Española), seven percent are from Taos County (Taos), and five percent are from Bernalillo County (Albuquerque).

Table VIII-7 Workers in Los Alamos County Live		
County of Residence	**Los Alamos County Workers**	
	#	**%**
Los Alamos County, NM	6,900	44%
Santa Fe County (Santa Fe), NM	3,263	21%
Rio Arriba County (Española), NM	1,878	12%
Taos County (Taos), NM	1,115	7%
Bernalillo County (Albuquerque), NM	732	5%
All Other Locations	1,717	11%
Source: LEHD; LSC, 2014.		

Chapter IX

TRANSPORTATION
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CHAPTER IX

Transit Demand Analysis

INTRODUCTION

A key step in developing and evaluating transit plans is a careful analysis of the mobility needs of various segments of the population and the potential ridership of transit services. Transit demand analysis is the basic determination of demand for public transportation in a given area. There are several factors that affect demand, not all of which can be forecasted. However, as demand estimation is an important task in developing any transportation plan, several methods of estimation have been developed in the transit field. The analysis makes intensive use of the demographic data and Atomic City Transit's ridership data discussed previously.

This chapter presents an analysis of the demand for transit services in Los Alamos County based upon standard estimation techniques. The transit demand identified in this section is used in the identification of transit service alternatives and the evaluation of the various alternatives. This chapter uses numerous models and formulas to help quantify different segments of transit need and demand in the Los Alamos County study area, such as:

- Greatest Transit Needs Index
- Mobility Gap Analysis
- Fixed-Route Demand Model
- ADA Paratransit Demand Model
- Commuter Transit Demand

Data were taken from the 2008-2012 American Community Survey (ACS) five-year estimates for all of the population groups. Each of these approaches helps to show the patterns that are likely to arise regarding transit needs within the area. Estimating demand for services is not an exact science and therefore must be carefully judged for reasonableness. Across the country, transit use remains a relatively low proportion of overall passenger travel compared to the use of the personal automobile. Average use for transit, where it exists, represents approximately one percent of the total travel mode split.

ESTIMATION OF TRANSIT NEEDS

Transit Need

Need is defined in two ways—as the number of people in a given geographic area likely to require a passenger transportation service, and as the number of trips that would be made by those persons if they had minimal limitations on their personal mobility. Because the incremental cost of a trip using a car is low for those who have ready access to and ability to use a car, the difference between the number of daily trips made by persons with ready availability of a personal vehicle and by those lacking such access is used as the indicator of unmet need for additional person-trips. Not all of this unmet need will be provided by public transit services.

Using the methodology described in Transit Cooperative Research Program (TCRP) Report 161, the initial input for estimating transit need includes the number of persons residing in households with income below the poverty level plus the number of persons residing in households owning no vehicle. According to the census data, there are 883 persons residing in households with incomes below poverty in the Los Alamos study area. Additionally, the number of zero-vehicle households was multiplied by the occupancy of zero-vehicle households to estimate the total number of individuals who need transportation. There are 205 persons residing in households owning no automobile. These data were derived from the ACS. The calculated result, or output, is shown in Table IX-1. The total need for passenger service is approximately 1,088 persons.

Table IX-1 Estimation of Transit Need		
Persons residing in households with income below the poverty level	883	Persons
	+	
Persons residing in households owning no automobile	205	Persons
Total need for passenger transportation service:	**1,088**	**Persons**
Source: TCRP Project B-36 Methods for Forecasting Demand and Quantifying Need for Passenger Transportation Services, LSC 2014.		

Greatest Transit Needs

The "greatest transit need" is defined as those areas in the Los Alamos County area with the highest density of zero-vehicle households, older adults, people with ambulatory disabilities, and low-income populations. This information is used in the development of service alternatives and the identification of appropriate service constraints.

Methodology

The ACS and US Census data were used to calculate the greatest transit need. The categories used for calculation were zero-vehicle households, older adult population, ambulatory disability population, and low-income population. Using these categories, LSC developed a "transit need index" to determine the greatest transit need. The density of the population for each US Census block group within each category was calculated, placed in numerical order, and divided into five segments. Five segments were chosen to reflect a reasonable range. Each segment contained an approximately equal number of US Census block groups to provide equal representation.

Census block groups in the segment with the lowest densities were given a score of 1. The block groups in the segment with the next lowest densities were given a score of 2. This process continued for the remainder of the block groups. The census block groups in the segment with the highest densities were given a score of 5. This scoring was completed for each of the categories (zero-vehicle households, older adult population, ambulatory disability population, and low-income population). After each of the census block groups was scored for the five categories, the five scores were added to achieve an overall score. Table IX-2 presents the rank for each census block group in the Los Alamos County area. The scores range from 4 (lowest need) to 18 (highest need).

Table IX-2
Greatest Transit Need Model
Los Alamos County, NM

Census Tract	Census Block Group	Land area (sq. miles)	Total Population 2012 ACS	Total Total Number of Households 2012 ACS	Zero-Vehicle Households 2012 ACS			Number of Older Adults 65 & Over 2012 ACS			Ambulatory Disability Population 2012 ACS			Low-Income Population 2012 ACS			Overall Score	Final
				#	#	Density (Hhlds. Per Sq. Miles)	Rank	#	Density (Persons Per Sq. Miles)	Rank	#	Density (Persons Per Sq. Miles)	Rank	#	Density (Persons Per Sq. Miles)	Rank	(4-18)	(1-5)
100	1	17.4	1,106	392	0	0.0	1	194	11.1	2	40	2.3	1	37	2.1	1	5	1
100	2	1.4	1,971	766	0	0.0	1	230	164.3	3	71	50.7	3	65	46.4	2	9	2
100	3	1.5	902	344	16	10.7	2	191	127.3	3	32	21.3	2	30	20.0	2	9	2
200	1	16.7	725	330	0	0.0	1	14	0.8	1	21	1.3	1	28	1.7	1	4	1
200	2	0.4	967	470	23	57.5	4	131	327.5	4	28	70.0	3	38	95.0	3	14	4
200	3	0.5	1,489	533	10	20.0	3	131	262.0	4	43	86.0	3	58	116.0	4	14	4
200	4	17.0	1,962	778	36	2.1	2	172	10.1	2	57	3.4	1	77	4.5	1	6	1
400	1	1.1	1,028	514	20	18.2	3	264	240.0	4	37	33.6	2	85	77.3	3	12	3
400	2	0.2	573	358	19	95.0	4	150	750.0	5	21	105.0	4	48	240.0	5	18	5
400	3	29.1	962	484	18	0.6	1	89	3.1	1	35	1.2	1	80	2.7	1	4	1
400	4	0.6	633	334	21	35.0	3	122	203.3	3	23	38.3	2	52	86.7	3	11	3
500	1	0.3	1,030	354	0	0.0	1	82	273.3	4	42	140.0	4	52	173.3	4	13	3
500	2	0.1	691	274	0	0.0	1	92	920.0	5	28	280.0	5	35	350.0	5	16	4
500	3	1.7	1,099	375	0	0.0	1	191	112.4	3	45	26.5	2	55	32.4	2	8	2
500	4	20.5	812	323	0	0.0	1	289	14.1	2	33	1.6	1	41	2.0	1	5	1
500	5	0.4	1,036	439	42	105.0	5	120	300.0	4	42	105.0	4	52	130.0	4	17	5
500	6	0.2	1,022	430	0	0.0	1	167	835.0	5	42	210.0	5	51	255.0	5	16	4
Study Area TOTAL:		***109.10***	***18,008***	***7,498***	***205***	***1.9***		***2,629***	***24.1***		***640***	***5.9***		***884***				

Source: 2008-2012 American Community Survey Five-Year Estimates, LSC 2014.

Results

Figure IX-1 presents the Los Alamos County study area's US Census block groups with the greatest transit need, along with the transit need index. Four block groups were determined to have the greatest transit needs based on zero-vehicle households, older adult population, ambulatory disability population, and low-income population. Table IX-3 presents information on these four block groups. As shown in Figure IX-1, the greatest transit need is mainly in the central and older areas of Los Alamos and White Rock.

Table IX-3
Census Block Groups with Greatest Transit Need

Census Tracts	Census Block Groups	Overall Score	Community
400	2	18	Los Alamos
500	2	16	White Rock
500	5	17	White Rock
500	6	16	White Rock

Source: LSC, 2014.

By identifying those areas with a high need for public transportation, LSC was able to uncover a pattern for the areas with the highest propensity to use transit service. As LSC examines service alternatives, Figure IX-1 can be used in the analysis to ensure that areas with a high transit need would be adequately served. Those US Census block groups not scoring in the highest category, but still having a high score, could still be considered a high priority for transit service.

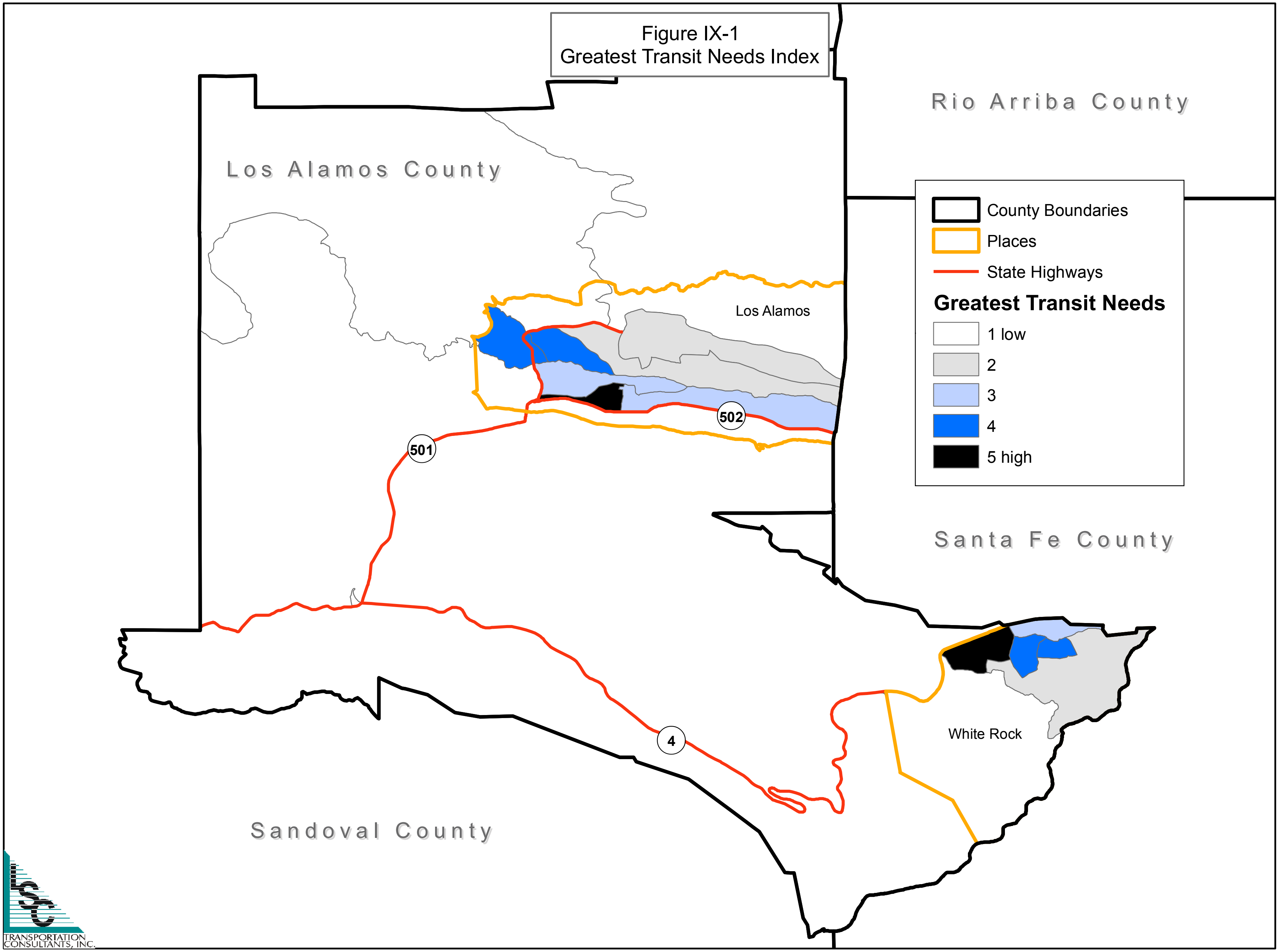

Figure IX-1
Greatest Transit Needs Index

Mobility Gap Analysis

The mobility gap methodology is used to identify the amount of service required to provide an equal mobility to households that have access to vehicles and those that do not. The National Household Travel Survey (NHTS) provides data that allow for calculations to be made relating to trip rates. Separate trip rates are generated for various regions throughout the United States to help account for any locational inequities. Trip rates are also separated by general density and other factors such as age. This methodology was updated using the 2009 NHTS data available.

New Mexico is part of Division Eight, the Mountain Region. The trip rate for zero-vehicle households in rural areas of the Mountain Region was determined to be 5.2 daily trips. For rural households with at least one vehicle, the trip rate was 6.0 daily trips. The mobility gap is calculated by subtracting the daily trip rate of zero-vehicle households from the daily trip rate of households with at least one vehicle. Thus, the mobility gap is represented as 0.8 household trips per day. This mobility gap is lower than the national average of 1.5 for rural households.

To calculate the transit need for each census block group in the study area, the number of zero-vehicle households is multiplied by the mobility gap number. Table IX-4 shows this information broken out by block group. In total, 164 daily trips need to be provided by transit to make up for the gap in mobility. This calculates to an annual transit need of 49,200 trips.

Table IX-4
Mobility Gap Transit Need

Census Tract	Census Block Group	2012 ACS Population	2012 ACS Households	No Vehicle	One Plus Vehicle	Mobility Gap	Transit Need
100	1	1,106	392	0	392	0.8	0
100	2	1,971	766	0	766	0.8	0
100	3	902	344	16	328	0.8	13
200	1	725	330	0	330	0.8	0
200	2	967	470	23	447	0.8	18
200	3	1,489	533	10	523	0.8	8
200	4	1,962	778	36	742	0.8	29
400	1	1,028	514	20	494	0.8	16
400	2	573	358	19	339	0.8	15
400	3	962	484	18	466	0.8	14
400	4	633	334	21	313	0.8	17
500	1	1,030	354	0	354	0.8	0
500	2	691	274	0	274	0.8	0
500	3	1,099	375	0	375	0.8	0
500	4	812	323	0	323	0.8	0
500	5	1,036	439	42	397	0.8	34
500	6	1,022	430	0	430	0.8	0
Los Alamos Study Area		18,008	7,498	205	7,293	0.8	164

Source: 2009 NHTS data; LSC, 2014.

FIXED-ROUTE DEMAND MODEL

In order to evaluate potential changes to the fixed-route service, LSC created a fixed-route demand model. The model format is based on household vehicle ownership, average walking distance to bus stops, and frequency of operation. The basic approach is described in the paper, *Demand Estimating Model for Transit Route and System Planning in Small Urban Areas, Transportation Research Board, 730, 1979.* This model incorporates factors for walking distance, the distance traveled on the bus, and the frequency of service or headway.

The model used for the Los Alamos area is shown in Tables IX-5 and IX-6. Table IX-5 shows the demand on a fixed-route model that operates on a 30-minute headway. Table IX-6 shows the demand on a fixed-route model that operates on a 60-minute headway. These models reflect the 2012 ACS data for the Los

Alamos area and were calibrated to the existing ridership data for FY2012. Since the model shown in Table IX-5 operates 40 percent of the time and the model shown in Table IX-6 operates 60 percent of the time, the ridership from each table is calculated accordingly. As shown in Tables IX-5 and IX-6, the two models combined generated 2,200 daily trips and approximately 556,500 annual trips—consistent with Atomic City Transit's ridership. This model does not include those trips where people would still need a ride on the para-transit/dial-a-ride service due to the FTA's ADA requirements.

The percentage of households with transit access was determined by the number of households within a quarter-mile of the transit service. Census block groups located entirely within a quarter-mile show 100 percent transit access.

This fixed-route model is used to estimate ridership for the alternate service concepts. The alternate concepts may be incorporated into the model by changing the percentage of households served by transit, the walking distance, and frequency of service. This model was applied to each of the service alternatives presented in previous Technical Memoranda reports.

LSC also created an ideal fixed-route model based on several assumptions. The assumptions included the headways, the destinations of the route structure throughout the community, and access to the transit routes. Based on these assumptions, LSC generated the estimated demand for an ideal fixed-route service to estimate the upper limit of potential transit demand. LSC used 30-minute headways on all routes, an average walking distance to the route of 500 feet, and 100 percent of all households having access to transit. These data are shown in Table IX-7. The model generated 6,933 daily trips and approximately 1,754,052 annual trips, as presented in Table IX-7.

Table IX-5

Calibrated Fixed-Route Demand Model - 30-Minute Headway

Census Tract	Census Block Group	Total # of Hhlds 2012 ACS	# of Hhlds with		% of Hhlds with Transit Access	Hhlds Served by Transit		Basic Transit Trip Rates		Walk Distance (ft)	Walk Factor		Headway (min)	Headway Factor		Daily Transit Trips		Daily Trip # of
			0 Auto	1 Auto		0 Auto	1 Auto	0 Auto	1 Auto		0 Auto	1 Auto		0 Auto	1 Auto	0 Auto	1 Auto	
100	1	392	0	56	20%	0	11	6.00	1.24	5,500	0.10	0.02	30	1.40	1.50	0	0	0
100	2	766	0	119	100%	0	119	6.00	1.24	2,880	0.20	0.03	30	1.40	1.50	0	7	7
100	3	344	16	97	85%	14	82	6.00	1.24	950	1.25	1.20	30	1.40	1.50	143	184	326
200	1	330	0	89	10%	0	9	6.00	1.24	2,075	0.50	0.70	30	1.40	1.50	0	12	12
200	2	470	23	186	100%	23	186	6.00	1.24	4,300	0.20	0.03	30	1.40	1.50	39	10	49
200	3	533	10	106	100%	10	106	6.00	1.24	2,850	0.20	0.03	30	1.40	1.50	17	6	23
200	4	778	36	282	15%	5	42	6.00	1.24	1,500	0.70	0.90	30	1.40	1.50	32	71	102
400	1	514	20	186	100%	20	186	6.00	1.24	880	1.25	1.20	30	1.40	1.50	210	414	624
400	2	358	19	246	100%	19	246	6.00	1.24	500	1.25	1.20	30	1.40	1.50	200	548	747
400	3	484	18	289	20%	4	58	6.00	1.24	1,100	1.00	1.10	30	1.40	1.50	30	118	148
400	4	334	21	124	100%	21	124	6.00	1.24	3,500	0.20	0.03	30	1.40	1.50	35	7	42
500	1	354	0	130	100%	0	130	6.00	1.24	1,150	1.00	1.10	30	1.40	1.50	0	265	265
500	2	274	0	37	100%	0	37	6.00	1.24	1,185	1.00	1.10	30	1.40	1.50	0	76	76
500	3	375	0	22	80%	0	18	6.00	1.24	2,200	0.50	0.70	30	1.40	1.50	0	23	23
500	4	323	0	11	5%	0	1	6.00	1.24	7,000	0.10	0.02	30	1.40	1.50	0	0	0
500	5	439	42	89	100%	42	89	6.00	1.24	1,200	0.90	1.05	30	1.40	1.50	318	173	491
500	6	430	0	78	100%	0	78	6.00	1.24	1,400	0.90	1.05	30	1.40	1.50	0	152	152
Subtotal		7,498	205	2,147		158	1,522	Estimated Daily Ridership (30-minute headway)										**3,087**
								Estimated Daily Ridership (operates 40% of the time)										**1,235**
								Estimated Annual Ridership (operates 40% of the time)										**312,441**
								Estimated TOTAL Annual Ridership										**556,581**

Source: LSC, 2014.

Table IX-6

Calibrated Fixed-Route Demand Model - 60-Minute Headway

Census Tract	Census Block Group	Total # of Hhlds 2012 ACS	# of Hhlds with		% of Hhlds with Transit Access	Hhlds Served by Transit		Basic Transit Trip Rates		Walk Distance (ft)	Walk Factor		Headway (min)	Headway Factor		Daily Transit Trips		Daily Trip # of
			0 Auto	1 Auto		0 Auto	1 Auto	0 Auto	1 Auto		0 Auto	1 Auto		0 Auto	1 Auto	0 Auto	1 Auto	
100	1	392	0	56	20%	0	11	6.00	1.24	5,500	0.10	0.02	60	0.60	0.85	0	0	0
100	2	766	0	119	100%	0	119	6.00	1.24	2,880	0.20	0.03	60	0.60	0.85	0	4	4
100	3	344	16	97	85%	14	82	6.00	1.24	950	1.25	1.20	60	0.60	0.85	61	104	165
200	1	330	0	89	10%	0	9	6.00	1.24	2,075	0.50	0.70	60	0.60	0.85	0	7	7
200	2	470	23	186	100%	23	186	6.00	1.24	4,300	0.20	0.03	60	0.60	0.85	17	6	22
200	3	533	10	106	100%	10	106	6.00	1.24	2,850	0.20	0.03	60	0.60	0.85	7	3	11
200	4	778	36	282	15%	5	42	6.00	1.24	1,500	0.70	0.90	60	0.60	0.85	14	40	54
400	1	514	20	186	100%	20	186	6.00	1.24	880	1.25	1.20	60	0.60	0.85	90	235	325
400	2	358	19	246	100%	19	246	6.00	1.24	500	1.25	1.20	60	0.60	0.85	86	310	396
400	3	484	18	289	20%	4	58	6.00	1.24	1,100	1.00	1.10	60	0.60	0.85	13	67	80
400	4	334	21	124	100%	21	124	6.00	1.24	3,500	0.20	0.03	60	0.60	0.85	15	4	19
500	1	354	0	130	100%	0	130	6.00	1.24	1,150	1.00	1.10	60	0.60	0.85	0	150	150
500	2	274	0	37	100%	0	37	6.00	1.24	1,185	1.00	1.10	60	0.60	0.85	0	43	43
500	3	375	0	22	80%	0	18	6.00	1.24	2,200	0.50	0.70	60	0.60	0.85	0	13	13
500	4	323	0	11	5%	0	1	6.00	1.24	7,000	0.10	0.02	60	0.60	0.85	0	0	0
500	5	439	42	89	100%	42	89	6.00	1.24	1,200	0.90	1.05	60	0.60	0.85	136	98	234
500	6	430	0	78	100%	0	78	6.00	1.24	1,400	0.90	1.05	60	0.60	0.85	0	86	86
Subtotal		7,498	205	2,147		158	1,522	Estimated Daily Ridership (60-minute headway)										**1,608**
								Estimated Daily Ridership (operates 60% of the time)										**965**
								Estimated Annual Ridership (operates 60% of the time)										**244,140**
								Estimated TOTAL Annual Ridership										**556,581**

Source: LSC, 2014.

Table IX-7

Ideal Fixed-Route Demand Model - Los Alamos Area

Census Tract	Census Block Group	Total # of Hhlds 2012 ACS	# of Hhlds with 0 Auto	# of Hhlds with 1 Auto	% of Hhlds with Transit Access	Hhlds Served by Transit 0 Auto	Hhlds Served by Transit 1 Auto	Basic Transit Trip Rates 0 Auto	Basic Transit Trip Rates 1 Auto	Walk Distance (ft)	Walk Factor 0 Auto	Walk Factor 1 Auto	Headway (min)	Headway Factor 0 Auto	Headway Factor 1 Auto	Daily Transit Trips 0 Auto	Daily Transit Trips 1 Auto	Daily Trip # of
100	1	392	0	56	100%	0	56	6.00	1.24	500	1.25	1.20	30	1.40	1.50	0	125	125
100	2	766	0	119	100%	0	119	6.00	1.24	500	1.25	1.20	30	1.40	1.50	0	265	265
100	3	344	16	97	100%	16	97	6.00	1.24	500	1.25	1.20	30	1.40	1.50	168	216	384
200	1	330	0	89	100%	0	89	6.00	1.24	500	1.25	1.20	30	1.40	1.50	0	198	198
200	2	470	23	186	100%	23	186	6.00	1.24	500	1.25	1.20	30	1.40	1.50	242	414	656
200	3	533	10	106	100%	10	106	6.00	1.24	500	1.25	1.20	30	1.40	1.50	105	236	341
200	4	778	36	282	100%	36	282	6.00	1.24	500	1.25	1.20	30	1.40	1.50	378	628	1,006
400	1	514	20	186	100%	20	186	6.00	1.24	500	1.25	1.20	30	1.40	1.50	210	414	624
400	2	358	19	246	100%	19	246	6.00	1.24	500	1.25	1.20	30	1.40	1.50	200	548	747
400	3	484	18	289	100%	18	289	6.00	1.24	500	1.25	1.20	30	1.40	1.50	189	643	832
400	4	334	21	124	100%	21	124	6.00	1.24	500	1.25	1.20	30	1.40	1.50	221	276	497
500	1	354	0	130	100%	0	130	6.00	1.24	500	1.25	1.20	30	1.40	1.50	0	289	289
500	2	274	0	37	100%	0	37	6.00	1.24	500	1.25	1.20	30	1.40	1.50	0	82	82
500	3	375	0	22	100%	0	22	6.00	1.24	500	1.25	1.20	30	1.40	1.50	0	49	49
500	4	323	0	11	100%	0	11	6.00	1.24	500	1.25	1.20	30	1.40	1.50	0	24	24
500	5	439	42	89	100%	42	89	6.00	1.24	500	1.25	1.20	30	1.40	1.50	441	198	639
500	6	430	0	78	100%	0	78	6.00	1.24	500	1.25	1.20	30	1.40	1.50	0	174	174
Subtotal		7,498	205	2,147		205	2,147							Estimated Daily Ridership				**6,933**

Source: LSC, 2014.

ADA PARATRANSIT DEMAND MODEL

Estimating the demand for ADA complementary paratransit/dial-a-ride service is an important part of the transit demand process. The *ADA Paratransit Handbook* published by the Urban Mass Transportation Administration (now the Federal Transit Administration) in 1991 describes an approach to estimate demand based on the population with disabilities, eligibility rates, certification rates, and trip rates. The parameters of this model were adjusted for the Atomic City Transit service area population to reflect 160 ADA individuals taking the trips. The model predicts that 2,979 annual trips will need to be provided within the county to meet the demand, which is consistent with Atomic City Transit's dial-a-ride ridership of 2,963 as presented in Table IX-8.

Table III-8
2012 Estimated Paratransit Demand - Los Alamos

Census Tract	Census Block Group	Total 2012 Population	% of Mobility-Limited Population 2012 Est.	Mobility-Limited Population	ADA Eligibility Factor	Estimate of ADA-Eligible Population	Certification Factor	Estimate of Certified Population	Trip Rates (1) per Eligible Person Per Month		Eligible Population Annual Trips		Certified Population Annual Trips	
									Low	High	Low	High	Low	High
100	1	1,106	3.6%	40	25.0%	10	13%	5	1.55	3.0	185	358	96	186
100	2	1,971	3.6%	71	25.0%	18	13%	9	1.55	3.0	330	639	172	332
100	3	902	3.6%	32	25.0%	8	13%	4	1.55	3.0	151	292	79	152
200	1	725	2.9%	21	25.0%	5	13%	3	1.55	3.0	98	189	51	98
200	2	967	2.9%	28	25.0%	7	13%	4	1.55	3.0	130	252	68	131
200	3	1,489	2.9%	43	25.0%	11	13%	6	1.55	3.0	201	389	104	202
200	4	1,962	2.9%	57	25.0%	14	13%	7	1.55	3.0	265	512	138	266
400	1	1,028	3.6%	37	25.0%	9	13%	5	1.55	3.0	172	333	89	173
400	2	573	3.6%	21	25.0%	5	13%	3	1.55	3.0	96	186	50	97
400	3	962	3.6%	35	25.0%	9	13%	5	1.55	3.0	161	312	84	162
400	4	633	3.6%	23	25.0%	6	13%	3	1.55	3.0	106	205	55	107
500	1	1,030	4.1%	42	25.0%	11	13%	5	1.55	3.0	196	380	102	198
500	2	691	4.1%	28	25.0%	7	13%	4	1.55	3.0	132	255	69	133
500	3	1,099	4.1%	45	25.0%	11	13%	6	1.55	3.0	210	406	109	211
500	4	812	4.1%	33	25.0%	8	13%	4	1.55	3.0	155	300	81	156
500	5	1,036	4.1%	42	25.0%	11	13%	6	1.55	3.0	198	382	103	199
500	6	1,022	4.1%	42	25.0%	10	13%	5	1.55	3.0	195	377	101	196
Total		**18,008**	**3.6%**	**641**		**160**		**83**			**2,979**	**5,767**	**1,549**	**2,999**

(1) Source: Survey of 7 "exemplary" paratransit operators. Crain, Et al. "Working Paper 6: Service Needs Analysis, San Francisco Bay Area Regional Paratransit Plan," Jan. 1990, LSC 2014.

COMMUTER DEMAND ESTIMATION

The demand estimation technique established in TCRP Report 161 to estimate commuter demand between counties is presented by the following formula:

Commuter trips by transit from County A to County B per Day = Proportion using transit for Commuter Trips from County A to County B x Number of Commuters x 2

Proportion using Transit for Commuter Trips from County A to County B =

0.024 + (0.0000056 x Workers Commuting from County A to County B)

– (0.00029 x Distance in Miles from County A to County B)

+ 0.015 (if the County has a state capital)

Census Longitudinal Employer-Household Dynamics (LEHD) data were used to determine how many individuals were commuting to Los Alamos County from the surrounding counties. Table IX-9 shows the numbers with the associated demand estimate.

Table IX-9

Daily Commute Demand to Los Alamos County From the Surrounding Counties

Place	Count	Percent Transit	Demand
Bernalillo County (Albuquerque), NM	732	0%	0
Santa Fe County (Santa Fe), NM	3,263	5%	307
Rio Arriba County (Española), NM	1,878	3%	108
Taos County (Taos), NM	1,115	1%	24

Source: LEHD; LSC, 2014.

As shown in Table IX-9, potential commuter demand to Los Alamos County from the counties of Santa Fe (Santa Fe) and Rio Arriba (Española) shows a demand for commuter service from these counties. The LEHD data do not capture the total commuter demand of Los Alamos County, but indicate the general commute patterns. It is estimated that the actual demand is greater than what is shown in Table IX-9. The New Mexico Department of Transportation (NMDOT) Park-and-Ride service and the North Central Regional Transit District (NCRTD) already meet some of the commuter demand to Los Alamos.

Mode Split Analysis

The LSC team developed a mode split analysis to compare with the LEHD commuter demand methodology between the counties presented above. The mode split analysis used the 2011 Los Alamos County traffic counts on the major roads in the study area to determine the travel pattern (Source: 2011 MPSI Systems Inc. d.b.a. DataMetrix). The LSC team used the 2.2 percent mode split from the US Census Bureau and 2008-2012 American Community Survey five-year estimates to determine the number of transit trips based on the average traffic volume of the major roadway providing access to Los Alamos County. State Route 502 is the major roadway to Los Alamos County with the highest average daily traffic volume of around 9,000 vehicles. The mode split analysis estimates commuter demand to be about 200 transit trips daily. This analysis, along with the above LEHD commuter demand methodology, provides a basic understanding of the commuter demand estimate from the adjacent counties to Los Alamos.

PROGRAM TRIP DEMAND

Program trips are those trips that would not be made but for the existence of a specific social service program or activity. In urban areas such as the Los Alamos County study area, the transit trips made by residents to and from specific social programs (such as for the Congregate Lunch program and Adult Day Care program) typically comprise a small part of the total transit demand. This demand differs from other types of demand in that clients in each program specifically generate this need for service. To develop an estimate of the demand for program trips, the types of programs, and the actual number of participants, related information would be needed to calculate the program trip demand using the formula below:

Program Trip Demand =
Number of program participants
x
Program events per week
x
The proportion of program participants who attend the program on an average day
x
The proportion of program participants that use program transportation

x

The number of weeks per year the program is offered

x

2 (trips per participant per event)

Based on the existing program trips, the demand by the Congregate Lunch program is 1,200 and Adult Day Care program is 5,200. There are almost 600 participants enrolled in the Congregate Lunch Program, out of which 8% of participants attend on an average day. For the Adult Day Care Program, 20 participants are enrolled and 50% attend on an average day. For the Congregate Lunch program 5% of participants are Transit dependent, whereas in the Adult Day Care program 100% of the participants are transit dependent.

Chapter X

TRANSPORTATION
CONSULTANTS, INC.

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CHAPTER X

Analysis of Service Improvement Options

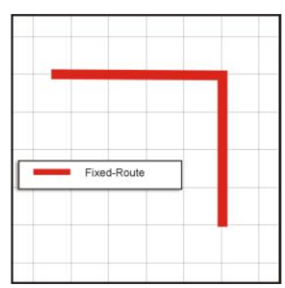
INTRODUCTION

The basis for any transit plan is the careful consideration of the realistic transit service alternatives. Capital requirements, financial plans, and management options can then be developed to support the planned transit services. Each transit service alternative must be evaluated using locally established goals and objectives. Any alternative that does not support the mission statement of public transportation or the corresponding goals and objectives should not be considered for implementation. The main purpose of Chapter X is to develop a basic level of understanding of the different types of transit services, followed by evaluation of various transit service options.

TYPES OF TRANSIT SERVICE

The term "transit service" encompasses a wide range of alternatives. Traditionally, people think of transit service as buses operating on a strict schedule. A number of other transit service alternatives exist, such as fixed-route, demand-response service, flex-route and commuter transportation. This chapter explores the realistic transit service alternatives for the Atomic City Transit (ACT).

Fixed-Route Service



Fixed-route transit service fits the popular description of a bus system—with transit vehicles operating on specified routes and following set schedules. Specific bus stops are typically identified for the locations where passengers will be picked up and dropped off. Routes are usually laid out in either a radial or a grid pattern.

In a radial route structure, all of the routes originate from a common point and extend to the outlying areas. The central location serves as a transfer point, and is frequently located at a destination with high transit activity. In many communities, this is the central business district or downtown area.

In a grid route structure, all of the routes function along a two-way direction (either north/south or east/west). The routes are normally spaced equidistantly if the roadway structure permits. This structure has no center transfer location. Instead, transfers are conducted at intersections of the routes. This type of service is mainly used in urban areas where the population density is greater and equally distributed across the area.

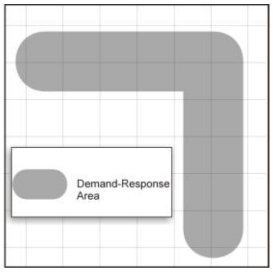
Fixed-route service is particularly convenient for passengers without disabilities. Research has shown that fixed-route passengers are willing to walk up to one-quarter mile to reach the bus stop. Therefore, a fixed-route service pattern may be efficiently laid out with routes having one-half mile spacing. However, those individuals with mobility impairments may have difficulty in accessing the fixed-route system.

The advantages of fixed-route service are that it can be provided at a relatively low cost on a per-passenger-trip basis, schedule reliability is high since buses do not deviate from their routes, service does not require advance reservations, and service is easy to understand.

Fixed-route transit service is seldom attractive for people with automobiles in smaller communities and rural areas. A private automobile offers flexibility compared to the rigid schedule of a fixed-route system. The need to walk even a few hundred feet to a bus stop, wait for the vehicle, and the comparatively slow travel time make the option of a private automobile an easy choice. Where there are significant congestion issues or limited parking availability, fixed-route transit service becomes a more attractive alternative. The low cost of transit as compared to owning and operating a private automobile can also be attractive, especially to young working couples who may be able to use the bus rather than own two vehicles.

The Americans with Disabilities Act (ADA) requires that communities with fixed-route transit service also provide complementary paratransit service that operates, at a minimum, in a three-quarter-mile radius of each fixed route. Paratransit service is typically much more costly to operate than fixed-route service because of the characteristics of the service. Fixed routes are established to meet the highest demand travel patterns, while paratransit service must serve many origins and destinations in a dispersed pattern. Fixed-route operations lack the flexibility to meet the needs of passengers with any special requirements in low-density areas.

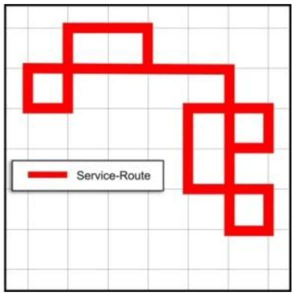
Demand-Response Service



Demand-response transit service, frequently termed dial-a-ride, is characterized as door-to-door transit service scheduled by a dispatcher. With demand-response service, advance reservations are typically required, although some immediate requests may be filled if time permits and if the service is particularly needed.

The concept of demand-response was originally developed in the early 1970s as an alternate form of public transportation for the general public. The original efforts proved to be more expensive than envisioned and did not attract the ridership that was forecast. As a result, demand-response transit has been used almost exclusively in this country for elderly and disabled passengers. However, many communities are beginning to recognize the advantages of demand-response service for low-density areas with low levels of transit demand. Improved technology has led to improvements in dispatching and scheduling, which has increased the efficiency of demand-response service and allows for real-time dispatching.

Service Routes



One concept that is being implemented in some communities as an alternative to fixed-route or demand-response service is the service route. A service route is essentially a fixed route specifically designed to serve the elderly and disabled. Typically, a service route winds through residential neighborhoods with high concentrations of elderly and disabled persons in a pattern that passes within one or two blocks of all houses. The service route also directly serves major destinations such as senior centers, commercial areas, and medical centers. However, the service route provides a higher in-vehicle travel time and a longer wait for the bus than is normally acceptable to the general public. The Bus in Butte, Montana and MET in Billings, Montana are examples of systems with successful service routes.

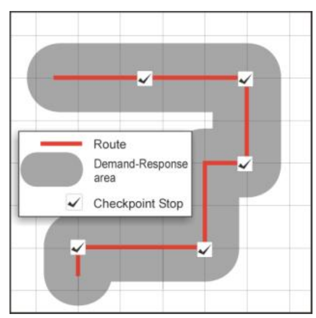
Flexible Routes

Another alternative is flexible routes, such as route-deviation or checkpoint service. With flexible routes, vehicle dispatching and scheduling must be done carefully to ensure that vehicles are available to serve the designated stops at the scheduled times. To provide a reasonable amount of flexibility, a lenient definition of on-time performance is typically used. A reasonable policy for route-deviation or checkpoint service within the ACT is a 10- to 15-minute window at each designated stop.

Route Deviation

With route deviation, transit vehicles follow a specific route, but leave the route to serve demand-response origins and destinations. The vehicles are required to return to the designated route within one block of the point of deviation to ensure that all intersections along the route are served. The passengers on the bus may have a longer travel time than for fixed-route service and the service reliability is lower. However, the ADA-mandated complementary paratransit service is therefore not necessary since the bus can deviate from the route to pick up disabled passengers.

Checkpoint Service



Under checkpoint service, the vehicles make periodic scheduled stops at centers of activity (such as program sites, shopping areas, or residential communities). The specific routes are not established between checkpoints, allowing the vehicles to provide demand-response service, again alleviating the need for the ADA complementary paratransit service. Riders are picked up at the check-points, typically at a reduced fare, and taken either to another checkpoint or to a demand-response specific destination. Service between the checkpoints does not require advance reservations. However, service from any other location on a demand-response basis requires an advance reservation so that the vehicles can be scheduled for pick-up and drop-off. Checkpoint service offers an advantage over route-deviation because there is no specified route for the vehicles to use. Checkpoint service requires only that the vehicle arrive at the next checkpoint within the designated time window.

Regional and Commuter Service

With regional and commuter service, the route is primarily designed to link different communities together for employment purposes, instead of linking all areas adjacent to the route. These communities may be within the same geographic area. In urban areas, this type of service is commonly known as an express or limited express service. There are cities like Espanola, Santa Fe, and Pojoaque from which people commute to Los Alamos for work. Presently, limited or express service is provided by the New Mexico Department of Transportation (NMDOT) and the North Central Regional Transit District (NCRTD) between Los Alamos and the surrounding cities.

TRANSIT SERVICE OPTIONS

Several service concepts have been developed to aid in the assessment of the Atomic City Transit service. Each service option is evaluated using locally established goals and objectives. The bus driver and operator meetings held at the ACT office from April 30-May 2, 2014 have been taken into consideration. The meeting notes are attached as Appendix E. The main purpose of this alternatives analysis is to determine the type and level of service that Atomic City Transit could implement to meet the needs of the community.

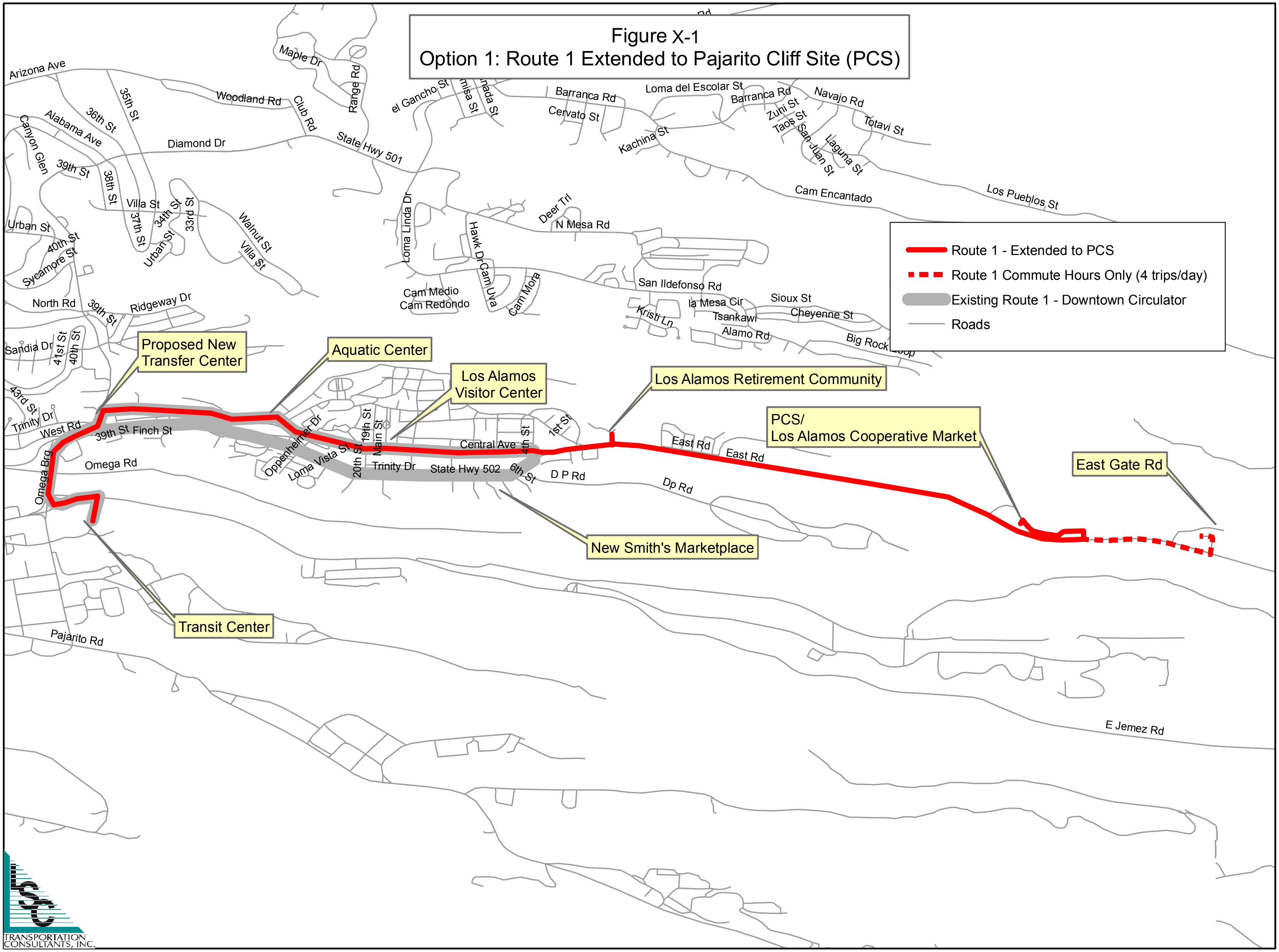
The following discussion evaluates the various transit service options, each of which is made up of several route alternatives. Table X-1, at the end of this chapter, provides a comparison of the service options. Estimated transportation costs are based upon ACT's fixed-route service cost per hour of $112.31. This approach provides a base estimate of cost for transit service within the Los Alamos study area and a means of comparing the options.

Option 1: Route 1 - Serves Canyon Road and Central Avenue and is Extended to Pajarito Cliffs Site (PCS)

The modified Route 1 will provide service on Canyon Road and Central Avenue to East Road through the core of the city. This route will commence the service from the existing transit center located at the Diamond/West Jemez Road intersection and serve East Gate only at certain commute hours and will turn around at the PCS/Los Alamos Cooperative Market during other times. It is estimated that this route will serve East Gate with four trips a day—two trips in the morning and two trips in the evening. This route will serve the businesses around downtown and will provide service to the Los Alamos retirement community. Figure X-1 provides a detailed map of Route 1 along with the important destinations it will be serving. This downtown route will provide 30-minute round-trip service Monday through Friday and will have a 15-minute headway during lunchtime between the hours of 10:40 a.m. and 1:40 p.m. This downtown route is a round-trip of approximately 8.15 miles to the PCS/Los Alamos Cooperative Market and 10.16 miles to East Gate Drive. Two vehicles would be used to provide this service during peak periods (10:40 a.m. to 1:40 p.m.). With a daily span of 13 hours and peak service during the lunch hours, this downtown route is estimated to cost $406,000 per year. As presented in Table X-1, this service option would result in the following operational cost, riders, and vehicles:

- Number of vehicles: 2
- Annual operating cost: $406,000
- Annual ridership: 141,000
- Average cost per passenger: $2.88
- Passengers per hour: 35.1

Figure X-1
Option 1: Route 1 Extended to Pajarito Cliff Site (PCS)

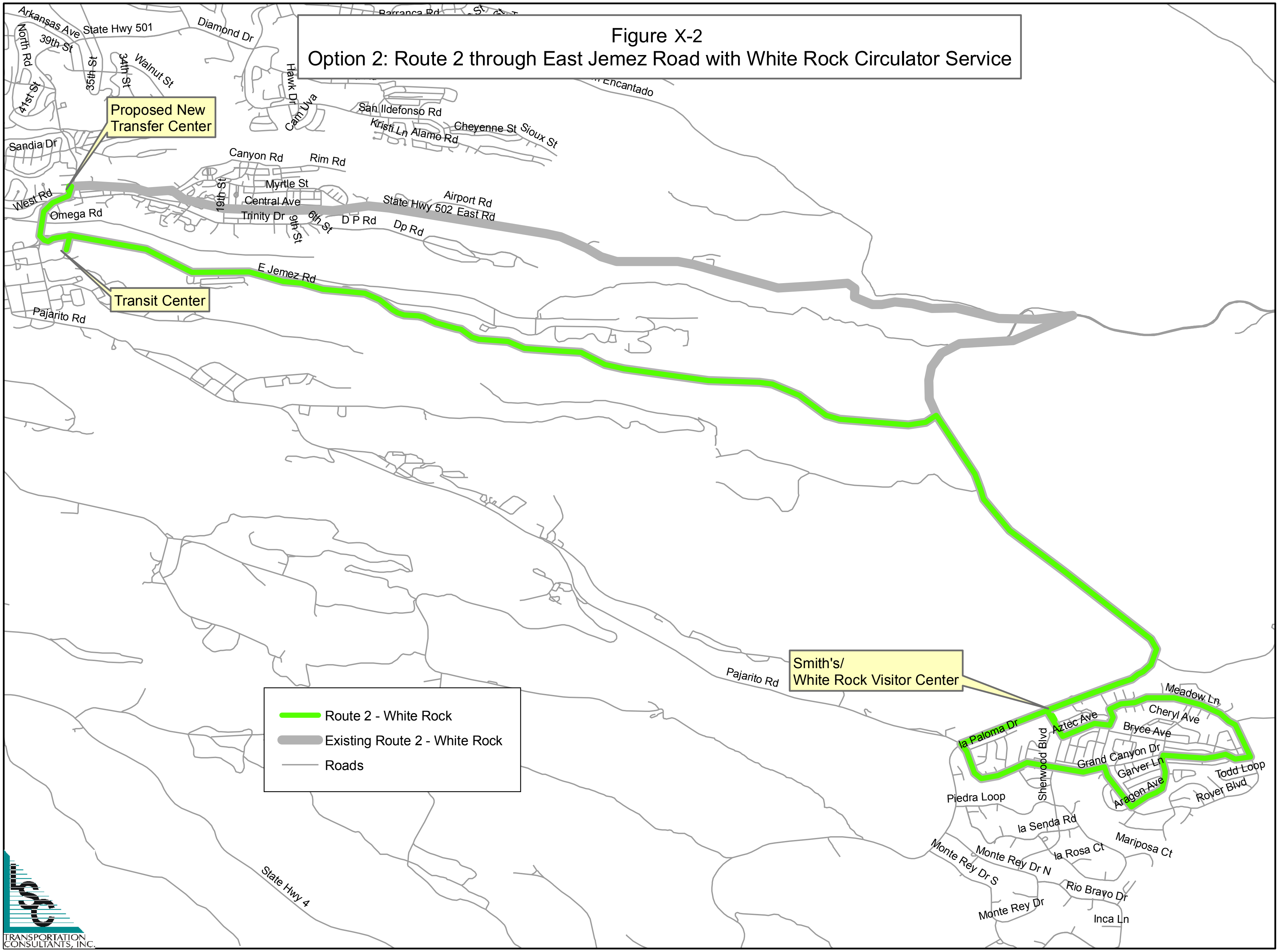


Option 2: Route 2 - Through East Jemez Road with White Rock Circulator Service

In this option, Route 2 will provide service through East Jemez Road (existing 2T Route) to White Rock. This route will commence service from the existing transit center located at Diamond/West Jemez Road intersection and serve the White Rock area and will return to the transit center through East Jemez Road. Figure X-2 provides a detailed map of Route 2 serving the White Rock area. This route would provide 45-minute round-trip service Monday through Friday throughout the day. The round-trip for this route is approximately 22.7 miles. One vehicle would be used to provide this service. With 17 round-trips a day, this White Rock route is estimated to cost $407,000 per year. As presented in Table X-1, this service option would result in the following operational cost, riders, and vehicles:

- Number of vehicles: 1
- Annual operating cost: $407,000
- Annual ridership: 71,000
- Average cost per passenger: $5.74
- Passengers per hour: 21.8

Figure X-2
Option 2: Route 2 through East Jemez Road with White Rock Circulator Service

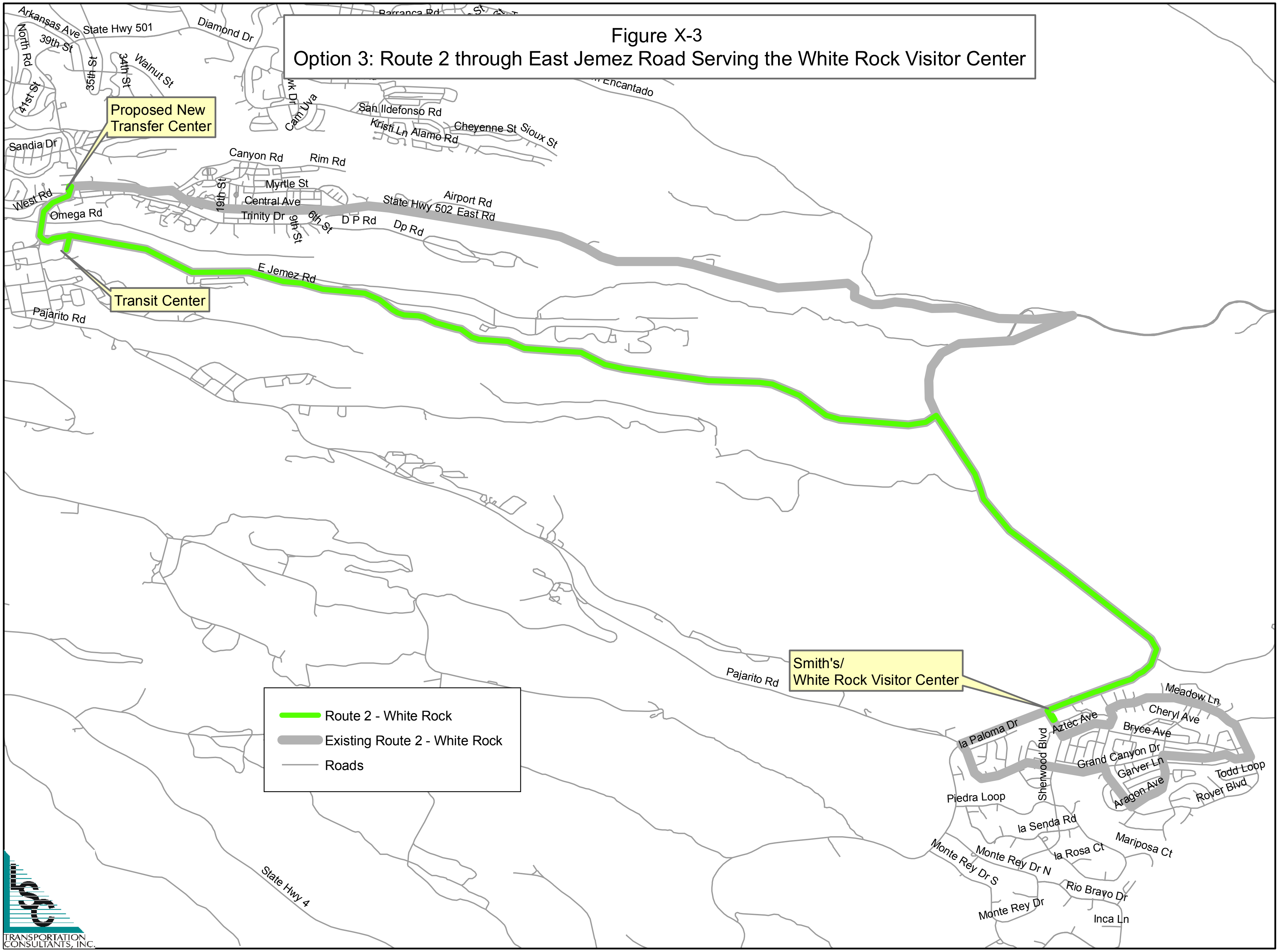


Option 3: Route 2 - Through East Jemez Road Serving the White Rock Visitor Center

In this option, Route 2 would provide service along East Jemez Road (existing 2T Route) to the White Rock Visitor Center. This route would commence at the existing transit center located at the Diamond/West Jemez Road intersection and turn around at the White Rock Visitor Center to return to the transit center via East Jemez Road. Figure X-3 provides a detailed map of Route 2, which travels along the Truck Route to the White Rock Visitor Center. This route will provide half-hour service throughout the day, Monday through Friday. The round-trip for this route is approximately 17.9 miles and takes 30 minutes. One vehicle would be used to provide this service. With 13 hours of service all day, this White Rock route is estimated to cost $444,000 per year. As presented in Table X-1, this service option would result in the following operational cost, riders, and vehicles:

- Number of vehicles: 1
- Annual operating cost: $444,000
- Annual ridership: 120,000
- Average cost per passenger: $3.70
- Passengers per hour: 36.8

Figure X-3
Option 3: Route 2 through East Jemez Road Serving the White Rock Visitor Center



Option 4: Route 2 - Central Avenue/15th Street to White Rock and East Jemez Road Serving the White Rock Visitor Center

Based on public and agency input, a number of Route 2 variations were considered to identify routes to provide all-day service between Los Alamos and White Rock. Option 4 is comprised of two routes and is shown in Figure X-4 and discussed below.

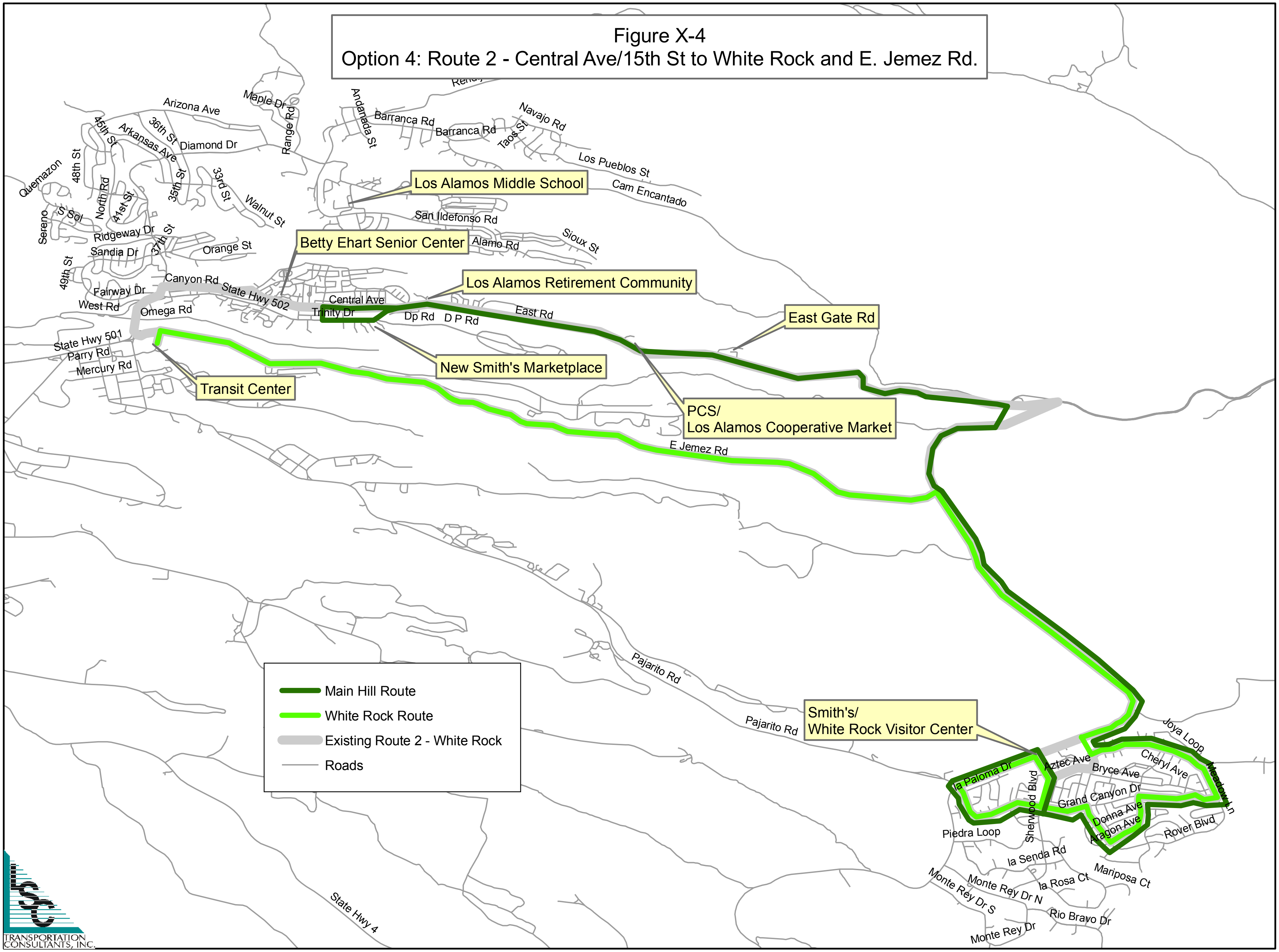
The Los Alamos to White Rock route (via Main Hill) would start at Central Avenue and 15th Street in Los Alamos and then travel eastbound along Trinity Drive to serve the new Smith's Marketplace. The route would then continue east along Trinity to Main Hill, where it would continue to White Rock and loop clockwise through White Rock, turning around at the White Rock Visitor's Center/Smith's (with no layover). The route would then complete a counter-clockwise loop around White Rock and continue back to Los Alamos via Main Hill and end at 15th Street. This route would provide an hourly all-day round-trip service.

The White Rock route (via East Jemez Road) would start at the transit center in Los Alamos and continue to White Rock along East Jemez Road (Truck Route). Once in White Rock, this route would make a clockwise and counter-clockwise loop through White Rock with a 5-minute layover at the White Rock Visitor Center between loops. The route would then travel from White Rock to the Transit Center via East Jemez Road. This route would provide an hourly all-day round trip service.

As presented in Table X-1, this service option comprised of these two routes would result in the following operational cost, riders, and vehicles:

- Number of vehicles: 2
- Annual operating cost: $757,995
- Annual ridership: 74,000
- Average cost per passenger: $20.54
- Passengers per hour: 22.6

Figure X-4
Option 4: Route 2 - Central Ave/15th St to White Rock and E. Jemez Rd.

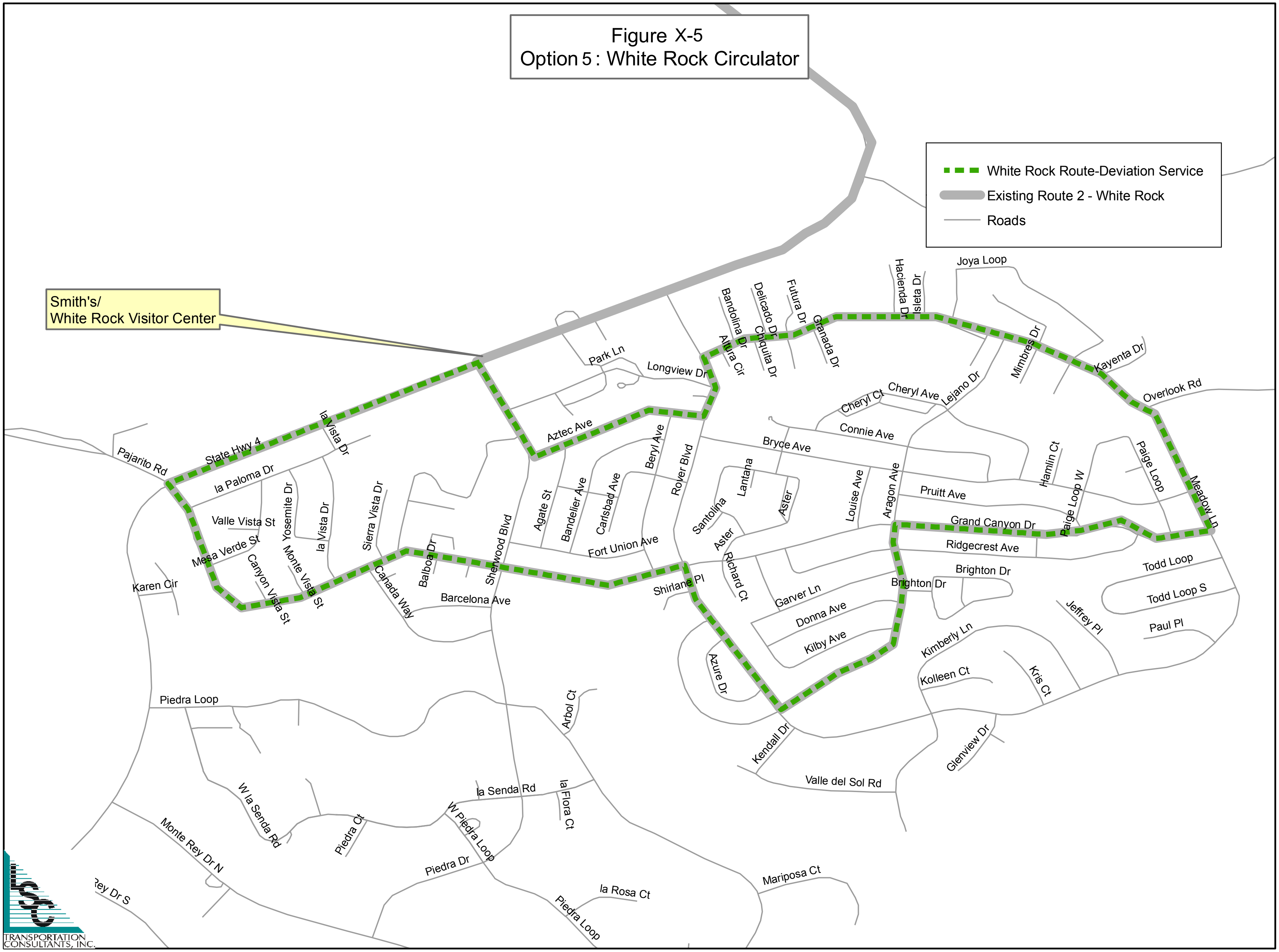


Option 5: White Rock Circulator

This is a circulator route in the White Rock area where riders can transfer to Route 2 going to the transit center near downtown, shown in Option 3 above. This route will serve the White Rock community and will commence and end its service at the White Rock Visitor Center. This route will deviate three-quarters of a mile from the existing route to help individuals in the White Rock area who cannot get to the scheduled stop as well as anywhere within Pajarito Acres. Figure X-5 provides a detailed map of the White Rock circulator. This route will provide 30-minute round-trip service throughout the day, Monday through Friday. The round-trip for this route is approximately 4.9 miles which can be completed in less than 30 minutes allowing time for deviations. One vehicle would be used to provide this service. With 13 hours of service all day, this White Rock circulator route is estimated to cost $287,000 per year. As presented in Table X-1, this service option would result in the following operational cost, riders, and vehicles:

- Number of vehicles: 1
- Annual operating cost: $287,000
- Annual ridership: 100,000
- Average cost per passenger: $2.87
- Passengers per hour: 30.6

Figure X-5
Option 5 : White Rock Circulator



Option 6: Reverse Times on Route 2M and Route 2T

Route 2M and Route 2T in Option 6 are the same existing routes that travel along the Main Hill Road and Truck Route to White Rock. Based on the driver and operator comments, we reversed the times to increase the efficiency of the routes. Both these routes would commence service from the existing transit center located at the Diamond/West Jemez Road intersection and serve the White Rock area. These routes will provide hourly service throughout the day, Monday through Friday and extra service during the peak hours. The round-trip for Routes 2M and 2T are approximately 25 and 28 miles, respectively. Two vehicles on each route would be used as they are now to provide the service.

Route 2M and Route 2T Option 6 are the same existing routes that travel along Main Hill Road and Truck Route to White Rock, but the direction through White Rock has been reversed. Based on the driver and operator comments, the direction was reversed in White Rock to better serve the community. Two vehicles on each route would be used as they are now to provide the services and it is estimated to cost the same as the status quo per year as shown below.

This would not change the status quo cost spent toward providing Route 2M and Route 2T, so for this option, we did not look at operational cost and vehicles. The ridership would slightly increase by reversing times on Route 2M and Route 2T.

Option 7: Route 3 - Would be Modified to Serve Trinity Drive and the Senior Center

The modified Route 3 would provide service through Trinity Drive, loop through 4th Street, Canyon Road, and Central Avenue to either the existing transit center or a new transfer center near Sullivan Field at the west intersection of Canyon Road and Diamond. This route would serve the new Smith's, the Betty Ehart Senior Center, and the Mesa Public Library. Figure X-6 provides a detailed map of Route 3 serving the above-mentioned destinations. This route would provide hourly service throughout the day, Monday through Friday and 30-minute service during the peak hours. The round-trip for this route is approximately five miles. One vehicle would be used to provide this service. With 17 round-trips a day, this route is estimated to cost $189,000 per year. As presented in Table X-1, this service option would result in the following operational cost, riders, and vehicles:

- Number of vehicles: 1
- Annual operating cost: $189,000
- Annual ridership: 24,000
- Average cost per passenger: $7.88
- Passengers per hour: 11.2

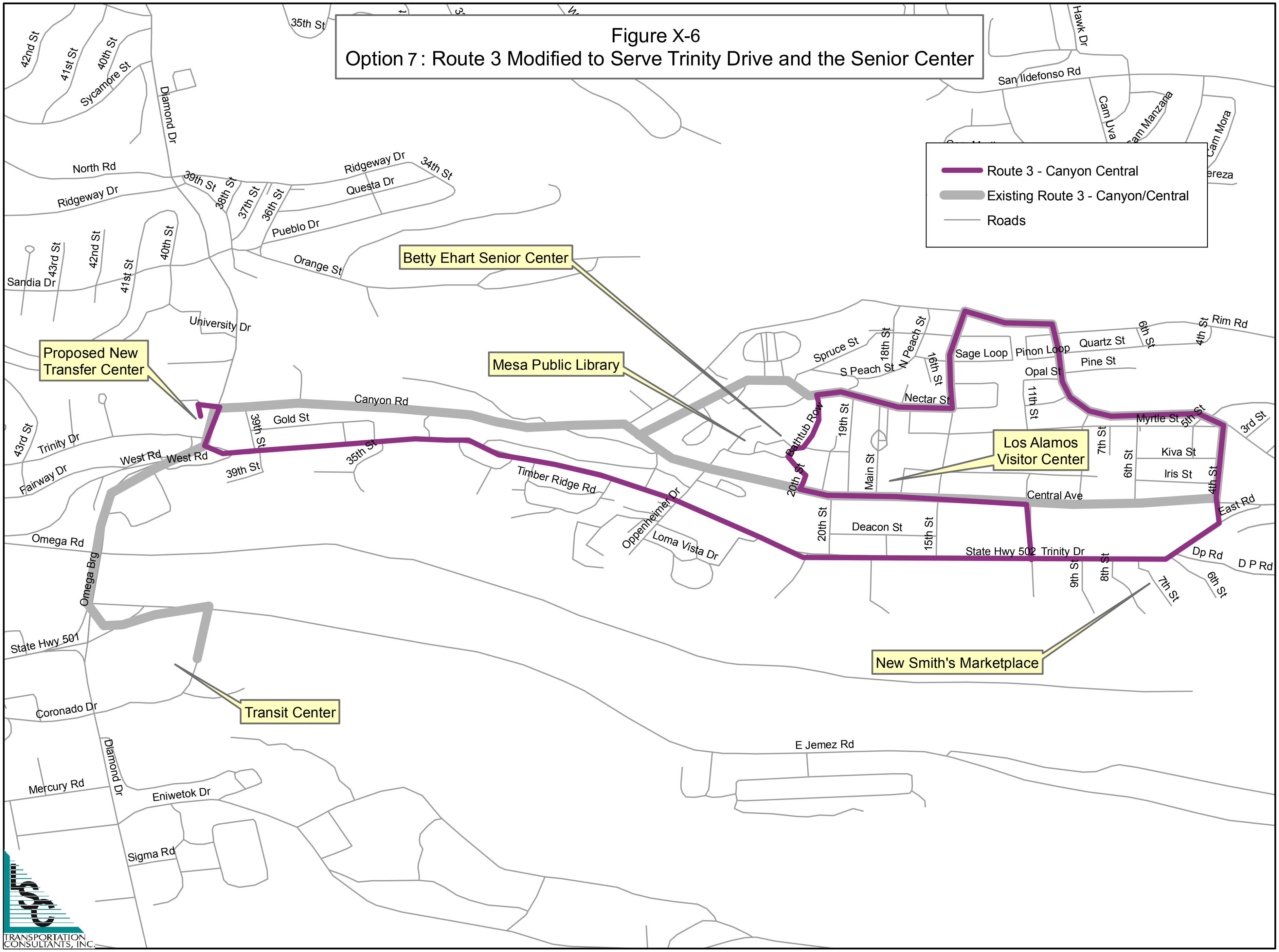


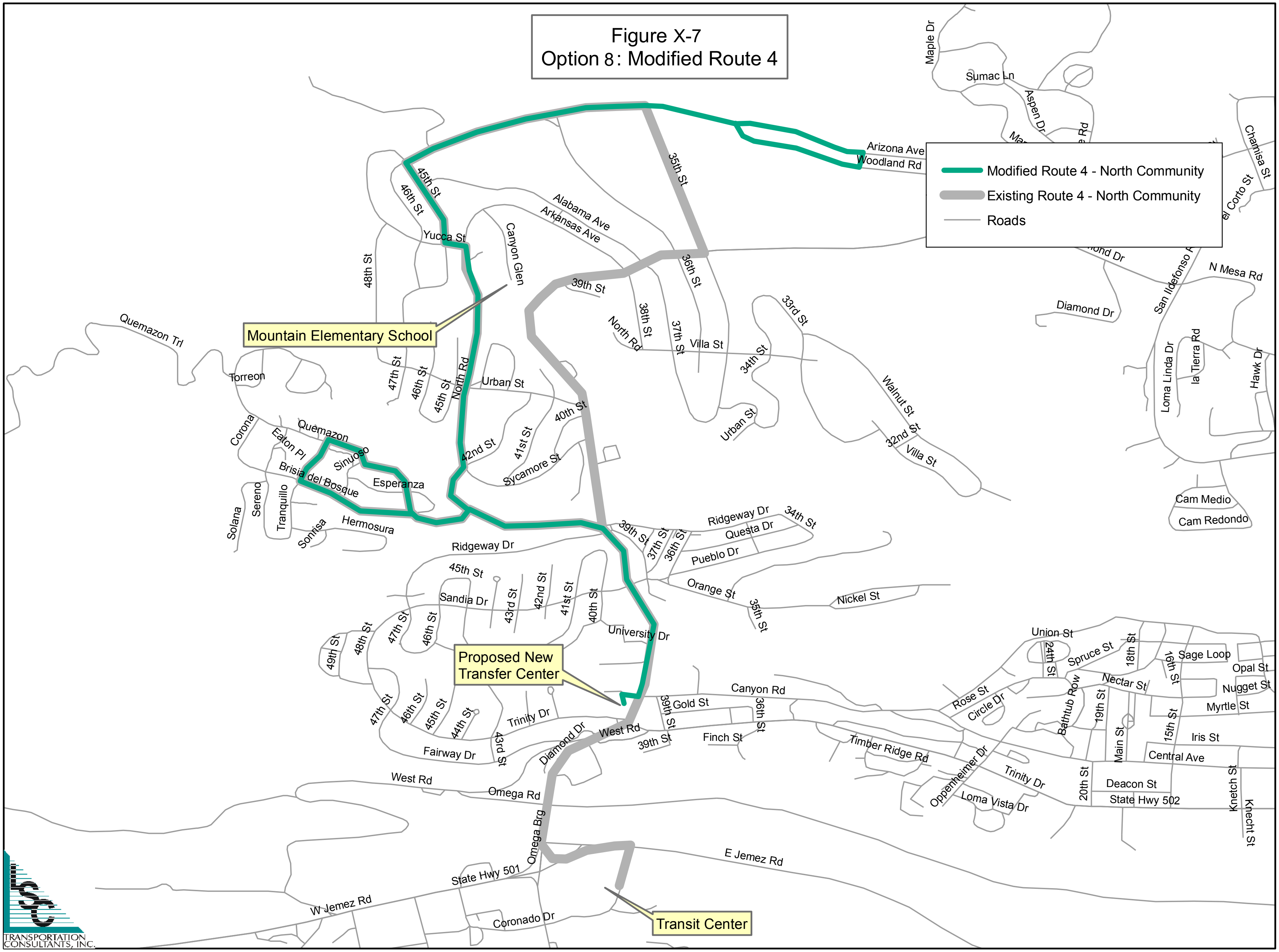
Figure X-6
Option 7: Route 3 Modified to Serve Trinity Drive and the Senior Center

Option 8: Modified Route 4

In this option, Route 4 would be modified to provide service through Diamond Drive and loop through the northwest portion of Los Alamos and return to the transit center from where it started its service. This route would serve Mountain Elementary School and make an additional loop at Arizona Avenue, County Lane, and Woodland Road on its way back to the transfer center. Figure X-7 provides a detailed map of Route 4 serving the above-mentioned destinations. This route would provide hourly service throughout the day, Monday through Friday and 30-minute service during the peak hours. The round-trip for this route is approximately 7.6 miles. One vehicle would be used to provide this service. With 17 round-trips per day, this route is estimated to cost $209,000 per year. As presented in Table X-1, this service option would result in the following operational cost, riders, and vehicles:

- Number of vehicles: 1
- Annual operating cost: $209,000
- Annual ridership: 43,000
- Average cost per passenger: $4.86
- Passengers per hour: 20.2

Figure X-7
Option 8: Modified Route 4



Option 9: Modified Route 5

Modified Route 5 will provide service along Diamond Drive and serve Barranca Mesa. The route will not serve Sandia Drive and Trinity Drive because of low ridership on that portion of the route. This route would start and end its service at the transfer center. Figure X-8 provides a detailed map of the modified Route 5. This route will provide hourly service throughout the day, Monday through Friday. The round-trip for this route is approximately 9.5 miles. One vehicle would be used to provide this service. With 13 hours of service all day, this route is estimated to cost $285,000 per year. As presented in Table X-1, this service option would result in the following operational cost, riders, and vehicles:

- Number of vehicles: 1
- Annual operating cost: $285,000
- Annual ridership: 39,000
- Average cost per passenger: $7.31
- Passengers per hour: 12.0

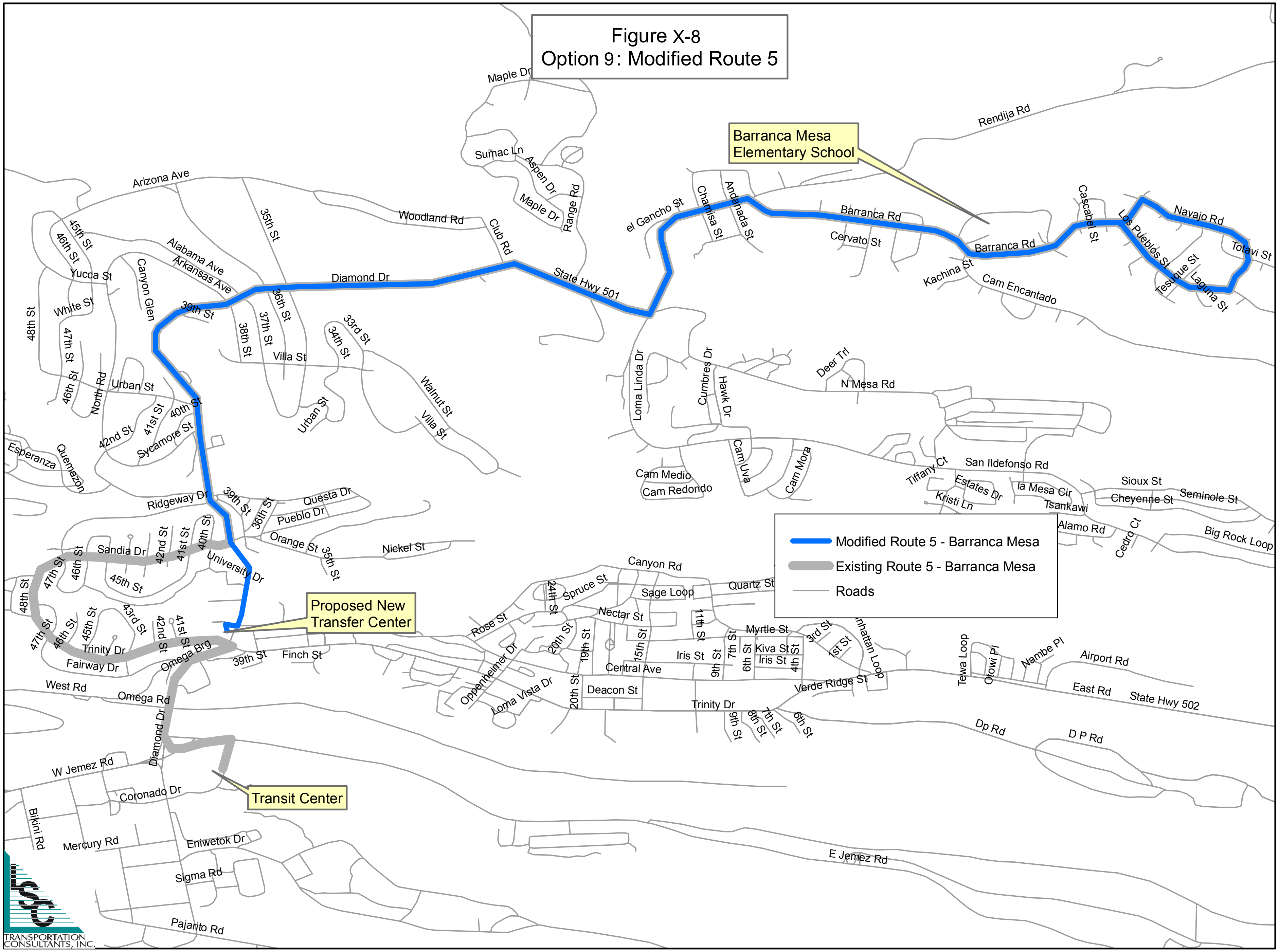


Figure X-8
Option 9: Modified Route 5
Barranca Mesa Elementary School
Proposed New Transfer Center
Transit Center
Modified Route 5 - Barranca Mesa
Existing Route 5 - Barranca Mesa
Roads
Maple Dr
Sumac Ln
Aspen Dr
Range Rd
Rendija Rd
Arizona Ave
Woodland Rd
Club Rd
35th St
45th St
46th St
Yucca St
Alabama Ave
Arkansas Ave
Canyon Glen
Diamond Dr
State Hwy 501
el Gancho St
Chamisa St
Andanada St
Barranca Rd
Cervato St
Kachina St
Cam Encantado
Cascabel St
Los Pueblos St
Navajo Rd
Totavi St
Tesuque St
Laguna St
48th St
White St
47th St
39th St
38th St
37th St
36th St
33rd St
34th St
Villa St
Urban St
North Rd
40th St
41st St
42nd St
Sycamore St
Walnut St
Loma Linda Dr
Cumbres Dr
Hawk Dr
Deer Trl
N Mesa Rd
Esperanza
Quemazon
Ridgeway Dr
Questa Dr
Pueblo Dr
Orange St
Nickel St
Cam Medio
Cam Redondo
Cam Uva
Cam Mora
Tiffany Ct
San Ildefonso Rd
Estates Dr
Kristi Ln
la Mesa Cir
Tsankawi
Sioux St
Cheyenne St
Seminole St
Alamo Rd
Cedro Ct
Big Rock Loop
Sandia Dr
University Dr
45th St
43rd St
Trinity Dr
Fairway Dr
Omega Brg
West Rd
Omega Rd
Diamond Dr
W Jemez Rd
Coronado Dr
Bikini Rd
Mercury Rd
Eniwetok Dr
Sigma Rd
Pajarito Rd
Canyon Rd
Spruce St
24th St
Sage Loop
Quartz St
Nectar St
Rose St
Oppenheimer Dr
20th St
19th St
15th St
11th St
Iris St
Myrtle St
Kiva St
9th St
7th St
6th St
4th St
3rd St
1st St
Central Ave
Deacon St
Loma Vista Dr
Trinity Dr
Verde Ridge St
8th St
Tewa Loop
Otowi Pl
Nambe Pl
Airport Rd
East Rd
State Hwy 502
Dp Rd
D P Rd
E Jemez Rd
Finch St
LSC
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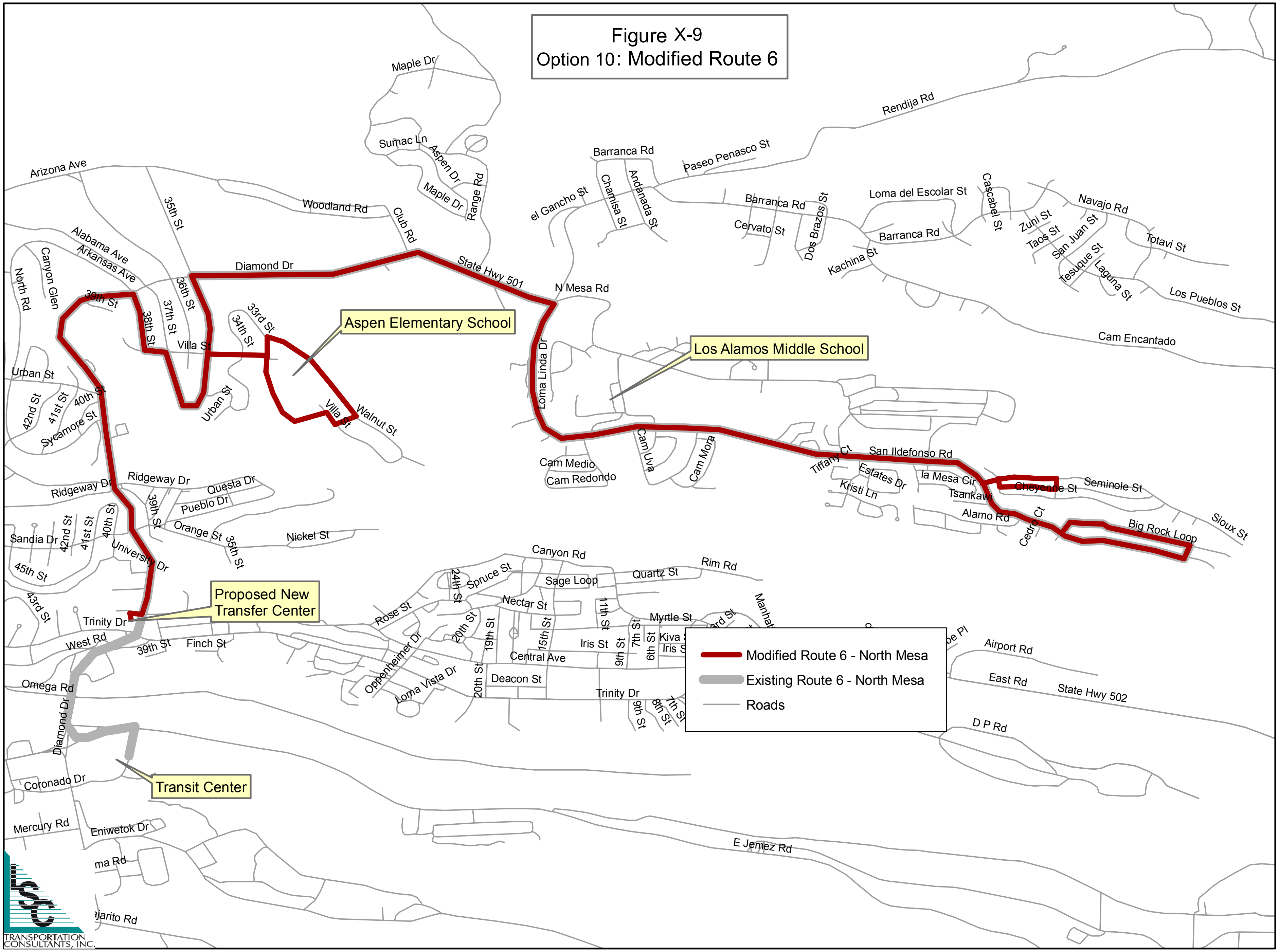
Option 10: Modified Route 6

Modified Route 6 will continue to provide service on Diamond Drive and San Ildefonso to serve the community located in the northeast part of Los Alamos. This route will start and end at the transfer center. This route will serve the Aspen School area and a loop on Sioux Street and Seminole Street. Figure X-9 provides a detailed map of modified Route 6. This route would provide hourly service throughout the day, Monday through Friday and 30-minute service during the peak hours. The round-trip for this route is approximately 14.2 miles. Two vehicles would be required to provide this service during peak periods with one vehicle during the off-peak period. With a daily span of 17 hours of service per day, this route is estimated to cost $411,000 per year. As presented in Table X-1, this service option would result in the following operational cost, riders, and vehicles:

- Number of vehicles: 2
- Annual operating cost: $411,000
- Annual ridership: 131,000
- Average cost per passenger: $3.13
- Passengers per hour: 30.7

Figure X-9
Option 10: Modified Route 6



Afternoon Express Routes

There were be no changes made in the schedules of the express routes (Afternoon Express Routes 7 through 11), but they must be properly adjusted to the timings of the school and all the time points must be printed on the schedule.

Afternoon Express Route 7 leaving the middle school should be shown as two routes on the schedule—one route going to downtown and the second route going to White Rock.

Option 11: Demand-Response Service in the Evening

During the late evening hours, a demand-response service must be implemented so that it connects with the last NMDOT park-and-ride bus. This demand-response service will deliver riders from the NMDOT park-and-ride stop to specific locations upon request. It is proposed that this demand-response service will be provided Monday through Friday between 7:00 and 9:00 p.m. As presented in Table X-1, this service option would result in the following operational cost, riders, and vehicles:

- Number of vehicles: 2
- Annual operating cost: $92,000
- Annual ridership: 6,600
- Average cost per passenger: $14.01
- Passengers per hour: 6.6

Schedule Changes

ACT's Routes 1 through 6 schedules could be adjusted so that they have a pulse timed transfer with 30/60 minutes running time and headways and to meet the NMDOT park-and-ride and NCRTD bus for seamless transfers. Schedules will differ depending on the location of the primary transfer point. Assuming relocation of the primary transfer point on Diamond Drive between Canyon Road and Trinity Drive, all routes would pulse at this transfer center. Routes 1 and 2 would routinely serve the bus stop at LANL TA-3. During peak commute periods, it may be appropriate to extend other routes to TA-3 for one or two trips to serve LANL employees.

SUMMARY

This chapter has provided information on various feasible transit service alternatives for Atomic City Transit. The alternatives include examining the fixed routes (Routes 1 through 6) with possible connections to NMDOT park-and-ride and NCRTD buses. Table X-1 provides a comparison of the transit service alternatives and the cost estimate.

Table X-1
Service Alternatives - Cost Estimates

Option	Service Description	# of Vehicles (maximum)	Total Daily		Total Annual		Operating Days	Annual Ridership	Operating Cost Annual	Passenger per Hour	Cost ($) Per Passenger
			Vehicle - Miles	Vehicle - Hours	Vehicle - Miles	Vehicle - Hours					
Status Quo	*M-F 6:00 am to 7:00 pm*	*varies*			*746,815*	*32,551*	*251*	*504,997*	*$3,655,959*	*15.5*	*$7.24*
Option 1: Route 1 extended to PCS	M-F 6:00 am to 7:00 pm; 30 mins (off-peak) and 15 mins (peak hours-lunch hours from 10:40 am to 1:40 pm)	2	268.84	16.00	67,479	4,016	251	141,000	$405,506	35.1	$2.88
Option 2: Route 2 through East Jemez Road with White Rock circulator service	M-F 6:00 am to 7:00 pm; 45 mins (all day)	1	386.07	13.00	96,904	3,263	251	71,000	$407,195	21.8	$5.74
Option 3: Route 2 through East Jemez Road serving the White Rock Visitor Center	M-F 6:00 am to 7:00 pm; 30 mins (all day)	1	465.40	13.00	116,815	3,263	251	120,000	$443,975	36.8	$3.70
Option 4: White Rock Circulator	M-F 6:00 am to 7:00 pm; 30 mins (all day)	1	126.62	13.00	31,782	3,263	251	100,000	$286,907	30.6	$2.87
Option 6: Route 3 would be modified to serve Trinity Drive and the Senior Center	M-F 6:00 am to 7:00 pm; 60 mins (off-peak) and 30 mins (peak)	1	85.85	8.50	21,548	2,134	251	24,000	$189,012	11.2	$7.88
Option 7: Modified Route 4	M-F 6:00 am to 7:00 pm; 60 mins (off-peak) and 30 mins (peak)	1	128.86	8.50	32,344	2,134	251	43,000	$208,952	20.2	$4.86
Option 8: Modified Route 5	M-F 6:00 am to 7:00 pm; 60 mins (all day)	1	123.11	13.00	30,901	3,263	251	39,000	$285,280	12.0	$7.31
Option 9: Modified Route 6	M-F 6:00 am to 7:00 pm; 60 mins (off-peak) and 30 mins (peak)	2	241.91	17.00	60,719	4,267	251	131,000	$410,575	30.7	$3.13
Option 10: Demand-Response Service in the Evening	M-F 7:00 pm to 9:00 pm	2	48.00	4.00	12,048	1,004	251	6,600	$92,470	6.6	$14.01

Source: LSC, 2014.

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Chapter XI

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CHAPTER XI

Vehicle Types and Requirements

INTRODUCTION

Fixed-route transit service has traditionally served medium- to higher-density residential and commercial centers in urban areas. Usually, transit services in such areas are operated most efficiently with standard transit vehicles because the passenger loads are large. However, much of the recent growth in residential and commercial centers has occurred at lower densities on the fringe or even beyond the fringe of urban areas. Transit services that are appropriate for these areas are feeder, route-deviation, and paratransit services that do not carry large passenger loads. The same is true for circulator routes in suburban activity centers and fixed-route services in smaller cities like Los Alamos. In order to provide these transit services in a most economical manner, transit providers are looking to employ smaller vehicles. As a result, in recent years the need for vehicles smaller than the standard 35- to 45-foot transit bus has increased. Across the United States, small transit vehicles have become widely used by grantees of several state and/or federally funded programs. The use of small transit vehicles is increasing as both small and large transportation providers are finding the vehicles appropriate in a variety of service environments. Small transit vehicles are advantageous over standard transit buses in several ways. They are more maneuverable, easier to drive, more cost-effective when passenger demand is low, quieter, and generally more attractive to many passengers and communities.

VEHICLE CHARACTERISTICS

This chapter is included to assist Atomic City Transit (ACT) with choosing appropriate vehicle types in the development of a public transit service. There are numerous types and sizes of transit vehicles on the market and these are constantly changing. In addition, there is no standard method of grouping the various types of transit vehicles. Also, because of the novelty of this field of mass transit, there is a lack of conclusive vehicle performance data. The combination of these factors may result in questions and confusion for grantees desiring to procure transit vehicles. We have used *FTA Report No. FTA VA-26-7229-07.01: Useful Life of Transit Buses and Vans, TCRP Synthesis 41: The Use of Small Buses in Transit Service,* and *TCRP Report 61: Analyzing the Costs of Operating Small Transit Vehicles* to analyze various types of transit vehicles.

Vehicle Overview

Most transit agencies use Federal Transit Administration (FTA) funding to procure buses. FTA has categorized the vehicles used in the transit industry into four service-life vehicle categories. For the purpose of this study, the LSC team divided the vehicles into four groups based upon their method of construction, length of the vehicle, useful life of the vehicle, cost, approximate gross vehicle weight, and the seating capacity. The four groups are: heavy-duty large bus; heavy-duty small bus; medium-duty and purpose-built bus; and light-duty small bus, cutaway, and modified van.

Heavy-Duty Large Bus

Heavy-duty large buses are mostly used in medium- and large-sized transit agencies and have a service life of 12 years. With a standard length of 40 feet (with variants ranging from 30 to 60 feet), a gross vehicle weight of 33,000 to 40,000 pounds, and an average seating of 40 passengers, the 12-year bus is the largest, heaviest, and biggest capacity rubber-tired vehicle serving the transit market. These large buses are produced by major manufacturers as part of their standard production line in response to specific orders. Therefore, these buses are readily available for purchase and maintenance/service and parts are not difficult to obtain.

The heavy-duty large buses are built on an integrated structure chassis, unit body monocoque, or semi-monocoque chassis. This type of construction is found in high-floor buses and is much more costly due to the substantial amount of metal used in the lower parts of the bus. A less expensive type of construction is an integrated chassis found in low-floor buses. Twelve-year buses come in size ranging from 30 to 60 feet. Shorter 30- to 35-feet buses are used for lower ridership routes and on streets with limited maneuverability.

These vehicles are available with a wide variety of propulsion system options such as diesel, gas, CNG, electric, and hybrid.

The 12-year useful life of heavy-duty large buses is one of the major advantages. Another is the larger size which provides a good amount of interior vehicle space. This is especially convenient for passengers in wheelchairs or those who require additional room in which to maneuver. These vehicles do, however, have several disadvantages. As these buses are exclusively built for the transit industry, specialized manufacturers build them. Also numerous components of the vehicle are obtained from the heavy-truck market, so there is little chance to influence the useful life characteristics of these components in a cost-effective manner. Despite these disadvantages, many providers have successfully used these heavy-duty buses to transport their riders.

Heavy-Duty Small Bus

The heavy-duty small bus is the second most popular bus used in the transit industry after the large heavy-duty bus. These buses are the second most durable bus and have a service life of 10 years. Vehicles in this category have a standard length of 30 to 40 feet, a gross vehicle weight of 26,000 to 33,000 pounds, and an average seating capacity between 26 to 35 passengers.

Heavy-duty small buses are built with body-on-frame construction but recently many small manufacturers are adapting European designs for the North American bus market. The new design is narrower in width and incorporates aluminum integral structural unit body monocoque or semi-monocoque structures with both high and low floors.

One advantage of these types of buses is its 10 year useful life. These vehicles also have disadvantages. The main disadvantage is that only a small number of transit buses are manufactured every year as the demand for it in the transit industry is less.

Medium-Duty and Purpose-Built Bus

The medium-duty bus represents the mid-level bus in terms of durability and size. These buses have a service life of seven years and have a standard length of 25 to 35 feet, a gross vehicle weight of 16,000 to 26,000 pounds, and an average seating of between 22 and 30 passengers. The medium-duty buses are referred to as "purpose-built buses" since they are designed specifically for transit service and each is constructed as a single unit.

The majority of these types of transit vehicles use a front-engine cab chassis or a stripped chassis, which are built by medium- and heavy-duty truck manufacturers. The transit vehicle manufacturer adds the body and other components to complete the construction and give the final look to the bus. The front engine layout dictates the entrance door to be behind the front axle and operator station. The front engine chassis is very popular as it is affordable and produced in large numbers for the trucking industry.

The advantage of these medium-duty vehicles is that it is much cheaper compared to heavy-duty vehicles. Also, they tend to be more durable than light-duty vehicles, having an expected life of seven years depending upon a number of factors. The front-engine cab chassis vehicle is cheaper compared to the stripped chassis vehicle. They also offer more interior space, which is especially convenient for passengers in wheelchairs. Many of the components of medium-duty buses (i.e., transmission, engine, and axles) are identical to heavy-duty components of standard-sized transit buses. This may make maintenance easier as those standard parts are more readily available. The main disadvantage of this type of vehicle is that vehicles with a seven-year life cycle have a small medium-duty truck market from where they are derived. Another disadvantage is that most of the vehicles in this category have a front-engine chassis and it is because of this that the vehicles have stiff suspensions which produce a bumpy ride.

Light-Duty Buses, Modified Minivans, Full-Size Passenger Vans and Cutaways

The light-duty bus represents the smallest bus used in transit. It is built on a cutaway van chassis or a modified van. These buses have a service life of four to five years and have a standard length of approximately 16 to 30 feet and a gross vehicle weight of 6,000 to 16,000 pounds. The majority of buses in this category are modified minivans, modified and unmodified full-size passenger vans, and special buses using a cutaway chassis.

Modified Minivans

Minivans are popular as they have a low floor, sliding doors, and can be used efficiently when space is a consideration. These types of vehicles are mostly used for vanpools and paratransit services and they have a four-year service life. These minivans have accessibility problems and limited headroom. As a result, vans are frequently modified to overcome these limitations and to meet special needs. The modifications usually adjust the structure and/or include the addition of equipment to improve the performance of vans as transit vehicles. These modifications enable standard vans to accommodate different types of passengers or provide added comfort and utility to regular passengers.

Increasing van size, particularly the height, is the most common modification. This is often accomplished by raising the roof through the addition of a bubble-top or pop-top, lowering the floor, or both. Other modifications may involve enlarging the entrances; reinforcing and insulating the walls and roof; adding wheelchair lifts, ramps, or low-rise steps to improve accessibility; widening the body and changing the seating arrangement to increase aisle width and make passenger movement easier inside the vehicle; installing rubber floor matting, padding on hard surfaces, and grab rails and stanchions for support; and adding heaters and air conditioners for passenger safety and comfort.

Modifications can also be made to the chassis of the van to increase vehicle durability. These may include an extended or widened wheelbase, heavy-duty brakes, improved transmission, and heavy-duty suspension. Modified vans generally can seat from 9 to 16 passengers. Although modified vans may be longer and slightly wider than standard vans, they are still relatively easy to drive and maneuver. The modifications create more room inside the van so movement is less restricted, providing passengers with more comfort. Accessibility is generally easier in modified vans than in standard vans.

Modified vans do, however, possess potential drawbacks. A raised roof can make the vehicle difficult to handle in heavy winds or on sharp curves and there is a potential for leaks to develop at points where the raised roof is attached to the vehicle. Another drawback to modified vans is reduced fuel mileage due to the added weight of the modifications and the increased wind resistance caused by the raised roof.

Full-Size Passenger Vans

Full-size passenger vans have become less popular with the arrival of the minivan. But these types of vehicles are still popular in commercial applications and are mostly used for vanpools and paratransit services. These vans use body-on-frame construction and have a service life of four years. These vehicles have accessibility problems and limited headroom. As a result, passenger vans are frequently modified to overcome these limitations and accommodate wheelchair lifts and raised roofs.

Buses Built on a Cutaway Van Chassis

Buses with a cutaway van chassis are a full-size van with the section of the body behind the B-pillar or the area of the front passenger seats removed. A supplier of cutaway-van-chassis vehicles will purchase a chassis manufactured by auto companies such as Chrysler, Ford, and GM. The body is then constructed on the chassis, normally around a steel frame that is attached to the chassis. In the transit industry, the bodies are constructed from steel, aluminum, and fiberglass.

The buses have a service live of four to five years. The five-year vehicles use truck axles with dual rear wheels, higher capacity springs and suspension components, heavier-duty frame and a slightly wider body. These five-year vehicles are more durable and have higher passenger capacity compared to the four-year models.

The heavy-, medium-, and light-duty buses use diesel fuel as opposed to gasoline. Diesel is less expensive compared to gasoline but different transit agencies are trying alternative fuels such as liquefied natural gas (LNG), compressed natural gas (CNG), electric, and hybrid technologies to reduce carbon emission and save on cost.

Table XI-1 provides a general vehicle comparison based on the construction method, size, weight, passenger capacity, cost and minimum life of the vehicles. The Americans with Disabilities Act of 1990, Section 38.23, requires all public transit agencies to have a minimum of two wheelchair tie-downs in all vehicles over 22 feet, and a minimum of one wheelchair tie-down in all vehicles under 22 feet. This regulation has an impact on the actual number of seats in vehicles and the seating variations used in vehicles.

The best sources of information on different types of buses are usually the manufacturers themselves, dealers or distributors, and other transit systems that have recently purchased similar equipment. The small bus industry is growing, with a variety of types and seating plan options now available.

Table XI-1
Vehicle Type Comparision

Category	Typical Characteristics				Minimum life Whichever Comes First	
	Length	Approx. GVW	Seats	Average Cost	Years	Miles
Heavy-Duty Large Bus	35 - 48 feet & 60 feet Artic	33,000 to 40,000	27 - 40	$325,000 - over $600,000	12	500,000
Heavy-Duty Small Bus	30 feet	26,000 to 33,000	26 - 35	$200,000 - $325,000	10	350,000
Medium-Duty and Purpose-Built Bus	30 feet	16,000 to 26,000	22 - 30	$75,000 - $175,000	7	200,000
Light-Duty Mid-Size Bus	20 - 30 feet	10,000 to 16,000	16 - 25	$50,000 - $65,000	5	150,000
Light-Duty Small Bus, Cutaway and Modified Van	16 - 28 feet	6,000 to 14,000	8 - 22	$30,000 - $40,000	4	100,000

Source: Useful Life of Transit Buses and Vans, Report No. FTA VA-26-7229-07.1, 2007 & LSC 2014

VEHICLE SELECTION

In the vehicle selection process, many criteria must be evaluated to ensure the best fit vehicle for Atomic City Transit. The key, in other words, is to match the vehicle to the particular type of service for which it will be used and to the physical environment in which it will be operated without overstepping budget constraints. The selection of a particular body style and vehicle size is affected primarily by the following factors: service considerations, costs, maintenance and storage requirements, operating environment, and other factors.

Service Type

The type of service is an important consideration in the vehicle selection process. Larger vehicles (heavy-duty small buses), for example, may be effectively utilized for longer trips, while smaller vehicles (medium-duty buses or light-duty vans) seem better suited for demand-responsive service and short trips. Vans may become uncomfortable for passengers over long distances due to the limited interior space. Buses, on the other hand, provide the comfort but may be difficult to maneuver in city traffic or on narrow streets and/or driveways. The service area also determines how a vehicle should be equipped. In large service areas, for example, an extra-capacity fuel tank may be appropriate.

Service Demand

Another key factor in determining what size vehicle to purchase is service demand. In an efficient transit operation, the vehicle is usually sufficiently filled. Ideally, the number of people entering the vehicle is equal to the number of people exiting, so that the vehicle is never overcrowded or empty.

Passenger Needs

Passenger needs must also be considered when selecting transit vehicles. Not only must the vehicle be able to accommodate every passenger, but also any special equipment that may be required. Passengers in wheelchairs, for example, require a ramp or lift to enter/exit the vehicle, handrails for support, wheelchair securement devices for safety, and sufficient room in which to ride and maneuver. Although this equipment is essential for wheelchair passengers, it adds weight to the vehicle, and caution must be taken not to exceed its maximum weight capacity.

Passenger comfort and safety is another area that should never be overlooked when selecting a vehicle. Certain tradeoffs, however, may be made. For example, seats with arms may make a bus ride more comfortable for some passengers but these seats can be difficult to get in and out of. Comfortable padded seats and interior improvements may be desired for long trips but an unnecessary expense for short routes.

Costs

The decision to buy large or small transit vehicles and which type to buy will be based upon available funds. Both initial purchase cost (capital cost) and maintenance and operating costs should be considered when selecting a vehicle. The types of costs include fuel, vehicle durability, replacement parts, and labor, etc. These costs can be a worthwhile trade-off to capital cost. For example, a more costly vehicle is sometimes more durable and less expensive to operate over its useful life than a vehicle with a lower purchase price.

Maintenance and Storage Requirements

Before any vehicle is obtained, adequate space must be provided for its storage. ACT currently has appropriate storage facilities for any future fleet and spare vehicles. Another consideration to be made involves vehicle maintenance. After the vehicles have been delivered, they must be properly maintained. Items such as interchangeable parts (between vehicles), for example, would be advantageous over special-ordered parts when the vehicle needs repairs.

A maintenance program should be arranged at the time the vehicle is ordered, and should begin upon vehicle delivery and acceptance. A good maintenance program is as important to a successful transit operation as is the purchase of the vehicles themselves. Major maintenance work early in the vehicle life should be covered by vehicle warranties. After the warranties expire, the ACT should develop adequate arrangements to assure proper maintenance.

One issue that may be encountered with vehicle warranty provisions stems from the fact that some large and small transit vehicles are constructed by several manufacturers. With modified vans, for example, the modifications are not usually made by the original manufacturer. A modifier acquires the van and modifies it according to an agreement with the buyer. Since the vans are assembled or modified by more than one company, it may be difficult for ACT to prove which company is responsible if problems occur. Similar problems may occur with cutaway van chassis vehicles, as one company manufactures the body and another the chassis. To facilitate clear warranties, all responsibility should be with the bidder, and the warranties they provide should cover the entire vehicle. This is to ensure that ACT receives the most complete and trouble-free warranty service.

Operating Environment

Climate, road conditions, and terrain also affect the vehicle selection process. Climate dictates whether auxiliary heaters or air conditioners are needed and the type of tires the vehicle requires. Road conditions are also an important consideration in choosing a vehicle. Service in urban or residential areas requires vehicles with a small turning radius that can maneuver through narrow or one-way streets, cul-de-sacs, and driveways. Narrow or limited-capacity bridges, low underpasses, and winding roads located along service routes may also limit the selection of vehicles.

ACT will need to determine the impact that roads will have on vehicle selection. ACT many need a more durable vehicle for the Bandelier service due to road conditions. Open highway travel, on the other hand, requires less vehicle maneuverability, and virtually any vehicle type would be appropriate. Another consideration is the terrain. For service areas with a lot of steep hills, for example, a vehicle with the heaviest-duty brake capacity (and possibly brake retarders) and adequate power should be purchased.

Other Factors

In addition to those mentioned above, there are several other considerations that must be made in selecting appropriate transit vehicles such as uniformity of fleet, driver needs, insurance, community acceptance, and government regulations. Some of these considerations are discussed below.

Uniformity of Fleet

It is advantageous to have a uniform fleet of vehicles for ACT. This may, however, be difficult to obtain when different types of transit service are offered. A uniform fleet offers certain advantages. The primary advantage of uniformity relates to maintenance and repairs. Mechanics need only be familiar with one type of vehicle and it is simpler and cheaper to acquire and keep a parts inventory. This improves the efficiency of the maintenance operation since, as problems develop in one vehicle, steps can be taken to see that the problem does not recur with the other vehicles. In addition to maintenance, a fleet uniform in passenger capacity and seating arrangement makes scheduling and dispatching easier because the vehicles are interchangeable. The main disadvantage of a uniform fleet is that its very uniformity limits its responsiveness to the varying demands placed upon it.

Driver Considerations

The drivers of the transit vehicles operate long hours. The needs of the drivers should be considered in the vehicle purchase. Driver visibility and comfort play a key role in many transit agencies. Many transit operations depend upon part-time and inexperienced drivers. As these drivers may be inexperienced, vehicles should be purchased that are maneuverable and relatively easy to drive.

Community Acceptance

Systems with small transit vehicles often operate in residential communities. Before purchasing a vehicle, ACT should ensure that it will be acceptable in that type of setting. Service in residential areas may require small, relatively quiet, unobtrusive vehicles that will not be objectionable to residents. Small diesel buses, for example, may not be acceptable in some communities due to the noise from the engine.

Vehicle Comparison

Table XI-2 provides a comparison of several medium-duty and heavy-duty vehicles. Light-duty vehicles do not have sufficient capacity and would be appropriate for demand-response service only. Initial cost for the vehicles ranges from $58,000 to $450,000. However, the expected life, operating cost, and maintenance cost are important factors and are compared in the following section.

Table XI-2
Vehicle Information for Atomic City Transit

	VEHICLE TYPE					
Factors	**ARBOC Spirit of Liberty 3000 Model**	**ARBOC Spirit of Freedom Cutaway - GM**	**NABI 31-LFW LFW Gen III**	**Gillig Low Floor Bus**	**New Flyer MiDi**	**Glavel Entourage**
	Medium Duty	***Body on Chassis, Medium Duty***	***Heavy Duty***	***Heavy Duty***	***Heavy Duty***	***Medium Duty***
1 Air Conditioning	Available	Available	Available	Available	Available	Available
2 Altoona Tested	Yes	Yes	Yes	Yes	Yes	Yes
3 Cost	$230,000	$100,000	$400,000 - $420,000	$370,000	$300,000	125,000 - 160,000
4 Driver Visibility	Good	Good	Good	Good	Good	Good
5 Est. Annual Maintenance Cost	$15,000	$15,000	$10,000	$7,500	$10,000	$15,000
6 Length	30'-10"	27'	32'-7"	29'-9"	30'	32'
7 Seating Capacity	25 + 2 wc	17 + 2 w/c	21 +2 wc	22 + 2wc	18+2 w/c OR 21+2 w/c WITH 1 DR	24 + 2 w/c
8 Step Height	12.5"	14.5"	15.5"	15.3"	13.4"	11.5"
9 Number of Wheelchair Ties	2	2	2	2	2	2
10 Appearance / Visibility	Good	Good	Good	Good	Good	Good
11 Brakes	4 wheel Hydraulic disc/with ABS	Hydraulic disc/with ABS	S-Cam brakes W/Automatic Slack Adjusters	Air Actuated Brakes - Drum or Disc are available	4 Wheel disc brakes (pneumatic)	Front and Rear Disc
12 Door Width	34"	41"	32"	32"	32"	30"
13 Doors Opening In or Out	out	out	Slide-glide(F), Out -Rear	Slide glide	out	out
14 Empty Weight	14,800	12,000	28,700	21,980	19,400	12,518
15 Engine	6.7 L Cummins ISB Diesel	6.0 L Vortex V8, 6.6L Duramex	Cummins ISL 280 Engine	Cummins 8.9 ISL	Cummins ISB	6.7L Power Stroke V-8/ 6.8L 3V SEFFI V-10
16 Engine Type	Diesel	Vortec 5700 or 7400 or 6.5 L Diesel	Diesel/ CNG	Diesel/CNG/Hybrid	Diesel	Diesel / Gas / CNG
17 Expected Vehicle Life	7 yrs	7 yrs	12 yrs	12 yrs	12 yrs	7 yrs
18 Body Height	116"	112"	126" / 133"	115"	121"	120"
19 Fuel Consumption	11-13 mpg	13-15 mpg	4.1 mpg	4 - 6 mpg	5 - 6 mpg	7-9 mpg
20 Fuel Tank Capacity	70 gal	57 gal	85 gal Diesel/13000 SCF-CNG	80 gal	70 gal	68 gal(Diesel)/40gal Gas
21 GVWR	25,500	14,200	43,420	30,000	31,450	19,500
22 Interior Height	82"	77"	98.5"	76" (Rear) & 94" (Front)	77" - 96"	78"
23 Noise	70 DB	70 DB	80 DB	75.2 DB	71 DB	75.7 DB
24 Number of Doors	1 wc	1 wc	1 + 1 wc	1+1wc	1 + 1 wc	1 + 1 w/c
25 Overhang	89.75""	40"	95"	N/A	85"	37.5"
26 Standing Room Availability	Yes	Yes	Yes	Yes	Yes	Yes
27 Steering	Power/Tilt	Power/Tilt	Power/Tilt	Power/Tilt	Tilting and Telescoping	Hydraulic Power assist
28 Suspension	Air - 2 Bage/Axle with Electronic Height Control	Conventional	Digital 2 in front and 4 Rear	Air	Air	Spring Suspension
29 Tire Size	245/70R x 19.5"	LT22/75R 16 D	305 / 70R 22.5	275/70R 22.5	265/70R 19.5	245 / 70 R 19.5
30 Transmission	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic
31 Turning Radii	24'	27'-6"	33'	29'	27'-11"	34'-9"
32 Wheelbase	170"	165" & 191" (183" w/Diesel chasis)	182"	162.8"	137"	201"
33 Wheelchair Access Type	Front	Front	Front	Front	Front	Rear
34 Body Width	100"	96"	102"	102"	96"	96"

#3 - Estimates from vendors subject to change.

#5 - Maintenance estimates from vendors.



Table XI-2 (continued)
Vehicle Information for Atomic City Transit

	VEHICLE TYPE				
Factors	**El Dorado Aero Elite**	**El Dorado Aerotech Cutaway Bus**	**El Dorado Passport - HD Cutaway Bus**	**El Dorado E-Z Rider II Low Floor Bus**	**El Dorado XHF**
	Medium Duty	***Medium Duty***	***Heavy Duty***	***Heavy Duty***	***Heavy Duty***
1 Air Conditioning	Available	Available	Available	Available	Available
2 Altoona Tested	Yes	Yes	Yes	Yes	Yes
3 Cost	$85,000	$58,000	$220,000	$330,000	$300,000
4 Driver Visibility	Good	Good	Good	Good	Good
5 Est. Annual Maintenance Cost	$15,000	$15,000	$7,500	$8,500	$8,500
6 Length	31'-8" - 33'	25'	30'-4.5"	30'-7"	29'-10"
7 Seating Capacity	24 + 2 wc	15 - 2 wc	19 + 2 wc	25 + 2 w/c	23+ 2 w/c
8 Step Height	13"	11.5"	14.5"	14"	15"
9 Number of Wheelchair Ties	2	2	2	2	2
10 Appearance / Visibility	Good	Good	Good	Good	Good
11 Brakes	4 wheel disc w/ABS & traction control	ABS Disc Front & Rear	S-Cam Drum W/Automatic Slack Adjusters and ABS	S-Cam Drum W/Automatic Slack Adjusters and ABS	S-Cam Drum W/Automatic Slack Adjusters and ABS
12 Door Width	36"	40"	40"	40"	40"
13 Doors Opening In or Out	out	out	out	out	out
14 Empty Weight	14,000	9,200	21,000	23,000	22,000
15 Engine	Ford F-550, Internation TC & UC	Ford Gas 5.4L V8/Diesel 6.6L V8	Navistar Maxxforce 7, Maxxforce DT	Cummins	Cummins
16 EngineType	Gas / Diesel	Gas / Diesel	Diesel	Diesel/CNG	Diesel/CNG
17 Expected Vehicle Life	7 yrs	7 yrs	10 yrs	12 yrs	12 yrs
18 Body Height	120 - 124.5"	115"	119" OR 122"	126" W/HVAC OR 136" w/CNG	127" W/HVAC OR 137" w/CNG
19 Fuel Consumption	5-8 mpg	6 - 9 mpg	7 - 8 mpg	7 mpg / 2 mpg	7 mpg / 2 mpg
20 Fuel Tank Capacity	40 gal	40 gal/ 55 gal	50 gal	80 gal (D)	90 gal (D) /12092 SCF
21 GVWR	19,500 - 23,500	14,500	28,700	35,000	35,000
22 Interior Height	79"	79"	76" (Rear) & 95" (Front)	78" (Rear) & 95" (Front)	80.5"
23 Noise	69.4 DB	74.6 DB	70.1 DB	75.6 DB	75.7 DB
24 Number of Doors	1 + 1 wc	1 + 1 wc	1	1	1
25 Overhang	N/A	N/A	131.5"	115"	N/A
26 Standing Room Availability	Yes	Yes	Yes	Yes	Yes
27 Steering	Power/Tilt	Power/Tilt	Power/Tilt	Power/Tilt	Power/Tilt
28 Suspension	Air Spring W/Auto self leveling	Front Coil Spring/Rear: Leaf Spring	Taper Leap Spring Front and Air Rear	Air Suspension Front and Rear	Air Suspension Front and Rear
29 Tire Size	225/70R x 19.5"	LT225 / 75 R 16	265/70R 19.5	275/70R 22.5	275/70R 22.5
30 Transmission	Automatic	Automatic	Automatic	Automatic	Automatic
31 Turning Radii	33.25'	31'	N/A	26'-6"	25'-6"
32 Wheelbase	217", 233" & 234"	186"	254"	160"	139"
33 Wheelchair Access Type	Front/Rear	Front/Rear	Front	Front	Front
34 Body Width	96"	96"	102"	102"	96"

#3 - Estimates from vendors subject to change.

#5 - Maintenance estimates from vendors.

VEHICLE LIFE CYCLE COST COMPARISON

To determine the life cycles for the different types of transit vehicles on the market, information was gathered from several vendors of transit vehicles. This life cycle information is presented in Table XI-3 for heavy-duty and medium-duty vehicles. The table also provides information on the general specifications and the estimated costs for fuel, maintenance, replacement, and operations for each type of vehicle. The life cycle cost calculations are based on *TCRP Synthesis 41, The Use of Small Buses in Transit Service.*

The following assumptions regarding average vehicle operations were used to estimate the average annual costs for fuel and maintenance:

- Average speed: 13 miles per hour
- Average hours of operation: 14 hours per day
- Average days of operation: 251 days per year
- Estimated $3.80 per gallon for fuel

Following are the estimated miles per gallon and maintenance costs per mile for vehicles with different life spans. These rates and costs are based on the information presented in *TCRP Synthesis 41*. Where more specific costs data were available from the manufacturer, that data were used.

- Miles per gallon for five-year vehicles: 7.75
- Miles per gallon for seven-year vehicles: 7.29
- Miles per gallon for 10-year vehicles: 6.33
- Miles per gallon for 12-year small vehicles: 4.66
- Miles per gallon for 12-year large vehicles: 4.36
- Maintenance cost per mile for five-year vehicles: $.22
- Maintenance cost per mile for seven-year vehicles: $.38
- Maintenance cost per mile for 10- to 12-year vehicles: $.18

Based on the vehicle specifications presented in Table XI-2 and the above information, life cycle costs were estimated for heavy-duty and medium-duty buses:

- Heavy-duty bus life cycle cost over 25 years has an average of $1.6 million, ranging from $1.5 to $2.1 million.
- Heavy-duty bus annual fuel cost ranges from $23,000 to $42,000.
- Medium-duty bus life cycle cost over 25 years has an average of $1.4 million ranging from $1.1 million to $1.6 million.
- Medium-duty bus annual fuel cost ranges from $13,000 to $23,000.

While the life cycle cost of the heavy-duty vehicles is typically greater than that for medium-duty vehicles, there is significant overlap depending on the particular vehicle which is chosen. Life cycle cost is an important factor in vehicle selection, but must be considered with other factors such as passenger loads and vehicle capacity.

Life cycle cost is an important consideration related to vehicle procurement. The life cycle cost takes into account the replacement schedule and other operating factors to provide a comparison across vehicle type. Light-duty vehicles may not provide a significant cost savings due to the fact that they have to be replaced more often. A medium-duty vehicle, for example, has a useful life of around seven years, while a smaller heavy-duty to larger heavy-duty bus has a useful life of 10 to 12 years. While the lower initial capital cost may seem to offer good savings, the replacement costs may make the savings negligible over the longer life of a more expensive vehicle.

Table XI-3
Life Cycle Cost Comparison for Atomic City Transit Vehicles

	VEHICLE TYPE					
Factors	**ARBOC Spirit of Liberty 3000 Model**	**ARBOC Spirit of Freedom**	**NABI 31-LFW LFW Gen III**	**Gillig Low Floor Bus**	**New Flyer MiDi**	**Glavel Entourage**
	Medium Duty	***Body on Chassis, Medium Duty***	***Heavy Duty***	***Heavy Duty***	***Heavy Duty***	***Medium Duty***
1 Air Conditioning	Available	Available	Available	Available	Available	Available
2 Altoona Tested	Yes	Yes	Yes	Yes	Yes	Yes
3 Cost	$230,000	$100,000	$400,000 - $420,000	$370,000	$300,000	125,000 - 160,000
4 Driver Visibility	Good	Good	Good	Good	Good	Good
5 Body Width	100"	96"	102"	102"	96"	96"
6 Length	30'-10"	27'	32'-7"	29'-9"	30'	32'
7 Seating Capacity	25 + 2 wc	17 + 2 w/c	21 +2 wc	22 + 2wc	18+2 w/c OR 21+2 w/c WITH 1 DR	24 + 2 w/c
8 Step Height	12.5"	14.5"	15.5"	15.3"	13.4"	11.5"
9 Engine	6.7 L Cummins ISB Diesel	6.0 L Vortex V8, 6.6L Duramex	Cummins ISL 280 Engine	Cummins 8.9 ISL	Cummins ISB	6.7L Power Stroke V-8/ 6.8L 3V SEFFI V-10
10 Engine Type	Diesel	Vortec 5700 or 7400 or 6.5 L Diesel	Diesel/ CNG	Diesel/CNG/Hybrid	Diesel	Diesel / Gas / CNG
11 Expected Vehicle Life	7 yrs	7 yrs	12 yrs	12 yrs	12 yrs	7 yrs
12 Fuel Consumption	12 mpg	14 mpg	4.1 mpg	5 mpg	5.5 mpg	8 mpg
13 Fuel Tank Capacity	70 gal	57 gal	85 gal Diesel/13000 SCF-CNG	80 gal	70 gal	68 gal(Diesel)/40gal Gas
14 GVWR	25,500	14,200	43,420	30,000	31,450	19,500
15 Tire Size	245/70R x 19.5"	LT22/75R 16 D	305 / 70R 22.5	275/70R 22.5	265/70R 19.5	245 / 70 R 19.5
16 Annual Fuel Cost	$14,466	$12,399	$42,339	$34,718	$31,562	$21,699
17 Annual Maintenance Cost	$17,359	$17,359	$8,223	$8,223	$8,223	$17,359
18 Life Cycle Cost Over 25 Years	$1,617,057	$1,101,107	$2,118,221	$1,844,360	$1,619,622	$1,494,310

Source: Vehicle Manufacturer Information 2014 & TCRP Syntheis 41

Table XI-3 (continued)
Life Cycle Cost Comparison for Atomic City Transit Vehicles

	VEHICLE TYPE				
Factors	**El Dorado Aero Elite**	**El Dorado Aerotech**	**El Dorado Passport - HD**	**El Dorado E-Z Rider II**	**El Dorado XHF**
	Medium Duty	***Medium Duty***	***Heavy Duty***	***Heavy Duty***	***Heavy Duty***
1 Air Conditioning	Available	Available	Available	Available	Available
2 Altoona Tested	Yes	Yes	Yes	Yes	Yes
3 Cost	$85,000	$58,000	$220,000	$330,000	$300,000
4 Driver Visibility	Good	Good	Good	Good	Good
5 Body Width	96"	96"	102"	102"	96"
6 Length	31'-8" - 33'	25'	30'-4.5"	30'-7"	29'-10"
7 Seating Capacity	24 + 2 wc	15 - 2 wc	19 + 2 wc	25 + 2 w/c	23+ 2 w/c
8 Step Height	13"	11.5"	14.5"	14"	15"
9 Engine	Ford F-550, Internation TC & UC	Ford Gas 5.4L V8/Diesel 6.6L V8	Navistar Maxxforce 7, Maxxforce DT	Cummins	Cummins
10 EngineType	Gas / Diesel	Gas / Diesel	Diesel	Diesel/CNG	Diesel/CNG
11 Expected Vehicle Life	7 yrs	7 yrs	10 yrs	12 yrs	12 yrs
12 Fuel Consumption	5-8 mpg	6 - 9 mpg	7 - 8 mpg	7 mpg / 2 mpg	7 mpg / 2 mpg
13 Fuel Tank Capacity	40 gal	40 gal/ 55 gal	50 gal	80 gal (D)	90 gal (D) /12092 SCF
14 GVWR	19,500 - 23,500	14,500	28,700	35,000	35,000
15 Tire Size	225/70R x 19.5"	LT225 / 75 R 16	265/70R 19.5	275/70R 22.5	275/70R 22.5
16 Annual Fuel Cost	$23,812	$23,146	$23,146	$24,799	$24,799
17 Annual Maintenance Cost	$17,359	$17,359	$8,223	$8,223	$8,223
18 Life Cycle Cost Over 25 Years	$1,332,858	$1,219,761	$1,334,208	$1,513,039	$1,450,539

Source: Vehicle Manufacturer Information 2014 & TCRP Syntheis 41





VEHICLE CAPACITY

LSC analyzed ACT ridership over the past year along with the recently collected data regarding stop-specific boarding and alighting patterns. The number of passengers on individual buses for each trip was reviewed to determine the peak number of passengers on each trip by route. Vehicles should be sized to accommodate the peak passenger load, although it is not necessary for all passengers to have a seat. Vehicle sizes were based on the passenger loads from the boarding and alighting data. ACT currently operates some routes with one bus which is interlined between two routes. This requires the use of the appropriate bus based on the route with the highest passenger load. Changes to the schedule may allow use of smaller buses on some routes.

Based on the detailed analysis of all ACT routes, smaller vehicles are feasible for some of the routes within the ACT system. Table XI-4 presents the vehicle capacity required for each route. Routes that require seating for 26 to 35 individuals (1, 2, 4, and 6) could use one of the heavy-duty smaller vehicles. Routes that require a seating capacity of between 22 and 30 passengers (White Rock Circulator, 3, and 5) will need a medium-duty bus. In addition to the vehicle requirement shown in Table XI-4, vehicles are required for the express routes and demand-response service.

Table XI-4 Vehicle Type Required		
Route	**30' Medium-Duty Bus**	**30' Heavy-Duty Bus**
	22-30 Seats	**26-35 Seats**
Downtown Circulator		2
White Rock Main Hill		2
White Rock Truck Route		
White Rock Circulator		1
Canyon/Central	1	
North Community		2
Barranca Mesa	1	
North Mesa		2
North Mesa Tripper		2
North Community Tripper		2
Aspen Area Tripper		1
Barranca Mesa Tripper		2
White Rock Tripper		1
Source: LSC, 2014.		

FUEL ALTERNATIVES

There has been a strong interest among transit systems to move from diesel fuel to other alternatives. The primary alternatives to diesel include compressed natural gas (CNG), hybrid vehicles, and battery-electric buses. Biodiesel is also an option although the primary fuel component in most biodiesel fuel applications remains diesel. Other fuels that have not been included for consideration are gasoline, ethanol, liquefied natural gas, hydrogen, propane, and hydrogen fuel cells. Transit systems have begun to change to these alternate fuels for a variety of reasons including reduction in green-house gases, reduced emissions, and lower fuel costs. Options for Atomic City Transit have been reviewed to develop recommendations for fleet purchases.

Over the past 20 years, the number of buses fueled by alternate fuels has increased dramatically. However, diesel remains the primary fuel for transit systems with more than 40,000 buses operating on diesel and about 14,000 operating on CNG. There are far fewer buses operating on other fuels and very few battery-electric buses in use. The prevalence of diesel use relates to a number of factors including the service life of vehicles, additional cost to convert to an alternate fuel, and technological issues. These issues will be described as they relate to each of the possible fuel choices.

Information from this analysis has been taken from Transit Cooperative Research Program Report 146, *Guidebook for Evaluating Fuel Choices for Post-2010 Transit Bus Procurements*, the Steamboat Springs Transit Alternate Fuel Systems Analysis, and experience of LSC with other transit systems.

Biodiesel

Biodiesel is derived from animal fats and vegetable oils. It contains no sulfur or aromatics and may be either used alone or blended with petroleum diesel. Most transit systems that have implemented biodiesel use a blend that is 20 percent biodiesel and 80 percent petroleum diesel. Experience in cold weather has led some systems to either stop using biodiesel or use a blend of 10 percent during the winter months. It is not known how many systems have implemented biodiesel as the application does not require special engine or facility modifications.

A 20 percent blend has little or no performance loss from the use of regular diesel in buses.

Use of biodiesel is a viable option for ACT if a reliable source of fuel is available and the fuel can be purchased at a reasonable price. This could be implemented with the existing fleet and any new vehicles without a major capital expense.

Compressed Natural Gas

Compressed Natural Gas (CNG) has been incorporated into many transit fleets including Santa Fe Trails. Natural gas is derived from petroleum sources and is typically refined to be mostly methane. The gas is compressed to high pressures to increase the density of energy for storage. There are over 14,000 CNG buses operated by transit agencies throughout the country. Systems range from smaller transit agencies such as Santa Fe Trails to Los Angeles County with over 2,500 CNG powered buses.

CNG is highly flammable and potentially explosive in enclosed areas. Facility improvements are required to include lighting, heating, and electrical systems rated for hazardous environments; ventilation, and use of detectors. Facility improvements for a transit maintenance facility may cost anywhere from $1 to $2 million depending on the size and characteristics of the facility.

A specialized fueling facility is required to use CNG. There are options for slow fueling and fast fueling. Although some transit agencies installed slow fueling stations initially, most have moved to the use of fast fueling which allows a CNG bus to be fueled in approximately the same amount of time as a diesel bus. A fueling station for ACT could cost about $1.5 million, depending on the availability of natural gas.

CNG vehicles cost more than a comparable diesel bus. The additional cost for a heavy-duty bus may be about $50,000 per vehicle. The additional vehicle cost is likely to be recovered by fuel savings, but the additional capital cost will take longer to recover. Fuel cost savings may be around $10,000 per year per bus. Systems such as CATA in State College, Pennsylvania, have found that the ongoing fuel costs are very low because of the availability and pricing of natural gas. The additional $2 to $3 million in facility expenses would require 10 to 15 years to recover in addition to the time to recover the additional cost for the vehicle.

CNG may be a good option for ACT to consider as part of a conversion of the County fleet to CNG vehicles, but upgrading the maintenance facility and installing a fueling facility for the transit system only is not justified.

Hybrid Electric

Hybrid electric buses are propelled by electricity plus some type of combustion engine. The majority of hybrid buses in service are based on a diesel engine, although it is possible to use CNG or other fuels. Hybrid bus technology is discussed in detail in Transit Cooperative Research Program Report 132 *Assessment of Hybrid-Electric Transit Bus Technology*.

Vehicle costs may be as much as 50 percent greater than a comparable diesel bus. Maintenance costs are higher than for a diesel bus as well. Fuel savings may be 10 to 15 percent per year, but do not appear to support the additional capital cost of the bus. There may be additional costs to replace the batteries in the bus before the vehicle has reached its useful life, but little information is available to determine actual battery replacement patterns.

Unofficially, some transit agencies have indicated that the payback time for the additional cost will be beyond the useful life of the bus, even though the economic analysis used to justify the purchase indicated a much shorter time to recover the additional capital cost of the bus.

Battery Electric

There have been a number of attempts to develop a battery powered electric bus. The downtown shuttle in Chattanooga uses electric buses developed by a local company in Chattanooga which went out of business. One end of the route is in a parking garage and serves as the charging station so the buses do not have to go out of service for charging. Colorado Springs purchased the Ebus for the downtown circulator. In Colorado Springs, the range of the bus was not adequate to operate all day, and required vehicle changes so the buses could be returned to the garage for charging. Technology has been improving and Ebus now indicates their small electric bus has a range of 125 miles. Proterra is a recent entry in the electric bus market and incorporates technology that provides fast charging in a period of less than 10 minutes. Ebus is developing a 40-foot electric bus which incorporates a small CNG turbine to recharge the batteries to achieve a range of 300 miles.

Electric buses cost more than twice as much as a diesel bus. Maintenance costs are only slightly less than a diesel bus while the fuel cost is significantly lower. The estimated cost for a fast charging station for the Proterra bus is about $600,000.

Based on the high initial cost for the vehicle and the developing technology, electric buses do appear appropriate for ACT. Buses traveling to White Rock would have to be charged at the end of each trip using the Proterra technology. The Ebus small vehicle is only 22 feet long and does not have the capacity for most of the ACT routes.

RECOMMENDATIONS

The analysis of vehicle needs indicates that a small heavy-duty bus is the most appropriate for ACT. It has the capacity to serve all of the routes with the exception of some afternoon trippers. However, using two buses on these tripper routes provides flexibility for the service and the use of the vehicles on other routes. Consideration should be given to larger 40-foot buses if ACT continues to operate the shuttle service for Bandelier National Monument. If this service continues, additional larger buses will be needed and could then be used on the afternoon trippers if needed. The life-cycle cost of the medium-duty bus is only slightly lower than the heavy-duty bus and may be comparable depending on the specific vehicles. A heavy-duty bus has a longer expected life and will likely have better endurance and lower maintenance costs in the Los Alamos environment. There are also advantages to maintaining consistency within the fleet. Feedback from drivers indicated preference for a small heavy-duty bus. Therefore, it is recommended that purchase of new buses should consider vehicles comparable to the El Dorado XHF or the New Flyer MiDi for the fixed-route service. The trolleys should be replaced with the same buses as the rest of the fleet. This will increase flexibility for use of the vehicles. The trolley type bus is attractive as a shuttle in tourist locations, but the practicality for use in a system like ACT is limited. Riders would be better served if the bus was the same as others in the fleet. For demand-response service offered in the evening and the ADA complementary transit service, a smaller body-on-chassis vehicle will be appropriate.

Table XI-5 shows the recommended vehicle replacement schedule for the ACT fleet.

Table XI-5
Vehicle Replacement Schedule

Unit Number	Category	Make/ Model	Model Year	Replacement Year	Replacement Vehicle
Fixed-Route Fleet					
4012	School	Blue Bird	2001	2015	None
4013	School	Blue Bird	2001	2015	30' heavy-duty bus
4022	School	Blue Bird	2002	2015	30' heavy-duty bus
4081	Cutaway	Elkhart	2008	2015	30' heavy-duty bus
4085	Trolley	KK Trolley	2008	2018	30' heavy-duty bus
4087	Cutaway	Glaval	2008	2019	30' heavy-duty bus
4091	Cutaway	El Dorado	2009	2019	30' heavy-duty bus
4092	Cutaway	El Dorado	2009	2016	30' heavy-duty bus
4093	Cutaway	ARBOC	2009	2016	30' heavy-duty bus
4094	Cutaway	ARBOC	2009	2016	30' heavy-duty bus
4101	Cutaway	El Dorado	2010	2020	30' heavy-duty bus
4102	Cutaway	El Dorado	2010	2020	30' heavy-duty bus
4103	Cutaway	El Dorado	2010	2020	30' heavy-duty bus
4104	Cutaway	El Dorado	2010	2020	30' heavy-duty bus
4106	Bus	New Flyer	2010	2022	30' heavy-duty bus
4111	Cutaway	Glaval	2011	2016	30' heavy-duty bus
4112	Trolley	KK Trolley	2011	2018	30' heavy-duty bus
4113	Cutaway	ARBOC	2011	2018	30' heavy-duty bus
4114	Cutaway	ARBOC	2011	2016	30' heavy-duty bus
4116	Trolley	KK Trolley	2011	2018	30' heavy-duty bus
4122	Cutaway	El Dorado	2014	2023	30' heavy-duty bus
4123	Cutaway	El Dorado	2014	2023	30' heavy-duty bus
4124	Bus	New Flyer	2012	2025	30' heavy-duty bus
4125	Bus	New Flyer	2012	2025	30' heavy-duty bus
Dial-A-Ride Fleet					
4084	Cutaway	Startrans	2008	2015	15 passenger cutaway
4115	Cutaway	ARBOC	2011	2018	15 passenger cutaway
4121	Minivan	Caravan	2012	22017	Minivan
4141	Cutaway	ARBOC	2014	2021	15 passenger cutaway

Chapter XII

TRANSPORTATION
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CHAPTER XII

Implementation Plan

INTRODUCTION

LSC has prepared the following Transit Implementation Plan which identifies the implementation steps for the development and installation of the preferred transit service alternative as identified in the Service Plan section of this Chapter.

This chapter includes the service plan, facility requirements, funding alternatives, financial plan, recommendations for an organizational structure for Atomic City Transit (ACT) services, a marketing program, a monitoring program, and schedule for implementing the preferred ACT service plan. A timeline has been included to illustrate the sequence and timing for activities over the short-term planning horizon (the next six years).

SERVICE PLAN

The proposed service plan is based on restructuring the routes and schedules to operate on either a 30-minute or 60-minute headway with a timed-transfer pulse at the transit center. This approach will accomplish several things. First is that transfers between routes will be much easier than with the current system. All routes will have a scheduled layover at the transit center to allow all buses to meet at the scheduled time, allowing passengers to transfer between all routes. During peak times, most routes will operate with a 30-minute headway and the frequency will be reduced to a 60-minute headway during off-peak times. The longer running time will improve schedule adherence on routes which currently have inadequate running times. Regular times, every half-hour or hour, make the schedule easy to understand and for passengers to re-member.

The proposed routes are shown in Figure XII-1 with individual route maps shown in Figures XII-2 through XII-7.

One of the more substantial route modifications is the change to the White Rock – Main Hill route. Two routes, the Main Hill Route (modified Route 2M) and the White Rock Route, will provide service between Los Alamos and White Rock. One route will operate to White Rock on the Truck Route and the other route will operate to White Rock on Main Hill as shown in Figure XII-3. In White Rock, both routes will loop clockwise through the community. The White Rock Route bus will then complete a counter-clockwise loop on the way back to the transit center in Los Alamos. After completing the White Rock clockwise loop and a short layover at the Visitor Center, the Main Hill route will continue along Main Hill to return to Los Alamos.

The White Rock route will operate on a 60 minute schedule with a short layover at the Visitor Center and the transit center. The Main Hill Route will have a 60 minute scheduled time with short layovers in White Rock and at Canyon Road and Diamond Drive in Los Alamos. It is recommended the schedule of these routes coincide with the arrival and departure of the routes such as the Downtown Circulator so riders can easily transfer between routes at major transit stops. It is recommended that this route interline with Route 3 to provide the connection between Los Alamos and White Rock without requiring a transfer.

Existing Route 3 has been modified to extend to the area by the Holiday Inn Express and the Coop, with an extension to the East Gate area on request as shown in Figure XII-4. This covers portions of the corridor which had been previously served by the Main Hill route. To reduce service area duplications for the Route 3 and Main Hill routes along Central Ave, the Main Hill Route was modified, as shown in Figures XII-1 and XII-3, to serve areas including the new Smith's along westbound Trinity Drive and portions of eastbound Central Avenue between Diamond Drive and 15th Street. Route 3 would continue to serve areas along the entire length of Central Avenue. Analysis of the boarding and alighting activity on Route 2M indicated that most of the passengers were riding within the central Los Alamos corridor and not between Los Alamos and White Rock.

The proposed service on the Downtown Circulator will operate every 30 minutes during the morning and afternoon peak periods with a second bus added to provide service every 15 minutes during the middle of the day. This will allow workers at LANL to have frequent access to and from downtown during lunch hours.

The former Route 4 has been modified to include service along Arizona. By adding time to this route, it can be extended to this area and serve residents in this neighborhood.

The recommended service includes adding demand-response service in the evening for all passengers. This will allow passengers to connect from the later New Mexico Park-and-Ride buses as well as those who may work later or need later service.

Example schedules are shown in Tables XII-1 through XII-7. These schedules may be refined and modified as part of the implementation process.

In addition to the routes and schedules shown for the regular routes, ACT will continue to operate school tripper routes to meet the high demand which occurs at the end of each school day. These routes should be shown in the schedule brochure and should be modified each school year based on anticipated demand patterns for that year.

The estimated operating cost in current dollars is shown in Table XII-8 for the propose service plan. By reducing the number of buses traveling to White Rock, the resources can be reallocated and the service implemented without a major budgetary impact.

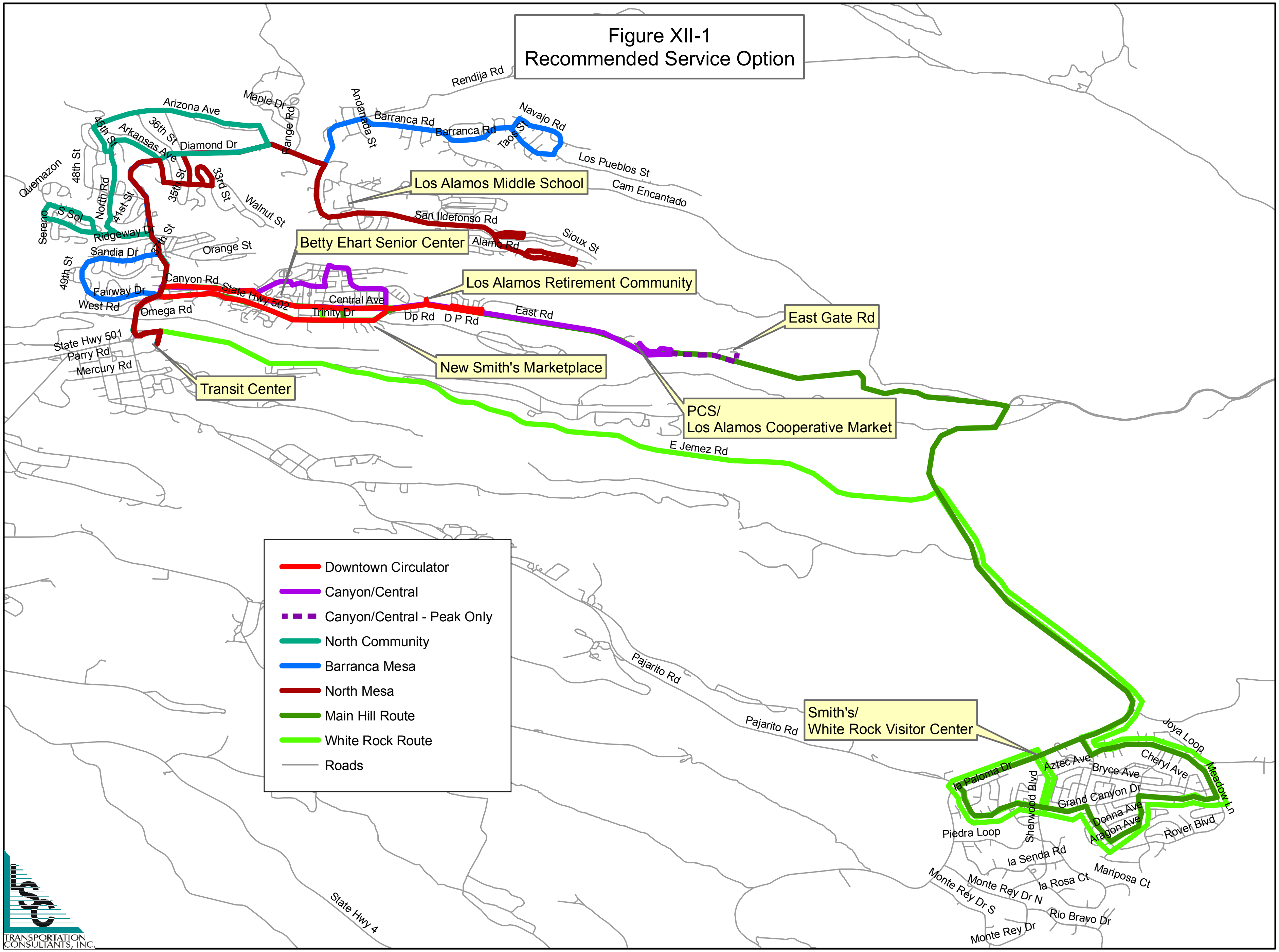


Figure XII-1
Recommended Service Option

Figure XII-2
Downtown Circulator Route

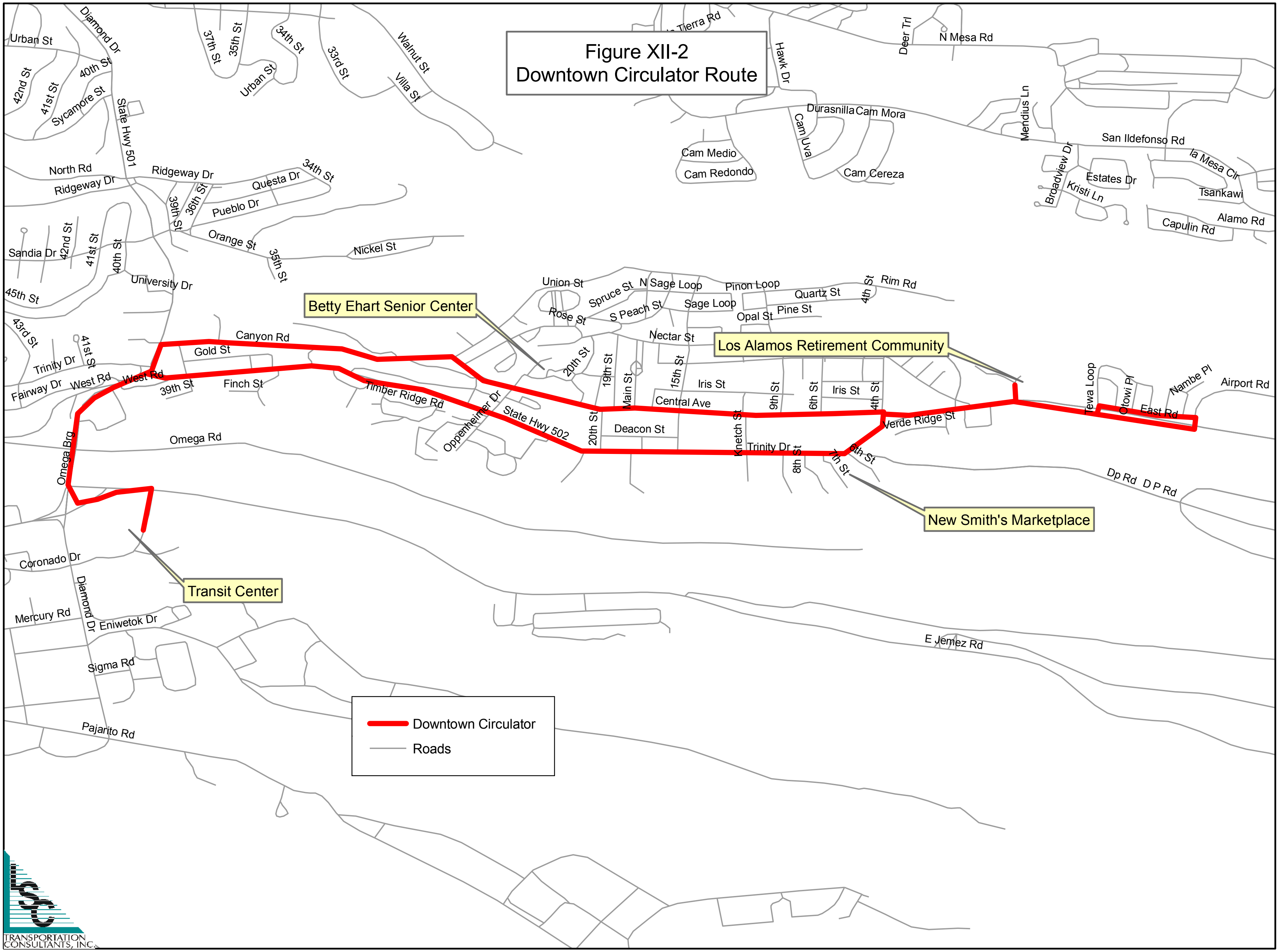
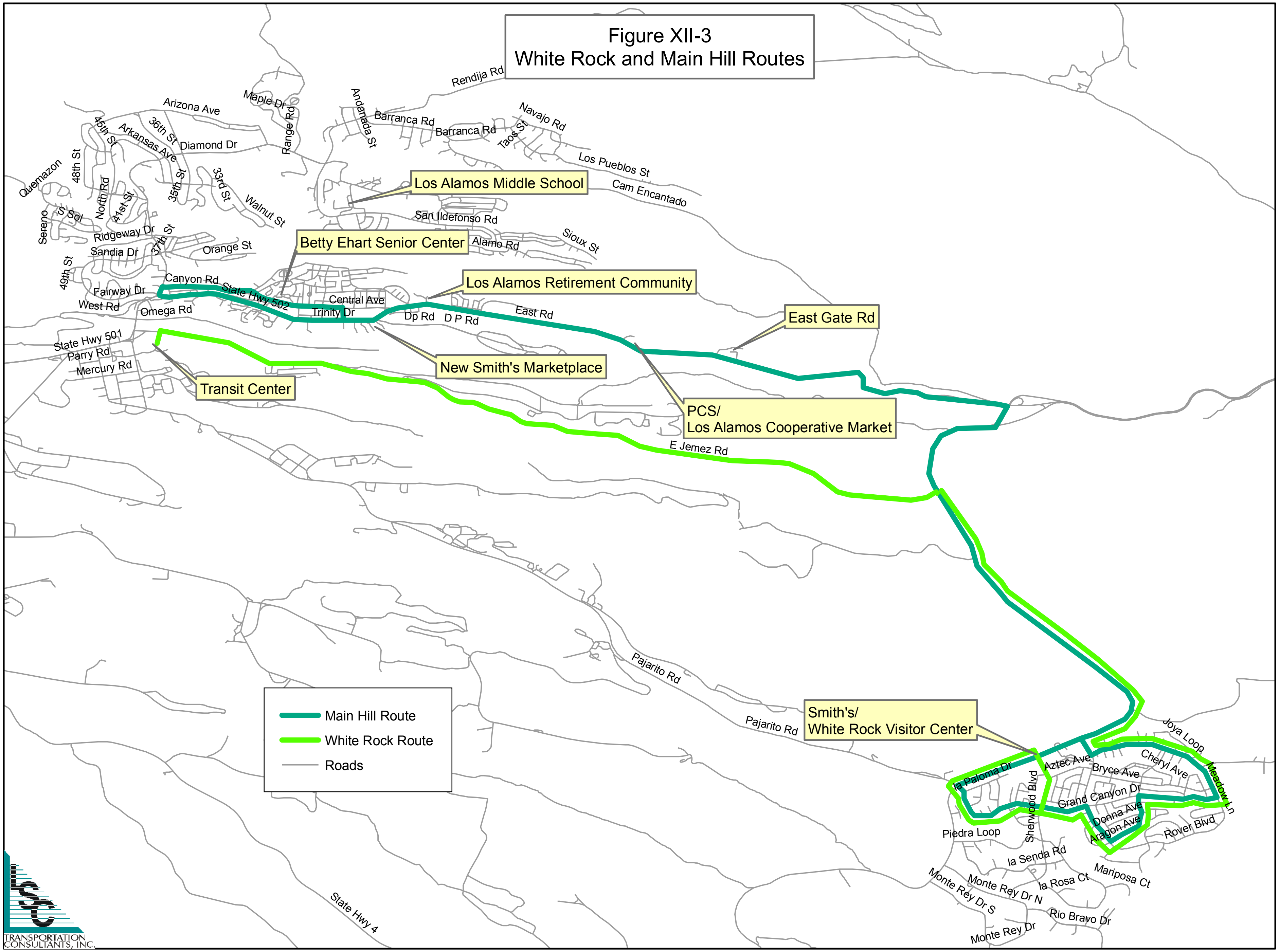


Figure XII-3
White Rock and Main Hill Routes



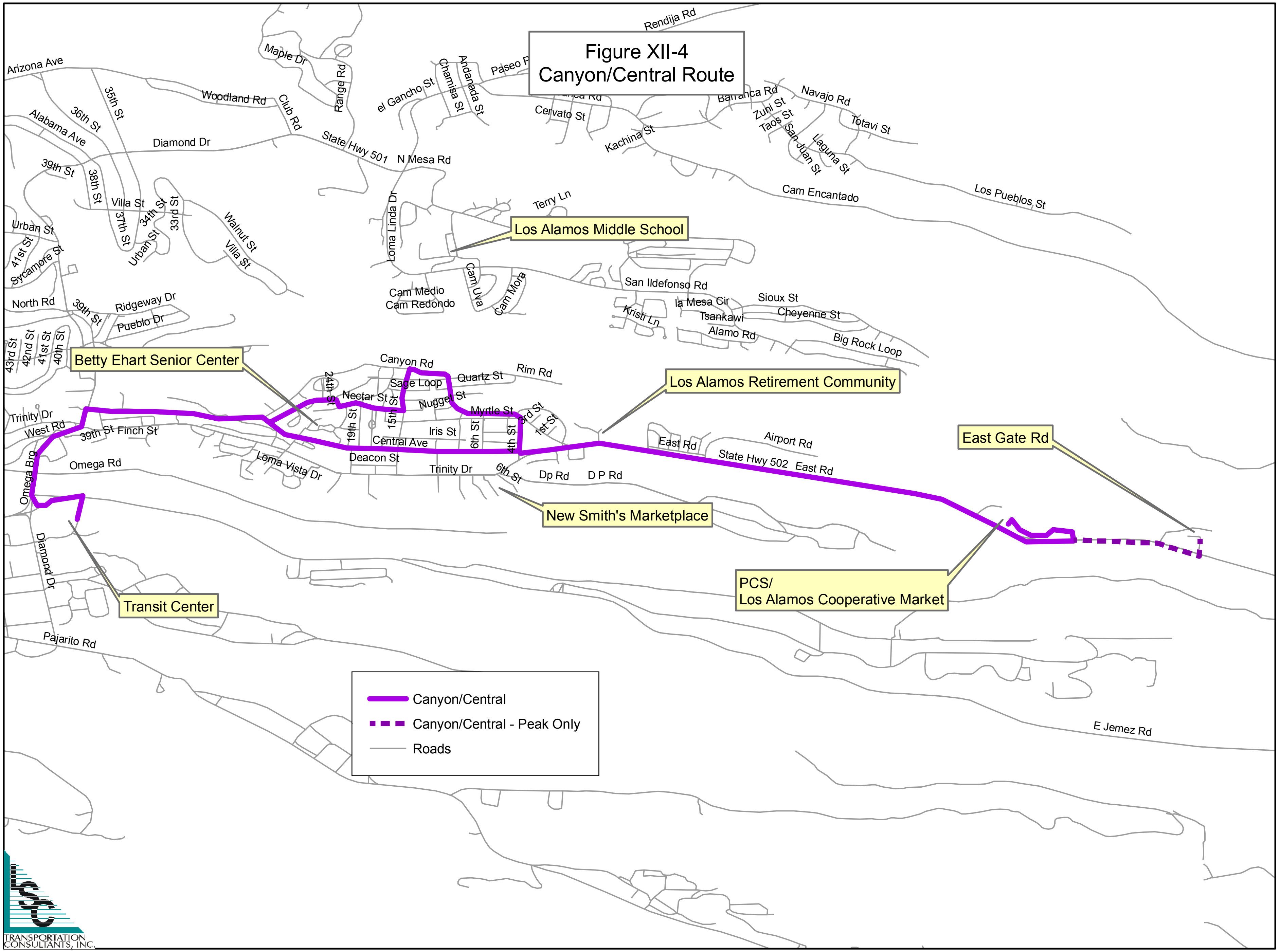
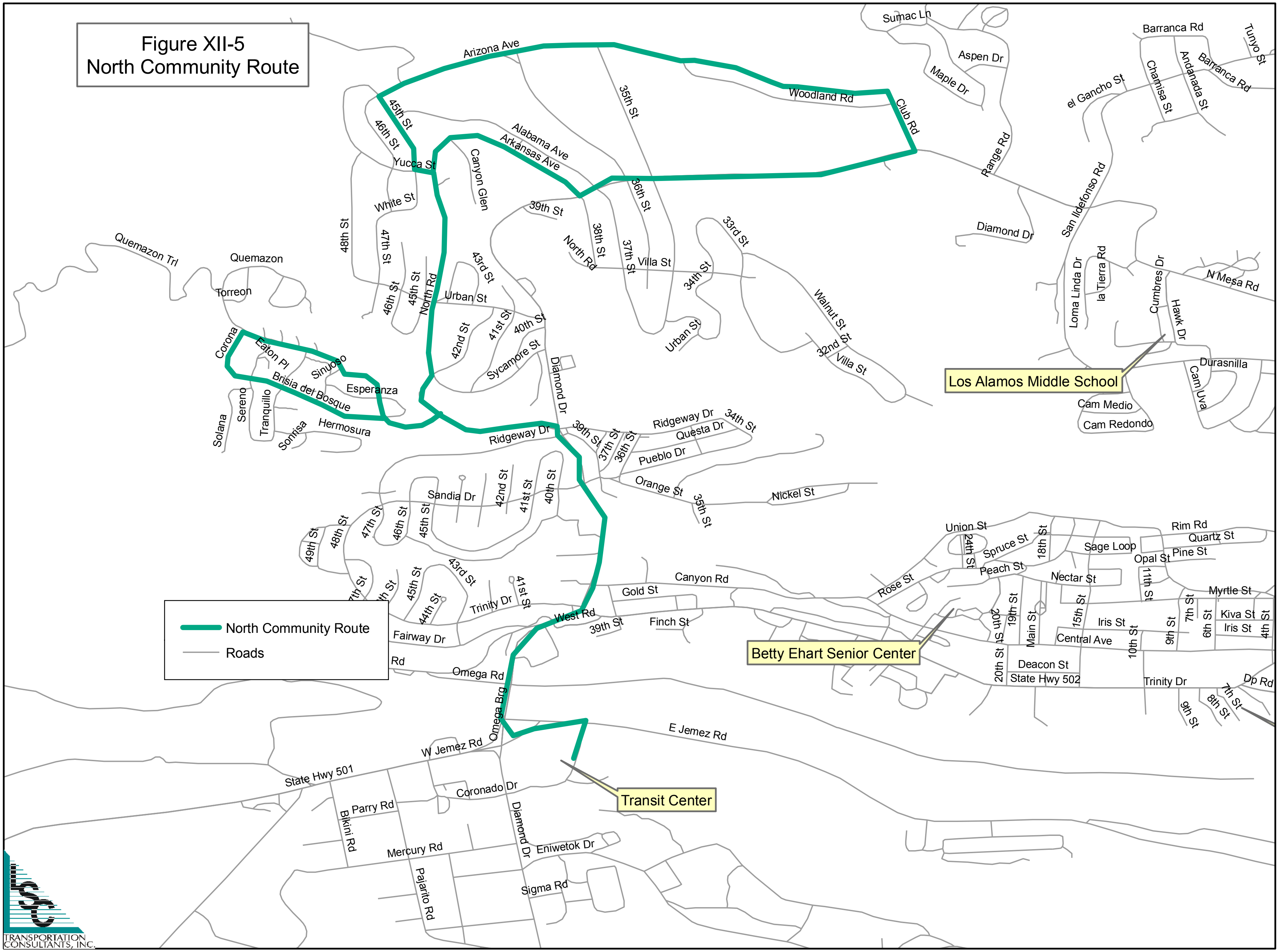


Figure XII-4
Canyon/Central Route
Los Alamos Middle School
Betty Ehart Senior Center
Los Alamos Retirement Community
East Gate Rd
New Smith's Marketplace
PCS/
Los Alamos Cooperative Market
Transit Center
Canyon/Central
Canyon/Central - Peak Only
Roads
Rendija Rd
Arizona Ave
Maple Dr
Range Rd
Woodland Rd
Club Rd
35th St
36th St
Alabama Ave
Diamond Dr
State Hwy 501
N Mesa Rd
el Gancho St
Chamisa St
Andanada St
Cervato St
Kachina St
Barranca Rd
Navajo Rd
Zuni St
Taos St
Totavi St
San Juan St
Laguna St
Cam Encantado
Los Pueblos St
Terry Ln
39th St
38th St
Villa St
34th St
33rd St
37th St
Urban St
Walnut St
Urban St
41st St
Sycamore St
Loma Linda Dr
Cam Medio
Cam Redondo
Cam Uva
Cam Mora
San Ildefonso Rd
la Mesa Cir
Sioux St
Kristi Ln
Tsankawi
Cheyenne St
Alamo Rd
Big Rock Loop
North Rd
39th St
Ridgeway Dr
Pueblo Dr
43rd St
42nd St
41st St
40th St
Canyon Rd
Rim Rd
Sage Loop
Quartz St
24th St
Nectar St
Nugget St
15th St
19th St
Myrtle St
3rd St
1st St
Trinity Dr
West Rd
39th St
Finch St
Iris St
6th St
4th St
Central Ave
Deacon St
Omega Rd
Loma Vista Dr
Trinity Dr
6th St
Dp Rd
D P Rd
East Rd
Airport Rd
State Hwy 502
East Rd
Omega Brg
Diamond Dr
Pajarito Rd
E Jemez Rd

Figure XII-5
North Community Route



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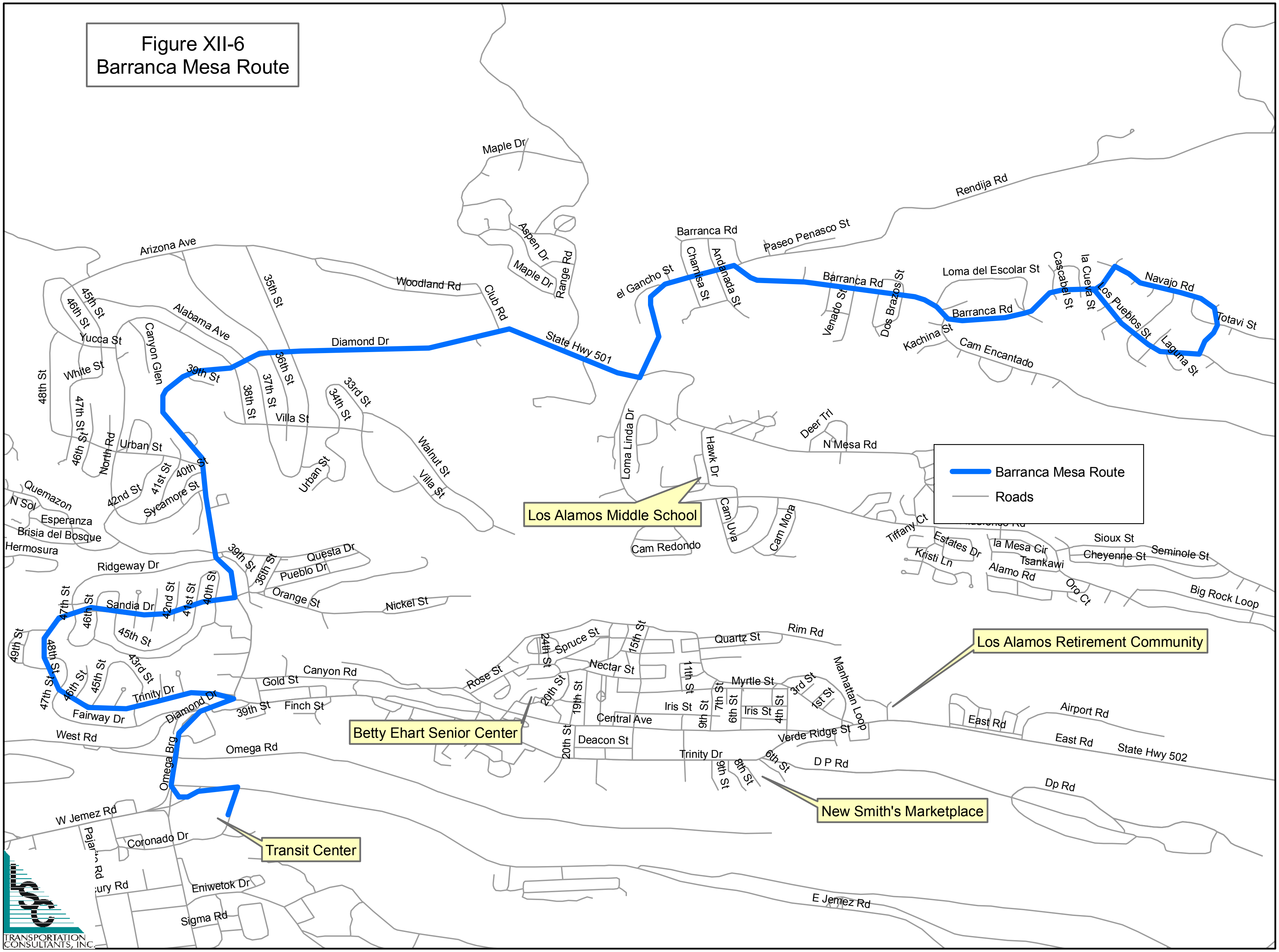

Figure XII-6
Barranca Mesa Route

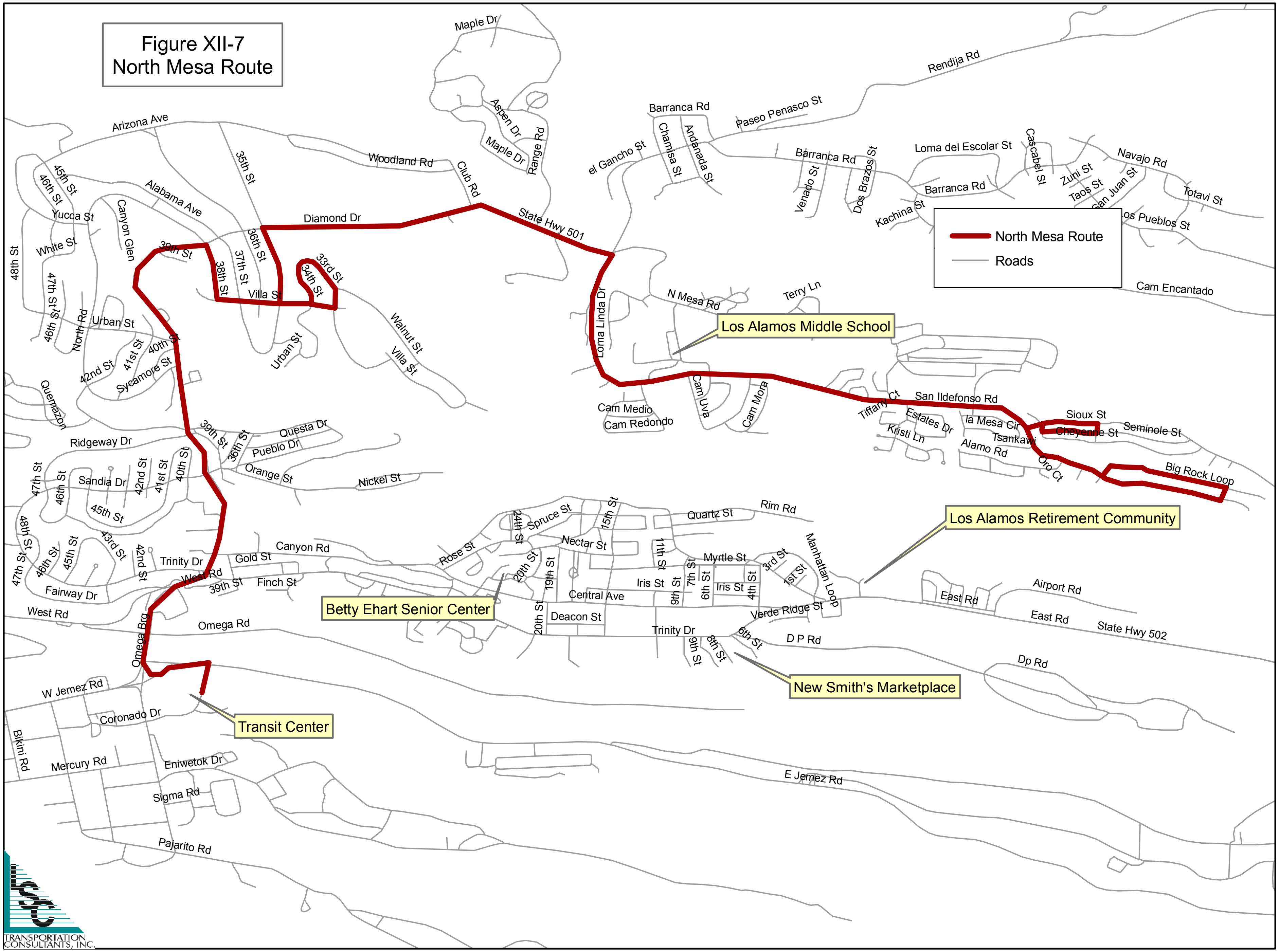

Figure XII-7
North Mesa Route

Table XII-1
Downtown Circulator

Transit Center Depart	Medical Center	Smith's Marketplace	Airport/East Drive	Aquatic Center	Transit Center Arrive
6:00 AM	6:03 AM	6:06 AM	6:10 AM	6:18 AM	6:22 AM
6:30 AM	6:33 AM	6:36 AM	6:40 AM	6:48 AM	6:52 AM
7:00 AM	7:03 AM	7:06 AM	7:10 AM	7:18 AM	7:22 AM
7:30 AM	7:33 AM	7:36 AM	7:40 AM	7:48 AM	7:52 AM
8:00 AM	8:03 AM	8:06 AM	8:10 AM	8:18 AM	8:22 AM
8:30 AM	8:33 AM	8:36 AM	8:40 AM	8:48 AM	8:52 AM
9:00 AM	9:03 AM	9:06 AM	9:10 AM	9:18 AM	9:22 AM
9:30 AM	9:33 AM	9:36 AM	9:40 AM	9:48 AM	9:52 AM
10:00 AM	10:03 AM	10:06 AM	10:10 AM	10:18 AM	10:22 AM
10:30 AM	10:33 AM	10:36 AM	10:40 AM	10:48 AM	10:52 AM
11:00 AM	11:03 AM	11:06 AM	11:10 AM	11:18 AM	11:22 AM
11:30 AM	11:33 AM	11:36 AM	11:40 AM	11:48 AM	11:52 AM
12:00 PM	12:03 PM	12:06 PM	12:10 PM	12:18 PM	12:22 PM
12:30 PM	12:33 PM	12:36 PM	12:40 PM	12:48 PM	12:52 PM
1:00 PM	1:03 PM	1:06 PM	1:10 PM	1:18 PM	1:22 PM
1:30 PM	1:33 PM	1:36 PM	1:40 PM	1:48 PM	1:52 PM
2:00 PM	2:03 PM	2:06 PM	2:10 PM	2:18 PM	2:22 PM
2:30 PM	2:33 PM	2:36 PM	2:40 PM	2:48 PM	2:52 PM
3:00 PM	3:03 PM	3:06 PM	3:10 PM	3:18 PM	3:22 PM
3:30 PM	3:33 PM	3:36 PM	3:40 PM	3:48 PM	3:52 PM
4:00 PM	4:03 PM	4:06 PM	4:10 PM	4:18 PM	4:22 PM
4:30 PM	4:33 PM	4:36 PM	4:40 PM	4:48 PM	4:52 PM
5:00 PM	5:03 PM	5:06 PM	5:10 PM	5:18 PM	5:22 PM
5:30 PM	5:33 PM	5:36 PM	5:40 PM	5:48 PM	5:52 PM
6:00 PM	6:03 PM	6:06 PM	6:10 PM	6:18 PM	6:22 PM
6:30 PM	6:33 PM	6:36 PM	6:40 PM	6:48 PM	6:52 PM

Source: LSC, 2014

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Table XII-2 Main Hill													
Depart Canyon Road/Diamond Dr	Central Ave/15th St	Arrive Trinity Dr/9th St (Smith's)	Depart Trinity Dr/ 9th St (Smith's)	East Dr/Tewa Loop	Rover Blvd/ Meadow Ln	Grand Canyon Dr/ Meadow Ln	Aragon Ave/ Rover Blvd	Grand Canyon Dr/ Sherwood Blvd	Arrive Visitor Center	Depart Visitor Center	East Dr/Tewa Loop	Trinity Dr/9th St (Smith's)	Arrive Canyon Rd/Diamond Dr
6:00 AM	6:03 AM	6:05 AM	6:08 AM	6:10 AM	6:22 AM	6:25 AM	6:28 AM	6:31 AM	6:36 AM	6:39 AM	6:51 AM	6:54 AM	6:58 AM
7:00 AM	7:03 AM	7:05 AM	7:08 AM	7:10 AM	7:22 AM	7:25 AM	7:28 AM	7:31 AM	7:36 AM	7:39 AM	7:51 AM	7:54 AM	7:58 AM
8:00 AM	8:03 AM	8:05 AM	8:08 AM	8:10 AM	8:22 AM	8:25 AM	8:28 AM	8:31 AM	8:36 AM	8:39 AM	8:51 AM	8:54 AM	8:58 AM
9:00 AM	9:03 AM	9:05 AM	9:08 AM	9:10 AM	9:22 AM	9:25 AM	9:28 AM	9:31 AM	9:36 AM	9:39 AM	9:51 AM	9:54 AM	9:58 AM
10:00 AM	10:03 AM	10:05 AM	10:08 AM	10:10 AM	10:22 AM	10:25 AM	10:28 AM	10:31 AM	10:36 AM	10:39 AM	10:51 AM	10:54 AM	10:58 AM
11:00 AM	11:03 AM	11:05 AM	11:08 AM	11:10 AM	11:22 AM	11:25 AM	11:28 AM	11:31 AM	11:36 AM	11:39 AM	11:51 AM	11:54 AM	11:58 AM
12:00 PM	12:03 PM	12:05 PM	12:08 PM	12:10 PM	12:22 PM	12:25 PM	12:28 PM	12:31 PM	12:36 PM	12:39 PM	12:51 PM	12:54 PM	12:58 PM
1:00 PM	1:03 PM	1:05 PM	1:08 PM	1:10 PM	1:22 PM	1:25 PM	1:28 PM	1:31 PM	1:36 PM	1:39 PM	1:51 PM	1:54 PM	1:58 PM
2:00 PM	2:03 PM	2:05 PM	2:08 PM	2:10 PM	2:22 PM	2:25 PM	2:28 PM	2:31 PM	2:36 PM	2:39 PM	2:51 PM	2:54 PM	2:58 PM
3:00 PM	3:03 PM	3:05 PM	3:08 PM	3:10 PM	3:22 PM	3:25 PM	3:28 PM	3:31 PM	3:36 PM	3:39 PM	3:51 PM	3:54 PM	3:58 PM
4:00 PM	4:03 PM	4:05 PM	4:08 PM	4:10 PM	4:22 PM	4:25 PM	4:28 PM	4:31 PM	4:36 PM	4:39 PM	4:51 PM	4:54 PM	4:58 PM
5:00 PM	5:03 PM	5:05 PM	5:08 PM	5:10 PM	5:22 PM	5:25 PM	5:28 PM	5:31 PM	5:36 PM	5:39 PM	5:51 PM	5:54 PM	5:58 PM
6:00 PM	6:03 PM	6:05 PM	6:08 PM	6:10 PM	6:22 PM	6:25 PM	6:28 PM	6:31 PM	6:36 PM	6:39 PM	6:51 PM	6:54 PM	6:58 PM
7:00 PM	7:03 PM	7:05 PM	7:08 PM	7:10 PM	7:22 PM	7:25 PM	7:28 PM	7:31 PM	7:36 PM				

Source: LSC 2014

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Table XII-3
White Rock Route

Depart Transit Center	Rover Blvd/ Meadow Ln	Grand Canyon Dr/ Meadow Ln	Aragon Ave/ Rover Blvd	Grand Canyon Dr/ Sherwood Blvd	Arrive Visitor Center	Depart Visitor Center	Grand Canyon Dr/ Sherwood Blvd	Aragon Ave/ Rover Blvd	Grand Canyon Dr/ Meadow Ln	Rover Blvd/ Meadow Ln	Arrive Transit Center
6:30 AM	6:41 AM	6:44 AM	6:47 AM	6:50 AM	6:55 AM	7:00 AM	7:03 AM	7:06 AM	7:09 AM	7:13 AM	7:24 AM
7:30 AM	7:41 AM	7:44 AM	7:47 AM	7:50 AM	7:55 AM	8:00 AM	8:03 AM	8:06 AM	8:09 AM	8:13 AM	8:24 AM
8:30 AM	8:41 AM	8:44 AM	8:47 AM	8:50 AM	8:55 AM	9:00 AM	9:03 AM	9:06 AM	9:09 AM	9:13 AM	9:24 AM
9:30 AM	9:41 AM	9:44 AM	9:47 AM	9:50 AM	9:55 AM	10:00 AM	10:03 AM	10:06 AM	10:09 AM	10:13 AM	10:24 AM
10:30 AM	10:41 AM	10:44 AM	10:47 AM	10:50 AM	10:55 AM	11:00 AM	11:03 AM	11:06 AM	11:09 AM	11:13 AM	11:24 AM
11:30 AM	11:41 AM	11:44 AM	11:47 AM	11:50 AM	11:55 AM	12:00 PM	12:03 PM	12:06 PM	12:09 PM	12:13 PM	12:24 PM
12:30 PM	12:41 PM	12:44 PM	12:47 PM	12:50 PM	12:55 PM	1:00 PM	1:03 PM	1:06 PM	1:09 PM	1:13 PM	1:24 PM
1:30 PM	1:41 PM	1:44 PM	1:47 PM	1:50 PM	1:55 PM	2:00 PM	2:03 PM	2:06 PM	2:09 PM	2:13 PM	2:24 PM
2:30 PM	2:41 PM	2:44 PM	2:47 PM	2:50 PM	2:55 PM	3:00 PM	3:03 PM	3:06 PM	3:09 PM	3:13 PM	3:24 PM
3:30 PM	3:41 PM	3:44 PM	3:47 PM	3:50 PM	3:55 PM	4:00 PM	4:03 PM	4:06 PM	4:09 PM	4:13 PM	4:24 PM
4:30 PM	4:41 PM	4:44 PM	4:47 PM	4:50 PM	4:55 PM	5:00 PM	5:03 PM	5:06 PM	5:09 PM	5:13 PM	5:24 PM
5:30 PM	5:41 PM	5:44 PM	5:47 PM	5:50 PM	5:55 PM	6:00 PM	6:03 PM	6:06 PM	6:09 PM	6:13 PM	6:24 PM
6:30 PM	6:41 PM	6:44 PM	6:47 PM	6:50 PM	6:55 PM						

Source: LSC, 2014

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Table XII-4
Canyon/Central

Transit Center Depart	Los Alamos Medical Center	East Gate Road (two trips a day)	Coop Market	Aquatic Center	Transit Center Arrive
6:00 AM	6:03 AM		6:26 AM	6:47 AM	6:51 AM
6:30 AM	6:33 AM	6:44 AM	7:01 AM	7:22 AM	7:26 AM
7:00 AM	7:03 AM		7:26 AM	7:47 AM	7:51 AM
7:30 AM	7:33 AM		7:56 AM	8:17 AM	8:21 AM
8:00 AM	8:03 AM		8:26 AM	8:47 AM	8:51 AM
9:00 AM	9:03 AM		9:26 AM	9:47 AM	9:51 AM
10:00 AM	10:03 AM		10:26 AM	10:47 AM	10:51 AM
11:00 AM	11:03 AM		11:26 AM	11:47 AM	11:51 AM
12:00 PM	12:03 PM		12:26 PM	12:47 PM	12:51 PM
1:00 PM	1:03 PM		1:26 PM	1:47 PM	1:51 PM
2:00 PM	2:03 PM		2:26 PM	2:47 PM	2:51 PM
3:00 PM	3:03 PM		3:26 PM	3:47 PM	3:51 PM
3:30 PM	3:33 PM		3:56 PM	4:17 PM	4:21 PM
4:00 PM	4:03 PM		4:26 PM	4:47 PM	4:51 PM
4:30 PM	4:33 PM		4:56 PM	5:17 PM	5:21 PM
5:00 PM	5:03 PM	5:14 PM	5:31 PM	5:52 PM	5:56 PM
5:30 PM	5:33 PM		5:56 PM	6:17 PM	6:21 PM
6:00 PM	6:03 PM		6:26 PM	6:47 PM	6:51 PM

Source: LSC, 2014

Table XII-5
North Community

Transit Center Depart	Los Alamos High School	Mountain Elementary (Outbound)	Mountain Elementary (Inbound)	U of NM - Los Alamos	Transit Center Arrive
6:00 AM	6:03 AM	6:06 AM	6:16 AM	6:23 AM	6:26 AM
6:30 AM	6:33 AM	6:36 AM	6:46 AM	6:53 AM	6:56 AM
7:00 AM	7:03 AM	7:06 AM	7:16 AM	7:23 AM	7:26 AM
7:30 AM	7:33 AM	7:36 AM	7:46 AM	7:53 AM	7:56 AM
8:00 AM	8:03 AM	8:06 AM	8:16 AM	8:23 AM	8:26 AM
8:30 AM	8:33 AM	8:36 AM	8:46 AM	8:53 AM	8:56 AM
9:00 AM	9:03 AM	9:10 AM	9:20 AM	9:23 AM	9:26 AM
9:30 AM	9:33 AM	9:40 AM	9:50 AM	9:53 AM	9:56 AM
10:00 AM	10:03 AM	10:10 AM	10:20 AM	10:23 AM	10:26 AM
10:30 AM	10:33 AM	10:40 AM	10:50 AM	10:53 AM	10:56 AM
11:00 AM	11:03 AM	11:10 AM	11:20 AM	11:23 AM	11:26 AM
11:30 AM	11:33 AM	11:40 AM	11:50 AM	11:53 AM	11:56 AM
12:00 PM	12:03 PM	12:10 PM	12:20 PM	12:23 PM	12:26 PM
12:30 PM	12:33 PM	12:40 PM	12:50 PM	12:53 PM	12:56 PM
1:00 PM	1:03 PM	1:10 PM	1:20 PM	1:23 PM	1:26 PM
1:30 PM	1:33 PM	1:40 PM	1:50 PM	1:53 PM	1:56 PM
2:00 PM	2:03 PM	2:10 PM	2:20 PM	2:23 PM	2:26 PM
2:30 PM	2:33 PM	2:40 PM	2:50 PM	2:53 PM	2:56 PM
3:00 PM	3:03 PM	3:10 PM	3:20 PM	3:23 PM	3:26 PM
3:30 PM	3:33 PM	3:40 PM	3:50 PM	3:53 PM	3:56 PM
4:00 PM	4:03 PM	4:10 PM	4:20 PM	4:23 PM	4:26 PM
4:30 PM	4:33 PM	4:40 PM	4:50 PM	4:53 PM	4:56 PM
5:00 PM	5:03 PM	5:10 PM	5:20 PM	5:23 PM	5:26 PM
5:30 PM	5:33 PM	5:40 PM	5:50 PM	5:53 PM	5:56 PM
6:00 PM	6:03 PM	6:10 PM	6:20 PM	6:23 PM	6:26 PM
6:30 PM	6:33 PM	6:40 PM	6:50 PM	6:53 PM	6:56 PM

Source: LSC, 2014

Table XII-6
Barranca Mesa

Transit Center Depart	Pueblo Complex	Barranca Mesa Elementary	Barranca Mesa Elementary	Across from Pueblo Complex	Transit Center Arrive
6:00 AM	6:10 AM	6:23 AM	6:32 AM	6:45 AM	6:55 AM
7:00 AM	7:10 AM	7:23 AM	7:32 AM	7:45 AM	7:55 AM
8:00 AM	8:10 AM	8:23 AM	8:32 AM	8:45 AM	8:55 AM
9:00 AM	9:10 AM	9:23 AM	9:32 AM	9:45 AM	9:55 AM
10:00 AM	10:10 AM	10:23 AM	10:32 AM	10:45 AM	10:55 AM
11:00 AM	11:10 AM	11:23 AM	11:32 AM	11:45 AM	11:55 AM
12:00 PM	12:10 PM	12:23 PM	12:32 PM	12:45 PM	12:55 PM
1:00 PM	1:10 PM	1:23 PM	1:32 PM	1:45 PM	1:55 PM
2:00 PM	2:10 PM	2:23 PM	2:32 PM	2:45 PM	2:55 PM
3:00 PM	3:10 PM	3:23 PM	3:32 PM	3:45 PM	3:55 PM
4:00 PM	4:10 PM	4:23 PM	4:32 PM	4:45 PM	4:55 PM
5:00 PM	5:10 PM	5:23 PM	5:32 PM	5:45 PM	5:55 PM
6:00 PM	6:10 PM	6:23 PM	6:32 PM	6:45 PM	6:55 PM

Source: LSC, 2014

Table XII-7
North Mesa

Transit Center Depart	Los Alamos High School	Los Alamos MS (San Ildefonso & Cumbres Dr)	Los Alamos MS (San Ildefonso & Cumbres Dr)	University of NM - Los Alamos	Transit Center Arrive
6:00 AM	6:04 AM	6:18 AM	6:37 AM	6:51 AM	6:55 AM
6:30 AM	6:34 AM	6:48 AM	7:07 AM	7:21 AM	7:25 AM
7:00 AM	7:04 AM	7:18 AM	7:37 AM	7:51 AM	7:55 AM
7:30 AM	7:34 AM	7:48 AM	8:07 AM	8:21 AM	8:25 AM
8:00 AM	8:04 AM	8:18 AM	8:37 AM	8:51 AM	8:55 AM
9:00 AM	9:04 AM	9:18 AM	9:37 AM	9:51 AM	9:55 AM
10:00 AM	10:04 AM	10:18 AM	10:37 AM	10:51 AM	10:55 AM
11:00 AM	11:04 AM	11:18 AM	11:37 AM	11:51 AM	11:55 AM
12:00 PM	12:04 PM	12:18 PM	12:37 PM	12:51 PM	12:55 PM
1:00 PM	1:04 PM	1:18 PM	1:37 PM	1:51 PM	1:55 PM
2:00 PM	2:04 PM	2:18 PM	2:37 PM	2:51 PM	2:55 PM
3:00 PM	3:04 PM	3:18 PM	3:37 PM	3:51 PM	3:55 PM
3:30 PM	3:34 PM	3:48 PM	4:07 PM	4:21 PM	4:25 PM
4:00 PM	4:04 PM	4:18 PM	4:37 PM	4:51 PM	4:55 PM
4:30 PM	4:34 PM	4:48 PM	5:07 PM	5:21 PM	5:25 PM
5:00 PM	5:04 PM	5:18 PM	5:37 PM	5:51 PM	5:55 PM
5:30 PM	5:34 PM	5:48 PM	6:07 PM	6:21 PM	6:25 PM
6:00 PM	6:04 PM	6:18 PM	6:37 PM	6:51 PM	6:55 PM

Source: LSC, 2014

Table XII-8
Proposed Service Plan

Option	Service Description	Actual roundtrip Time	# of Vehicles (maximum)	Total Daily		Total Annual		Operating Days	Annual Operating Cost	Cost per Passenger
				Vehicle - Miles	Vehicle - Hours	Vehicle - Miles	Vehicle - Hours			
Downtown Circulator	M-F 6:00 am to 7:00 pm; 30 mins, 15 mins mid-day	26 minutes	2	198.00	16.50	49,698	4,142	251	$381,440	$ 3.18
White Rock	M-F 6:30 am to 7:00 pm; 60 mins	54 minutes	1	306.25	12.50	76,869	3,138	251	$361,412	$ 10.63
Main Hill	M-F 6:00 am to 7:30 pm, 60 mins	59 minutes	1	344.25	13.50	86,407	3,389	251	$396,583	$ 9.91
Canyon/Central	M-F 6:00 am to 7:00 pm; 60 mins	50 minutes	1	132.60	13.00	33,283	3,263	251	$289,679	$ 9.66
North Community	M-F 6:00 am to 7:00 pm; 30 mins (all day)	26 minutes	1	234.00	13.00	58,734	3,263	251	$336,691	$ 10.20
Barranca Mesa	M-F 6:00 am to 7:00 pm; 60 mins (all day)	50 minutes	1	169.00	13.00	42,419	3,263	251	$306,556	$ 9.58
North Mesa	M-F 6:00 am to 7:00 pm; 60 mins, 30 mins peak	54 minutes	2	234.00	18.00	58,734	4,518	251	$424,461	$ 4.24
Evening Demand-Response Service	M-F 6:00 pm to 9:00 pm	varies	2	72.00	6.00	18,072	1,506	251	$138,705	$ 13.87
			11			**424,215**	**26,481**	**251**	**$2,635,528**	$ 6.61

Source: LSC, 2014.

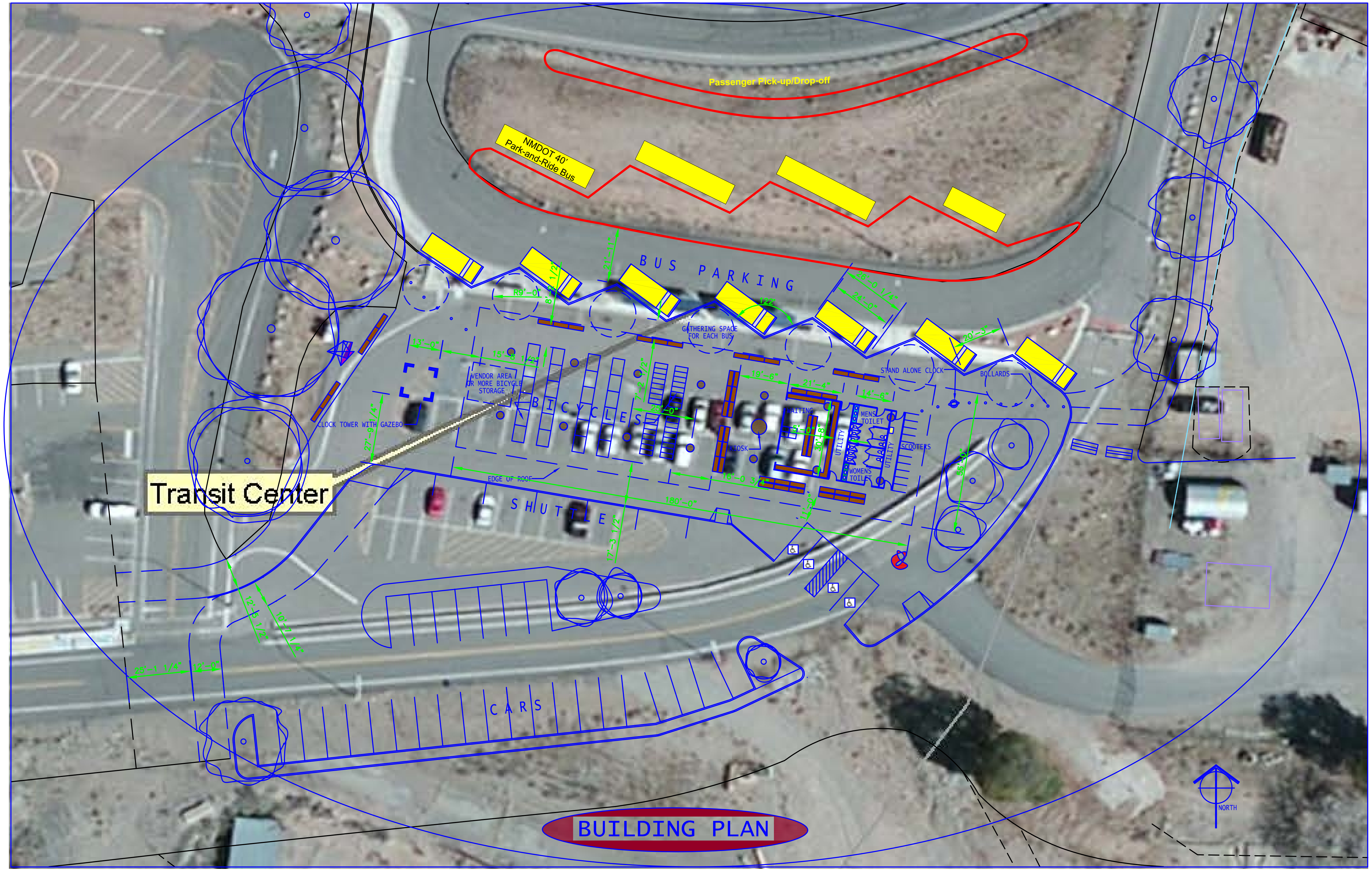
FACILITY REQUIREMENTS

The existing transit center is located near the intersection of Diamond Drive and West Jemez Road, near the Los Alamos National Laboratory (LANL). Presently, all of ACT routes (Routes 1 through 6), NCRTD, and the NMDOT park-and-ride bus provide a stop at this transit center. This transit center lacks proper amenities and needs to be developed. ACT currently uses over one Full-Time Equivalent driver just for travel between the Transit Center and PCS.

There should be separate lanes for ACT, NMDOT park-and-ride, and private cars at the transit center so there is free flow of traffic entering and exiting the transit center. A break room, along with restrooms, must be available for drivers in the transit center. The passenger shelters at the transit center should be improved so that they protect passengers from rain and winter weather and make the public transit experience a pleasant one. Finally, a stop signal must be installed for the traffic leaving LANL, so that the buses can turn left across existing traffic. This signal should be an actuated signal which would be activated by the presence of a bus approaching the transit center. This is both a safety issue and an operational effectiveness issue. Figure XII-8 illustrates modifications to the proposed transit center based on the LANL Project Initiation and Site Services (May 2009) plan. A separate lane was added to accommodate four more buses—three NMDOT park-and-ride buses (Purple Route, Green Route, and Blue Route), and one NCRTD bus (Espanola-Los Alamos-Pojoaque Bus Route).

If it is not possible to improve the transit center at the current location on LANL property, ACT should consider using the County owned land near the intersection of Canyon and Diamond (the “Lemon Lot”) as shown in Figure XII-9. This site is less desirable because of space and operational issues. However, the importance of a good facility outweighs these factors.

Figure XII-8
Proposed Transit Center Modifications



Infrastructure Planning

LANL Project Initiation & Site Services

Drawing modified by LSC Transportation Consultants, Inc.

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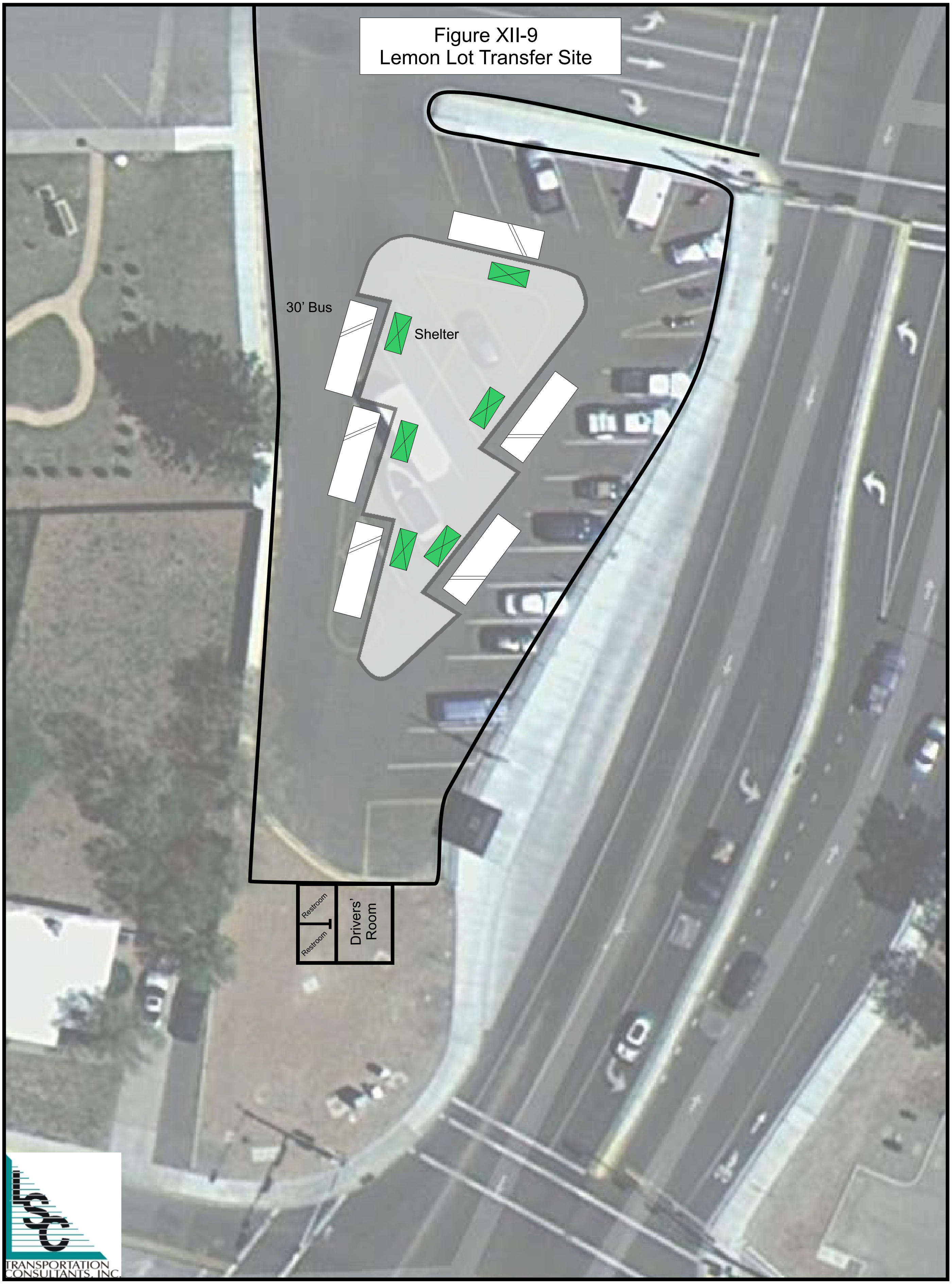

Figure XII-9
Lemon Lot Transfer Site

FUNDING ALTERNATIVES

This section provides an evaluation of potential funding alternatives for Atomic City Transit (ACT). There are a variety of funding sources, many of which ACT is already taking advantage of. This includes a variety of Federal Transit Administration (FTA) funds, NCRTD Regional Transit Gross Receipts Tax (GRT), the Los Alamos County General Fund, and funding from Bandelier. One of the principal challenges facing any transit service is developing a funding system that supports capital investment (such as buses/transit vehicles, bus stops, shelters, etc.) and provides a stable source of revenue for operations and maintenance. An important objective of this study is to present recommendations for a financing plan for public transit that is acceptable to the parties involved and that can be realistically implemented. With this goal in mind, the following discussion presents an analysis of the most appropriate funding sources and a basis for making a decision.

Funding Sources

Successful transit systems are strategic about funding and attempt to develop funding bases that enable them to operate reliably and efficiently within a set of clear goals and objectives according to both short-range and long-range plans. Potential strategies for funding the transit services in Los Alamos are described below.

Capital Funding

The transit services will require capital funding for bus/transit vehicle fleet procurement, bus stops, computers, automatic vehicle locator (AVL), and other administration capital. The following strategies for funding the capital development should be considered:

- Federal funding should be applied for within the existing Federal Transit Administration (FTA) Sections 5310 and 5311 programs. Small transit systems often under achieve their potential for federal grant assistance because they assume that they cannot compete in this arena. Close coordination with the New Mexico Department of

Transportation's (NMDOT) Transit and Rail Division will help Atomic City Transit (ACT) remain aware of funding opportunities and compete for funding.

- Planning for capital facilities (such as vehicles and transit and maintenance facilities) examines the long-range transit system's development needs. Many transit systems outgrow their facilities quickly and face costly relocation and expansion needs because of inadequate space or other constraints. ACT should continue to include specific provisions for fleet replacement and other capital investments. Note that buses/transit vehicles and certain other capital facilities purchased with federal participation (80 percent under MAP-21) are also eligible for federal participation toward replacement costs once the buses, transit vehicles, and facilities reach maturity (as defined in the FTA rules).

Operations and Maintenance Funding

Over time, the primary financial requirement of a transit system will be funding routine operations and maintenance, including daily transit service, vehicle maintenance, and system administration. In general, labor represents about 75 percent of the costs of operating transportation, with much of that going to drivers' salaries. The following strategies for funding operations and maintenance should be considered:

- Reliance on general fund appropriations from local governments should be avoided, if possible. It is common for local and regional transit agencies to be dependent on annual appropriations from their constituent towns, cities, and/or counties. As a practical matter, this means it will not be possible to forecast future funding levels, given the exigencies of local government funding. Such an agency will be unable to undertake capital planning and will continually face potential service cutbacks. This, in turn, makes it difficult or impossible for the transit agency to enter into partnership arrangements with other agencies or with private entities. Transit agencies, like highway agencies, require that most or all of their operations and maintenance funding comes from dedicated sources so that they can undertake responsible planning and offer reliable, consistent service.

- Operations and maintenance funding mechanisms should be designed to anticipate transit system growth. Successful rural and small urban transit systems around the country are experiencing annual growth in ridership. It is important to be able to respond to such growth by increasing the service levels to meet the transit demand. This means that the ideal funding sources for operations and maintenance are those that have the flexibility to be increased or expanded as the transit demand grows. Such flexibility will, in most cases, require voter approval. The advantages of the various funding sources are described in the following paragraphs. The important consideration is that the need for growth has been anticipated, and that the potential for larger budgets is not precluded by the choice of a specific funding source.

Overall Service Considerations

There are also a few overarching considerations in developing a coherent transit system funding strategy including the following:

- Issues of funding and service equity are of paramount importance in designing funding systems. Informal systems based on annual appropriations and systems without specific accounting for the distribution of costs and benefits struggle with local elected bodies to find acceptable allocations of cost responsibility. This can become a significant barrier to coordinated system establishment and, later, to system growth.

- The strongest transportation systems are those that make extensive use of partnerships. Examples include partnerships with private companies, partnerships with national parks or other major public facilities, and partnerships with adjacent jurisdictions. Partnership arrangements enable a transit system to broaden its base of beneficiaries, expand its funding source alternatives, achieve better governance, and improve public support.

Potential Local and Regional Funding Sources

The principal funding sources for local and regional transit systems in New Mexico are described below.

General Fund Appropriations

Counties and municipalities may appropriate funds for transit operations, maintenance, and capital needs. Money to be appropriated generally comes from local gross receipts taxes. Competition for such funding is high and local governments generally do not have the capacity to undertake major new annual funding responsibilities for transit.

Advertising

One modest but important source of funding for many transit agencies is on-vehicle advertising. The largest portion of this potential is for exterior advertising, rather than interior "bus card" advertising. The potential funds generated by advertising placed within the vehicles are comparatively low. Advertising on bus shelters has also been used to pay for the cost of providing the shelter. Some systems have used full bus "wraps" as a means of generating significant revenue.

Voluntary Assessments

The voluntary assessments alternative requires each participating governmental entity and private business to contribute to the funding of the transit system on a year-to-year basis. This alternative is common with transit agencies that provide regional service rather than service limited to a single jurisdiction. The main advantage of voluntary assessment funding is that it does not require voter approval. However, the funding is not steady and may be discontinued at any time.

Private Support

Financial support from private industry is essential to providing adequate transportation services in Los Alamos. The major employer in Los Alamos like the Los Alamos National Laboratory (LANL) and the Bandelier National Monument are potential sources of revenue. These employers may be willing to help support the cost of alternative fuel vehicles or the operating costs for employee transportation.

Transportation Impact Fees

Traditional methods of funding the transportation improvements required by new development, raises questions of equity. Sales taxes and property taxes are applied to both existing residents and new residents attracted by the development. However, existing residents then inadvertently pay for the public services required by the new residents. As a means of correcting this inequity, many communities nationwide (faced with strong growth pressures) have implemented development impact fee programs that place a fee upon new developments equal to the costs imposed on the community.

Previous work by LSC indicates that the levy of impact fees on real estate development has become a commonplace tool in many regions, to ensure that the costs associated with a development do not fall entirely upon the existing residents. Impact fees have been used primarily for highways and roadways, followed by water and sewer projects. A program specifically for mass transit has been established in San Francisco. However, this is not a likely source for transit funding in rural New Mexico.

A number of administrative and long-term considerations must be addressed:

- It is necessary to legally ensure that the use on which the fees are computed, would not change in the future to a new use with a high impact, by placing a note restricting the use on the face of the plat recorded in public records.
- The fee program should be reviewed annually.
- The validity of the program, and its acceptability to the community, is increased if a time limit is placed on the spending of collected funds.
- TIF funds need to be strictly segregated from other funds.
- The imposition of a TIF program could constrain capital funding sources developed in the future, as a new source may result in a double payment.
- TIF fees should be collected at the time that a building permit is issued.

Hotel Bed Tax

The appropriate use of lodging taxes (occupancy taxes) has long been the subject of debate. Historically, the bulk of lodging taxes are used for marketing and promotion efforts for conferences and general tourism. In other areas, such as resorts, the lodging tax is an important element of the local transit funding formula. A lodging tax can be considered a specialized sales tax placed only upon lodging bills. As such, it shares many of the advantages and disadvantages of a sales tax. Taxation of this type has been used successfully in Park City, Utah; Sun Valley, Idaho; Telluride, Colorado; and Durango, Colorado. A lodging tax creates inequities between different classes of visitors as it is only paid by overnight visitors. The day visitors (particularly prevalent in the summer) and condominium/second home owners, who may use the transit system as much as the lodging guests, do not contribute to this transit funding source.

Gross Receipts Tax

A gross receipts tax could be held with funds to go to transit services. Sales tax or a gross receipts tax is the financial base for many transit services in the western United States. The required level of gross receipts tax would depend upon the service alternatives chosen. One advantage is that sales tax/gross receipts tax revenues are relatively stable and can be forecast with a high degree of confidence. In addition, gross receipts tax can be collected efficiently, and it allows the community to generate revenues from visitors in the area.

This source, of course, would require legislative approval and a vote of the people to implement. In addition, a gross receipts tax increase could be seen as inequitable to residents not served by transit. This disadvantage could be offset by the fact that gross receipts tax could be rebated to incorporated areas not served by transit. Transit services, moreover, would face competition from other services which may seek to gain financial support through gross receipts taxes. The North Central Regional Transit District which contains Los Alamos County is funded by a one-eighth cent transit gross receipts tax. The gross receipts tax rate varies throughout New Mexico from 5.125% to 8.6875%.

Regional Transit Districts (RTD)

New Mexico statues allow the creation of Regional Transit Districts with no direct taxing authority. The purpose of the Regional Transit District Act is to "serve the public by providing efficient public transit services, allowing multijurisdictional public transit systems to reduce the congestion of single-occupant motor vehicle traffic by providing transportation options for residents, and provide residents with a choice of transportation alternatives so that seniors, youth, low-income and mobility-impaired residents and others unable to drive or afford motor vehicles continue to have full access to the goods, services, jobs and activities of the community" among other purposes listed in the statute. Chapter 73- Special Districts, Article 25: Regional Transit District Sections 73-25-1 though Section 73-25-19 2013 in the New Mexico Statutes provides details on the Regional Transit Districts. The North Central Regional Transit District (NCRTD) was developed through this statute.

Federal Transit Funding Sources

On July 6, 2012, President Obama signed Moving Ahead for Progress in the 21st Century Act (MAP-21) and extended the current law Safe, Accountable, Flexible, and Efficient Transportation Equity Act - A Legacy for Users (SAFETEA-LU) providing $10.578 billion in authorized funding for federal surface transportation programs for FY2013. MAP-21 and the new provisions of the law went into full effect October 1, 2012. It authorized programs for two years, through September 30, 2014.

MAP-21 builds on many of the strengths of rural transit's favorable treatment in SAFETEA-LU, TEA-21, and the Intermodal Surface Transportation Efficiency Act (ISTEA), the preceding highway and transit authorizations. Some of the desirable aspects of the rural transit program are brought into other elements of federal transit investment and an increased share of the total federal transit program will be invested in rural areas under this new legislation.

The highlights of MAP-21 for FTA grantees are listed below:

- It is a steady and predictable funding.
- It consolidates certain transit programs to improve efficiencies.

- There are targeted funding increases particularly for improving the state of good repair.
- There are new reporting requirements.
- It requires performance measures for the state of good repair, planning, and safety.

Information provided below was gathered from FTA's implementation of MAP-21. Listed below are descriptions of federal funding programs that may be used by the area's providers:

- ***Safety Authority 5329:*** This is a new program under MAP-21. FTA granted new Public Transportation Safety Authority. It provides additional authority to set minimum safety standards, conduct investigations, audits, and examinations. It overhauls state safety oversight. There are new safety requirements for all recipients.
- ***FTA Section 5310 Enhanced Mobility of Seniors and Individuals with Disabilities (New Freedom):*** This grant consolidates the 5310 and New Freedom program eligibilities into a single formula program. In fiscal years 2013 and 2014, $255 million and $258 million in funding are authorized, respectively.
- ***FTA Section 5311 Rural Area Formula Grants:*** This program consolidates the 5311 and JARC-eligible activities into a single program. This program provides funding to states for the purpose of supporting public transportation in rural areas (population less than $50,000). The program establishes a $5 million discretionary and $25 million formula tribal grant program. In fiscal years 2013 and 2014, there are $600 million and $608 million in funding authorized, respectively.
- ***FTA Section 5312 Research, Development, Demonstration, and Deployment:*** This grant separates research from technical assistance, training, and workforce development. It creates a competitive deployment program dedicated to the acquisition of low- or no-emission vehicles and related equipment and facilities. In fiscal years 2013 and 2014, there are $70 million in general fund authorization each year.

Transportation and Community System Preservation Program

The Transportation and Community System Preservation Program is funded by the Federal Highway Administration to provide discretionary grants for developing strategic transportation plans for local governments and communities. The goal of the program is to promote livable neighborhoods. Grant funds may be used to improve the safety and efficiency of the transportation system; reduce adverse environmental impacts caused by transportation; and encourage economic development through access to jobs, services, and centers of trade.

Temporary Assistance for Needy Families

States receive the Temporary Assistance for Needy Families (TANF) grants to provide cash assistance, work opportunities, and necessary support services for needy families with children. States may choose to spend some of their TANF funding on transportation and related services for program beneficiaries.

Head Start Program

Head Start is a program of comprehensive services for economically disadvantaged preschool children. Funds are distributed to local public and nonprofit agencies to provide child development and education services, as well as supportive services such as transportation. Head Start funding can be used to provide transportation service, acquire vehicles, and provide technical assistance to local Head Start centers.

Other Federal Funds

The US Department of Transportation funds other programs, including the Research and Special Programs Administration and the National Highway Traffic Safety Administration's State and Community Highway Grants Program (which funds transit projects that promote safety). A wide variety of other federal funding programs provide support for elderly and handicapped transportation programs, including the following:

- Retired Senior Volunteer Program
- Title IIIB of The Older Americans Act
- Medicaid Title XIX
- Veterans' Affairs

- Job Training Partnership Act
- Developmental Disabilities
- Housing and Urban Development - Bridges to Work and Community Development Block Grants
- Department of Energy
- Vocational Rehabilitation
- Health Resources and Services Administration
- Senior Opportunity Services
- Special Education Transportation
- Justice Department - Weed and Seed Program
- National Endowment for the Arts
- Agriculture Department - Rural Enterprise Community Grants
- Department of Commerce - Economic Development and Assistance Programs
- Environmental Protection Agency - Pollution Prevention Projects

Funding Summary

Experience with transit systems across the nation underscores the critical importance of dependable (preferably dedicated) sources of funding if the long-term viability of transit service is to be assured. Transit agencies that are dependent upon annual appropriations and informal agreements have suffered from reduced ridership (because passengers are not sure if service will be provided from one year to the next), high driver turnover (contributing to low morale and a resulting high accident rate), and inhibited investment in both vehicles and facilities.

The advantages of financial stability indicate that a mix of revenue sources is prudent. The availability of multiple revenue sources helps to avoid large swings in available funds which can lead to detrimental reductions in service. As the benefits of transit service extend over more than one segment of the community, dependence upon more than one revenue source helps to ensure that costs and benefits are equitably allocated. It is clear that a hybrid of these alternatives will be necessary if the short-term and long-range goals of the transit system and the community are to be met.

FINANCIAL PLAN

This section presents a financial plan with projected expenditures and revenues for Atomic City Transit. Table XII-9 presents a five-year transit plan, with the assumption of an annual five percent inflation rate. As detailed in the preferred service plan, the cost projection incorporates the following elements:

Table XII-9
Transit Financial Plan, 2015-2020 (assumed 5% inflation)

	2015	2016	2017	2018	2019	2020
EXPENSES						
OPERATING						
Restructured Routes	$2,767,380	$2,905,749	$3,051,036	$3,203,588	$3,363,768	$3,531,956
School Tripper Service	$136,500	$143,325	$150,491	$158,016	$165,917	$174,212
ADA Complementary Paratransit	$472,500	$496,125	$520,931	$546,978	$574,327	$603,043
Marketing Program*	$8,000	$8,400	$8,820	$9,261	$9,724	$10,210
Subtotal	**$3,384,380**	**$3,553,599**	**$3,731,279**	**$3,917,843**	**$4,113,735**	**$4,319,422**
Capital						
Transit Facility		$1,000,000				
Vehicles- 30' heavy duty buses, 15-passenger cutaways, and a minvan	$940,000	$1,500,000	$300,000	$1,240,000	$600,000	$1,200,000
Subtotal	**$940,000**	**$2,500,000**	**$300,000**	**$1,240,000**	**$600,000**	**$1,200,000**
TOTAL EXPENSES	**$4,324,380**	**$6,053,599**	**$4,031,279**	**$5,157,843**	**$4,713,735**	**$5,519,422**
REVENUES						
REVENUES						
Operation						
FTA 5311 Operational Funding^	$1,390,090	$1,459,595	$1,532,574	$1,609,203	$1,689,663	$1,774,146
Subtotal	**$1,390,090**	**$1,459,595**	**$1,532,574**	**$1,609,203**	**$1,689,663**	**$1,774,146**
Capital						
FTA 5310/5311 Grant Funding*	$752,000	$2,000,000	$240,000	$992,000	$480,000	$960,000
Subtotal	**$752,000**	**$2,000,000**	**$240,000**	**$992,000**	**$480,000**	**$960,000**
Local Revenues						
Operational (Local Match)	$1,974,290	$2,084,005	$2,188,705	$2,298,640	$2,414,072	$2,525,276
Capital (Local Match)	$188,000	$500,000	$60,000	$248,000	$120,000	$240,000
Advertising	$20,000	$10,000	$10,000	$10,000	$10,000	$20,000
Subtotal	**$2,182,290**	**$2,594,005**	**$2,258,705**	**$2,556,640**	**$2,544,072**	**$2,785,276**
TOTAL REVENUES	**$4,324,380**	**$6,053,599**	**$4,031,279**	**$5,157,843**	**$4,713,735**	**$5,519,422**

*An 80% federal share was estimated.
**This is based on a portion of the money already spent on transportation. It is used to leverage more federal funds.
^A 50% federal share was estimated for operations.

Source: LSC, 2014.

Operating Plan

- Reconfiguring of the current transit routes.
- A marketing/public education program to support the transition from the current to the future system configuration.

Capital Expenses

- Modifying the ACT transit Center
- Vehicle Purchases

ORGANIZATION AND POLICY RECOMMENDATIONS

Current policies of ACT were reviewed and recommendations made for each of the current policies. In addition, recommendations are provided for the certification process for ADA complementary paratransit. The recommendations for specific policies are included in Appendix F.

Complementary Paratransit Certification Process

As part of the Training and Technical Assistance Review conducted by the New Mexico Department of Transportation in 2014, the lack of process for certifying eligibility for ADA complementary paratransit service was cited as a deficiency. The following are the recommendations for a process to be implemented by ACT.

- Develop an application form for eligibility.
- Develop a Healthcare Professional verification form to be completed by the applicant's healthcare provider.
- Post information on the website describing the certification process and eligibility standards for paratransit service. The website should include a self-evaluation checklist to help the individual determine the potential for eligibility.
- Require that applicants contact ACT to request the application forms. As part of the initial contact, the receptionist should conduct a short interview regarding the applicant's need for paratransit service.
- When the applicant has completed the application forms, an interview will be scheduled with the ACT staff person responsible for determining

eligibility. This interview should take place within five working days of receipt of the completed application. During the interview, questions will be asked about the person's functional abilities including walking to a bus stop, climbing stairs, using a lift or ramp to board the bus, and cognitive abilities to use the fixed-route service. The focus should be on functional abilities and not the specific type of disability. Additional information may be requested from the healthcare provider if needed to support the determination of eligibility.

- A determination of eligibility must be completed within 21 days for receipt of the completed application.
- Establish an appeals process and form an appeals review committee. The appeals committee should not include the staff member making the original determination. The appeals committee may include County employees outside of the transit department and may include a member of the Transportation Board.
- Limit use of the complementary paratransit service only to those individuals who have been certified as eligible.
- Require all individuals who are certified to go through recertification every five years. Recertification may be done through a telephone call to determine if the person continues to need the paratransit service.

Other elements could be added to the certification process. These include a functional assessment and conditional eligibility. These are not recommended as the cost to implement would outweigh the cost savings which might be found through these processes.

A travel training program is recommended. This should be offered to individuals who may be able to use the fixed-route service routinely or on occasion with personalized training. These individuals may find that fixed-route options work well for certain trips and may reduce the demand for paratransit service.

Once the certification process has been implemented, use of the complementary paratransit service must be limited only to those individuals who have been certified. This will require support of higher management and elected officials within the County. Implementation of the process will require education of the policy makers so that the need for the process and the process itself are understood.

The staff member who will be responsible for eligibility determinations should receive training. There are several training programs available including training provided through Easter Seals Project Action. This training should be provided prior to starting the certification process.

MARKETING PROGRAM

Atomic City Transit has done well promoting the services they provide. Based on the 2014 onboard survey, a large percentage of riders get their source of information from drivers and the ACT website. Atomic City has good signage on its bus stops to indicate the bus routes it serves. Some of the marketing efforts that Atomic City Transit could improve are:

Developing a new brochure which includes the transit routes and schedule. This should also be available to the drivers, as 34 percent of survey respondents get their source of information from drivers (2014 Onboard Survey).

In the age of the internet, it is important that ACT do all they can to disseminate their information online in ways that can be easily accessed. Atomic City Transit website should have an interactive system map with links to schedules and detailed route maps. According to the 2014 onboard survey, 44 percent of survey respondents get their information from ACT website/internet.

Atomic City Transit should market the 'fare-free service' which they already provide. They could highlight how using transit will alleviate parking issues and how it is good for the environment.

Bus stops are a good opportunity to build visibility of Atomic City Transit and convey passenger information. Atomic City Transit should take steps to install bus stop schedules at all bus stops and shelters. The sign pole should also have space to display the scheduled times for the routes serving that stop. This improvement should be implemented for all stops within the system. Bus schedules of all routes should be available at the Atomic City Transit Center and at points where two or more buses converge.

Atomic City Transit is in the process of installing Automated Vehicle Location (AVL) systems in vehicles so that vehicle location will be reported automatically and be observed by dispatchers. The data obtained through this system will allow Atomic City Transit to provide real-time schedule information to passengers. ACT can include unique stop identifier numbers at bus stops that will allow passengers to track bus arrivals on a smart phone. These features should be publicized by Atomic City Transit.

ACT should also initiate a marketing program, intended to support the transition from the current system to the future system configuration and to relay the new route information to the consumer.

This should include a route map illustration to be used in all marketing. Introductory campaign recommendations include submitting announcement materials to community bulletin boards, neighborhood groups, and others before rolling out the introductory campaign. It is recommended to provide posters, route maps, and flyers to government agencies, public and private schools, businesses, hospital, and retirement homes.

It is recommended to run newspaper advertisements (local introduction ads), as well as other print publications located in communities throughout Los Alamos. The newspaper advertisements should target the zones that include LANL, the hospital and medical centers, the human service agencies, and other local community stakeholders.

MONITORING PROGRAM

This section provides information on databases, and standard reports which should be prepared. Data to be collected falls into three basic categories—ridership data, on-time performance, and financial.

Ridership

Passenger boarding data should be collected continually on a time-specific basis. There is a trade-off between data collection efforts and the value of information. It is just as easy to collect too much data as it is to collect insufficient data.

With the installation of AVL, Atomic City Transit will be able integrate ridership data with the GPS system to allow passenger boarding data to be collected at the bus stop level. Passenger boardings should be recorded daily by route and by trip.

An onboard passenger survey should be conducted periodically. We recommend that a survey be conducted six months after major service changes have been implemented. Following that, passenger surveys should be conducted at least every two years. Survey instruments with questions appropriate for Atomic City Transit should collect information about passenger demographics, trip characteristics, and perceptions of the transit service. The onboard survey completed in 2014 would be an excellent sample questionnaire for future years.

On-Time Performance

With any transit system, it is important to monitor on-time performance. An on-time performance goal should be established. For instance, an attainable on-time goal of 95 percent for the service may be considered for system changes. Minor adjustments to routes may be needed to ensure that schedules and headway adherence can be maintained.

To record on-time performance, the AVL system should record actual arrival and departure times at designated bus stops along the routes and at major stops. It should be emphasized that drivers should not leave prior to a scheduled stop time in order to make up time along a route. Leaving early could cause riders to miss a bus.

Financial Data

ACT should carefully track financial data. Accounts should be kept so that separate costs can be tracked for each route. Financial data are required to evaluate performance measures such as the operating cost per hour of service and the cost per passenger-trip.

Performance Monitoring

Transit performance measures serve as a guide to find out how a transit system performs. Performance measures define the types of data to be collected, and gives the tools necessary to identify transit system deficiencies and opportunities.

It is worth noting that criteria used for the selection of performance measures include the following:

- Be measurable.
- Have a clear and intuitive meaning so that it is understandable to those who will use it and to non-transportation professionals.
- Be acceptable and useful to transportation professionals.
- Be comparable across time and between geographical areas.
- Have a strong functional relationship to actual system operations so that once changes occur in system operations, changes to the system can readily be determined.
- Provide the most cost-effective means of data collection.
- Where appropriate, be based on statistically sound measurement techniques.
- Be consistent with measures identified for other systems.

Performance measure categories that should be used include:

- On-time Performance
- Missed/Late Trips
- Passenger No-Shows
- Service Denials
- Fleet Maintenance

Many of these measures have been described above. Other performance measures that should be used are:

Passengers/Hour: Number of total monthly and annual passengers divided by the corresponding revenue-hours.

Passengers/Mile: Number of total annual passengers divided by the annual revenue-miles.

Cost/Trip: Total expenses divided by total annual one-way trips.

Passenger-Miles: Passenger-miles are one of the most difficult performance measures to calculate. Multiplying total system miles by one-way passenger-trips does not give a good measure of passenger-miles. This involves very detailed data collection to get average passenger-miles per route. One way is to take an average trip length multiplied by systemwide miles or sample passenger activity.

Vehicle-Miles/Service Area: A good measure of the level of service being provided. The service area must be realistically identified. As an example, a county system may say they serve the entire county, but in fact much of the county is very rural and service is never provided.

Service/Road Calls: Vehicle breakdowns are inevitable. This measures the distance traveled between mechanical breakdowns. Although frequent occurrences can create disruptions in a transit system, it is important to track the frequency and type of mechanical failures of each vehicle in addition to monitoring a fleet's age. Monitoring of vehicle breakdowns is one method of reducing system disruptions and may allow an agency to improve monitoring of vehicle replacement schedules and preventative maintenance practices. Data collection efforts should include date, time of day, type of failure, age of vehicle, vehicle number, vehicle mileage, and how the situation was rectified. Monitoring of these items will allow an agency to recognize repeated types of mechanical breakdowns, breakdowns related to vehicle type, age or mileage, and assist with preventative maintenance programs. Wheelchair lift failures should also be monitored. Data should be included in the monthly report.

Accidents/1,000 Miles: Measure of driver safety. Accidents must be defined as a standard.

Average Age of Fleet: A good single indicator of vehicle replacement needs, although individual vehicle inventories, ages, and mileage should be tracked.

Cost/Revenue-Hour: An excellent indicator of efficiency is cost per revenue-hour of service. Costs per hour should be analyzed by route and compared to overall system averages.

ACT should provide monthly performance reports. The report should include performance data for the current month, the same month in the previous year, year-to-date performance, and the prior year-to-date performance. Information which should be reported includes passenger boardings by route, passengers per revenue-hour by route, total passengers, and system passengers per revenue-hour. Financial information should be reported including the operating cost and the cost per passenger.

Quarterly reports should be considered for providing recent trends and interim performance data to elected officials, the public, and other stakeholders. Additionally, an annual report should be compiled and presented. The information for these reports can be easily generated from the databases and the accounting system.

IMPLEMENTATION SCHEDULE

The recommended service plan should be implemented prior to the start of school in the summer of 2015. This will avoid disruption of transportation service once the school year has begun. This is an important consideration in Los Alamos because of the large number of school students using ACT for travel to and from school each day.

Routes and schedules should be finalized in the spring of 2015 and driver schedules prepared. The schedule brochure should be printed and distributed a month in advance of the changes with additional publicity about the upcoming changes.

The ADA Certification process should be implemented as soon as possible to correct the deficiency identified by the NMDOT.

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Appendix A: Onboard Survey Questionnaire

TRANSPORTATION
CONSULTANTS, INC.

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Atomic City Transit (ACT) Rider:
Please take a few minutes to complete this survey during your bus ride today. Your answers and suggestions will help us improve service. You may receive more than one survey form today.

Thank you! Atomic City Transit (ACT)

1. **Bus Route Number you are currently riding on?**
   - ☐ Route 1 - Downtown Circulator ☐ Route 2M - To White Rock ☐ Route 2T - To Los Alamos
   - ☐ Route 3 - Canyon/Central ☐ Route 4 - North Community ☐ Route 5 - Barranca Mesa
   - ☐ Route 6 - North Mesa

2. **What is the nearest major intersection of your residence/trip origin?**
   Address or main cross streets (i.e., Trinity Drive & Timber Ridge Road)

   ____

3. **What is your final destination?**
   Address or main cross streets (i.e., Trinity Drive & Timber Ridge Road)

   ____

4. **In addition to this bus, what other means are you using on this trip?**
   - ☐ Walking ___ blocks ☐ Having someone drive me
   - ☐ Bicycle ☐ Driving myself
   - ☐ Transfer from ______________________ Route
   - ☐ Other ________________________ (for example: NCRTD bus, park-and ride bus)

5. **Was a vehicle available to use on this trip instead of taking the bus?** ☐ Yes ☐ No

6. **What is the average amount of time you spend to get from your point of origin to your point of destination?** __________ (# of minutes)

7. **Have you filled out this survey in the past two days?** ☐ Yes ☐ No

If YES, please stop here. If NO, please continue and complete all questions.

---

8. **Is a transfer needed to reach your final destination?** ☐ Yes ☐ No

8.a. **If yes, how many transfers do you need to reach your final destination?**
   ☐ One ☐ Two ☐ Three ☐ More than three

9. **I usually ride the bus ___?___ days a week. (*check only one*)**
   - ☐ One Day ☐ Two Days ☐ Three Days ☐ Four Days
   - ☐ Five Days ☐ Less than once a month ☐ One -Three Days/Month
   - ☐ This is my first time

10. **What is the single MOST IMPORTANT reason you ride the bus? *(check one)***
    - ☐ Family doesn’t have a car ☐ Someone else uses car
    - ☐ Traffic is bad ☐ Parking is a problem
    - ☐ Car trouble/no insurance ☐ I don’t drive
    - ☐ Bus is economical ☐ Bus is convenient
    - ☐ Other (please specify) ____

11. **Are you a licensed driver and able to drive?** ☐ Yes ☐ No

12. **How many vehicles in operating condition does your household have?**
    ☐ None ☐ One ☐ Two ☐ Three or more

13. **Age in Years:** __________

14. What is your primary language? ___________________________________

15. What is your ethnicity?

- ☐ American Indian/Alaskan Native
- ☐ Asian
- ☐ Black/African American
- ☐ Hispanic/Latino
- ☐ Pacific Islander
- ☐ White
- ☐ Other (please specify) ___________________________________

16. How do you RATE your present bus service? (*check answers below for each part*)

	Very Good	*Good*	*Fair*	*Poor*	*Don't Know*
Service Frequency	☐	☐	☐	☐	☐
Service Hours	☐	☐	☐	☐	☐
Condition of Buses	☐	☐	☐	☐	☐
Transfer Convenience	☐	☐	☐	☐	☐
Bus Routes/Area Served	☐	☐	☐	☐	☐
ACT Bus System Website	☐	☐	☐	☐	☐
ACT Facebook Page	☐	☐	☐	☐	☐
Overall Service Quality	☐	☐	☐	☐	☐

17. The combined Total Annual Income of all members of my household is:

- ☐ $0 - $14,999
- ☐ $15,000 - $19,999
- ☐ $20,000 - $29,999
- ☐ $30,000 - $39,999
- ☐ $40,000 - $49,999
- ☐ $50,000 - $59,999
- ☐ $60,000 - $74,999
- ☐ $75,000 or more

18. For what one purpose do you MOST OFTEN ride the bus? *(check one)*

- ☐ Personal Business/Errands
- ☐ Shopping
- ☐ Recreation
- ☐ Work
- ☐ School/College
- ☐ Other (please specify)___________________________________

19. How do you get information about Atomic City Transit? *(check all that apply)*

- ☐ From the driver
- ☐ Internet
- ☐ Atomic City Transit Facebook Page
- ☐ Shopping center/store
- ☐ Transit Center
- ☐ Bus stop sign/shelter
- ☐ Newspaper
- ☐ Someone told me
- ☐ Other (specify) ___________________________________

20. What are your suggestions to improve Atomic City Transit service/any other comments?

THANK YOU!!

ATOMIC CITY TRANSIT

Atomic City Transit (ACT) Rider:
Por favor tómese unos minutos para completar esta encuesta durante su viaje en autobús hoy. Sus respuestas y sugerencias nos ayudarán a mejorar el servicio. Es posible que reciba más de un formulario de la encuesta de hoy.
¡Gracias! Atomic City Transit (ACT)

1. **Número de Ruta de Autobús en que está viajando actualmente?**
☐ Ruta 1 - Circulador Downtown ☐ Ruta 2M - Para White Rock ☐ Ruta 2T - Para Los Alamos
☐ Ruta 3 - Canyon / Central ☐ Ruta 4 - Comunidad del Norte ☐ Ruta 5 - Barranca Mesa
☐ Ruta 6 - North Mesa

2. **¿Cuál es el cruce principal más cercano a su lugar de origen / residencia?**
Dirección o cruce principal (es decir, por ejemplo Trinity Drive & Timber Ridge Road)
____

3. **¿Cuál es su destino final? Calles o cruce principal (es decir, Trinity Drive & Timber Ridge Road)**
____

4. **Además de este autobús, ¿qué otros medios de transporte está utilizando en este viaje?**
☐Caminando ___ manzanas de la ciudad ☐Viajando en coche de otra persona
☐Bicicleta ☐Conduciendo mí mismo
☐Transbordo desde otra ruta (Nombre de Ruta)_________________
☐Otro _____________________ (por ejemplo: autobús NCRTD, autobús de aparcamientos disuasorios

5. **¿Era disponible un vehículo para su uso en este viaje en lugar de tomar el autobús?** ☐ Sí ☐ No

6. **¿Cuál es la cantidad promedio de tiempo que pasa en llegar desde su punto de origen hasta su punto de destino? __________ (número de minutos)**

7. **¿Ha completado esta encuesta en los últimos dos días?** ☐ Si ☐ No

En caso afirmativo, por favor, pare aquí. En caso negativo, favor de continuar y completar todas las preguntas.

---

8. **¿Es necesario hacer transbordo para llegar a su destino final?** ☐Si ☐No

8.a. **En caso afirmativo, ¿cuántas veces es necesario hacer transbordo para llegar a su destino final?**
☐ Uno ☐ Dos ☐ Tres ☐ Más de tres

9. **Suelo usar el autobús ¿___? días a la semana. (marque sólo una)**
☐ Un Día ☐ Dos Días ☐ Tres Días ☐ Cuatro Días
☐ Cinco Días ☐ Menos de una vez al mes ☐ Uno – Tres Días al mes
☐ Ésta es mi primera vez

10. **¿Cuál es la razón MÁS IMPORTANTE para viajar en el autobús? (marque uno)**
☐ Familia no tiene coche ☐ Otra persona usa el coche
☐ El tráfico es malo ☐ El estacionamiento es un problema
☐ Problemas con el auto – seguros ☐ No conduzco
☐ El autobús es económico ☐ El autobús es conveniente
☐ Otros (por favor especifique)___________________________________

11. ¿Es usted un conductor con licencia y capaz de conducir? ☐ Si ☐ No

12. ¿Cuántos vehículos en condiciones de funcionamiento bueno tiene su casa?
☐Ninguno ☐ Uno ☐ Dos ☐Tres o más

13. Edad en Años ___________

14. ¿Cuál es su idioma principal? _____________________________________

15. ¿Cuál es su origen étnico?
☐ Indio Americano / Nativo de Alaska ☐ Asiático ☐ Negro / afroamericano
☐ Hispano / Latino ☐ Isleño del Pacífico ☐ Blanco
☐ Otros (por favor especifique) ____________________________________

16. ¿Cómo calificaría su servicio de autobús actual? (marque las respuestas a continuación para cada parte)

	Muy bueno	**Bueno**	**Regular**	**Malo**	**No sé**
Frecuencia de servicio	☐	☐	☐	☐	☐
Horario de servicio	☐	☐	☐	☐	☐
Condición de Autobuses	☐	☐	☐	☐	☐
Conveniencia de Transbordo	☐	☐	☐	☐	☐
Rutas de Autobús/Área Servida	☐	☐	☐	☐	☐
Sitio Web del Sistema ACT de Autobuses	☐	☐	☐	☐	☐
Página de Facebook de ACT	☐	☐	☐	☐	☐
En general la calidad de servicio	☐	☐	☐	☐	☐

17. El Ingreso combinado Total Anual de todos los miembros de mi familia es:
☐ $0 - $14,999 ☐ $15,000 - $19,999 ☐ $20,000 - $29,999
☐ $30,000 - $39,999 ☐ $40,000 - $49,999 ☐ $50,000 - $59,999
☐ $60,000 - $74,999 ☐ $75,000 or more

18. Por qué propósito viaja Ud. MÁS A MENUDO en autobús? (marque uno)
☐ Asuntos personales – Mandados ☐ Compras ☐ Recreo
☐ Trabajo ☐ Escuela – Universidad
☐ Otro (por favor especifique)_________________________________

19. ¿Cómo obtiene información sobre Atomic City Transit? (marque todas las que apliquen)
☐ Del conductor ☐ Del internet ☐ Alguen me dijo
☐ Página Facebook de Atomic City Transit ☐ Centro de compras – tienda
☐ Centro de Tránsito ☐ Letrero en parade de autobuses
☐ Periódico ☐ Otro (por favor especifique) _____________________________________

20. ¿Cuáles son sus sugerencias para mejorar el servicio Atómica City Transit / algúnos otros comentarios?

¡GRACIAS!

Appendix B: Onboard Survey Comments

TRANSPORTATION
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Onboard Survey Comments

1. 1) Add Saturday and Sunday service--important especially for summer students without a car. 2) Add times to bus stops so if you are walking by you can figure out when next bus is coming. 3) Get small business grant(?) to pay for electronic/solar powered times to be posted at bus stops.
2. 1. Extend evening hours 2. Run on weekends 3. Resume ski hill service when ski hill is open 4. Show bus stops on route maps 5. More frequent White Rock-LA routes during the middle of the day. The bus drivers are extremely nice, professional, and helpful! They make commuting a pleasure!
3. A stop on Sioux St.
4. Add pamphlets to bus stops for convenience.
5. Add weekend service and/or evening service.
6. Add weekends - even just trolley.
7. After getting dropped off by Los Alamos Middle School, there should be a bus that takes us up to the school.
8. All buses leave the Transit center at about the same time so if you miss one, it's a half-hour wait for the next. If they were staggered, it would be helpful not to wait so long.
9. All good.
10. Already pretty good. My only complaint is that it doesn't go all the way around Meadow and Rover but I know that would be inconvenient. All good, thanks for providing the bus system!
11. Already very good.
12. Ask drivers to turn off radio, turn down volume, or eliminate speakers in passenger section. Train dispatchers and drivers to use radio professionally.
13. Atomic City Transit is wonderful.
14. Better connections between buses #1, 2 and #5, 6.
15. Bigger buses.
16. Bring back a decent route in Pajarito Acres. Don't have confusing route numbers - the 2T/M throws people off. Please don't be early through a stop. I've missed buses and been to the stop on time, which is very frustrating.
17. Bus Route 6 would be better if the one at 8:17 a.m. at Stoneview could be changed to 8:07 a.m. as before.
18. Bus stop at the Coop.

19. Buses are often very late. Very happy to have ACT!

20. Buses should be more punctual with their schedules.

21. Certain designated stops.

22. Coordinate schedules with park-and-ride. This should not be very hard. A few minutes adjustment will make use of the bus convenient. I'm missing North Mesa bus by one minute every day so I'm taking this bus instead, then walking 20 minutes.

23. Dial-a-ride is too full. Needs more taxis.

24. Drivers are fantastic!

25. Drivers are great! Very nice and helpful.

26. Each time buses left me (because they didn't stop) a dial ride got me and I was on time for my jobs. Be more strict when passengers are rowdy.

27. Eliminate White Rock bus "layovers" and tighten the schedule.

28. Enjoy very much; good service.

29. Even though I don't need it personally, I've always thought better route coverage at Meadow/Rover Loop would be nice for residents back there.

30. Evening service would be nice, weekend also.

31. Evening/weekend service.

32. Evenings until after library closes; weekends.

33. Everyone does a great job.

34. Everything is great and drivers are great.

35. Extend hours past 8:00 p.m.

36. Fantastic service! All our family loves the ACT service. We especially appreciate the very friendly, helpful drivers. Thank you!

37. First run of Route 4 is always late! Because students need to ride the bus. Use a special bus to get them to school; have a second bus start Route 4 on time.

38. Fix the bumpy roads that buses travel on.

39. Food? :)

40. Get the buses to run later when traveling to school early in the morning.

41. Get the WiFi going, ACT phone app with bus locator. The drivers are great!

42. Give the cute hard-working blonde a raise!!!

43. Go to Pajarito Acres. Run on the weekends.

44. Good as is.

45. Great bus drivers - give Ron a raise!

46. Great service and so nice that it doesn't cost me to use the bus! Please look into Route 2 M&T at non-peak hours. The rides from WR to the

Transit Center are 10 minutes apart with nothing else for 50 minutes. I wait every Wednesday from 1:15 until 1:50, then have to pick up my son in LA and wait until 2:09 for the next Route 4. It takes me 2 hours and 15 minutes from work to the house.

47. Great service. The drivers are great. I like it when the driver remains stationary until I am seated. Price is great!

48. Have all the bus drivers have name tags on the name tag holder.

49. Have Route 3 loop down Quartz/6th/Rim Rd and through the airport neighborhood.

50. Have the route times near the stop.

51. I am very pleased with the ACT service and have ridden it for years. Suggestion: Just because the sun is shining doesn't mean that the AC needs to be on.

52. I don't always know bus driver's name.

53. I greatly appreciate the system! Reliability is the key. I would appreciate the buses not leaving any listed stop until the posted time and minimizing delays (although understandable).

54. I like the frequency of buses to/from WR, but it would be nice if the downtown circulator was more frequent, especially over the lunch hours.

55. I love ACT - drivers and schedules are great.

56. I love ACT!! Drivers and great (drivers and people skills).

57. I love the bus and the drivers are terrific! They are friendly, word hard, and provide personal service.

58. I love the bus system. Since January I have had to depend on the bus system to get from home to college and work. Without the buses, I don't know what I would do. Thank you for everything that is done to keep the bus system running.

59. I miss the Pajaritos bus because I work there. Thank you.

60. I think it's pretty good.

61. I think we should be dropped off closer to the school.

62. I wish there was a 30-minutes interval on the White Rock buses.

63. I would like for the buses to stick to their posted times. It's nice the drivers wait for transfers, but during peak times when there are more options, it makes those of us late (i.e., kids).

64. I would like weekend runs for shopping and church.

65. If the county/lab and high school wanted to support public transportation, they could make parking vehicles more difficult, require carpooling for parking spaces, and perhaps run more frequently once patterns are established from limiting parking. I also support a park/ride lot in White Rock (Visitor Center).

66. Including later hours would help for UNM-LA college classes - some end at 8:00 p.m.

67. Information should be available on Google maps or I-phone app (SS). (Trying to get from Dixon to Espanola.)

68. Instead of having both White Rock buses almost back to back, spread them out a little and maybe have a later bus from Los Alamos to White Rock for sporting events or later activities. PS: The bus drivers are all very friendly and knowledgeable.

69. It is awesome that a city of this size is able to offer a bus service in the first place. Given that there is probably not much you can improve. A more frequent service would be nice, but already how very few people ride the bus. Keep it up! I very much appreciate your service!

70. It is good service.

71. It works very well for me - keep it up!

72. It would be nice if it ran on the weekend and maybe later in the evening in the summer.

73. It would be nice to have either the 2M or 2T bus do the whole Rover/ Meadow Lane loop instead of both buses cutting up Grand Canyon from Meadow Lane.

74. It's great. Drivers are always awesome. I detest driving and this is a terrific alternative.

75. Just filed a tort claim - going to US Federal Court - harassed on bus - slandered - discriminated against - no assistance from driver of man with shovays - transportation (ask DOS) - civil complaint.

76. Keep the service to the elementary schools.

77. Keep up the good work.

78. Keep up the great work!

79. Kids mess around, smoke and sometimes tease you on the bus. Oh, and let us take our small, well-behaved dogs on the bus.

80. Label stops better.

81. Later hours and Saturdays.

82. Later hours.

83. Later hours.

84. Later routes would be helpful.

85. Let well-behaved dogs on the bus. Don't let people smoke on buses.

86. Longer hours and run on the weekend!

87. Longer hours and run on the weekend.

88. Longer hours.

89. Love the service! It is very much needed for myself, students, and all of Los Alamos and White Rock.

90. Make it more convenient: half-hour spacing from WR as well as to WR; rapid routes from elementary schools to the lab right after school starts; go both directions in WR so we can use it as transportation to library, post office, parks, schools, grocery store.

91. Maybe they could put seatbelts; other than that, it is perfect.

92. More benches at bus stops would make it easier for disabled riders to use main routes.

93. More buses.

94. More consistent stopping/starting times. Currently it varies from bus/driver.

95. More often peak times. Fix the very back middle seats in the large buses.

96. More routes in the morning (ex: Longer than 8:40).

97. Music in bus.

98. Music in the buses.

99. Music on the bus.

100. No bus at the weekend.

101. None - except give all the drivers a raise. They are great!

102. Nothing other than it would be awesome if the bus went down Bryce Avenue.

103. On some of the buses have no alert system to let the driver know you want to get off at your stop. You need to install an alert system.

104. On-time pickups in the morning. Our Route #2 is always late.

105. Operate until Larry Walkup closes.

106. Overall very good service to the town. It provides safe, easy transportation throughout Los Alamos County.

107. Perhaps more coverage. Very reliable.

108. Perhaps more often and to be on time in the morning. But overall it's a great service. Bus drivers are nice and professional. I am really happy to have a bus service available. I wish they could extend it over the weekends. I would even pay for monthly pass.

109. Picking up at the beginning of the hour and end for people from White Rock.

110. Play dentist office music or news radio on the bus.

111. Possibly more routes -- maybe for Barranca Mesa/North Mesa. Phone call 10 minutes before bus comes.

112. Publish some measure of the energy savings.

113. Put a big permanent map of transit routes/stops/times at the transit center. :) You guys are great!

114. Route 1, the only one I ride, really needs to be more on time. The bus usually is running four minutes behind but it's not uncommon for it to be up to seven minutes late. But to make sure, you can't take advantage of that 4-7 minutes (5 days a week!). Once in a blue moon (for me twice in a year) it will be on time. That adds up to an average of 22 hours a year I'm waiting on Route 1. Over ten years, that's the equivalent of 14 days of my life waiting on the bus.

115. Route 2 times could be improved. In the afternoons, I have noticed that 2M, 2T, and the downtown bus all come about the same time at 9th/Central. Bus drivers are extremely helpful and friendly. I find this is a great way to wind down after work and is a very calming way to get to work.

116. Route 3 starting at 6:00 a.m.

117. Run 24/7.

118. Run later into the night, perhaps till 8:00.

119. Run on weekends!

120. Run on weekends.

121. Run weekends. Good for summer students.

122. Saturday and Sunday buses. More shelters or benches. More stops.

123. Saturday service! Midday extra run to WR (like the morning and afternoon). Run later in summer. I really like the extra service provided when the community has events (i.e., 4th of July).

124. Saturday service.

125. Schedule the departures closer to the park-and-ride schedule. The morning schedule works, but the afternoon schedule is tight.

126. Separate weekend drivers.

127. Service during weekends.

128. Service later in the evening.

129. Service on Saturday and Sunday. Service until 8:00 p.m.

130. Service on weekends.

131. Service to Pajarito Acres - kids need it there, too.

132. Should be peak hour all day. Add more benches.

133. Should provide refreshments.

134. Should provide refreshments.

135. Some bus drivers need to know our lives are in their hands when they are the ones driving. There have been some scary times.

136. Some drivers need to improve their people skills and interactions.

137. Some service on the weekend will be great!!

138. Stagger departure from TS so trolley and bus 3 do not duplicate times. I leave work at 4:30 and there is not a convenient departure time unless I leave early or wait 20 minutes.

139. Super good!

140. Talk to LANL shuttle service to make transfers more convenient.

141. Teenagers sometimes use foul language and are loud. Don't know what ACT could do about this. Most are respectful. Very nice drivers!

142. Temperature control -- it gets hot.

143. The bus drivers for Route 6 are all very professional and nice.

144. The people, the drivers, and the bus are beyond exceptional. Route 4 should only go AM direction. The PM direction is pointless and confusing.

145. They should slow down when approaching bus stops! Have a route on Brice.

146. Tighten up the shaky/rattling objects (seats, windows, etc.).

147. Very good.

148. Very good overall.

149. Very good service! All drivers are very good!

150. Very good service. The only thing that I would improve is maybe put a bus stop between school and Pueblo complex and a stop before Diamond Drive.

151. Very pleased with bus system as it is.

152. Video on how to use bike rack.

153. Weekend - even limited - would be good. #5 (regular hr) does not get me to town conveniently for events that start/end on the hour. (The old schedule was much better for me.)

154. Weekend and evening service.

155. Weekend and night shifts. There may not be much to do here in LA, but later hours and weekend services may encourage an increase of recreational activities countywide, from both civilian and business standpoints. Also, multiple trolleys going opposite directions simultaneously for convenience (at least two going in each direction).

156. Weekend buses!

157. Weekend hours.

158. Weekend hours.

159. Weekend service.

160. Weekend service would be good.

161. Weekend service would be great.

162. Weekend service would be nice.

163. Weekend service.

164. Weekend service.

165. Weekend service.

166. Weekend services!

167. What an excellent service that shows the LA county government's commitment to the community and sustainability. It has freed parents from chauffeuring kids, elders from driving, and kids from being homebound.

168. White Rock route should be clockwise and counter-clockwise.

169. White Rock, as a community by itself, it not very well served. Getting to and from Los Alamos from White Rock is easy, but getting to and from someplace in White Rock from White Rock is irritating. I understand that serving White Rock in this way may not be a priority, but it is an irritation whenever I think of the overall service of Atomic City Transit.

170. Would like some weekend service.

171. You guys are great at what you do. Thanks!

172. You guys are great! Keep up the great work! Thanks for the wonderful free service!

173. Your service is super. I can't think of anything else.

Appendix C: Afternoon Express Questionnaire

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Atomic City Transit (ACT) Afternoon Express Rider/Parent:
Parents, please take a few minutes to complete this survey regarding your child's school trip. Your answers and suggestions will help us improve service.
Thank you! Atomic City Transit (ACT)

1. **Which Afternoon Express bus route does your child use?**
   ☐ Route 7 - North Mesa Express
   ☐ Route 8 - North Community Express
   ☐ Route 9 - Aspen Area Express
   ☐ Route 10 - Barranca Mesa Express
   ☐ Route 11 - White Rock Express

2. **What is your school name/trip origin?** (e.g., Aspen Elementary)

   ____

3. **What is your final destination?**
   Address or main cross streets (e.g., Central Avenue & 15th Street)

   ____

4. **How do you RATE your child's current school bus service?**
   (*check answers below for each part*)

	Very Good	*Good*	*Fair*	*Poor*	*Don't Know*
Condition of Buses	☐	☐	☐	☐	☐
Transfer Convenience	☐	☐	☐	☐	☐
Overall Service Quality	☐	☐	☐	☐	☐

5. **Have you reviewed the Coloring and Activity Book available on ACT's website and discussed bus safety basics with your child(ren) to ensure they understand bus safety tips before they ride?** ☐ Yes ☐ No

6. **Parents, would you volunteer to be an on-board express route monitor at least one day per month?** ☐ Yes. If so, please contact ACT for details. ☐ No

7. **What are your suggestions to improve Atomic City Transit Afternoon Express service/any other comments?**

Please return completed surveys to the Afternoon Express drivers.

If you have any questions, concerns or suggestions,
please contact Atomic City Transit
Primary Contact: Francine Suazo, ACT Management Analyst
(505) 663-1720
Secondary Contact: Keith Rosenbaum, Transit Operations Supervisor
(505) 663-1761
We are here to serve you.

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Appendix D: Afternoon Express Comments

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Afternoon Express Service Comments

Q. What are your suggestions to improve Atomic City Transit Afternoon Express service/any other comments?

Route 7 - North Mesa Express

- Get a bigger bus and be on time.
- Less crowded, more seats, bigger bus.
- Make bus on time; give more room; less standing.
- Too many kids trying to get on at once. More buses.

Route 8 - North Community Express

- I did not know about coloring and activity book.

Route 9 - Aspen Area Express

- I understand the bus gets pretty loud and some children are out of control, which causes the driver to speak profanity.

Route 10 - Barranca Mesa Express

- Faster service to North Mesa from Barranca.
- The bus drivers are very rude and mean!
- Very happy with service.

Route 11 - White Rock Express

- I have no complaints. My child had a complaint about having to shout "next stop" for the bus driver to stop, but they didn't. It has changed ever since the cord bus came through. It's been a month now! I sincerely apologize if X has been trouble to you. Thank you for bringing my child back on time and for bringing him back in general.
- I should keep on riding on the Atomic City Transit.
- I think this is a great bus system.
- It's a great service for us. Thank you.
- My child wants the bus driver to put on some good music. She also wants people to quiet down when she is in the bus.
- Pay attention to the child's stop request.
- Two times I had to pick up my first grader from school because they left while the staff and child was flagging down the bus.
- When there is a substitute, make sure they are aware of the route. Many times my kids call me from some other stop saying the driver completely passed turning on Aztec, which I find interesting because the next stop is the Y.A.C. where most of the kids riding the bus go and Aztec is really the most convenient street to get there from Chamisa side of WR. The route makes sense, just wish it would get followed.

Appendix E: Bus Driver/Operator Comments

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Atomic City Transit Bus Driver and Operator Meetings
April 30, May 1, and May 2, 2014

LSC staff met with the Atomic City Transit bus drivers and operators to obtain input on some of the issues with the existing transit service. LSC met with drivers and operators in sets of groups. Atomic City Transit employees were free to request a one-on-one conversation with LSC. Listed below are comments presented by the drivers and operators concerning the transit service.

Comments about the Buses

- There is often a shortage of vehicles. Vehicles are taken in for service on minor items. There needs to be a protocol on who sends bus to maintenance (it needs to be a safety or functional issue).
- Sizes of buses need to change. For example: Route #2 has a big bus with not many people. Friday ridership is low from LANL.
- Larger buses work well for Bandelier. The New Flyers don't work well for students.
- The New Flyers are high maintenance and require technical support from maintenance.
- There are more maintenance issues with diesel buses.
- Poor maintenance. Need diesel technicians.
- Passports have problems as there is a requirement for regeneration. They also give out fumes inside the bus, which is a safety concern.
- Standardization of the bus fleet would help. It would also help with maintaining parts inventory.
- Problems and challenges with air ride kneeling system. Manufactures don't recommend use of kneeling at every stop.
- Dispatcher is given the responsibility for updating fleet information. It is difficult for dispatcher to do fleet plus scheduling and dispatching duties. It would be better for one person responsible for fleet management.
- Don't like the Internationals.
- Trolley without windows are a hazard. The air-conditioning cannot work.
- Most driver seats are low. Higher seats would be much better. Bus 4111, 4113 and 4114 are very low.

Bandelier Service

- Wear and tear on buses and tires from the Bandlier service.

Comments about the Bus Stops

- Schedules need to be posted on shelters and at stops.
- Outbound PCS (Pajarito Cliffs Site) stop is not safe. It has 4 lanes with high speed traffic. It could be better closer to the food co-op and the trailhead.
- The stops on Barranca and Grand Canyon are not ADA accessible.
- The stop at Royal Crest inbound cannot be put in.
- Golf Course stop is difficult to see. It would be nice to see that someone is waiting at that stop.

- The stops on Central westbound are too close together. The number of stops should be reduced. The stop across from Dave's barber shop just west of the Municipal building.

Comments about Transfers

- Holding a bus to accommodate transfers delays other passengers. This is especially true when bus is late or on schedule.
- Transfers don't work well for people connecting.

Comments about the Transit Center

- NMDOT Park & Ride buses, NCRTD, and Atomic City Transit (ACT) bus schedules are not coordinated. The ACT buses leave before NMDOT Park & Ride bus arrives. The NMDOT Park & Ride bus schedule is set by Rail Runner.
- Can't make a left turn into the transit center at 3:30 p.m. to 5:00 p.m. There is also a challenge getting out of the transit center during these times.
- Several drivers reported that there were issues with private vehicles entering the bus lanes at the Transit Center. Also, there is no support from law enforcement.
- Transit Center has no shelter and there are no bathrooms (only porta-potties). ACT added the benches.
- The Transit Center is tight with ACT buses.
- More layover time at the Transit Center

Express Route Comments/Trips Made to Pick Up School Children

- Monitors on express routes would be a big help. Currently drivers volunteer to be monitors.
- The New Flyers have standees on express routes.
- Need to send a second bus on Route 6 at 3:31 p.m. at 35th Street and Villa Street.
- There should be a backup bus staged for Routes 4 and 6 in the afternoon.
- Not equipped like the school bus service. Can't stop traffic and kids dart into the traffic.

Comments Specific to a Route

- Routes 4 and 6 have a tight schedule.
- Route 4 is too tight. Maybe it can be combined with Route #3.
- Route 1-Downtown is a tedious route. There is a need to run a second bus for Farmers Market.
- Do Route 2T in the peak service only.
- Route 2 should only be a truck route and not on Main Hill.
- Route 2 time points don't match the driving time.
- Route 2M and 2T times need to be reversed.
- Route 3 has low usage. There is a need to promote the service. On the other hand, there were some drivers that thought that Route 3 ridership has been increasing and bus is now full regularly.
- Some drivers reported that Route 3 picks up in summer with graduate students.
- If times were switched on Route 2M and 2T, it might work better.
- Trolley and 2M route trail at about 4th and Central.
- Route 4 is very tight and makes other routes late for transfers.

- Buses trail on Central Avenue and in White Rock.
- The combination of Routes 3 and 5 runs well.
- Interline Routes 4 and 5 and interline 3 and 6.
- Ridership patterns will change with the new Smiths location.
- The layovers at North Mesa in the early afternoon are light. There is not enough layover at the Transit Center for a restroom break.
- The time points on Route 5 are early.
- On Route 4, Tranquilo should be a one-way or should loop around to Corona. Quemazon has no parking places and is difficult for buses to maneuver.

Comments Related to White Rock

- Route 2 is spaced 11 minutes apart in White Rock. So patrons in White Rock have to wait 11 minutes or 49 minutes.
- Consider a circulator service in White Rock. On the other hand, one driver commented that a circulator in White Rock would not necessarily be beneficial.
- Route 2 riders don't like the layover in White Rock.

Comments Related to Pajarito Acres

- Service in Pajarito Acres would attract commuter riders. On the other hand some drivers thought that serving Pajarito Acres would not be a good idea and you would expect low ridership from past history in serving that area.

Extended and Expanded Service

- Later evening service at the Aquatic Center, the University of New Mexico (UNM) Los Alamos, and Overlook Park. UNM Los Alamos has classes that let out at 8:00 p.m. and e Overlook Park has evening activities.
- A lot of people would like weekend service. On the other hand, some drivers thought that weekend service would be a waste of money.
- Maybe serve the airport every run.
- The dial-a-ride service could help with later hours and on weekends.
- Need to hire part-time drivers for express and weekend dial-a-ride service.
- It would be difficult to serve Camino and Entrada Drive. People would be forced to walk. An Obsidian loop would be better option.
- North Mesa has a mobile home park.
- It is easy to forget to stop at East Gate.

Dial-a-Ride Comments

- Nearing limit of 50 percent on subscribed routes. No certification has been done.
- Need more dial-a-ride service, people are denied service.

Driver Benefits

- Provide CDL training for new drivers.
- Provide water for drivers.
- Drivers were discontented with the new uniforms. They do not want to wear uniforms, and clean buses.

Driver Shifts

- Shift S has a long shift without any breaks from 11:00 a.m. to 5:30 p.m.
- Some driver shifts are scheduled to walk, others are scheduled to change using a shuttle.
- Drivers have a short time for changes at the transit center.
- Shift C has only 10 minutes for pre-trip.
- Shift N has no time to pre-trip express run vehicle.
- Switching drivers at East Gate isn't safe.
- AM and PM need full-time relief drivers that can remain in the field during peak times to provide back up and driver relief. Even when routes are not behind schedule, having an opportunity to get off route for a little while helps a lot.
- Long driving time before or after break.
- Split shifts are not liked among drivers.
- There is no layover for bathroom breaks at the transit center.
- For the evening dial-a-ride, lunch is very early in the shift.
- The first trip on midday dial-a-ride is at 11:20 a.m. There is not enough time for pre-trip.
- Mix Route 2 into other shifts.

Comments about the Safety at Specific Locations

- Signals by the high school can make routes late.
- 35th and Diamond is a hazardous right turn. There should be a warning light to alert drivers a bus is pulling out.
- At roundabouts, mirrors can hide a vehicle in a roundabout. There is a roundabout planned for Central and Trinity.
- Big buses cannot turn around at East Gate with 40-foot scrape going in and out that same drive. Also, drivers reported that there is not much ridership.
- Layover location for Route 2 PM is not a good location.
- Signal at Grand Canyon and NM4 should have a green arrow and no right turn on red.

Other Comments

- Retrieval of lost items. Currently there is a lot of transfer of items to get them back to their owner. This seems like a lot of distraction especially for non-essential items. Policy is for the item to stay on the bus and brought to the office.
- Some drivers would like a specific policy on lost and found items.
- The yellow light timing is short (about 2 seconds). Countdown signals for pedestrians would help.
- RTD is looking at making more stops along the route.
- Dispatcher could use another person mid-day.
- The community is getting older and people would like to get to special events such as Halloweeen, St. Patrick's Day, and 4th of July.
- There should be a dedicated mechanic. Funding calls for two mechanics.
- Extensive training top to bottom such as commercial driving, inspections, supervision and driving techniques.
- Fuel nozzles haven't been changed out.
- Have overkill on peaks. There is no need for so much peak service.
- Peak service could be shorter.

Appendix F: Review of Policy Documents

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Review of Policy Documents

<u>The following documents were reviewed to identify any changes which should be made:</u>

<u>#</u> **<u>Document</u>**

1. *Safety Management System (SMS) On-Site Review Report*, Federal Transit Administration, April 2013.
2. *Safety, Security and Emergency Preparedness Plan (SSEPP)*, Atomic City Transit, New Mexico Department of Transportation, August 14, 2007.
3. *Transit Operating Procedures for Safety and Security (TOPSS)*, New Mexico Department of Transportation, Transportation Programs Division, Transit/Rail Bureau, prepared by Lazaro & Noel (no date).
4. *Maintenance Arrangements*, Atomic City Transit, (no date)
5. *Scheduling and Dispatch Procedures and Capabilities. Type of Software Currently Being Used*, Atomic City Transit (no date)
6. *Customer Service Policy*, Atomic City Transit, (no date).
7. *Operations Profile*, Atomic City Transit, August 23, 2013.
8. *Transit Driver Handbook*, Atomic City Transit, (no date).

No serious conflicts or discrepancies were found. There are minor or unresolved policy, information, and procedural issues. The general recommendation is that they be addressed as they will influence system policy, system safety and/or Federal Transit Administration (FTA) compliance. Document review findings are summarized in the following table.

Los Alamos Comprehensive Transit Study **Document Review Findings**			
#1 - Safety Management System (SMS) On-Site Review Report, Federal Transit Administration, 2013: Identifies areas of non-responsiveness or non-compliance with FTA Safety Management System (SMS) requirements.			
Page #	**Issue**	**Description**	**Comment/Recommendation**
18	No Formal Written Safety Policy	ACT safety data collected but not used to measure against agency safety objectives.	FTA recommends corrective action for each safety issue listed.

	Leadership and Accountability	No written accountability or responsibility for achieving ACT safety objectives in CEO or Supervisor job descriptions.	**Recommendations:** (1) FTA recommendations listed in Document #1-SMS, Pages 18 – 27 and in Appendix A, Pages 29 – 30 should be followed. (2) Add safety objective in LSC Service Plan, page II-3 under Goal #4. This should reflect updated ACT SMS policy. Suggested text may be: "Ensure system resources and personnel are dedicated to providing safe transit operations for the safety and security of all passengers and employees." (3) In the final Transit Service Plan, summarize and reference the ACT Safety, Security and Emergency Preparedness Plan and Handbook, which (if completed) will incorporate FTA SMS recommendations and consolidate all ACT safety policies, plans and procedures.
19	Key Safety Personnel	No designated personnel responsible for safety program.	
	Safety Culture	No employee safety incentives or documentation of employee input to safety program.	
		No policy for establishing non-punitive safety culture.	
20	Public Safety Initiatives	Employees not required to display ID badges on duty.	
		Active shooter response protocols not distributed to employees.	
	Safety Risk Management	No formal schedule for conducting fixed route evaluations and no documentation of these evaluations.	
21		New passenger assistance policy being developed.	
	Vehicle Maintenance	No formal vehicle maintenance plan explaining ACT role in managing corrective maintenance efforts. (Note: The ACT role is described in Document #4 - Maintenance Arrangements).	
	Safety Hazard Identification	Absence of internal Safety Committee.	
		Near misses reported but not tracked or analyzed.	
	Safety Risk Assessment	Process for identifying safety hazards not formalized or documented.	
	Safety Risk Mitigation	Process for hazard mitigation not documented.	
		Risk control strategies and process not documented.	

23	Safety Assurance	Absence of formal safety performance targets.	
	Accident and Incident Investigation	Limited documentation on accident and incident causal factors.	
24	Internal Emergency Response Procedures	ACT currently updating Manager and Supervisor Handbook to incorporate emergency response procedures.	
	Change Management	No formal approach or description for implementing safety changes.	
		Safety changes informally monitored but not documented or analyzed.	
	Safety Audits and Reviews	Reviews do no focus on monitoring safety performance against established ACT safety objectives.	
	Continuous Improvement	No documented planning process for undertaking corrective action.	
25	Safety Promotion	No workforce violence recognition and prevention training for employees.	
		No documentation or analysis of safety needs, trainer skills or safety training effectiveness.	
	Bus Operations/Driver Training	Curriculum being developed.	
26	Supervisor and Dispatcher Training	No formal documentation of supervisor and dispatcher training.	
	Managing Employee Performance	No formalized individual safety performance goals and objectives.	

	Safety Communications	Absence of process for communicating safety goals or objectives.	
27	Human Factors	No documentation of management decision making process and accident/incident analysis process.	
		No human error factor analysis.	

#2 - Safety, Security and Emergency Preparedness Plan (SSEPP), Atomic City Transit, 2007: Assesses accident and incident, organization infrastructure, acts of nature, hazardous materials, criminal activity and domestic/international terrorism vulnerabilities; presents risk reduction strategies and response protocols for areas of highest vulnerability.

Page #	Issue	Description	Comment/Recommendation
7	1.1c - Goals	Safety and security goals not mentioned in LSC Service Plan.	<u>**Recommendations:**</u> (1) Add safety objective In LSC Service Plan, page II-3 under Goal #4. This should reflect ACT's updated SMS policy. Suggested text may be: "Ensure system resources and personnel are dedicated to providing safe transit operations for the safety and security of all passengers and employees." (2) In final Transit Service Plan, summarize and reference the updated ACT Safety, Security and Emergency Preparedness Plan and Handbook, which will (if completed) incorporate FTA SMS recommendations and consolidate all ACT safety policies, plans and procedures.
7	1.1d - Objectives	None of the 5 safety and security goals covered in LSC Service Plan.	<u>**Recommendation:**</u> Add safety objective In LSC Service Plan, page II-3 under Goal #4. This should reflect ACT's updated SMS policy. Suggested text may be: "Ensure system resources and personnel are dedicated to providing safe transit operations for the safety and security of all passengers and employees."

8	1.2b – Mission Statement	Mission statement that does not reflect current policy work.	**Recommendation:** Update to reflect LSC Service mission statement, page II-1.
	1.2c – Service Area	Fuller description of service area needed, including boundaries, population, major employment, residential, commercial and educational (school) centers.	None of the reviewed documents offer a succinct descriptive narrative of the ACT service area covering its boundaries, square mileage, population, land use, and economic and community features. Document #1 (FTA SMS) offers some information in Section 3, Page 7 - Background. The LSC Service Plan, in various locations, provides more but not all service area information. Chapter III of the Service Plan (pages III-1 and 2) describes existing conditions. Fixed-route services and passenger facilities are described on page VII-6. And, Figure VII-1 (Page VII-7) illustrates existing amenities. Chapter VIII – Community Conditions describes demographics and economic conditions. **Recommendation:** A succinct and current narrative of the ACT service area should be developed. This summary should be incorporated in: - The Final Transit Service, with any service area changes that may be approved - All other ACT policy documents.
	1.2d – Service Design	This will require update.	**Recommendation**: Use final approved service design concept presented in Chapter XII of the LSC Service Plan.
	1.2e – Vehicles and Facilities	Fleet inventory should be updated to reflect new inventory resulting from LSC Service Plan.	**Recommendation:** Use final approved fleet composition from Chapter XI of the LSC Service Plan.

Pgs. 9 - 79	Safety/Security Analysis and Procedures	Remainder of document discusses areas of highest vulnerability, i.e. buses, vans, injuries and fatalities from vehicle fire, bomb threat; and establishes system protocols for responding.	This document is redundant, covering and repeating sections and themes from Document #3 – TOPSS. **<u>Recommendations:</u>** (1) Consolidate safety policies and procedures into one ACT Safety, Security and Emergency Preparedness Plan and Handbook, after incorporating FTA SMS recommendations. (2) Summarize and reference document in Updated Transit Service Plan.

#3 - Transit Operating Procedures for Safety and Security (TOPSS), Atomic City Transit, NM DOT (no date): Overview of emergency planning and preparation procedures and protocols including forms for driver training and passenger assistance performance evaluation.

Page #	Issue	Description	Comment/Recommendation
Cover	No date	Document is not dated.	**<u>Recommendation</u>**: Date document.
1-153	Operating Procedures for Safety and Security	SOPs for emergency, security and safety events.	This document is redundant, covering and repeating sections and themes from Document #2 – SSEPP. **<u>Recommendations:</u>** (1) Consolidate safety policies and procedures into one ACT Safety, Security and Emergency Preparedness Plan and Handbook, after incorporating FTA SMS recommendations. (2) Summarize and reference document in Updated Transit Service Plan.
121	Customer Service Policy	Different than in Document #6 – CSP.	**<u>Recommendations:</u>** (1) Delete and replace with Document #6 – Customer Service Policy text. (2) Incorporate CSP, as amended, in appropriate chapter or as appendix in Updated Transit Service Plan.

#4 - Maintenance Arrangements, Atomic City Transit (no date or point of reference): Describes Los Alamos County Fleet Division responsibility for ACT vehicle maintenance and ACT *Excel* spreadsheet for tracking driver-reported maintenance issues, printed weekly for staff review.			
Page #	**Issue**	**Description**	**Comment/Recommendation**
1	Stand Alone	Document has no date and not linked to other ACT policy documents.	**<u>Recommendations</u>**: (1) Incorporate text into ACT Operations Manual and ACT Safety, Security and Emergency Preparedness Plan and Handbook. (2) Summarize and reference in Updated Transit Service Plan.
#5 - Scheduling and Dispatch Procedures and Capabilities. Type of Software Currently Being Used, Atomic City Transit (no date or point of reference): Overview of how Dispatch logs and communicates daily system activities; how bus service is scheduled using *Excel* worksheet and how mileage, unit hours and ridership data is logged based on daily written reports from Drivers to Dispatch.			
Page #	**Issue**	**Description**	**Comment/Recommendation**
1	No date	Document is not dated.	**<u>Recommendation</u>**: Date document.
1	Stand Alone	Document is not linked to other ACT policy documents.	**<u>Recommendations</u>**: (1) Incorporate text into ACT Operations Manual and ACT Safety, Security and Emergency Preparedness Plan and Handbook. (2) Summarize and reference in Updated Transit Service Plan.
#6 - Customer Service Policy and Rider Tips, Atomic City Transit (no date): Passenger brochure explaining system safety and courtesy rules.			
Page #	**Issue**	**Description**	**Comment/Recommendation**
1-2	Date	Document is not dated.	**<u>Recommendation</u>**: Date document.
1-2	Customer Service Policy	Not same CSP as presented in in Document #3 - TOPSS**,** Page 121.	**<u>Recommendations:</u>** (1) Eliminate Document #3 TOPSS, page 121 version. Use this version.

			(2) Incorporate CSP, as amended, in appropriate chapter or as appendix in Updated Transit Service Plan.
1	Illegal Weapons	States "Illegal weapons ….are not allowed on any vehicle at any time. Any person found in possession of an illegal weapon or device will be reported to the police." Statement implies "legal" weapons are permitted.	**<u>Recommendation:</u>** (1) Revise CSP text stating no weapons permitted. (2) Incorporate CSP, as amended, in appropriate chapter or as appendix in Updated Transit Service Plan.
#7 - Operations Profile, Atomic City Transit, 2013: Description of organizational structure and program of services.			
Page #	**Issue**	**Description**	**Comment/Recommendation**
4 -5	Mission Statement, Goals and Objectives	Mission, goals and objectives different from Chapter II of the LSC Service Plan.	**<u>Recommendations:</u>** (1) Add a safety objective in the LSC Service Plan, page II-3 under Goal #4. This should reflect ACT's updated SMS policy. Suggested text may be: "Ensure system resources and personnel are dedicated to providing safe transit operations for the safety and security of all passengers and employees." (2) Update mission statement, goals and objectives in Document #4 – Operations to reflect LSC Service Plan mission statement, goals and objectives in Chapter II, pages II-1 to 4 (as adjusted per Recommendation #1 above).
5	Service Area	Does not adequately describe service area.	None of the reviewed documents offer a succinct descriptive narrative of ACT service area covering its boundaries, square mileage, population, land use, and economic and community features. Document #1 (FTA SMS) provides some information in Section 3, Page 7 - Background.

			The LSC Service Plan provides, in various locations, more but not all of this information. Chapter III (pages II-1 and 2) describes existing conditions. Fixed-route services and passenger facilities are described on Page VII-6. And, Figure VII-1 (Page VII-7) illustrates existing amenities. Chapter VIII – Community Conditions describes demographic and economic conditions. **Recommendation:** A succinct and current narrative of the ACT service area should be developed. This summary should be incorporated in: - The Final Transit Service Plan, with any service area changes that may be approved - All other ACT policy documents.
5	Route Design	Does not adequately describe route design(s).	**Recommendation**: Use final approved service design concept presented in Chapter XII of the LSC Service Plan.
5	Schedule	May not reflect schedule resulting from LSC Service Plan.	**Recommendation**: Use final approved service design concept presented in Chapter XII of the LSC Service Plan.
9	Vehicle Fleet	Does not reflect suggested vehicle changes and additions in LSC Service Plan.	**Recommendation:** Use final approved fleet composition presented in Chapter XI of the LSC Service Plan.
10	Maintenance Schedule	Does not reflect findings from vehicle recommendations in LSC Service Plan.	**Recommendation:** Use final approved fleet composition and maintenance features presented in Chapter XI of the LSC Service Plan.
10	Vehicle Replacement	Refers to Transit Service Plan 10 year capital replacement schedule. Should be updated to reflect LSC Service Plan findings.	**Recommendation:** Use final approved fleet composition, maintenance and replacement features presented in Chapter XI of the LSC Service Plan.

11-12	Customer Service Policy	Not same as Customer Service Policy in Document 3 - TOPSS, Page 121.	**<u>Recommendations:</u>** (1) Eliminate Document #3 - TOPSS, page 121 CSP version. Use Document #6 version. (2) Incorporate CSP, as amended, in appropriate chapter or as appendix in Updated Transit Service Plan.
11-12	Customer Service Policy – Illegal Weapons	States "Illegal weapons ….are not allowed on any vehicle at any time. Any person found in possession of an illegal weapon or device will be reported to the police." Statement implies "legal" weapons are permitted.	**<u>Recommendations:</u>** (1) Revise CSP text prohibiting all firearms. (2) Incorporate CSP, as amended, in appropriate chapter or as appendix in Updated Transit Service Plan.
#8 - Transit Driver Handbook, Atomic City Transit (no date/transitional document with visible edits): Overview on driver policies, procedures, protocols and rules.			
Page #	**Issue**	**Description**	**Comment/Recommendation**
Cover	No date	Document is not dated and apparently a draft.	**<u>Recommendation</u>**: Date document and finalize.
4	Report All Accidents and Incidents	States "take care of any injuries first then wait for supervisor to arrive." What does "take care" mean?	**<u>Recommendation:</u>** Strengthen text, offer guidance on what drivers may and may not do when attending to passenger injuries.
5	Assist All Passengers	States "give appropriate assistance." What does "appropriate" mean?	**<u>Recommendation:</u>** Strengthen text, offer guidance on what drivers may and may not do when assisting passengers.
5	Use Good Safety and Security Awareness	States "Always wear your company ID badge while driving and query other employees who are not displaying proper identification." Contradicts Document #1 - SMS, Page 20 finding that employees do not wear ID badges.	**<u>Recommendation:</u>** Determine why FTA SMS finding differs from stated policy.

69	Incident Management	States: "Be particularly concerned about anyone carrying what might be a weapon or a suspicious package. Avoid boarding these individuals and immediately call in the incident to dispatch and the appropriate authorities." This policy prohibits all firearms. Customer Service Policy (Document #6) prohibits only "illegal" firearms.	**Recommendations:** (1) Revise CSP text prohibiting all firearms. (2) Incorporate CSP, as amended, in appropriate chapter or as appendix in Updated Transit Service Plan.