Red Rock Canyon National Conservation Area Transportation Feasibility Study

Final Report

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BLM

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Overview and Goals

The Transportation Feasibility Study addresses growing concerns with traffic and parking congestion at popular recreation sites within Red Rock Canyon National Conservation Area (RRCNCA), a Bureau of Land Management (BLM) natural area in Clark County, Nevada. The Volpe National Transportation Systems Center/U.S. Department of Transportation (Volpe Center) examined four transportation alternatives that combine parking, transit, and management strategies to address transportation challenges at RRCNCA. The study explores alternatives that encompass a broad range of transportation solutions including parking lot reconfigurations and expansions, voluntary transit services, and intelligent transportation systems as well as other management options for reducing congestion at parking lots.

The study has several specific goals to inform alternatives evaluation:

1. Enhance visitor mobility by reducing congestion at parking lots along Scenic Drive.
2. Improve the visitor safety and especially consider the safety of non-motorized visitors.
3. Improve visitor experience.
4. Preserve the site's unique natural and aesthetic resources.
5. Ensure that all transportation and management solutions are financially and operationally feasible.

To achieve the goals of the study addressing the causes of congestion, the transportation alternatives incorporate one or more of the following strategies:

1. Reduce the number of vehicles on the site during peak visitation periods.
2. Improve transportation infrastructure to accommodate more vehicles and/or visitors.
3. Influence driver behavior to operate vehicles more efficiently.

Existing Conditions

On many days during the busiest months of the year, visitors arriving at RRCNCA find the lots along Scenic Drive filled to capacity. With no place to park, visitors may be unable to stop to enjoy the natural features of the site, or may have to park illegally or in a dangerous place on the side of the road, requiring a walk along the road to reach trailheads and other scenic attractions. On the busiest days, the scene is far from the peaceful natural setting that visitors expect. As a result, cars line up along the side of the road for hundreds of yards, traffic slows to a crawl and pedestrians weave their way through parked cars or across the desert on undesignated trails. Safety hazards abound, natural habitats are at risk, and many visitors' only experience of the beauty of RRCNCA's sandstone cliffs is from a car window.

Despite the best efforts of the BLM and its partners, the problem is only getting worse. Over the past twenty years, Las Vegas has grown at a rapid pace, as has the number of tourists visiting the region. More and more people have discovered RRCNCA and visitation has nearly tripled since the 1990s. Today, nearly a million people visit RRCNCA each year, representing tourists, rock climbers, hikers, photographers, cyclists, equestrians, and many other user groups. Given this growth in popularity, it is likely that parking and traffic congestion will continue to get worse if the problem is not addressed.

The purpose of this study is to identify potential long-term solutions to this transportation problem. While transportation studies have been conducted before, in 2001 and 2007, this study takes those studies a step further by detailing a set of feasible strategy options for addressing traffic and parking congestion and by proposing eventual implementation strategies.

Definition of Alternatives

The study team developed four alternatives from a list of potential strategies for reducing congestion at parking lots on the Scenic Drive while accommodating existing and future visitation demand.

No Action

The No Action alternative includes all parking and transportation facilities and services that currently exist or are programmed for implementation as of the date of this study, such as the future SR 159 multiuse trail, and associated parking improvements to the Scenic Drive Exit parking lot. The No Action alternative serves as a baseline with which to compare the costs and impacts of the proposed action alternatives, as guided by the National Environmental Policy Act (NEPA).

Management Strategies Bundle

There are several low-cost management strategies the BLM should implement regardless of the alternative that is selected including the following:

- Designate long-term and short-term parking at select parking lots, with signage that delineates parking space allocation. Long-term and short-term parking would be self-enforcing.
- Install signs to direct driver behavior, including:
    - Passing zones in safe areas and “slower drivers keep right”
    - “Watch for cyclists,” particularly near steep or curved road sections
    - “Pullout areas ahead” or “Slower drivers use pullouts” near designated lookouts or disturbed sites that may be appropriate for one or two car photo stops
- Reconfigure selected parking lots (Calico I, Calico II, Sandstone Quarry, Willow Springs, Lost Creek, Ice Box, Pine Creek) by restriping to allow for the addition of 4 to 21 spaces per lot. Reconfiguration does not involve any construction or expansion of the total paved footprint. In some cases, reconfiguration can help reduce total hours of congestion without new construction, significant expense, or resource impacts.
- Install traffic counters at paved parking lots with trailheads along Scenic Drive (Calico I, Calico II, Sandstone Quarry, Lost Creek, Willow Springs, Ice Box Canyon, and Pine Creek). Appendix III: Use of Traffic Counters includes a plan for the use of traffic counters.
- Re-open the carpool lot so that visitors can park prior to paying the amenity fee.

The following three alternatives include the management strategies bundle in addition to strategies that will have a larger impact on congestion.

Alternative A – Parking Expansion and Management

Alternative A reduces congestion through management strategies and parking expansion. These strategies include the following:

- Reconfigure existing lots at the Visitor Center, Calico Vista II, Ice Box Canyon.

- Reconfigure and expand existing lots at Calico Vista I, Sandstone Quarry, Willow Springs, Lost Creek and Pine Creek Canyon.
- Construct a small lot between Calico Vista II and Sandstone Quarry: Calico Vista III.
- Apply management strategies bundle.

The total costs for parking expansion in Alternative A, including design and engineering costs, is approximately $2.4 million.

Alternative B – Voluntary Transit and Parking Expansion

Alternative B includes voluntary transit service to reduce congestion. Alternative B includes the following:

- Introduce voluntary transit with stops at the Visitor Center and each lot along the Scenic Drive.
- Construct a small, transit-oriented lot at Calico Vista III.
- Introduce a hiker/climber shuttle with stops at the campground, the Visitor Center, and lots along Scenic Drive that runs during the early morning and evening hours.
- Construct limited expansion and reconfigure existing parking areas.
- Apply management strategies bundle.

Voluntary transit allows visitors to enter and exit a transit vehicle at each lot along the Scenic Drive. Transit vehicles would run at least every 20 minutes and would include interpretative narration on the natural and cultural history of the site. The study estimates that 5 to 10 percent of visitors would use transit, lowering overall demand for parking; therefore, the parking expansion proposal for Alternative B is more limited than that in Alternative A.

The capital cost for Alternative B is approximately $2,095,000, including $884,000 for parking expansion, and the annual operating cost is approximately $405,000 in the first year of operation.

Alternative C – Voluntary Two-Way Transit with Limited Parking Expansion

Alternative C is similar to Alternative B in that there would be limited parking lot expansion and one-way transit service stopping at all parking lots on the Scenic Drive. Additionally, widening Scenic Drive would allow for the construction of a two-way transitway between the Visitor Center and Sandstone Quarry, permitting two-way transit service with intermediate stops at Calico I, Calico II, and a new Calico III. The transitway would have a raised concrete curb to separate traffic flow. By using two-way transit, visitors who want to visit one of the first three lots would have a shorter travel time and do not have to travel the entire Scenic Drive.

Alternative C includes the following:

- Introduce one-way transit with stops at the Visitor Center and each lot along the Scenic Drive (one-way).
- Construct a reverse-direction, median-separated transitway between the Visitor Center and Sandstone Quarry.
- Introduce two-way transit with stops at the Visitor Center, Calico I, Calico II, Calico III, and Sandstone Quarry.
- Introduce a hiker/climber shuttle with stops at the campground, the Visitor Center, and lots along Scenic Drive, that operates during the early morning and evening hours.
- Construct limited parking expansion and reconfigure existing parking areas.
- Apply management strategies bundle.

Transit allows visitors to enter and exit at each lot and would provide interpretative narration on the natural and cultural history of the site. The study assumes slightly more visitors (6 to 12 percent) will use transit relative to Alternative B because of the incentive of shorter travel times.

The parking expansion proposal for Alternative C is identical to that of Alternative B under the limited parking expansion scenario.

The capital cost for Alternative C is approximately $4,501,000, including $884,000 for parking expansion and $1.75 million for the construction of a two-way transitway. The annual operating cost for transit is approximately $552,000 for the first year of operation.

Evaluation and Selection of Alternatives

The study compares the alternatives by rating each alternative according to a series of evaluation criteria. The criteria serve as measures of the study objectives within the goal areas of visitor mobility, safety, visitor experience, resource impacts, and financial and operational feasibility. In addition, the Volpe Center sought public input on the alternatives through public meetings, stakeholder interviews and by providing a forum to submit comments online.

As a result of the findings of the study, the BLM selected Alternative C as the alternative to include in the Environmental Assessment, reflecting the following rationale:

- The alternative provides additional parking and reconfigures lots without unduly impacting resources.
- The alternative includes a transit service with high frequency (20 minutes) and interpretation, responding to visitor and public comments on desired service characteristics.
- The alternative includes the construction of a reverse direction transitway, with the potential for other uses when transit is not in service.
- The alternative has the potential to meet long-term growth, while containing the flexibility to be implemented slowly.

1 Introduction

The Transportation Feasibility Study addresses growing concerns with traffic and parking congestion at popular recreation sites within Red Rock Canyon National Conservation Area (RRCNCA), a Bureau of Land Management (BLM) natural area in Clark County, Nevada. The BLM requested that the Volpe National Transportation Systems Center/U.S. Department of Transportation (Volpe Center) undertake a study to examine the feasibility of several alternatives to address transportation challenges at RRCNCA. The Transportation Feasibility Study builds on several past efforts to examine the causes of congestion at RRCNCA and to assess the feasibility of potential transportation strategies. This study will focus on alternatives and strategies that are feasible, cost-effective, and implementable, targeted to address current transportation conditions and visitation patterns at the site.

1.1 Problem Definition

RRCNCA has experienced increasing visitation in the past decade, with a 37 percent increase in annual visitation between 2005 and 2010. RRCNCA had an annual visitation of approximately 991,797 in 2011, and up to 6,900 visitors on peak days. RRCNCA is also a popular destination for climbers, rated as one of the top climbing destinations in the United States. The influx of visitors on spring and fall weekends has led to significant congestion, particularly on the site's parking lots along the Scenic Drive, which is the most popular visitor use area. The congestion results in vehicles parking in undesignated areas, including vegetated areas adjacent to paved and gravel roads and parking, along the shoulder of Scenic Drive, and in washes adjacent to Scenic Drive. Vehicles parking along the Scenic Drive shoulder also cause some congestion for drivers along the road, and may impede vehicular flow on the road during high visitation periods. Congestion can be attributed to two main causes:

1. The number of vehicles exceeding the capacity of parking lots and roads.
2. Driver behavior, such as decisions to park in undesignated areas or to drive and stop unpredictably for sightseeing on Scenic Drive.

Undesignated parking creates several problems at RRCNCA:

1. Safety impacts caused by slowing or inhibiting the flow of vehicles, especially emergency vehicles, and by decreasing visibility and mobility for motorists, pedestrians, and bicyclists.
2. Natural resource impacts caused by the expanded human footprint on soils, vegetation, and habitat areas.
3. Visitor experience impacts caused by requiring visitors to spend more time looking for parking, limiting visitor access to amenities at parking lots over capacity, and creating visual and noise impacts outside of designated parking areas.

While congestion has significant visitor and resource management problems, its occurrence and severity are limited to days and hours of high visitation. High visitation periods generally run from October through May, though visitation levels tend to be manageable during weekdays from December through February. Congestion is highly specific to lots, seasons, and times of day; one lot may be experiencing severe congestion while another lot has many available spaces. Congestion varies at individual lots, based on the types of activities most popular at those lots. For example, parking lots that access climbing sites have low turnover rates and higher congestion. Section 2.4.4 describes lot-specific congestion in greater detail. The specificity and variability of congestion are important to targeting mitigation strategies, as detailed later in this study.

1.1.1 Goals, Objectives, and Strategies

The Transportation Feasibility Study has the broad goal of improving safety, reducing natural resource impacts, and improving visitor experience by reducing congestion at parking lots and along Scenic Drive.

The study has several specific goals to inform alternatives evaluation. Transportation alternatives and strategies evaluated within the study should:

1. Enhance visitor mobility by reducing congestion at parking lots along Scenic Drive.
2. Improve the visitor safety and especially consider the safety of non-motorized visitors.
3. Improve visitor experience.
4. Preserve the site's unique natural and aesthetic resources.
5. Ensure that all transportation and management solutions are financially and operationally feasible.

The first four goals address the negative *impacts* of congestion and the potential improvements at the site that can be realized through the reduction of congestion. The goals draw from the BLM's vision and management goals for Red Rock Canyon and throughout the agency. They envision a future condition at Red Rock Canyon where traffic and parking congestion has been reduced in a sustainable manner. To these goals, the Volpe Center added a fifth goal addressing the *feasibility* of transportation strategies.

In addition to the project goals and objectives, there are several strategies that can address the *causes* of parking and roadway congestion. The transportation alternatives included in this study should incorporate one or more of the following strategies:

1. Reduce the number of vehicles on the site during peak visitation periods.
2. Improve transportation infrastructure to accommodate more vehicles and/or visitors.
3. Influence driver behavior to operate vehicles more efficiently.

The evaluation framework, described in Section 3.6, describes how the objectives and strategies inform the framework to guide the selection and evaluation of alternatives.

1.1.2 Project Overview

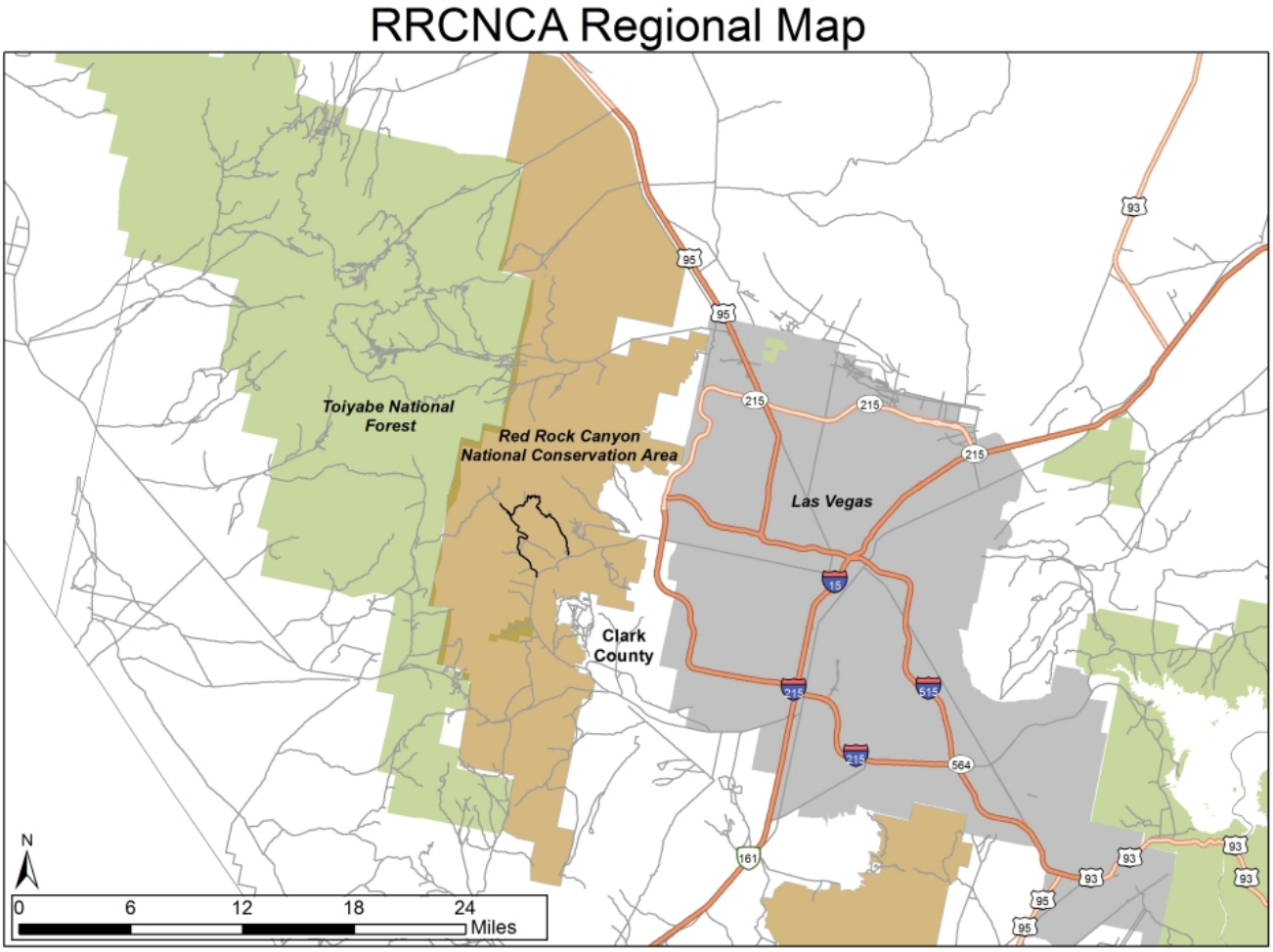
The Transportation Feasibility Study is the first part of a three-part transportation planning project for RRCNCA. One or more alternatives from the Transportation Feasibility Study will be carried into an Environmental Assessment to more fully evaluate the benefits and impacts of the transportation strategies, in accordance with the requirements of the National Environmental Policy Act (NEPA). The goal of the Environmental Assessment is to arrive at a preferred alternative to address transportation issues at RRCNCA that does not significantly impact natural or cultural resources. The report will also provide the necessary planning documentation to move into construction or implementation of a preferred alternative. The transportation planning effort will conclude with an Implementation Plan, which will identify funding sources and management guidance to construct and implement the selected alternative.

2 Existing Conditions

2.1 Physical Description

The Red Rock Canyon National Conservation Area is a 198,000-acre natural area in Clark County, Nevada, adjacent to the city of Las Vegas, one of the fastest-growing urbanized areas in the United States over the past decade. RRCNCA is bordered on the west by the Spring Mountains National Recreation Area (SMNRA, part of the Humboldt-Toiyabe National Forest, administered by the U.S. Forest Service), and by additional lands administered by BLM. Red Rock extends north to the mouth of Cold Creek Canyon and Nellis Air Force Base, and extends south to include the Bird Spring Mountain Range. A substantial portion of the eastern boundary is contiguous to the Summerlin Master Planned Community, a large and rapidly developing enclave within Las Vegas. Substantial BLM lands are also immediately adjacent to the east of Red Rock, as is a small portion of the Las Vegas Paiute Indian Reservation. RRCNCA is accessible via Nevada State Route (SR) 159. Figure 1 shows the regional context around the NCA.

Figure 1: Regional Map of RRCNCA



2.2 Background of Red Rock Canyon National Conservation Area

Congress passed the Red Rock Canyon National Conservation Area Establishment Act of 1990, designating 83,000 acres as a "National Conservation Area (NCA)." In 1994, additional legislation enlarged the NCA to 196,000 acres. Prior to the establishment of the NCA, Red Rock Canyon was maintained as "recreation lands" by the BLM and managed according to the Red Rock Canyon Recreation Lands Master Plan, which was completed in 1976. RRCNCA produced an Interim General Management Plan in 1995, which was replaced by the Resource Management Plan (RMP) in 2005. The RMP guides all management decisions at the NCA. The RMP designates environmental safeguards "designed to provide recreation opportunities allowing the public to enjoy and appreciate the unique natural setting which composes Red Rock Canyon."

Red Rock Canyon is one of the BLM's sixteen NCAs, which are lands with "exceptional scientific, cultural, ecological, historical, and recreational values," designated by Congress to conserve, protect, and manage public lands for present and future generations. RRCNCA is part of the BLM's National Landscape Conservation System (NLCS), which conserves, protects, and restores nationally significant landscapes of outstanding cultural, ecological, and scientific values. As the largest landowner in the western United States, the BLM manages land according to a multiple use policy, providing recreation opportunities while protecting cultural and natural resources; RRCNCA's management practices are in accordance with the overall mission of the BLM.

RRCNCA is renowned for its unique natural and cultural resources and scenic value. RRCNCA's unique geologic features include a 3,000 foot escarpment along the west side of Red Rock Canyon and the sandstone Calico Hills. The geologic features include limestone and sandstone formations, multi-colored stratification of the rocks, and unique textures and forms, such as potholes, domes, and arches.

Natural features include over 40 natural springs and natural catchment basins, supporting higher concentrations of plants and animals than the surrounding Mojave Desert. Several species include the springsnail, the desert tortoise, and the Blue Diamond cholla. Red Rock also contains wild horses and burros within the Red Rock Herd Management Area, which is a unique habitat, considering its proximity to the Las Vegas metropolitan area. Red Rock Canyon is also renowned for its cultural resources, including shelter caves, agave roasting pits, rock art (petroglyphs and pictographs) and a portion of the Spanish Trail; some of these artifacts date back to as early as 3,500 B.C.E.

The Resource Management Plan (RMP) identifies management considerations for biodiversity, recreation use, commercial use, cultural resources and Native American concerns, and additional considerations, including the implementation of a Scenic Drive Mass-Transit System. Each area of management consideration includes objectives and strategies to ensure that all developments and human uses are conducted in accordance with the overall goal of natural resource conservation and protection.

The RMP designated the Scenic Drive and surrounding vicinity as a "Roaded Developed" Management Emphasis Area. This designation allows for the development of paved roads and buildings (designed in concert with the

natural environment), moderate to high human interaction in developed areas, and visible on-site management and law enforcement. The RMP also calls for future development to be concentrated around the Scenic Drive, thus preserving other areas of the NCA for greater resource preservation. Immediately adjacent to the Scenic Drive area (to the west, north, and south), there are 72,177 acres of congressionally-designated wilderness areas, where motorized and non-motorized vehicular uses are prohibited.[1]

Most of the developed areas of the site are located in the southern portion of RRCNCA; these include a Visitor Center and a 13-mile Scenic Drive with 12 parking areas that access trailheads and interpretive materials. The southern portion of the site contains over 100 miles of trails, used for hiking, off-road vehicle use, mountain biking, and equestrian use; picnic areas; and camp sites. RRCNCA also contains an undeveloped and primitive northern area, with designated wilderness areas.

The primary visitor use areas at the site include:

- **Visitor Center**: Constructed in 2009 using funds from the Southern Nevada Public Land Management Act (SNPLMA) of 1998, the Visitor Center Complex includes an 11,000 square foot indoor Visitor Center, with interpretive displays, a gift shop, and a classroom. The Complex also contains 34,000 square feet of outdoor exhibit space, a 5,500 square foot amphitheater, and a desert tortoise habitat. The former Visitor Center, constructed in 1982, was converted to administrative offices, and is located adjacent to the new Visitor Center.
- **13-Mile Scenic Drive:** The Scenic Drive is a 13-mile one-way loop road that starts at the Visitor Center, with access provided from SR 159. The Scenic Drive and adjacent overlooks and trailheads are the focal points for visitation.
- **Red Rock Overlook on SR 159:** An overlook facility contains covered picnic tables, restrooms, interpretive panels, and parking spaces. The overlook is outside of the amenity fee area.
- **Red Rock Campground:** The campground is open from September to May and contains 71 individual campsites and seven group campsites, with picnic tables, grills, fire rings, and vault toilets. Recent upgrades to the campground include a paved access road, solar-powered water and electrical utilities at host sites, shade structures for selected sites, and additional parking. Roads within the campground are unpaved.
- **Red Spring:** This recreation site is accessible from a paved access road off of SR 159. It contains a half-mile interpretive boardwalk, individual and group covered picnic areas, vault toilets, and access to hiking trails and rock climbing.
- **Trails:** In addition to trails accessible from the Scenic Drive, there are several trails for hiking, mountain biking, and equestrian uses that are accessible from SR 159 and SR 160.

[1] Approximately 48,000 acres of this wilderness area is managed by the BLM. BLM. 2005. Red Rock Canyon National Conservation Area Resource Management Plan and Record of Decision. P. 7.

The primary recreational uses at Red Rock are sightseeing, rock climbing, hiking, birding, cycling, and horseback riding. Visitors also participate in interpretive and educational programs, conducted in partnership with Red Rock Canyon Interpretive Association and Friends of Red Rock Canyon.

2.3 Amenity Fee

RRCNCA relies on the collection of amenity fees to fund the majority of its operational expenses on the site. The amenity fees are required for the Visitor Center, the Scenic Drive, the campground, and the reservation of the group picnic area at Red Spring; all other areas of the NCA do not require a fee. The BLM restructured its amenity fees most recently in 2010, following the publication of the Red Rock Canyon Final Business Plan. The current fee structure is shown in Table 1.

Table 1: Amenity Fee Schedule

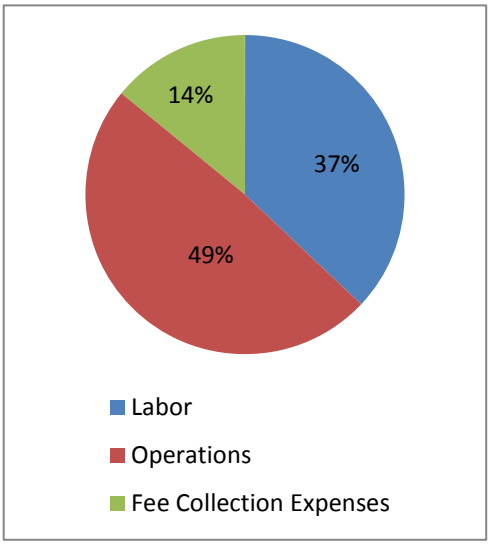
Type of Entry	Fee
Scenic Drive - Day Pass (car)	$7
Scenic Drive - Day Pass (motorcycle)	$3
Scenic Drive - Day Pass (bicycle)	$3
Scenic Drive - Day Pass (pedestrian)	$3
Scenic Drive - Commercial Tour Bus (per person)	$5
Scenic Drive - Red Rock Annual Support Pass	$30
Red Spring - Reserved Group Picnic Area with Permit	$40
Campground - Individual Site	$15
Campground - Group Site	$40

Source: 2010 RRCNCA Final Business Plan

The Federal Lands Recreation Enhancement Act (FLREA) of 2004 authorizes BLM to collect recreation amenity fees at NCAs that offer specified amenities, such as RRCNCA, and to keep the fee revenue to reinvest for the enhancement of visitor services on site. SNPLMA authorizes BLM to dispose of specified Federal lands in Clark County and to use the revenue from those sales to fund specific types of projects, including planning and capital enhancements at Red Rock.

The amenity fee covers the labor and operations expenses associated with amenity fee projects. See Figure 2: Use of Fee Funds (Fiscal Years 2005 through 2008) for a distribution of fees. Amenity fee projects include the maintenance of visitor facilities, such as restrooms, picnic sites, and roads, as well as trash disposal. It also supports the upkeep and expansion of projects built using SNPLMA capital funds, such as the Visitor Center, the campground, restroom and parking facilities,

Figure 2: Use of Fee Funds (Fiscal Years 2005 through 2008)



Note that "Other" includes Amenity Fee Projects.
Source: 2010 RRCNCA Final Business Plan

and trailheads and trails.

The Red Rock Canyon Interpretive Association (RRCIA) has a staff of 13 fee collectors, who staff the entry fee station 365 days per year. The hours of operation for the entrance fee booth vary throughout the year. All fee revenues go directly to the BLM. The BLM then reimburses the RRCIA for the costs of collection plus an administrative fee, for a total of approximately 20 percent of all fee revenue.[2]

2.4 Current Transportation Conditions

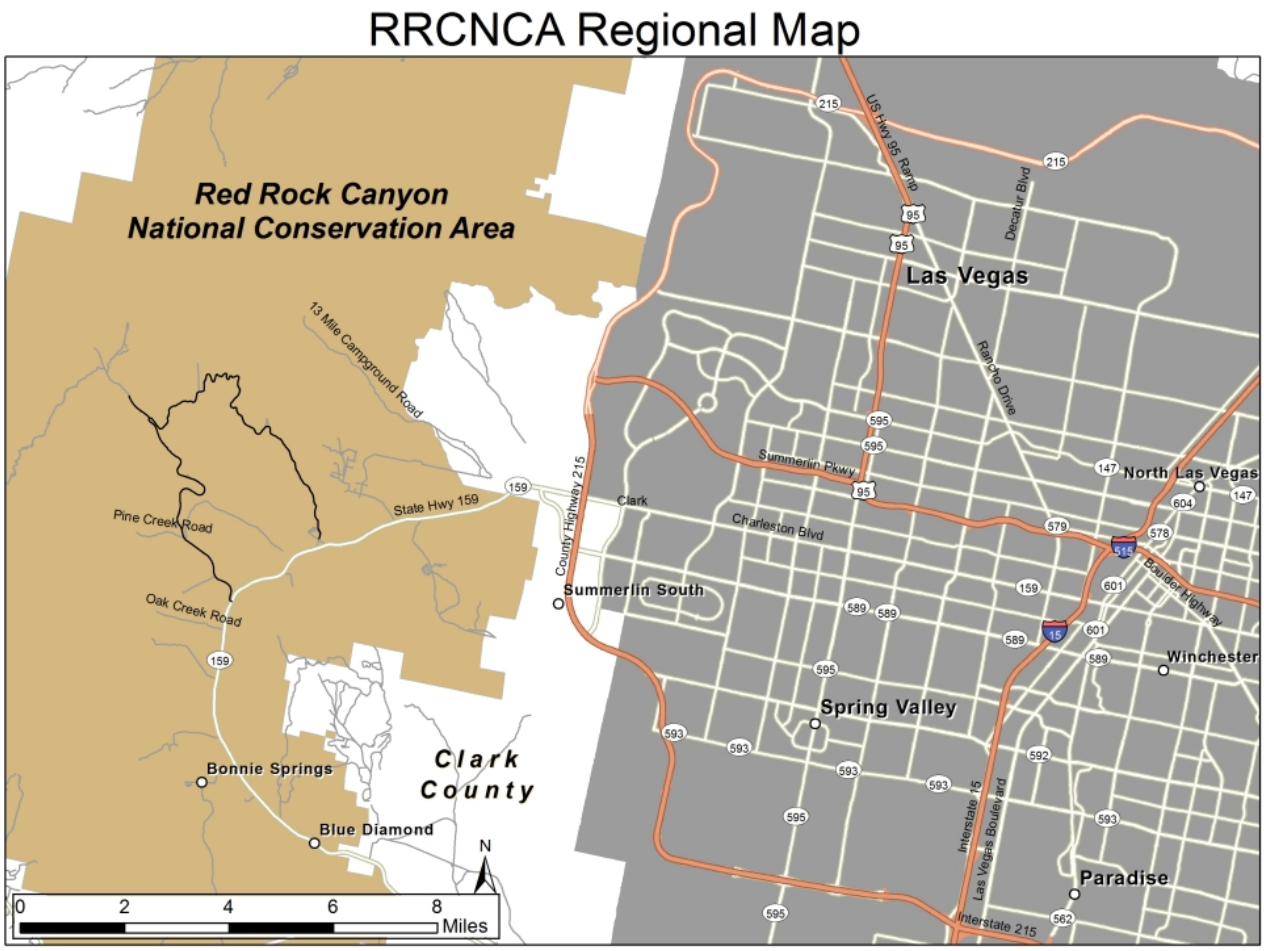
The Transportation Feasibility Study focuses on the Scenic Drive and associated visitor user area, but it will also consider roads and parking lots for visitor use areas outside of the amenity fee area and accessible from SR 159. This section outlines the current transportation assets within and immediately surrounding the site, the conditions of those assets, and associated information on visitor travel and safety.

2.4.1 Access to the Site

RRCNCA is less than 20 miles west of downtown Las Vegas, Nevada, in Clark County. The major transportation facilities that visitors use to access RRCNCA are State Route (SR) 159, Summerlin Parkway, and Clark County Route 215 (the latter two routes are limited-access freeways, and visitors cannot access RRCNCA from these routes). The site is about 25 miles from McCarran International Airport.

[2] Using data from 2008, the RRCNCA Final Business Plan notes that the administrative fee was approximately 19 percent. BLM. 2010. RRCNCA Final Business Plan. P. 19.

Figure 3: Transportation to Access RRCNCA



2.4.1.1 State Route 159

SR 159 runs through RRCNCA and is the principal road to access the site. The two-lane road turns into Charleston Boulevard near the Las Vegas city limits, about five miles northeast of its junction with Scenic Drive. Charleston Boulevard is a six-lane major east/west urban arterial that connects with Interstate-15 and downtown Las Vegas. Approximately 8.5 miles south of Scenic Drive, SR 159 connects to SR 160; SR 160 is a major east/west route that connects to Interstate-15 and Las Vegas to the east and the community of Pahrump to the west. Figure 3 shows the general locations of these state routes.

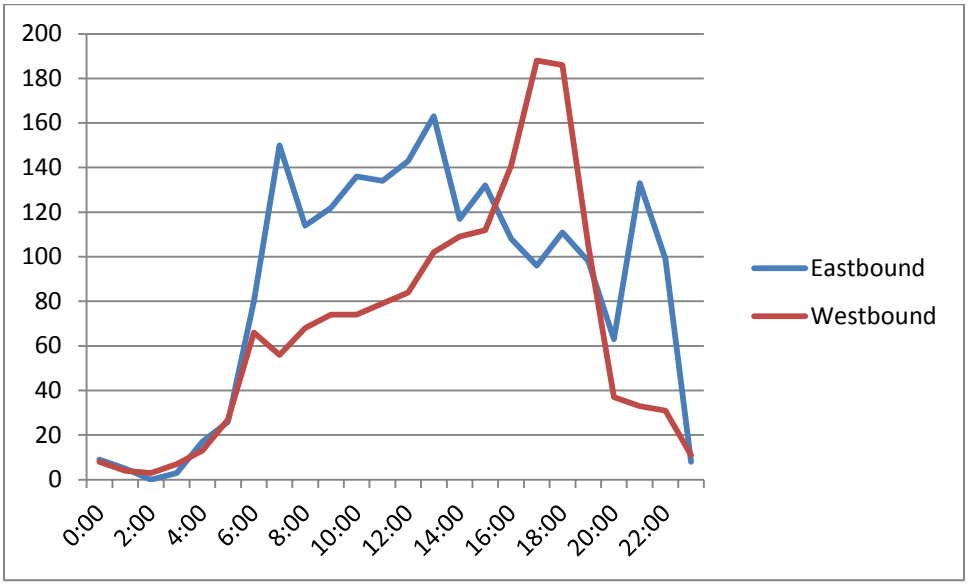
SR 159 consists of two sixteen-foot-wide driving lanes with five-foot-wide paved shoulders with cycle lanes on both shoulders. The road has officially designated bicycle lanes between County Route 215 and SR 160. There are dedicated left- and right-turn lanes at the junction of the Scenic Drive entry. SR 159 has a posted speed limit of 50 miles per hour (mph).

SR 159 provides access to the following visitor-use and recreation areas within and near the NCA: Red Rock Canyon Campground, Red Rock Vista Overlook, Calico Basin, Oak Creek Canyon Trail, First Creek Trail, and Spring Mountain Ranch State Park. SR 159 also provides access to other developments in the area, including the Desert

Sportsman's Rifle and Pistol Club, Calico Basin residential area, Cowboy Trail Rides concession, Bonnie Springs Ranch, Oliver Ranch, and the community of Blue Diamond. While SR 159 has been used by commuter traffic and commercial truck traffic traveling between north central Las Vegas, Pahrump, and other destinations to the southwest, local officials indicate that the use of SR 159 for commuter and freight traffic is declining as upgrades are made to SR 160 to facilitate faster vehicle movement.

Average annual daily traffic (AADT) was 4,300 in 2010, recorded at a counter just east of the entrance to Scenic Drive on SR 159.[3] Peak hour data is only available for Thursday, August 20, 2009. On this day, the peak vehicle volumes were at 1:00 PM eastbound (163 vehicles) and at 5:00 PM westbound (188 vehicles). Figure 4 shows the hourly vehicle volumes for the entire day of August 20. The eastbound direction did not experience as much "peaking" as the westbound direction; however, any conclusions about regular traffic patterns cannot be determined from a single day of traffic counts.

Figure 4: SR 159 hourly traffic volumes on August 20, 2009



Source: Nevada Department of Transportation, Traffic Count Data, August 20, 2009.

The 2001 transit study recognized the combination of high-speed commuter vehicles and recreational bicycle traffic on SR 159 as a concern for the BLM, and bicycle-vehicle conflict remains a concern today. At the time of the 2001 study, NDOT was considering an increase in the speed limit from 40 mph to 60 mph. Following this increase, NDOT lowered the speed limit to its current 50 mph. Road users note that the issue is less about the posted speed limit and more about how the design and rural character of the road encourage drivers to exceed

[3] 2010 Annual Traffic Report – Clark County, Nevada Department of Transportation, June 27, 2011, http://www.nevadadot.com/About_NDOT/NDOT_Divisions/Planning/Traffic/2010_Annual_Traffic_Report.aspx, accessed November 18, 2011.

the speed limit. Vehicles also face safety risks on SR 159 with regard to collisions with the wild burros that live within RRCNCA.

2.4.2 BLM Roads within the Site

2.4.2.1 Scenic Drive

Source: Volpe Center

Scenic Drive is a 13-mile one-way loop road that starts at the Visitor Center, with access from SR 159. Vehicles, cyclists, and pedestrians travel in a counter-clockwise direction, with a primary exit point onto SR 159 located two miles southwest of the entrance. Scenic Drive is a paved, asphalt road that varies in width from 22 to 24 feet. A recent condition assessment, completed by the Central Federal Lands Highways Division (CFLHD), found that the Drive is in fair condition, with a remaining service life of eight to twelve years. The road varies in elevation from 3,720 to 4,771 feet, and it has several sections with steep grades,[4] limited visibility, and tight curves, especially in the vicinity of the High Point Overlook parking area.

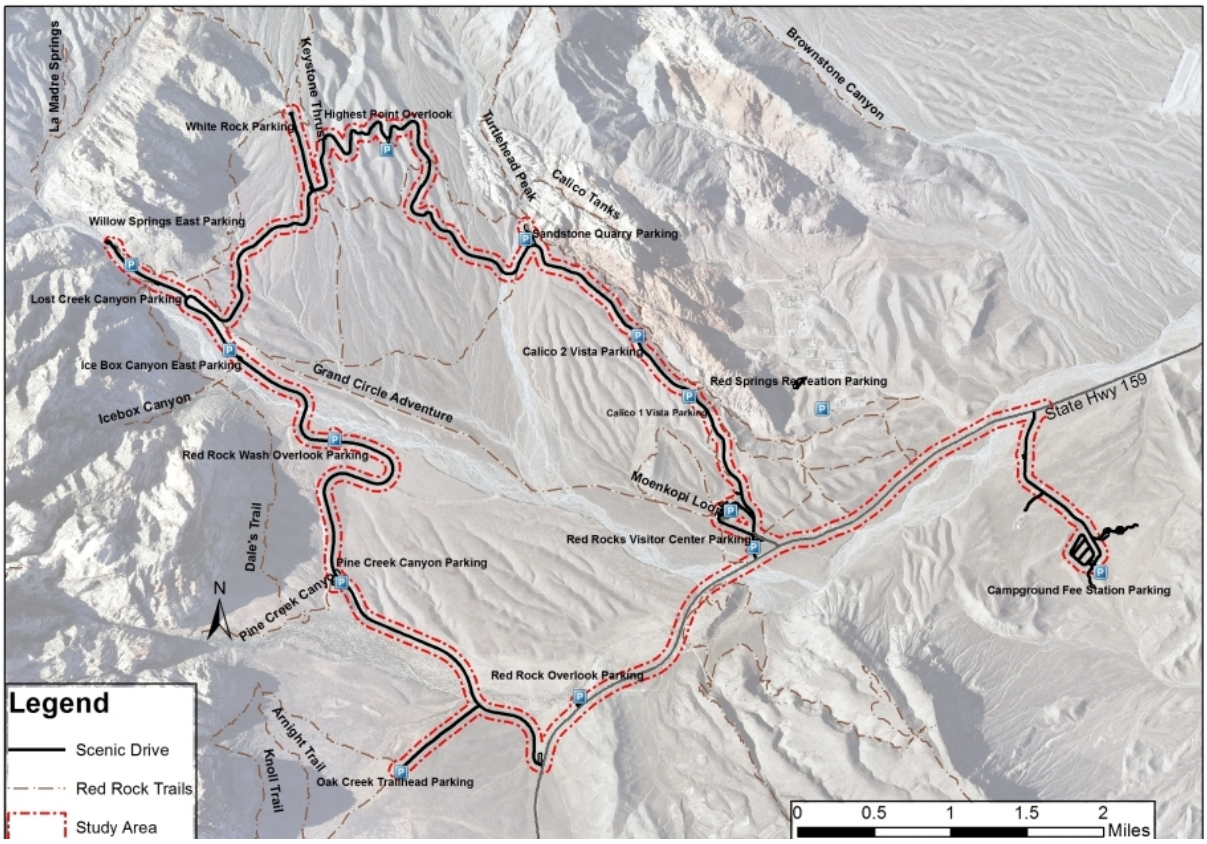
The speed limits along Scenic Drive range from 15 mph to 35 mph. Several dozen signs along the road indicate speed limits, pedestrian crossings, dips, upcoming turns, washes, restricted vehicle areas (ATVs) and parking areas. There is a single sign past the Visitor Center noting the presence of bicycles, and a few additional signs instructing cyclists to stay right. The signs appear to be in good condition.

Scenic Drive provides access to the Visitor Center and to seven parking lots (Calico I and II, Sandstone Quarry, High Point Overlook, Ice Box Canyon, Red Rock Wash Overlook, and Pine Creek Canyon). It also provides access to three gravel roads: one leading to White Rock parking lot, Rocky Gap Road leading to the Lost Creek parking lot and two lots at the Willow Springs picnic area, and one leading to the Oak Creek parking lot. There are approximately 290 parking spaces along Scenic Drive. Scenic Drive and its associated parking areas are within the NCA's amenity fee use area.

Scenic Drive is overwhelmingly the most highly used BLM road within RRCNCA; all other roads described in this section receive a small fraction of the visitation, although exact amounts vary by day and season.

[4] Scenic Drive has an average grade of 5.8 percent, with grades of up to 24 percent in the steepest sections. Data from Google Earth, 2011.

Figure 5 - Roads, trails, and parking in RRCNCA



2.4.2.2 White Rock Trailhead Access Road

The White Rock access road has a short (0.04 mile) paved section leading to a small parking area, but the majority (0.48 miles) of the road is native surface and 18 feet in width. The 2010 CFLHD condition assessment rated this road as being in failed condition, with no remaining service life. Most visitors drive to the end of the road for the parking lot accessing the White Rock Trailhead. Also, as the lower parking lot is popular with equestrian users, there is often equestrian use along the unpaved road section since equestrian use is limited to designated trails (no cross country riding) and the nearest designated trails leave the Upper White Rock parking lot (i.e. White Rock Loop and Keystone Thrust Trails).

2.4.2.3 Willow Springs Road


Source: Volpe Center

The access road to the Lost Creek trailhead and the Willow Springs picnic area is paved for 0.6 miles and then turns to gravel for 0.1 miles. The two-way road is 20 feet in width and then leads to the unpaved, four-wheel-drive Rocky Gap Road (entrance is restricted to all-terrain vehicles). The paved section is considered to be in fair condition, with a remaining service life of 10 years, and the gravel road is in good condition, with a remaining service life of seven years. Traffic volumes and speeds are significantly lower than those on the Scenic Drive, although many visitors park their vehicles along the side of this road when

the designated lots are full, causing access and safety issues.

2.4.2.4 Oak Creek Trailhead Access Road

The Oak Creek access road is an 18-foot-wide, gravel road leading to the unpaved Oak Creek Trailhead parking lot. The road is considered to be in failed condition, with no remaining service life. Traffic volumes are often low, relative to Scenic Drive, but vehicles parallel park along this road when the parking lot is full.

2.4.3 Parking

The vast majority of visitors travel to and within the site by personal vehicle, and therefore parking infrastructure is important both to visitor experience and visitor management. Parking lots within the amenity fee area include the Visitor Center lots and lots accessed from the Scenic Drive. There are additional paved and unpaved (unlined) lots through the NCA, as well as informal gravel and road shoulder parking. One of the study goals (as described in Section 1.1.1) is to reduce this type of informal parking and associated resource impacts.

2.4.3.1 Visitor Center

The Visitor Center parking lots consist of a two-tiered lot for general parking, an upper lot with designated handicapped spaces, and an overflow parking lot located below the general parking area. Table 2 shows details from the 2010 Condition Assessment of the three parking areas.

Table 2: Visitor Center Parking Areas

Lot	Area (Sq. Ft.)	Surface	Condition	Capacity
General Parking	38,488	Asphalt	Fair	82 general spaces, 2 motorcycle spaces, 2 compact /motorcycle spaces
Upper Lot (Handicapped Parking)	13,067	Asphalt	Excellent	14 general spaces and 8 handicapped spaces
Overflow Parking	49,491	Asphalt	Good	93 spaces and bus parking in center

Visitor Center parking (left) and overflow lot (right). Source: Volpe Center

The overflow parking lot is used infrequently. Additionally, BLM staff note that the undeveloped lands surrounding the Visitor Center have long-term potential to develop into additional overflow parking.

2.4.3.2 Scenic Drive

There are twelve parking lots that are accessible via the Scenic Drive, within the amenity fee area. These parking lots offer access to 16 trailheads, interpretation sites, cultural sites, picnic areas, and scenic vistas. Most of these also have pit toilets and benches for visitor convenience. Details about each of these parking lots are located in Table 3, including ratings from the 2010 CFLHD Condition Assessment.

Table 3: Parking Lots on Scenic Drive

Parking Lot	Surface	Area (Sq. Ft.)	Number of Spaces	ADA Spaces	Bus/RV Spaces	Condition	Restrooms
Calico Vista I	Asphalt	19,970	42	3	3	Good	No
Calico Vista II	Asphalt	9,967	13	1	0	Good	Yes
Sandstone Quarry	Asphalt	41,386	70	2	0	Good	Yes
High Point Overlook	Asphalt	13,102	16	0	2	Good	No
White Rock (lower lot)	Gravel	6,746	12	0	0	Fair	No
White Rock (upper lot)	Gravel	8,556	17	0	0	Poor	Yes
Lost Creek Canyon	Asphalt	11,383	21	2	2	Good	Yes
Willow Springs	Gravel	19,501	60	0	0	Good	Yes
Ice Box Canyon	Asphalt	13,050	23	2	0	Good	Yes
Red Rock Wash Overlook	Asphalt	9,772	5	0	0	Good	No
Pine Creek Canyon	Asphalt/ Gravel	22,025	11	1	5	Fair/ Excellent	Yes
Oak Creek Trailhead	Gravel	15,478	20	0	0	Good	Yes
Total		210,437	310	11	12		8 restrooms

2.4.3.3 Additional Parking Lots

In addition to the lots on the Scenic Drive, there are several additional parking areas located outside of the amenity fee area. Most of these lots allow visitors to access recreation areas elsewhere within the NCA, but a few are located in close proximity to the Scenic Drive and may allow visitor access to amenity fee areas.

- The Scenic Drive Exit Parking is a 36,290 square foot gravel lot located just outside the exit to the Scenic Drive, with access from SR 159. This large lot is popular with equestrian users; the lot usually has six or seven horse trailers on a typical weekend day and over 20 trailers on very busy weekend days. The lot does not have designated parking spaces for vehicles or trailers, leading to some conflicts and inefficient use of space during busy periods. The lot is in good condition.
- The Red Rock Vista Overlook parking is a 28,220 square foot paved lot located on SR 159 between the Scenic Drive entrance and exit (it is not accessible from the Scenic Drive). The lot has lined spaces for 25

vehicles, 4 handicapped vehicles, and two buses or RVs. There is also a helicopter landing pad for emergency access. The lot is in good condition.

- The Red Springs Recreation Parking area is a 69,073 square foot paved lot, with access from a paved road from SR 159. The lot offers access to a boardwalk, a picnic area, restrooms, and trails. The lot is in good condition.
- There are two parking lots located off of SR 159, accessing trailheads outside of the amenity fee area. These are the Oak Creek Trailhead South Parking lot, a 5,310 square foot gravel lot in fair condition, and the First Creek Trailhead Parking lot, a 7,152 square foot lot in good condition.
- There is also a parking area at the entry to the Cowboy Trail Rides on the southeast side of SR 159, the only parking area on this side of SR 159.
- A large, paved lot adjacent to the fee booth at the Scenic Drive entrance, currently within the amenity fee use area, is a former carpool lot, where visitors would park, join carpools, and then enter through the fee booth (thereby paying fewer vehicle entry fees). (The BLM changed the lot from a carpool lot when they changed their fee structure in 2010). The lot is currently mostly vacant, with some parking by fee booth employees. The lot is 26,178 square feet, has approximately 51 parking spaces, and is in excellent condition.

2.4.4 Parking Lot Use and Demand

The study team collected data on the use of the parking lots along Scenic Drive through interviews with BLM staff and stakeholder groups and direct observation. Interviewees identified lots that experienced congestion during the year and described typical use patterns at each lot. The study team directly observed vehicle parking patterns including rate of entry and duration of stay at select lots on November 4 and 5, 2011. The results of these direct observations were used to model traffic congestion throughout the year and to project parking demand levels in future years. The results of the direct observation and modeling activities are described in detail in section 3.4 of this report. Table 4 describes typical use patterns at each lot in more general terms as explained by BLM staff and stakeholder groups.

Table 4: Scenic Drive Parking Lot Characteristics

Parking Lot	Congestion Level	Typical Stay	Typical Use	Notes
Calico Vista I	Frequent	Under 30 minutes. Over 2 hours (occasional climbers and hikers)	Predominantly sightseer and hiking use with some sport climbing.	Some overflow onto Scenic Drive; visitors often do not see or use the overflow parking at the north end of the lot.
Calico Vista II	Frequent	Varies. Under 30 minutes (sightseeing) Over 2 hours (climbing and hiking)	Popular sport climbing, hiking spot, and sightseeing spot.	Located in a steep area with limited room for overflow parking.
Sandstone Quarry	Frequent	Over 2 hours	Popular hiking trailhead, some sightseeing and sport climbing.	Parking in undesignated locations along road exiting lot; designated spots along the exit road are hard to see.
High Point Overlook	No	Under 15 minutes	Sightseeing only, very popular with tour buses and photographers.	Significant erosion between pavement and surrounding soils.
White Rock (lower lot)	No	Over 2 hours	Equestrian and hiking.	Limited space for equestrian trailers.
White Rock (upper lot)	No	Over 2 hours	Hiker use.	
Lost Creek Canyon	No	Under 1 hour	Sightseeing and school groups	
Willow Springs	Occasional	1 – 2 hours	Popular picnicking, sightseeing and hiking spot.	
Ice Box Canyon	Rare	2 hours	Predominantly hiking and some traditional climbing.	Parking on both sides of the Drive, some parking spaces are difficult to see due to parallel parking.
Red Rock Wash Overlook	No	Under 30 minutes.	Predominantly sightseeing.	
Pine Creek Canyon	Frequent	Over 2 hours	Traditional climbing, some hiking and sightseeing as well.	Significant overflow into undesignated parking spots along Scenic Drive shoulders.
Oak Creek Trailhead	No	Over 2 hours	Traditional climbing as well as some hiking and equestrian use.	Unpaved access road accommodates spillover on peak days.

2.4.5 Transportation Safety

RRCNCA has three law enforcement rangers who enforce BLM rules and regulations. Their jurisdiction encompasses both the protection of natural and cultural resources and visitor traffic and safety. The law enforcement rangers have limited staff availability to patrol the Scenic Drive, and they are unable to offer sufficient coverage during visitation hours from approximately 6 a.m. through 8 p.m. daily.

The law enforcement rangers issue traffic violations to visitors for speeding and parking in undesignated areas, and the BLM collects fines for these violations. However, the BLM does not have aggregate records of the amount, dates, or times of these violations. The law enforcement rangers note that parking in undesignated areas is very common, and they are only able to ticket and fine a very small percentage of the violators. Law enforcement rangers also note that one important means to increase visitor safety would be to increase funding for staffing to support the facilities and manage the NCA.

Law enforcement rangers also have the primary responsibility for closing Scenic Drive (in sections or in its entirety) due to unsafe conditions. Natural disasters, such as snow, fires, and floods, are the most common reasons for road closures, although these only happen a few days per year. BLM staff also temporarily closes the road during emergency rescues, such as when medical helicopters need to use the roadway as a landing zone. (Emergency rescues happen approximately four to five times per month during the fall and spring, but emergency workers usually only need to close the Drive for access four or five times per year). Rangers may also elect to close the Scenic Drive or restrict entry if the number of vehicles impedes safe passage for emergency vehicles. This occurs when illegally-parked vehicles and heavy traffic volumes create conditions such that there is less than 10 feet of asphalt available for the passage of emergency vehicles.

2.4.6 Bicycle and Pedestrian Activity

The BLM has records of bicycle traffic since June of 2010, when the new fee structure required bicyclists to pay an amenity fee for use of the Scenic Drive. Monthly bicycle entries range from 94 to 394, with an average of 232 bicycle entries per month. The actual bicycle use is likely higher, due to cyclists who enter with an annual pass or bring their bicycles by personal vehicles and are not counted in the amenity fee bicycle data. Bicycle use is highest from March through May.

Many cyclists bike the Scenic Drive at least once per week, year-round, and purchase an annual pass. Cyclists with annual passes may be counted with vehicles in the visitation data, so that the actual number of cyclists may be higher than records indicate. During summer months, cyclists will limit rides to before noon or after sunset. During other months, they will ride at all times of the day but may avoid Scenic Drive during the busiest periods.

Cyclists can use the Scenic Drive according to Nevada state laws, which require them to stay on the right side of the road and ride single-file or two abreast. Scenic Drive has no lined shoulder or bicycle lane. The cyclists that bike on Scenic Drive range from recreational adult riders to competitive cycling teams. Due to the grades, curves, and length of the roadway, there are few families or inexperienced cyclists. Several cycling teams use Scenic Drive for training, and these groups often travel in groups of ten to twelve. Some Red Rock site users note that these larger groups may not follow state cycling laws.

Cyclists encounter safety hazards in the form of speeding motorists and motorists that stop unpredictably for sightseeing and photos, both of which have caused cyclist injuries and fatalities. The BLM does not have specific data on cyclist injuries or fatalities.

A negligible number of pedestrians enter at the fee booth, although entrance by pedestrians was more common when the carpool lot was open and accessible prior to passing through the fee booth. Many visitors hike on unpaved trails that are accessed from the Scenic Drive. One such trail, the Great Circle Trail, is 11.6 miles long and roughly parallels the Scenic Drive. A small number of visitors also walk or jog along the Scenic Drive, which has no designated shoulder or sidewalks for pedestrians.

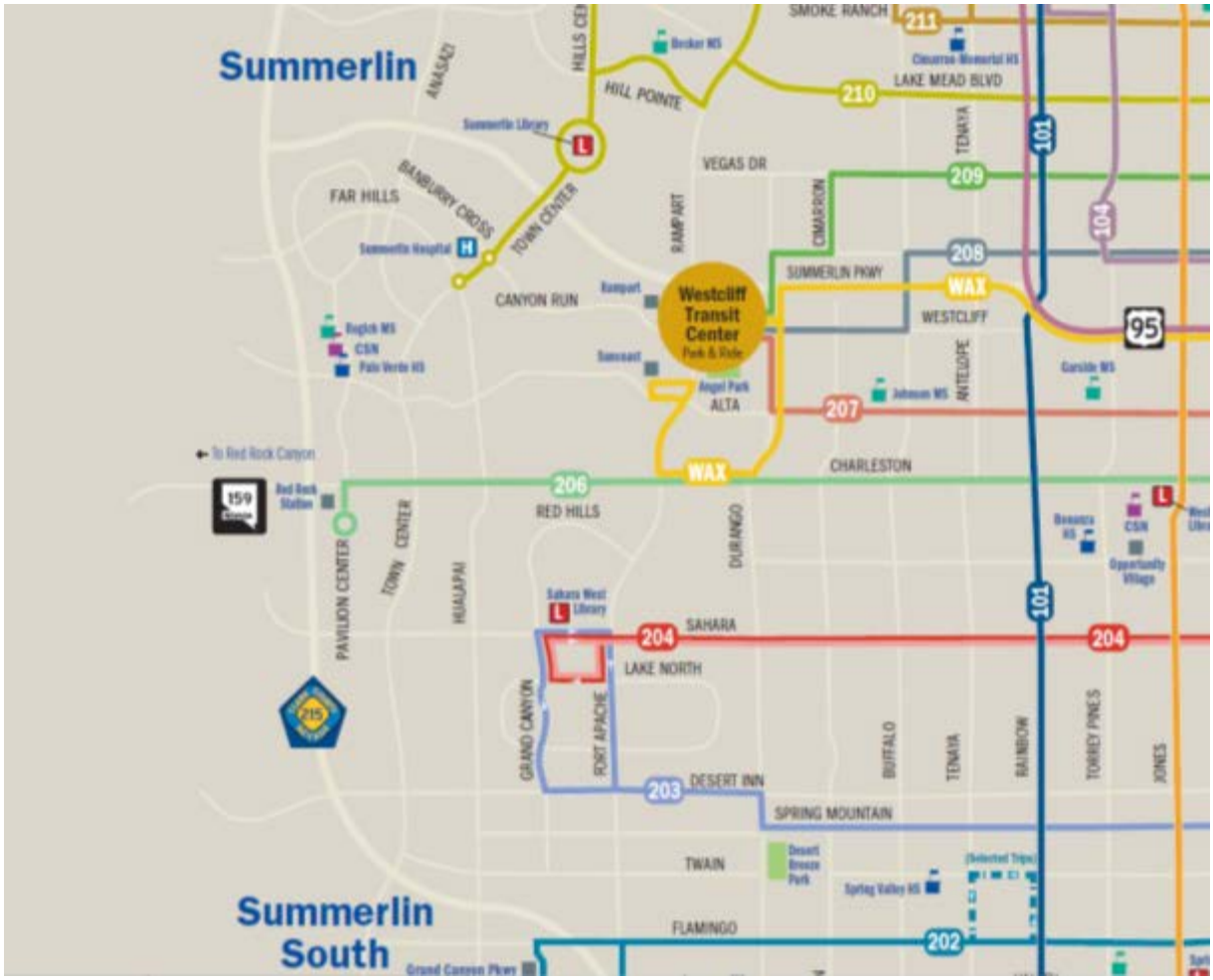
2.4.7 Transit

The Regional Transportation Commission (RTC) of Southern Nevada is the transit authority and transportation-planning agency for southern Nevada. RTC transit has 36 bus routes and 408 fixed-route transit buses. RTC is also the paratransit agency for the region. Currently, no RTC routes operate to RRCNCA.

The routes that operate nearest to RRCNCA are 203, 204, 206, and 210 (see Figure 6). Routes 203 and 204 operate to the Sahara West Library (about eight miles to the RRCNCA Visitor Center), while route 206 serves the Red Rock Casino at Pavilion Center, just under six miles from the RRCNCA Visitor Center. Route 210 serves the Summerlin Hospital (just under 8 miles from RRCNCA). All four routes generally operate east-west through the center of Las Vegas. There is daily service on all routes, with weekday headways of about 15 to 25 minutes, and 20 to 30 minutes on weekends.

All RTC buses have bicycle racks which can accommodate two or three bikes, enabling RTC customers to bring their bicycle with them at no additional cost.

Figure 6: RTC Routes near Red Rock Canyon



Source: Transit System Map, Regional Transportation Commission, http://www.rtcsnv.com/transit/sysmap/system_map.cfm, Accessed September 29, 2011.

RTC is currently constructing the Sahara Express Bus Rapid Transit (BRT) Improvement Project along Sahara Avenue.

Figure 7), which will significantly improve transit access to the Red Rock Casino and other points in the city of Las Vegas. The project consists of a 12-mile corridor between the Red Rock Casino and points east, including Las Vegas Boulevard (the Strip), and includes dedicated bus lanes along much of the route. Once operational, RTC will operate double-decker, high-capacity buses along the route. Completion of the project occurred in early 2012, and the route is now operational.[5]

[5] Sahara Express Bus Rapid Transit Improvement Project, Regional Transportation Commission, http://www.rtcsouthernnevada.com/mpo/projects/sahara/index.cfm, accessed September 27, 2011. The Sahara Express bus schedule is available at http://www.rtcsouthernnevada.com/transit/route/sx/SX(05-20-12).pdf, accessed June 25, 2012.

Figure 7: Sahara Bus Rapid Transit Project

Source: Sahara Express Bus Rapid Transit Improvement Project, Regional Transportation Commission[6]

2.4.7.1 Transit Opportunities

The potential exists to connect RRCNCA directly to RTC's transit service, particularly given existing and planned future service to the Red Rock Casino. Once the BRT is operational, there will be an opportunity for coordination of service between this service and RRCNCA. Preliminary conversations with RTC indicate a willingness to consider coordination and/or RTC service to the NCA. The consideration of transit access to RRCNCA involves thorough analysis of costs, feasibility, ridership potential, and mobility options within the NCA. The alternatives evaluation later in this study addresses many of these issues.

Additionally, all RTC buses have bicycle racks, enabling RTC passengers to bring their bicycles and ride to the NCA from the nearest transit stop. This multi-modal option could be cross-promoted between RTC and RRCNCA.

2.5 Visitation

2.5.1 Overview

Over the past decade, visitation to RRCNCA has grown to nearly one million visitors annually. The rapid increase in visitation is a direct cause of congestion on Scenic Drive and elsewhere in the NCA. It is important to understand visitation trends and patterns to understand the scope and variance of congestion and evaluate potential solutions. This section examines historic visitation trends, temporal and seasonal patterns, and visitor modal groups.

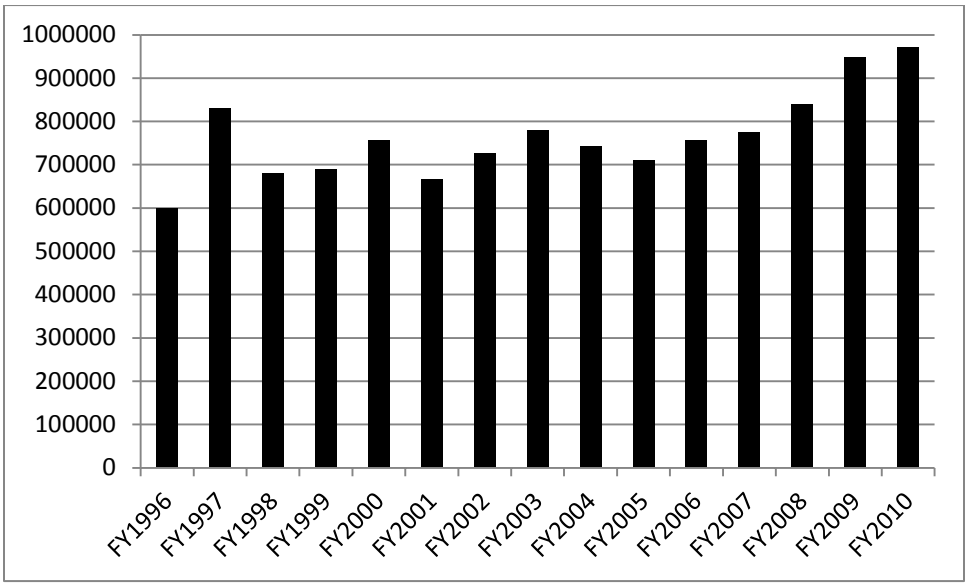
[6] http://www.rtcsouthernnevada.com/mpo/projects/sahara/images/SaharaMap.pdf, accessed September 27, 2011.

RRCNCA tracks visitation through its fee booth, through which all visitors must pass to use the Scenic Drive or the Visitor Center. Fee booth staff, employed by the Red Rock Canyon Interpretive Association, collect data on the number and types of passes purchased or used each day. The data includes the number of bus passengers (who are required to pay individual amenity fees), annual pass holders (both for Red Rock Annual Pass and for the America the Beautiful pass) and people who do not pay amenity fees, such as BLM staff and official visitors. The number of cars and motorcycles are multiplied by an average occupancy rate[7] to arrive at daily visitor counts.

2.5.2 Historic Trends

The BLM has recorded significant visitation increases in the past decade, with growth from 667,277 visitors in Fiscal Year (FY) 2001 to 970,454 visitors in FY 2010, as shown in Figure 8. This represents a growth of 45 percent, or an annual growth rate of 4.2%, higher than the rate of population growth in Clark County during the same time period (see later section). BLM staff and stakeholders attribute the visitation growth to population and tourism growth in Clark County, greater awareness of the site among climbers and hikers, and greater use of social media to learn about the site.

Figure 8: Historic Visitation at RRCNCA



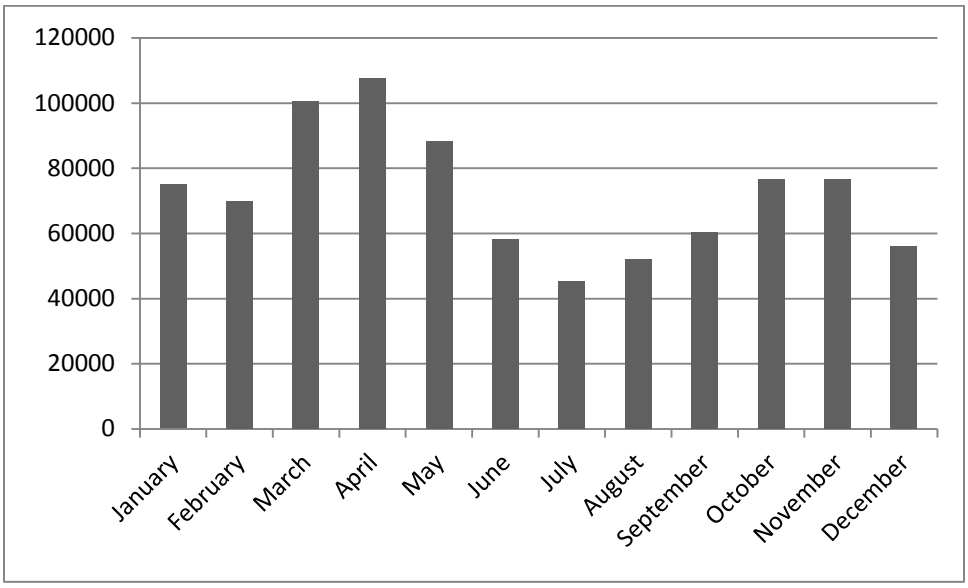
2.5.3 Seasonal and Temporal Visitation

Visitation to the RRCNCA follows a consistent annual pattern. Over the past two years, visitation peaked in the spring, averaging around 87,000 visitors in April and around 80,000 in March, compared to the average monthly total of approximately 60,000. There were also minor peaks in the cooler fall months, with visitation ranging

[7] The BLM derived the occupancy rates of 2.5 for cars and 1.25 for motorcycles from a 2007 Visitor Survey, administered by the BLM and the University of Idaho.

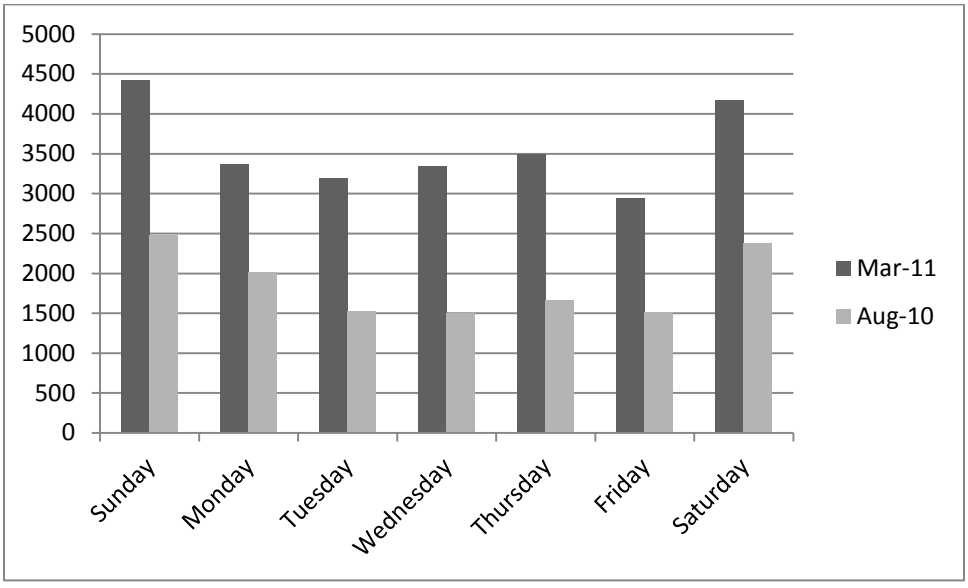
from 60,000 to 70,000 visitors. The lowest visitation occurred in the summer (from June through August), with monthly visitation of 60,000 people or fewer. Figure 9 shows the average monthly visitation, using data from October 2009 through May 2011.

Figure 9: Average Visitation by Month



Generally, visitation is highest on weekends, with Saturdays and Sundays averaging around 4,200 daily visitors each during peak seasons and 2,400 during off-peak seasons, as shown in Figure 10. On weekdays, average daily visitation ranges from 3,300 during peak seasons to 1,500 during non-peak seasons. Monday, Wednesday, and Thursday have higher visitation than other weekdays during peak season, and Mondays tend to have the highest weekday visitation during the off-season.

Figure 10: Visitation by Day of the Week (Peak and Non-Peak)



Fee booth data do not include time of entry, but there is anecdotal data from stakeholders and BLM staff for general temporal visitor patterns. According to staff and stakeholder observations, the most popular visitation hours during the peak season are between 10 a.m. and 4 p.m. Hikers, cyclists, and climbers tend to visit early in the morning or late in the afternoon, especially during warm-weather months. During cooler months, hikers and climbers have much longer trip durations and will often enter the site early to complete lengthy hikes and climbs.

2.5.4 Visitor Transportation Mode

The fee booth data records visitation by the type of pass purchased or used, which is strongly correlated with the mode of transportation visitors use for travel to and within the site. Auto traffic accounts for 92 percent of all RRCNCA visits. Auto traffic is split between the following types of passes:[8]

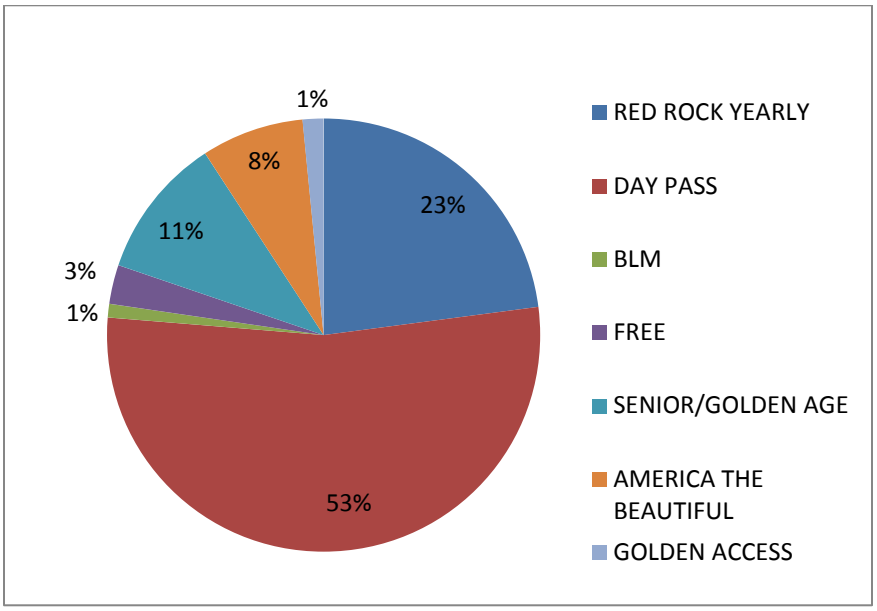
- **Day Pass**: This pass is sold to visitors traveling in personal motor vehicles (excluding motorcycles), and it is good for all passengers in the vehicle for a single day. This pass accounts for the majority of all passes purchased or shown at the fee booth.
- **Red Rock Annual Pass**: This pass allows unlimited admission for one calendar year for the pass holder and passengers in his or her vehicle. Cyclists or motorcyclists may also use the Annual Pass; two cyclists may enter under one annual pass.[9] Annual pass holders account for nearly a quarter of visitors at RRCNCA.
- **America the Beautiful Annual Pass**: This is an interagency pass that allows unlimited access for one year for the pass holder and up to three adult passengers in his or her vehicle. The pass covers lands owned and managed by the National Park Service (NPS), the U.S. Fish and Wildlife Service (USFWS), the U.S. Forest Service (USFS), and the BLM.
- **Senior/Golden Age Pass**: The Senior Pass (formerly Golden Age Pass) is an interagency pass that allows unlimited access to all federal lands to U.S. citizens or residents age 62 and older. The Senior Pass is a lifetime pass that allows the pass holder to enter up to three adult passengers.
- **Golden Access Pass**: This is a free, lifetime pass for U.S. citizens or residents with permanent disabilities. It allows the pass holder to enter up to three adult passengers.[10]
- **BLM**: This category refers to BLM employees or official visitors.
- **Free**: This category encompasses designated visitors and contractors doing business at the Visitor Center or along the Scenic Drive. It also includes visitors who enter on "fee-free" days, designated by the Department of the Interior. (There were five "fee-free" days in 2011).

[8] The revenue from day passes, Red Rock Annual Passes, and America the Beautiful Annual Passes account for a significant amount of RRCNCA's operating revenue. For greater discussion of the distribution and use of this revenue, please see the 2010 RRCNCA Final Business Plan.

[9] The annual pass entrance data includes both motor vehicles and bicycles; there is no data available on the percentage of annual pass holders who come by bicycle. The study team assumes that this is a very low percentage relative to the number of pass holders who come by motor vehicle, but recognizes that the true number of visitors by bicycle may be higher than recorded.

[10] Pass information was obtained from http://www.nps.gov/findapark/passes.htm, accessed October 18, 2011.

Figure 11: Types of Vehicle-Based Visitor Passes

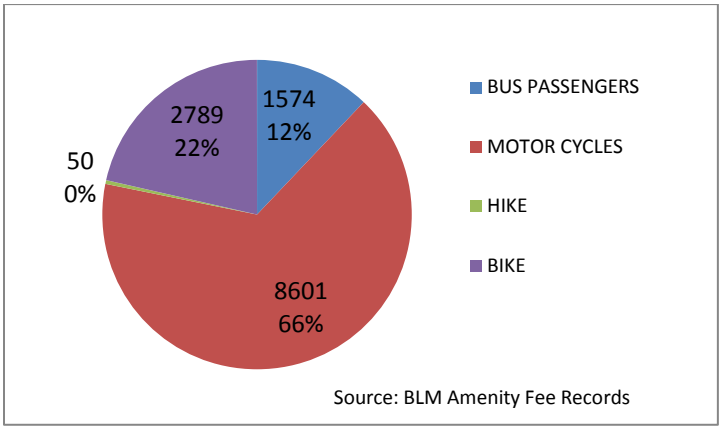


Source: BLM Amenity Fee Records

As recorded by the fee booth pass purchases, alternative transportation includes bus passengers, motorcycles, hikers, and bicyclists. Visitors who access the site by alternative modes follow the same general seasonality patterns as car-based visitors. However, both motorcyclists and bicyclists have notable fall peaks and drop significantly during December.

Figure 12 shows the relative proportions of alternative transportation modes. Alternative transportation modes account for between seven and eleven percent of total visitation, depending on the year. This figure includes data from June 2010 through May 2011, as the new amenity fees that went into effect in June 2010 changed the way that some of these alternative modes are recorded. Motorcycles account for the majority of alternative transportation, followed by bicyclists and bus passengers. Prior to June 2010, BLM formerly counted a high number of visitors entering by foot (counted as "hikers"), most of whom parked at a carpool lot outside of the amenity fee area that is now closed for use for this purpose. Also, the BLM did not count cyclists until June 2010.

Figure 12: Annual Visitation by Alternative Transportation Mode



Source: BLM Amenity Fee Records

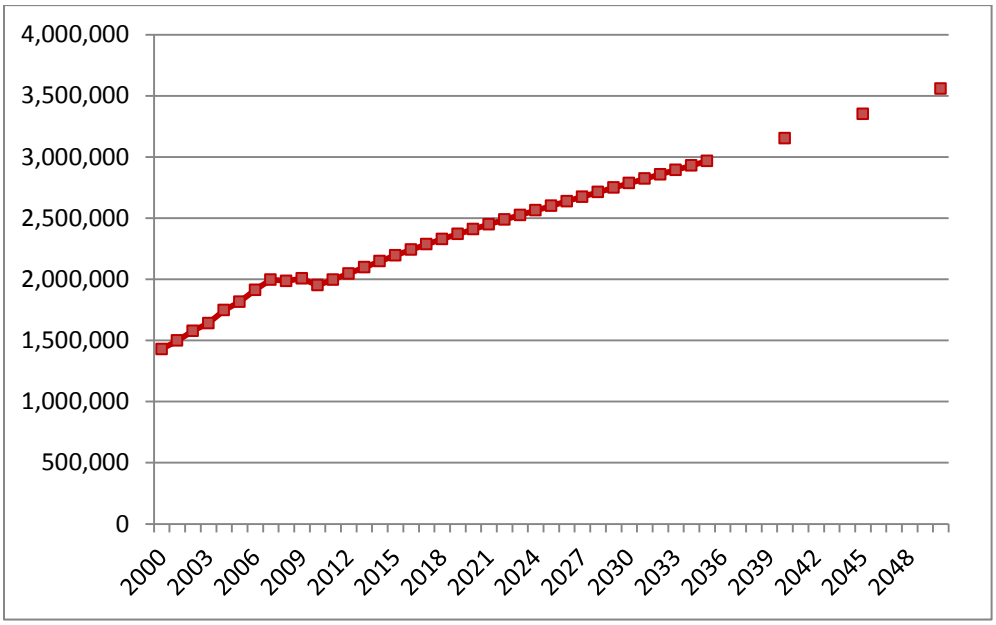
2.5.5 Clark County Visitation and Population

Visitation at Red Rock Canyon can be explained by its proximity to a major population center and the high number of tourists that visit Las Vegas. Therefore, the population of Clark County and the tourism rates for Las Vegas should be considered in relation to RRCNCA's past visitation rates and predicted future visitation.

The population of Clark County, which contains the cities of Las Vegas, Paradise, and Henderson, has a population of 1.95 million, according to the 2010 Census. The population grew from approximately 1.5 million in 2001 to approximately 2 million in 2008, a growth rate of 33 percent in seven years. The population leveled off in recent years due to economic conditions, but the Regional Transportation Commission of Southern Nevada (RTC) predicts the population growth to pick up by the end of the decade and reach 2.7 million by 2030 (

Figure 13). A growing population in Clark County could lead to higher demand for visitation at RRCNCA. It could also lead to development of residential areas near the RRCNCA and more people living in close proximity to its borders.

Figure 13: Clark County Population Growth and Predictions



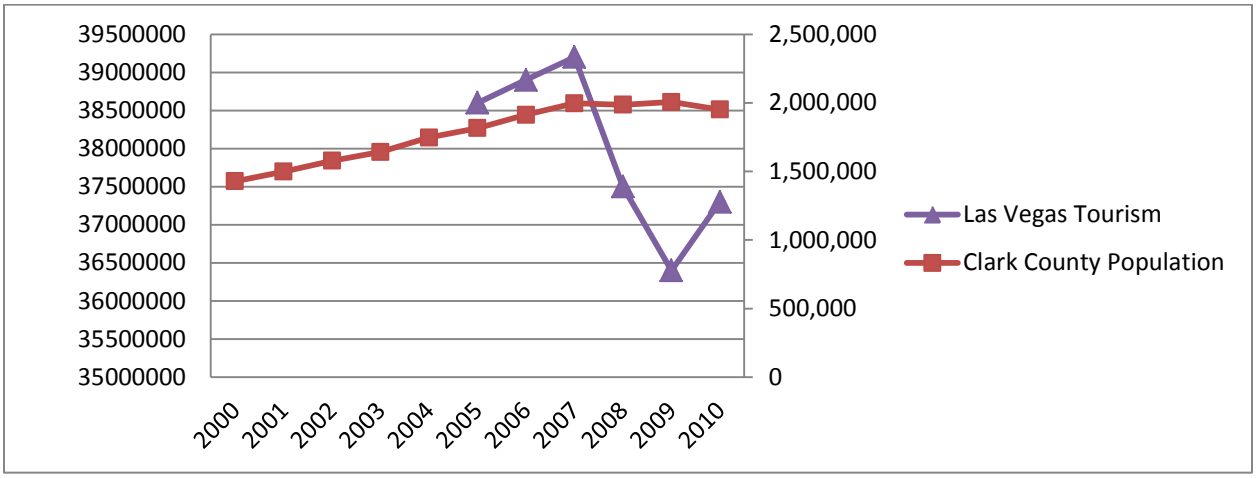
Source: Regional Transportation Commission of Southern Nevada

As in Clark County, tourism in Las Vegas experienced steady growth prior to 2008. The Las Vegas Convention and Visitor Authority provided statistics from 2005 through 2010, showing a peak of 39.2 million visitors in 2008 before economic conditions caused a steep decline (Figure 14). More recent figures show that tourism is increasing again, and future visitation to Las Vegas is expected to exceed 40 million per year in the near future. Visitation to RRCNCA has continued to grow since 2008, even as population growth stagnated, indicating the popularity of the site.

These visitation and population trends suggest that, despite recent fluctuations in local economic conditions, population and tourism are expected to continue to grow over the long term. Infrastructure and program

planning at RRCNCA should meet projections for visitation, which will be related to local growth and tourism, for at least a 20-year horizon.

Figure 14: Las Vegas Tourism and Clark County Population



Source: Regional Transportation Commission of Southern Nevada and Las Vegas Convention and Visitor Authority

2.5.6 Visitor Origin

Visitors to RRCNCA come from all over the world. In 2007, the University of Idaho completed a Visitor Satisfaction Survey at Red Rock Canyon NCA on behalf of the BLM. Their survey responses include visitors' zip codes (or country of origin for non-U.S. visitors) and primary activities during the site visit. A total of 297 respondents provided zip code and activity data. Table 5: Visitor Origin shows the distribution of survey respondents according to their origin.

Table 5: Visitor Origin

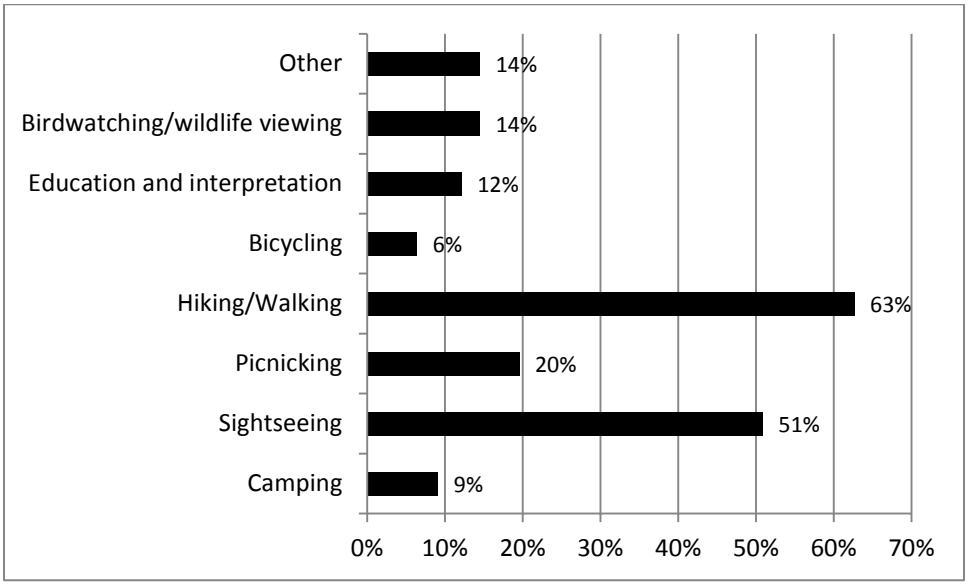
Origin	Number	Percent of Total
Nevada	107	36.0%
Other US	132	44.5%
CA, AZ, UT	29	9.8%
Other states	103	34.7%
Foreign	25	8.4%
Unknown	33	11.1%
Total	297	100.0%

Of the 297 respondents, 36 percent were from Nevada and most of these respondents were from the Clark County area. Visitors from out of state outnumbered locals, with California, Arizona, and Utah accounting for a total of 10 percent of total RRCNCA visitors. An additional 35 percent of visitors were from the remaining 46 states. Foreign visitors made up 8 percent of total respondents. Eleven percent did not indicate a home origin.

2.5.7 Visitor Activity Preferences

The survey included a list of activities generic to all BLM sites. The most popular activities among respondents was Hiking/Walking (63%), followed by Sightseeing (51%), Picnicking (20%), Bird watching/Wildlife (14%), Education and Interpretation (12%), Camping (9%) and Bicycling (6%), with 14 percent of responses claiming "Other" (Figure 15). The survey did not include climbing as an activity option, but it is possible that many respondents who selected "Other" were participating in climbing activities. The characteristics of the respondents that selected "Other" are similar to those of climbers, as expressed anecdotally by BLM staff and climbing representatives. The total percentages do not add up to 100 percent, since survey respondents were allowed to select more than one activity.

Figure 15: Visitor Activities



The survey revealed differences in visitor activities between locals and those from outside of Nevada. Nevadans were most likely to participate in hiking/walking, picnicking, bicycling, and education and interpretation. Visitors from elsewhere in the U.S. were most likely to participate in sightseeing, hiking/walking, and birding/wildlife viewing. International visitors were most likely to participate in camping, sightseeing, education/interpretation, and "Other" (likely climbing).

2.5.8 Visitation Analysis

The visitor origin and activity data have several implications for transportation planning, which should be considered in terms of both the causes of congestion at RRCNCA and the most appropriate and feasible strategies to address congestion and the goals of the study.

- Visitation has grown approximately 45 percent in the past decade, while little has been done to increase visitor capacity at the RRCNCA or to manage demand.
- Visitation varies significantly by season and day of week. The highest visitation periods, during spring and fall weekends and holidays, are associated with the greatest safety concerns related to congestion (access of emergency vehicles and pedestrian or bicycle collisions), according to BLM staff.

- While the number of days with significant congestion is growing, there are still many days where visitation levels remain low and congestion is not an issue. Transportation strategies should first consider seasonal strategies, especially for the short-term.
- If there is growth in the surrounding population and in tourism over the next several decades, as predicted, the site visitation will also increase, further increasing congestion.
- Most visitors travel by personal vehicle, increasing the demand for parking spaces. While there have been some recent advances in public transit throughout Clark County (as described in other sections), the vast majority of visitors will continue to access the site by personal vehicle for the foreseeable future.
- There may be opportunities to increase visitor access by alternative modes to reduce the number of personal vehicles on site, but this must be balanced with the need for infrastructure to accommodate alternative modes (bicycle infrastructure, bus parking) and the carrying capacity of the site. For example, the addition of more visitors to the site may affect the visitor use of site amenities and/or negatively impact natural resources.

2.6 Stakeholders

Red Rock Canyon National Conservation Area stakeholders include:

- Recreational users;
- Friends groups;
- Licensed tour operators and vendors operating at the site; and
- Neighboring residents, businesses, and schools.

Each of these groups uses the site in different ways, and their use patterns drive the traffic conditions and congestion at the site.

2.6.1 Recreational Groups

Recreational users include tourists and local residents who participate in a variety of activities, including sightseeing, hiking, climbing, cycling, picnicking, horseback riding, pleasure driving, and the use of all-terrain vehicles. Local residents who are regular visitors have organized a variety of user groups that arrange activities at the site, support the maintenance and development of amenities that benefit those users, and, generally, represent the concerns of those users to site management.

2.6.1.1 Hikers

Hiking is a popular activity at RRCNCA. There are a number of hiking trails throughout the site and there are several hiking groups that organize group hikes at RRCNCA. Groups such as Las Vegas Hiking and Outdoor Meetup, which has nearly 5,000 members (of which 300-400 are “active”), regularly organize groups of as many as 15 people for hikes in the RRCNCA. Hiking takes place year round but, during the hotter summer months (July through September), much less so.

There are trailheads at most parking lots along the Scenic Drive as well as at the Visitor Center. The characteristics of popular hiking trails are summarized in Table 6. According to leaders of the Las Vegas Hiking and Outdoor Meetup and BLM staff, the most popular trailhead for regular hikers is Sandstone Quarry, followed

by Ice Box Canyon, Willow Springs and Calico I. Hikers will park their vehicles at the lots at the trailheads for the duration of the hike, typically ranging from one to five hours.

Local hikers have responded to parking congestion issues by arriving early, avoiding peak days and busy lots, and carpooling. Organized groups often meet at nearby shopping centers and carpool into the site to save on entrance fees. Once on the trail, however, regular hikers report that they do not experience levels of trail congestion that would detract from the visitor experience.

Table 6: Popular Hiking Trails with Trailheads along the Scenic Drive

Trail Name	Trailhead Location(s)	Distance	Est. Round Trip Time
Calico Hills Trail	Calico Hills I & II, Sandstone Quarry	2 – 6 mi	1 – 3.5 hours
Calico Tanks Trail	Sandstone Quarry	2.5 mi	2 hours
Turtlehead Peak Trail	Sandstone Quarry	5 mi	3.5 – 4.5 hours
Keystone Thrust	White Rock Spring	2.2 mi	1.5 hours
White Rock Loop	White Rock Spring and Willow Springs	6 mi	3.5 hours
Lost Creek Tail	Lost Creek	.75 mi	1 hour
Ice Box Canyon Trail	Ice Box Canyon	2.6 mi	2 hours
Pine Creek Canyon Trail	Pine Creek Overlook	3 mi	2 hours
Oak Creek Trail	Oak Creek	2 mi	1.5 hours

2.6.1.2 Climbers

RRCNCA is considered one of the top climbing destinations in the world by both sport and traditional climbers. RRCNCA is known for its sandstone escarpments, which offer over 2,000 climbing routes of varying length and level of difficulty.

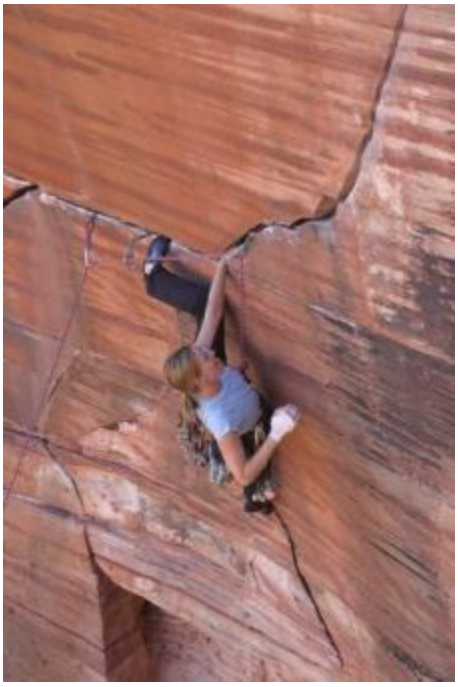
Sport and traditional climbing are distinct climbing styles with distinct user groups, locations, and activity patterns. Sport climbing involves shorter routes with many fixed anchors for protection and is more accessible and widely practiced than traditional climbing. Popular sports climbing routes are primarily located on escarpments to the east of the Scenic Drive accessed from the Calico Hills and Calico Tanks trails. Traditional climbing routes are located along the mountains to the west of the Scenic Drive (North Peak, Bridge Mountain, and Rainbow Mountain), and are accessed via the Ice Box Canyon, Pine Creek Canyon, and Oak Creek Canyon trails. Sport climbing routes are typically shorter than traditional climbing routes; sport climbers will generally engage in climbing for two to four hours. Traditional climbing routes are longer and climbers may access climbing sites for six to eight hours or more. Climbers tend to drive directly to trailheads and carry gear, ropes, bolts, and helmets. Often, traditional climbers will apply to the BLM for late exit passes and overnight permits to accommodate their climbing schedule.

Climbers visit RRCNCA most often during the spring and fall months. Climbing activity picks up at the end of September through November and again in March through May. Many local climbers use the site intensively on a weekly or daily basis, but the majority of climbers are not local. Climbers visiting the RRCNCA will typically

come for one to two weeks, often camping in nearby campsites, and climb nearly every day of their visit. In March, RRCNCA hosts Red Rock Rendezvous, the nation's largest climbing festival, which attracts over 1,000 climbers from around the world each year.

Climbers represent a small portion of the total visitors to RRCNCA, but they are marked by their intensity and passion for their sport and the sites where they climb. They are organized in various groups locally and nationally. Local groups include the Las Vegas Rock Climbing, Bouldering and Canyoneering Meetup Group (which counts nearly 900 members) and the Las Vegas Climbers' Liaison Council (LVCLC). These groups organize events and advocate for continued access to and maintenance of climbing routes.

The LVCLC is dedicated to ensuring climbing access, encouraging stewardship of the environment, cultivating a sense of community among Las Vegas climbers, and consulting with government agencies to help them better manage climbing areas around Las Vegas. The LVCLC has signed an official Memorandum of Understanding (MOU) with the BLM. The five-year agreement outlines a collaborative relationship between climbers and the BLM. Specific provisions state that the BLM will regularly attend LVCLC meetings, respond to climbers' questions and concerns, and update the community in a timely manner on any agency actions related to climbing. The agreement also states that the LVCLC will advise the BLM on future planning efforts related to climbing, keep the BLM informed on national and local climbing issues, provide technical assistance, and perform periodic stewardship and maintenance of climbing areas.



Source: www.mountainproject.com

2.6.1.3 Cyclists

The 13-mile Scenic Drive is marked by many curves and a significant altitude change that makes it a fun and challenging ride for cyclists. Due to the challenging nature of the course, most cyclists at RRCNCA are experienced cyclists. Cyclists often include the Scenic Drive as part of a longer loop course along Route 159 beginning in Summerlin or Henderson. Local cyclists often park in neighboring communities or at the Red Rock Overlook parking lot along SR 159 (outside of the amenity fee area) and bike into the site. Within the fee area, many cyclists stop to rest at High Point Overlook before beginning their descent.

Organized local cycling groups include Biking Las Vegas and the Las Vegas Valley Bicycle Club. The Las Vegas Valley Bicycle Club has over 100 dues-paying members. The Club organizes at least two rides per week in the Las Vegas area and advocates for bicycle facilities and road safety for the broader Las Vegas cycling community. In addition to these clubs, many local cyclists participate one of the eight semi-professional racing teams in the area. In addition, several tour operators provide cycling tours of the Scenic Drive and mountain biking trails in the RRCNCA.

The curves and varying pitch of the Scenic Drive are a safety concern for cyclists, particularly given the presence of numerous vehicles and sporadic driver behavior on the road. To manage steep ascents, cyclists often use the whole road, weaving back and forth across the road. During descents, cyclists can travel at speeds of 30 to 50

miles per hour. These speeds combined with sharp turns have led to serious accidents with vehicles traveling at different speeds or stopped in unexpected locations along the Drive.[11]

2.6.1.4 Equestrian Users

Horseback riding is a popular activity at RRCNCA for a small cohort of local users. Equestrian users use designated trails throughout the site. Equestrian users have unique transportation needs in that they require parking lots that can accommodate horse trailers. The most popular starting point for horseback riding is the unpaved lot south of Red Rock Overlook off of SR 159, adjacent to the exit to Scenic Drive, which is designated for equestrian use and has space to accommodate trailers. This lot often fills on weekends with vehicles and horse trailers. From this lot, equestrian trails access Pine Creek and Oak Creek Canyon. Equestrian users also use the Lost Creek and Willow Springs lots to access La Madre Springs and Rock Gap Road. During peak days, however, equestrian users avoid the Scenic Drive due to a lack of parking that can accommodate their trailers. Equestrian users may ride for two to four hours at a time.

Table 7: User Groups

User Group	Typical Lots Used	Typical Duration of Use	Special Issues
Hikers	Calico I and 2 Sandstone Quarry White Rock Willow Springs Lost Creek Ice Box Canyon Pine Creek Overlook Oak Creek Canyon	1 – 5 hours	None
Sport Climbers	Calico 1 and 2 Sandstone Quarry	2 – 4 hours	Lots of gear
Traditional Climbers	Ice Box Canyon Pine Creek Overlook Oak Creek Canyon White Rock	6 – 12 hours	Lots of gear Late access and overnight parking
Cyclists	SR 159 Red Rock Overlook	2-3 hours	Safety concerns
Equestrians	SR 159 Equestrian Lot White Rock	2-4 hours	Need parking that accommodates trailers

[11] BLM staff and cycling representatives recall one to two serious accidents per year, but the BLM does not keep data on nonfatal bicycle incidents.

2.6.2 Friends Groups

Friends groups are nonprofit organizations that work in partnership with the BLM on a voluntary or contractual basis to support the RRCNCA. There are two friends groups of the RRCNCA, which each serve a different support function:

- Friends of Red Rock Canyon
- Red Rock Canyon Interpretive Center

2.6.2.1 Friends of Red Rock Canyon

Friends of Red Rock Canyon is a volunteer-run nonprofit group officially established in 1984. The friends group supports RRCNCA through organizing volunteer labor and fundraising financial and in-kind donations. The mission of Friends of Red Rock Canyon is to preserve, protect, and enrich RRCNCA. Through the Friends of Red Rock Canyon, over 300 members provide over 20,000 hours of volunteer services and donate over $100,000 in donations to RRCNCA each year.

Friends of Red Rock Canyon volunteers assist with a range of activities, including graffiti removal, trash pickup, trail maintenance, leading hikes, maintaining the Visitor Center grounds, staffing the Visitor Center information desk, monitoring cultural sites, and sponsoring photo and art contests and a bus scholarship program for local schools. They also fundraise $100,000 annually for program support, equipment, and volunteer/staff training.

The Friends group has the following 11 committees:

- Cultural Resources
- Hospitality
- Plant (Visitor Center landscaping and re-vegetation projects)
- Membership
- Dedication Walkway
- Natural Resources
- Newsletter
- Tortoise Habitat
- Transportation (bus scholarship program)
- Procurement
- Community Outreach

Each committee has a chair, and the group also has an officer and a Board of Directors. Additionally, Friends of Red Rock Canyon has two paid staff members (an office manager and an AmeriCorps intern).

2.6.2.2 Red Rock Canyon Interpretive Association (RRCIA)

The Red Rock Canyon Interpretive Association is a nonprofit with 45 full and part-time employees. It was established in 1988 with the mission of enhancing the recreational, educational, and interpretive programs of the BLM at RRCNCA. RRCIA operates under a Cooperating Agreement with the BLM and is responsible for operating the RRCNCA fee booth, interpretative center and gift shop. In addition, the RRCIA runs education and interpretative programs and assists in the design and development of amenities at the RRCNCA. The RRCIA's operating funds come primarily from its gift shop operations.

RRCIA maintains a website that serves a dual purpose: provide visitation information to the public, and educate the public about the climate, geology, flora, and fauna of RRCNCA. The website includes information on hiking, climbing, biking, and camping, as well as a map of roads and trails.

The group runs the Elements Gift and Book Store, located in the Visitor Center, and runs hikes, educational, and interpretive programs (including children's programs, walks, table presentations, family programs, and lectures). They also publish "The Trail Source," a quarterly newsletter with a schedule and description of programs, as well as some additional interpretive information.

2.6.2.3 Permitted Tour Operators and Vendors

The BLM issues permits to guides and outfitters to operate within RRCNCA. Permitted guides and outfitters include jeep tours, guided hiking and cycling tours, guided horse tours, guided rock climbing, and yoga retreats. The terms of the permit indicate the frequency of visits, the areas of the site, and the number of visitors that the permit holder may guide on an annual basis. The BLM has a limited total number of permits, as designated in the site's Resource Management Plan.

Table 8: Permittees

Activity Type	Operator
Jeep Tours	• Bobcat Tours • Pink Jeep Tours
Hiking Guides	• Escape the City Streets • Hike This • Jackson Hole Mountain Guides • Red Rock Tours
Cycling Guides	• Blue Diamond Bike Outpost • Single Track Tours
Horse Guides	• Cowboy Trail Rides • Red Rock Riding Stables
Climbing Guides	• American Alpine Institute • Jackson Hole Mountain Guides • Mountain Skills • National Outdoor Leadership School • Red Rock Climbing Center and Outdoor Guide Service
Yoga	• Sherry Goldstein's Yoga Sanctuary

2.6.2.4 Neighboring Residents

Blue Diamond is a small community in Clark County, Nevada, bordering RRCNCA to the east. As of the 2000 Census, Blue Diamond counted 282 residents and 118 households. Many local residents enjoy recreational activities at Red Rock Canyon and often take guests to visit the site on holidays and weekends.

The Red Rock Citizens Advisory Council represents the concerns of Blue Diamond residents to the County government. They often deal with zoning and transportation issues. The residents of Blue Diamond have expressed concerns about traffic on SR 159. They have worked with the Nevada Department of Transportation

(NDOT) to lower the speed limit on SR 159, add reflectors, and widen shoulders to improve safety for motorists and cyclists. They have also worked with the BLM to repair fencing along SR 159 to reduce wildlife collisions.

In addition to the Blue Diamond residents, who live in the closest proximity to the site, there are hundreds or thousands of other nearby Clark County residents who regularly use the site. Many of these residents actively monitor and participate in management decisions that may affect visitor use at Red Rock Canyon. In particular, the master-planned community of Summerlin is the closest heavily-populated area near RRCNCA. The community has approximately 100,000 residents, as of 2010.

2.6.2.5 User Group Profiles

Discussion with stakeholder groups and analysis of visitation data provide some general observations about how visitation patterns of different user groups affect transportation. The study team incorporates these considerations in developing transportation strategies and evaluation criteria, as documented in Section XX.

- Local visitors, as well as those from neighboring states, are likely to drive their own personal vehicles. These visitors are divided between those that may visit for short recreational trips, including short hikes and picnics, and longer hikes and climbs of four hours or more. Many local visitors may also sightsee along the Scenic Drive with visiting friends and family.
- Tourists are most likely to participate in the Scenic Drive as a sightseeing loop with brief stops for hikes. They are likely to visit RRCNCA for a half- or full day as part of a trip to Las Vegas or the surrounding public lands.
- A small subset of tourists comes to Las Vegas specifically to climb at RRCNCA. These visitors will spend several days, up to 12 hours per day, at the NCA. (The total number of climbers visiting the site is unknown.)
- The majority of visitors who bicycle at RRCNCA are locals, which is less true of other recreational user groups.

3 Alternatives Evaluation

3.1 Development of alternatives

To develop alternatives, the study team identified a list of initial strategies in the areas of parking and road expansion, transit operations, and management, which the study team classified into core and supporting strategies. These strategies were informed by discussions with the BLM and stakeholder representatives, and a public meeting in July 2011. The study team classified strategies into two groups.

- **Core strategies** have the potential to *significantly* reduce traffic and parking congestion at RRCNCA. These strategies address one or more of the *causes* of congestion by reducing the number of vehicles on site, improving transportation infrastructure to accommodate more visitors, and/or influencing drivers to operate more efficiently.
- **Supporting strategies** improve the effectiveness of core strategies in achieving study goals, but may only have a minor impact on congestion when used independently.

The study team did not consider the feasibility or cost of strategies at this stage, so the range of strategies presented in Table 9 include many ideas that were later considered infeasible. The table includes all strategies presented to the BLM for consideration.

Table 9: Initial Transportation Strategies

Transit Strategies Considered
Provide mandatory seasonal shuttle service running during peak hours
Provide seasonal voluntary shuttle service with high-frequency headways
Provide seasonal voluntary shuttle service that offers visitor interpretation services and hourly headways
Provide shuttle service between campground and climbing areas
Provide two-way shuttle service operating only between Visitor Center and Sandstone Quarry
Make a van or bus available on as needed basis (school or interpretive programs, high-congestion days)
Allow permitted tour operators to pick up additional customers at Visitor Center
Connect Bus/shuttle services to an off-site location (Red Rock Casino/Bus Rapid Transit)
Parking and Road Improvements Considered
Add two-way road between Sandstone Quarry and Visitor Center for use by shuttle only
Add a two-way road between the Scenic Drive exit and Pine Creek lot for use by shuttle only
Create a new lot and trailhead area at Calico III or elsewhere
Expand congested parking areas
Selectively widen Scenic Drive for additional short-term pullout areas, parallel parking, and passing lanes
Reconfigure lots by restriping within existing paved footprint
Build out overflow parking at Visitor Center
Institute carpool lot near fee booth
Extend Scenic Drive to expand visitor use areas
Open old service road for emergency access
Add a bike lane painted on Scenic Drive
Add a separated bicycle/pedestrian path
Management Strategies Considered
Institute higher fees on peak days offset by lower fees on non-peak days to manage demand
Use traffic counters to monitor lot capacity and use of variable message signs to indicate lots at or under capacity
Close Scenic Drive when a specific vehicle threshold is reached
Close specific lots when a vehicle threshold is reached
Create signs for short-term and long-term parking (self-enforcing)
Create signs to clarify designated parking, overflow parking, queuing lines, and no parking zones
Create signs for passing zones and pullouts on Scenic Drive
Create signs for greater bicycle/pedestrian awareness
Provide displays and programs informing visitors of driving and parking rules (at Visitor Center and throughout the Scenic Drive)
Expand visitor amenity/trails at other areas outside of Scenic Drive and promote use
Use web tools or mobile applications to assist visitors in trip planning

3.1.1 Selecting and Evaluating Strategies

To assess potential strategies, the study team identified measurable objectives aligned with each of the study goals (see Table 10). The study team worked with the BLM to assess each of the transportation strategies for their ability to achieve BLM's goals and meet the Transportation Feasibility Study objectives.

Table 10: Transportation Feasibility Study Objectives

Goal	Objective
1. Visitor mobility	a) Parking lots can accommodate all visitors on a typical busy day. b) Visitors can travel on Scenic Drive at posted speed limits on a typical busy day.
2. Visitor safety	a) There is a reduction in unsafe travel conditions due to infrastructure. b) There is a reduction in unsafe travel behaviors.
3. Visitor experience	a) The strategy does not detract from the visitor experience of user groups. b) Visitors are able to experience all attractions at RRCNCA with minimal wait time associated with accessing the amenity on a typical busy day.
4. Natural and aesthetic resources	a) Scenic and aesthetic resources can be enjoyed by current visitors and future generations. b) Preserve cultural resources. c) Preserve natural resources.
5. Financially and operationally feasible	a) Strategy is financially feasible and sound. b) BLM has the capability to operate maintain the resulting transportation improvement.

To assess the feasibility and potential impact of the proposed strategies, the study team held meetings with BLM staff at the site and district levels, interviewed public stakeholders, surveyed transportation strategies at similar sites, and developed demand and financial models to estimate costs. The study team incorporated assessments of the cost and management impacts of each strategy, BLM staff and funding constraints for management and operations, and concerns for safety, resource impacts, and visitor experience impacts into their feasibility assessments. The strategies in the refined list are the building blocks for the four alternatives presented in this report.

3.1.2 Final alternatives determination

The four alternatives present an evaluation of strategies to reduce congestion at parking lots on the Scenic Drive while accommodating existing and future visitation demand. These alternatives fit within feasible management parameters for the BLM in the areas of resource management, safety, and financial sustainability.

The assessment results in one No Action alternative and three action alternatives; one action alternative uses parking and transportation management strategies exclusively and the other two alternatives include the introduction of transit service. The subsequent sections describe and analyze each of the four alternatives, which are summarized in Table 11. Each of the action alternatives includes a transportation management strategies bundle, detailed in the next section.

Table 11: Overview of Alternatives

		Alternative A	Alternative B	Alternative C
Parking and Management	Transportation Management Strategy Bundle Signage Scenic Drive passing Short and long term parking Traffic counters at all lots Re-open carpool lot	X	X	X
	Parking lot reconfiguration	X	X	X
	Limited parking expansion		X	X
	Maximum parking expansion	X		
Transit	Climber/Hiker shuttle from campground		X	X
	Voluntary shuttle of the full loop (one-way)		X	X
	Two-way shuttle between Visitor Center and Sandstone Quarry			X
	Reconfigure/possible future expansion of Visitor Center lots (to accommodate transit users)		X	X
	Widening Scenic Drive for two-way transit use			X

3.2 Definition of Alternatives

Section 3.3 defines major assumptions, such as visitation growth rates, amenity fees, planned infrastructure improvements, and other transportation and visitor services changes that are planned to occur outside the scope of this study. These assumptions will apply to both the action and No Action alternatives. An overview of each of the four alternatives is included in this section.

3.2.1 No Action

The No Action alternative includes all parking and transportation facilities and services that currently exist or are programmed for implementation as of the date of this study, such as the future SR 159 multiuse trail, and associated parking improvements to the Scenic Drive Exit parking lot. There are no planned changes to the size of the parking lots or the width of Scenic Drive. This alternative does not include or assume the introduction of new management strategies that would affect visitation levels or transportation use patterns; the alternative anticipates that the BLM will continue with current management strategies. As the BLM has made no commitments to new construction elsewhere around the Scenic Drive, the No Action alternative would not include additional transportation projects unless considered under BLM's use of SNPLMA funds, which may include the road and parking lot repaving, as well as limited parking lot expansion.

The study team will compare the transportation and environmental impacts of the No Action alternative to those of the proposed action alternatives, as guided by the National Environmental Policy Act (NEPA). The No Action alternative will also be a component of the NEPA environmental review, which will analyze the impacts of action and No Action alternatives.

Management Strategies Bundle

There are several management strategies the BLM should implement regardless of the alternative that is selected. Each of the strategies in this bundle can be implemented with minimal investment. The study team expects these strategies to be non-controversial, low-cost management options that will help realize one or more study goals in the areas of visitor mobility, safety, experience, and impacts to natural and aesthetic resources. Some of these strategies can reduce congestion in the Scenic Drive parking lots. Others will improve overall traffic operations, safety, and visitor experience on the Scenic Drive.

The management strategies bundle consists of the following:

- Designation of long-term and short-term parking at select parking lots, with signage delineating parking space allocation. Long-term and short-term parking would be self-enforcing. This strategy will likely increase efficiency of parking operations and decrease parking in undesignated locations.
- Signs to direct driver behavior (See Appendix 1: Maps of New Signs), including:
    - Passing zones in safe areas and "slower drivers keep right"
    - "Watch for cyclists," particularly near steep or curved road sections
    - "Pullout areas ahead" or "Slower drivers use pullouts" near designated lookouts or disturbed sites that may be appropriate for one or two car photo stops
- Reconfigure selected parking lots (Calico I, Calico II, Sandstone Quarry, Willow Springs, Lost Creek, Ice Box, Pine Creek) by restriping to allow for the addition of 4 to 21 spaces per lot. The reconfiguration would not involve any construction or expansion of the total paved footprint. In some cases, reconfiguration can help reduce total hours of congestion without new construction, significant expense, or resource impacts. Table 12 includes the number of spaces under reconfiguration for all included lots. A sample of conceptual schematics for reconfiguration is included in Appendix II: Parking Reconfigurations and Expansions.
- Installation of traffic counters at the paved parking lots with trailheads along Scenic Drive (Calico I, Calico II, Sandstone Quarry, Lost Creek, Willow Springs, Ice Box Canyon, and Pine Creek). A plan for the use of traffic counters is included in Appendix III: Use of Traffic Counters.
- Re-opening of the carpool lot so that visitors can park prior to paying the amenity fee. The use of an on-site carpool lot would encourage carpooling among hikers/climbers and help reduce the number of vehicles (especially those occupying long-term parking spaces) on Scenic Drive.

The bundle of management strategies described above will yield some benefits in congestion reduction, but the BLM will need additional changes to significantly reduce its congestion. The following three alternatives include the management strategies bundle in addition to strategies that are designed to have a larger impact on congestion, such as parking expansion and the introduction of transit service to Scenic Drive.

3.2.2 Alternative A – Parking Expansion and Management

Alternative A reduces congestion through a combination of management strategies and an increase in the amount of parking (see Section 3.4).

These strategies include the following:

- Expansion and reconfiguration of existing parking areas (see Table 12)

- Management strategies bundle.

The following is a summary of changes to parking lots:

- Reconfiguration only: Visitor Center, Calico Vista II, Ice Box Canyon
- Re-configuration and expansion: Calico Vista I, Sandstone Quarry, Willow Springs, Lost Creek and Pine Creek Canyon
- New construction: Calico Vista III

The total costs for parking expansion in Alternative A, using an assumption of $40 per square foot (which incorporates design and engineering costs), is $2.4 million. There are no additional annual operating costs beyond those in a No Action scenario baseline.

Table 12: Parking Lot Expansion Proposals under all Alternatives

Lot Name	Current Spaces	Reconfigure	Alt A # of Spaces	Alt A % of Pavement Expansion	Alt B/C # of Spaces	Alt B/C % of Pavement Expansion
Calico I	42	46	106	80%	75	30%
Calico II	13	19	19	0%	19	0%
Calico III	NA	NA	12	NA	5	NA
Sandstone Quarry	70	74	100	25%	100	25%
Willow Springs/ Lost Creek	81	85	103	22%	85	0%
Ice Box Canyon	23	27	27	0%	27	0%
Pine Creek	11	36	112	120%	61	20%

3.2.3 Alternative B – One-Way Transit and Parking Expansion

Alternative B includes voluntary transit service to reduce congestion. Alternative B consists of the following strategies:

- One-way transit with stops at the Visitor Center and each lot along the Scenic Drive.
- Construction of a small, transit-oriented lot at Calico III.
- Hiker/climber shuttle with stops at the campground, the Visitor Center, and lots along Scenic Drive, operating during the early morning and evening hours.
- Limited expansion and reconfiguration of existing parking areas.
- Management strategies bundle.

One-way transit would allow visitors to enter and exit a transit vehicle at each lot along the Scenic Drive. The transit service would provide interpretative narration on the natural and cultural history of the site. Transit vehicles would run at 20 minute intervals. It is assumed that 5 to 10 percent of visitors would use transit. This would have the effect of lowering overall demand for parking; therefore, the parking expansion proposal for Alternative B is more limited than that in Alternative A (see Table 12).

The capital cost for Alternative B is $2,095,000, including $884,000 for parking expansion, and the annual operating cost is $405,000 in the first year of operation.

3.2.4 Alternative C – Intensive Two-Way Transit with Limited Parking Expansion

Alternative C is similar to Alternative B in that there would be limited parking lot expansion and one-way transit service stopping at all parking lots on the Scenic Drive. In addition, the Scenic Drive would be widened to allow for two-way transit service between the Visitor Center and Sandstone Quarry, with stops at Calico I, Calico II, and a new Calico III. The two-way transit service would include the construction of a reverse-direction transitway with a short (10 cm) concrete curb between the Visitor Center and Sandstone Quarry. Alternative C would shorten the travel time for visitors who want to visit one of the first three lots but do not want to travel the entire Scenic Drive.

Alternative C consists of the following strategies:

- One-way transit with stops at the Visitor Center and each lot along the Scenic Drive (one-way).
- Two-way transit with stops at the Visitor Center, Calico I, Calico II, Calico III, and Sandstone Quarry.
- Construction of a reverse-direction, median-separated transitway between the Visitor Center and Sandstone Quarry.
- Hiker/climber shuttle with stops at the campground, the Visitor Center, and lots along Scenic Drive, operating during the early morning and evening hours.
- Limited expansion and reconfiguration of existing parking areas.
- Management strategies bundle.

Transit would allow visitors to enter and exit at each lot, with ridership depending upon visitor demand. It is assumed that slightly more visitors (6 to 12 percent) would use transit under this alternative due to the shortened travel time incentives. The transit service would also provide interpretative narration on the natural and cultural history of the site.

The parking expansion proposal for Alternative C is identical to that of Alternative B under the limited parking expansion scenario (see Table 12).

The capital cost for Alternative C is $4,501,000, including $884,000 for parking expansion and $1.75 million for the construction of a two-way transitway. The annual operating cost for transit is $552,000 for the first year of operation.

3.3 Assumptions for Alternatives Evaluation

This study makes several assumptions about the demand for and use of transportation at RRCNCA to aid in the assessment of the ability of the alternatives to achieve the objectives. This section explains the rationale for the following assumptions:

- The build years will be 2015 and 2025 to plan for demand and implementation of improvements.
- Assessment of the ability of the alternatives to achieve the study objectives will be based on the performance of the alternative on a hypothetical busy day, or “design day.” The design day, defined in detail in Section 3.3.2, is one that has more visitation than approximately 90% of all other days in that year.

- Visitation will grow at an annual rate of 2%.
- No other transportation improvements will occur that will affect the capacity or operation of the Scenic Drive and the Scenic Drive parking lots, aside from routine maintenance, with a possible exception for re-paving the Scenic Drive and parking lots.

3.3.1 Build Years

The implementation of alternatives included in this study is subject to environmental analysis and permitting, the procurement of funding for capital and operations expenses, and the provision of management policy changes. Implementation of some alternatives may require the BLM to consider changes to the amenity fee structure, which would be the result of full analysis through its Business Plan update in 2015. In consideration of these issues, the study team set a Build Year of 2015 as a reasonable time frame in which the alternatives can be implemented. Given the size and durability of the transportation investments considered in the alternatives, 2025, or 10 years after implementation of alternatives, would be an appropriate timeframe to analyze transportation system changes under future conditions.[12]

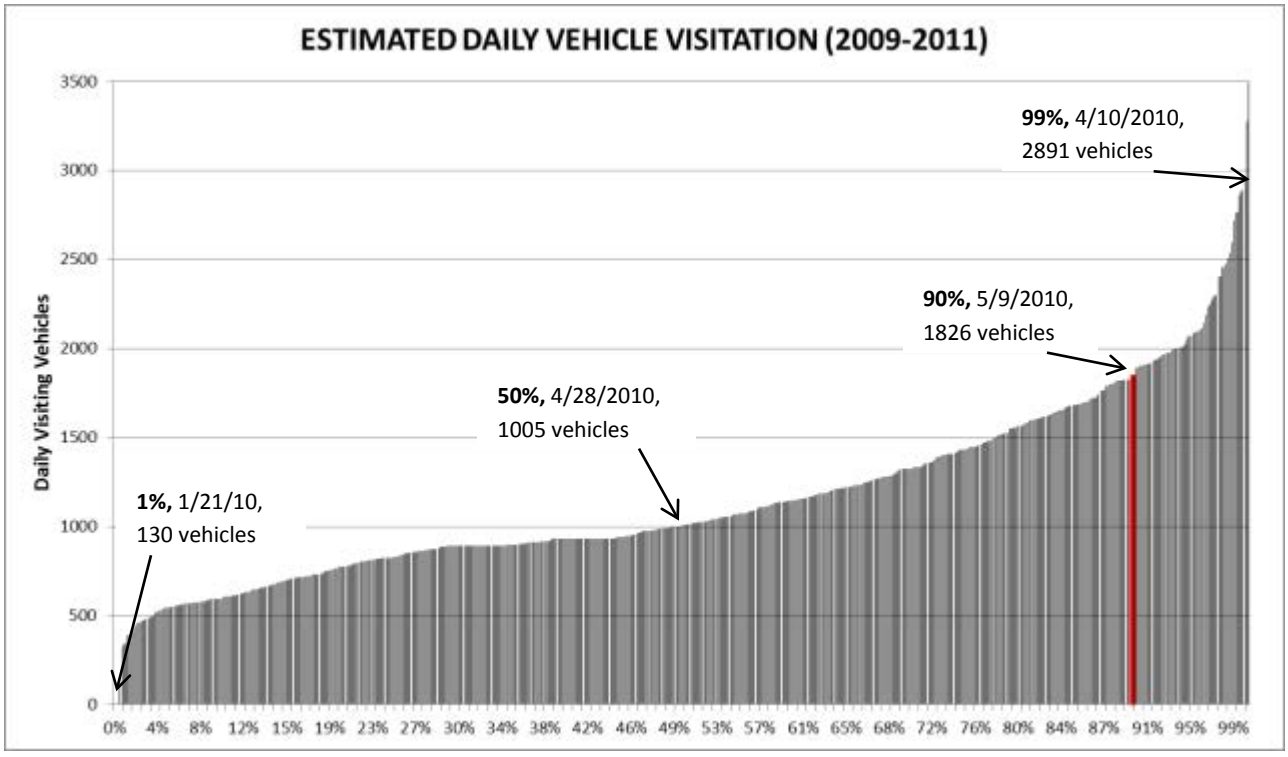
3.3.2 Design Day

The study uses a "design day" to assess the ability of the alternatives to achieve the study objectives. The design day is one that has more visitation than approximately 90% of all other days in that year. The purpose of using such a design day is to plan for transportation strategies that accommodate high-usage days without overbuilding parking and/or transit to accommodate only a few days of the year. The BLM may need to include additional management strategies (such as the temporary closing of the Scenic Drive to new vehicles) to accommodate congestion on those 10% ~~percent~~ of days where visitation exceeds that of the design day.

The study team evaluated overall vehicle visitation from 2009 to 2011 to determine a design day (see Figure 16). Visitation to RRCNCA varies by month of the year and day of the week. Visitation is higher on weekends than weekdays, and peaks in the spring months of March and April. Based on available visitation data, the median (or 50th percentile) number of vehicles entering RRCNCA in a given day is 1,003. The study team observed a day on which approximately 1,550 vehicles entered RRCNCA; this was the equivalent of an 80th percentile day. Between 2009 and 2011, a 90th percentile day was equivalent to approximately 1,826 vehicles entering RRCNCA.

[12] Transit vehicles have a useful life of approximately 12 years, and at 10 years, the BLM would likely need to reassess the demand and levels of service for any transit systems in operation.

Figure 16: Estimated Daily Vehicle Visitation (2009-2011)



Based on historic trends and regional planning projections, it is reasonable to expect that visitation to RRCNCA will continue to increase over the next decade. To project parking demand on a 90th percentile day in 2025, the study team assumes that visitation to RRCNCA will increase at two percent annually; approximately in line with regional demographic growth projections (see Section 3.3.3). The effect of this growth assumption is that on a 90th percentile day in 2025 there will be 2,433 vehicles, or 58 percent more vehicles than on November 5, 2011, the day the observations of parking use patterns were recorded. This number corresponds to 4,565 visitors and 6,083 visitors on the 90th percentile day in 2015 and 2025, respectively, based on average vehicle occupancy of 2.5 persons per vehicle.

Table 13: 90% Design Day 2015 and 2025

90% visitation day, RRCNCA	2015	2025
Vehicles	1,826	2,433
Visitors	4,565	6,083

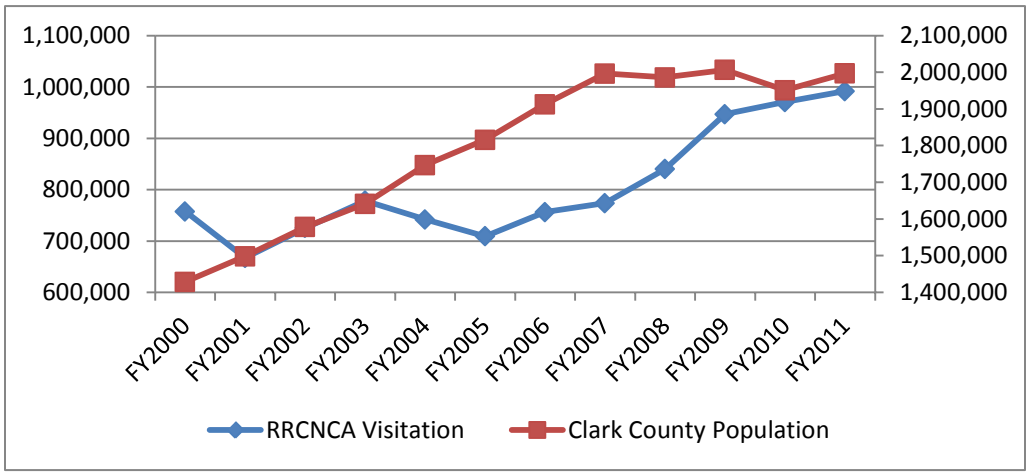
3.3.3 Visitation Growth

Estimates for growth rates are based on historic growth rates in visitation and the population projections developed for Clark County regional growth plans. From 2000 to 2011, annual visitation at RRCNCA ranged from 667,277 to 991,797. Annual visitation growth varied from *negative* growth of 11.9 percent (2000-2001) to positive growth of 12.7 percent (2008-2009). The average growth rate during this period was 2.8 percent,

and the average growth rate from 2005 through 2011 was 5.8 percent.[13] The growth in visitation has leveled off in Fiscal Years 2010 and 2011 to 2.5 percent and 2.2 percent, respectively (see Figure 17).[14]

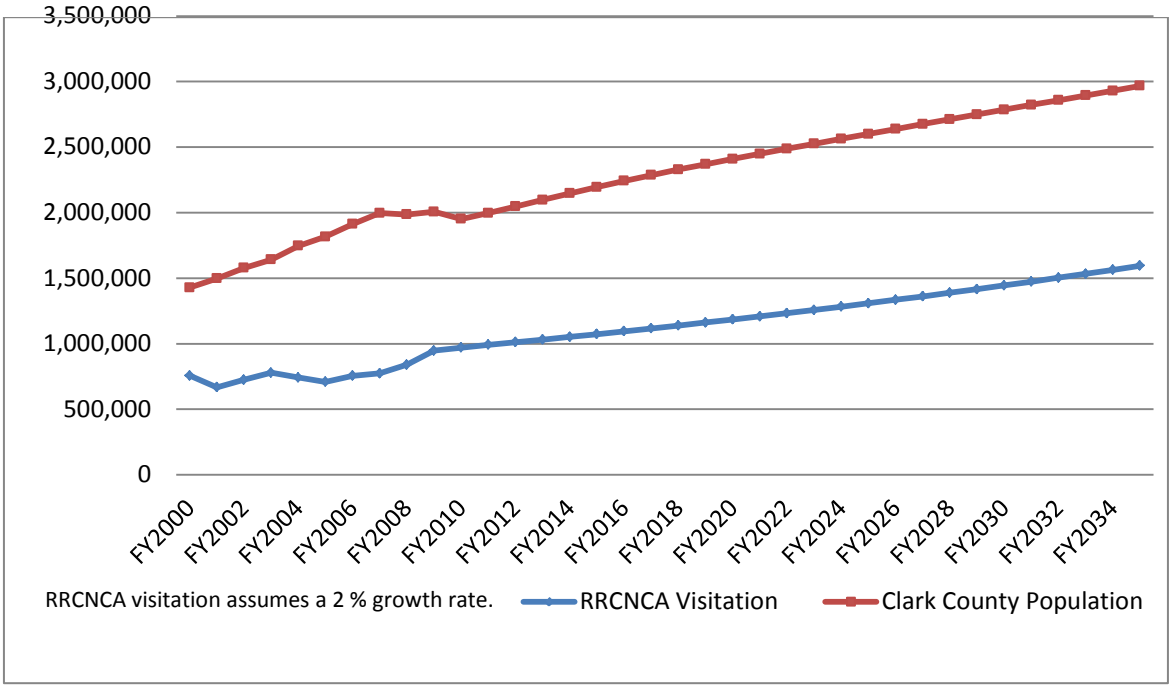
Clark County experienced higher and more consistent growth rates from 2000 through 2011, with lower growth rates between 2009 and 2011. Population projections for Clark County show predicted growth rates of 2.0 to 2.5 percent between 2011 and 2017, decreasing to 1.2 to 1.9 percent for 2017 to 2035.[15] Based on the historic growth rates of visitation at RRCNCA and projected growth rates in Clark County, this study considers a visitation growth rate of 2 percent from 2011 through 2035 (see Figure 18), which is a conservative estimate. The growth rate may be higher than 2 percent during some years and the site may experience negative growth in other years (due to factors such as fluctuations in tourism, economic downturns, and weather).

Figure 17: RRCNCA Visitation and Clark County Population (2000 – 2011)



[13] Lower visitation in 2004 and 2005 is likely due to a wet winter and a wildfire near the Scenic Drive in the summer.
[14] RRCNCA visitation data, provided by BLM staff.
[15] Tra, Constant and Christopher Drury. 2011. Population Forecasts: Long Term Projections for Clark County, Nevada 2011-2050. University of Las Vegas, Nevada. Prepared for Regional Transportation Commission (RTC), Southern Nevada Water Authority, Southern Nevada Regional Planning Coalition, and members of the Forecasting Group. Provided to study team by RTC.

Figure 18: RRCNCA Visitation and Clark County Population Projections (2000 – 2035)



3.3.4 Additional Transportation Improvements

The BLM has considered and/or may consider in the future the following improvements:

- Repave the 13 mile length of the Scenic Drive.
- Repave all paved parking areas along the Scenic Drive, without expanding their footprints.
- Pave the roads leading from Scenic Drive to White Rock parking lot and Oak Creek parking lot.
- Pave the White Rock and Oak Creek parking lots.
- Expand the Pine Creek parking lot.

At the time of publication, the BLM had not made any decisions or commitments to pursue these transportation improvements. They also have not planned for or completed environmental permitting, design, and engineering for these improvements. Therefore, the No Action alternative will not include these changes to the transportation infrastructure, although these changes could be evaluated in subsequent environmental review documents if the BLM makes any commitments prior to its development of alternatives.

3.4 Parking

3.4.1 Current and Projected Parking Lot Use and Demand

This study addresses growing concerns with traffic and parking congestion along the Scenic Drive. During peak usage periods, the number of vehicles seeking parking exceeds the capacity of parking lots. The study team estimates and projects parking demand using a simple demand model derived from observed visitor behavior. The model allows the team to estimate periods of parking congestion, when demand exceeds supply at specific lots along the Scenic Drive and assess the impacts of various transportation strategies on parking congestion.

The parking demand model estimates parking demand based on data collected on seasonal and daily usage patterns. Usage patterns used to project parking demand are derived from lot use data collected at RRCNCA on Saturday, November 5, 2011, as well as daily vehicle visitation data collected at the fee booth from 2009 through 2011. The model uses these data to make generalizations about expected patterns in visitor behavior at seven lots along the Scenic Drive (Calico I, Calico II, Sandstone Quarry, Willow Springs, Lost Creek, Ice Box, and Pine Creek). In making projections of future parking demand, the study assumes a two percent annual growth rate in visitation (see section 3.3.3). The model then projects visitation patterns (the number of vehicles, the times of entry, and the lengths of stay) to each lot for 2025, given expected growth in visitation.

The model postulates parking demand as a function of the number of vehicles entering the Scenic Drive, the hourly rate of vehicle entry into various lots along the Drive, and the length of vehicle stays in each lot. The findings of the model are limited in that the model uses simple assumptions about visitor behavior that are drawn from a limited data set that may vary from typical use patterns. The number of visitors and their length of stay varies depending on the time of year, day of the week, weather, purpose of trip, and occurrence of organized events. The model could not account for all of these factors. With those caveats in mind, the model can be taken as a roughly accurate portrayal of potential parking demand that can be used to estimate the scale of parking congestion and the impact of transportation strategies on overall parking congestion.

3.4.2 Observed Parking Patterns

The study uses data collected at RRCNCA on Saturday, November 5, 2011 to make generalizations about parking lot usage. Saturday, November 5, was a sunny day approximately ten degrees cooler than average for early November. Approximately 1,550 vehicles entered through the fee booth, an amount typical for a November weekend day. The study team, BLM staff, and volunteers recorded vehicle entries and stays at Calico I, Calico II, Sandstone Quarry, Willow Springs, and Lost Creek,[16] Ice Box, and Pine Creek. Volunteers observed parking congestion beginning approximately at 10:00 AM at Pine Creek, at 10:30 AM at Calico I and Sandstone Quarry, and at 11:00 AM at Calico II. Once lots reached capacity, visitors parked in non-designated spots along the Scenic Drive and along the entrances to the lots to access trailheads at Calico I, Calico II, Sandstone Quarry, and Pine Creek.

Parking pattern observations include the rate of vehicles entering each lot, and the duration of vehicle stays. Table 14 shows the hourly rate of entry at each lot. Table 15 shows the observed duration of stay at each lot. To verify the accuracy of the data, the study team compared these observations to the findings of the 2001 Transit Feasibility Study, which found similar results for most lots (see Appendix IV: Parking Model Validation).

[16] To facilitate data collection, the study team counted combined entries and exits to Willow Creek and Lost Springs. The demand predictions treat the two lots as a single use area, although the study team acknowledges that the two lots have different uses and amenities.

Table 14: Observed Hourly Entries by Lot (November 5, 2011)

	Calico I	Calico II	Sandstone Quarry	Willow Springs and Lost Creek	Ice Box	Pine Creek
6am-7am	1	1	4	1	0	1
7am-8am	10	1	12	7	2	7
8am-9am	7	7	10	8	3	10
9am-10am	38	8	40	19	5	15
10am-11am	70	23	60	32	14	17
11am-12pm	113	34	94	52	19	44
12pm-1pm	86	30	96	61	26	36
1pm-2pm	77	33	82	42	25	32
2pm-3pm	65	30	81	52	22	49
3pm-4pm	56	24	72	38	14	33
4pm-5pm	49	14	48	21	11	30
Total	572	205	599	274	333	141

Table 15: Distribution of Stay Durations by Lot (November 5, 2011)

	Calico I	Calico II	Sandstone Quarry	Willow Spring and Lost Creek	Ice Box	Pine Creek
5-15 min	46%	47%	33%	23%	50%	33%
16-30 min	21%	21%	16%	10%	9%	3%
31-60 min	19%	19%	10%	11%	8%	10%
61-120 min	10%	8%	14%	22%	14%	18%
121-180 min	1%	1%	14%	19%	12%	10%
181+ min	4%	3%	12%	15%	7%	26%

3.4.3 Modeling Parking Demand in 2025 (No Action)

Using the observations and assumptions above, the study team developed a model of hourly parking demand in 2025 for each observed lot. These results are displayed in the next section as Figure 19 through Figure 24 in the description for Alternative A (design day demand will be the same for both alternatives). The solid horizontal red line shows existing parking capacity, as recorded in the 2011 Condition Assessment.[17] The solid, sloped black line represents estimated parking demand for November 5, 2011. The dashed, sloped black line represents projected parking demand for the design day. During the hours in which the slopes of the parking demand curves are above the solid red line, the model predicts congestion.

[17] Federal Highway Administration- Central Federal Lands Highway Division. 2011. Red Rock Canyon National Conservation Area Condition Assessment. Obtained from BLM.

While the model is based upon the rate of vehicle entries observed, the figures are normalized to show expected average hourly demand and are not a direct translation of the November 5 data shown in Table 14.

The model demonstrates that for the chosen design day, parking demand will exceed supply at all lots included for study. Table 16 shows the hours of congestion on the design day for all four alternatives, comparing existing capacity to estimated peak parking demand[18] for both the observed day and the design day at each lot.

On the design day, lots along Scenic Drive will experience congestion periods ranging from five to nine hours. Projected peak parking demand at Calico I, Calico II, and Sandstone Quarry will be more than twice the supply. At Pine Creek, projected peak parking demand will be more than nine times the supply. The projected levels of congestion are likely to result in increased occurrences of informal parking along the Scenic Drive, which will increase risks to visitor safety and natural resources.

Parking congestion may never approach the levels projected under this model, because the model does not account for the effects of growing congestion on demand.[19]

3.4.4 Parking Demand in 2025 (Alternative A)

Alternative A relies primarily on strategies that increase parking supply rather than strategies that manage parking demand. Parking demand under Alternative A may be marginally lower due to the opening of the carpool lot (included in the management bundle for Alternatives A, B, and C). Otherwise, under Alternative A parking demand remains unchanged from demand in the No Action alternative. Since the impact of opening the carpool lot on overall site traffic is uncertain and likely to be marginal compared to other factors, the study team assumes parking demand is effectively unchanged in this scenario.

Alternative A includes the addition of a new small lot between Calico II and Sandstone Quarry, known as Calico III. The BLM included the future development of Calico III in their Resource Management Plan. The study team includes Calico III to help meet demand for parking at Calico II without expanding parking at Calico II, due to the steep slopes and other environmental constraints at that lot. Calico III contains 12

[18] Peak parking demand is defined as the highest number of parking spaces demanded at the end of an hour for a given lot based on overall visitation to the RRCNCA, and vehicle rates of entry and durations of stay at the given lot.

[19] Parking supply may act as a constraining resource on the growth of visitation. As visitation grows, congestion will grow as well, deterring visitors and dampening growth. Following the logic of induced demand, over the long-term congestion will tend towards equilibrium. While increased supply will reduce congestion in the short-term, over the long term more people will choose to visit the RRCNCA and the RRCNCA will eventually become as congested as it was before parking supply was increased. If this is the case, the primary benefit of increasing supply may derive from the increased *quantity* of visitors that are able to experience and enjoy RRCNCA, rather than from the improved *quality* of a visitor experience free from congestion. That said, the latent demand, or the number of visitors who currently choose to avoid visiting the RRCNCA due to parking congestion, would have to be quite substantial to wipe out the gains in reduced congestion from significantly increased supply. Furthermore, if the RRCNCA employs demand management strategies in conjunction with increased parking supply, the effects of induced demand may be neutralized and the benefits of reduced congestion realized.

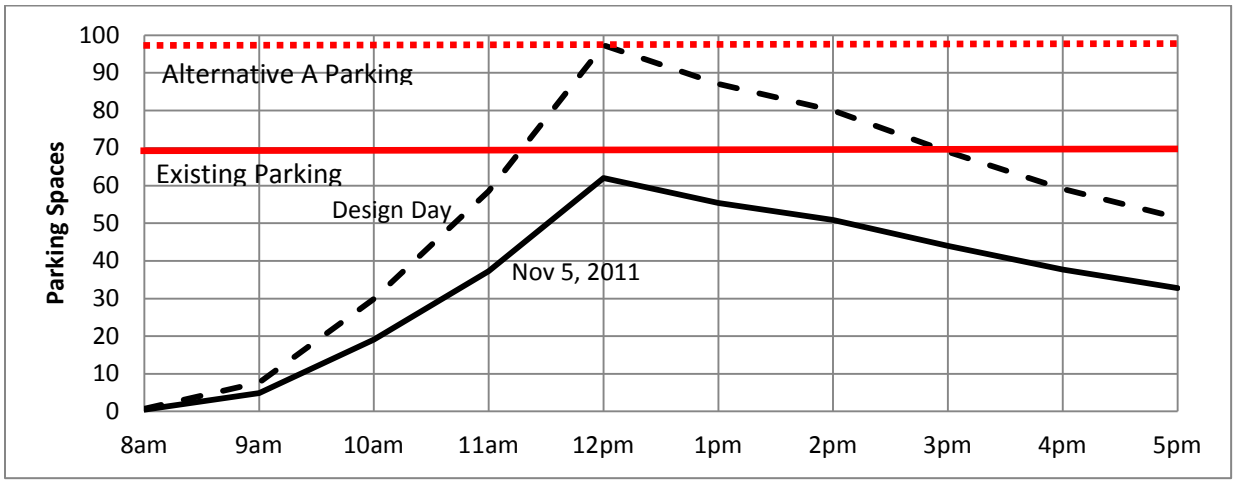
spaces, which is the amount of parking expansion that would otherwise be allocated to Calico II in a limited parking expansion scenario.[20]

The goal of increasing parking supply is to reduce parking congestion to a minimum on the design day. Under Alternative A, the increase in parking spaces at each lot is set to accommodate the volume of 2,433 vehicles on the design day. Where design cost or environmental constraints limit the extent to which a lot may be expanded to address congestion, the lot is expanded to those limits. This is the case at Sandstone Quarry and Calico II, due to the presence of sensitive resources and steep slopes. Table 12 describes the parking supply expansion considered under Alternative A.

Depending on variations in use patterns, congestion may still occur on days in which visitation is equal to or greater than the design day, but congestion will be significantly less than under the No Action alternative. The Alternative A scenario demand model does not account for the potential for induced demand as congestion is alleviated (see footnote 19).

These results of increasing supply under base assumptions of visitor demand are displayed in Figure 19 through Figure 24. The dotted horizontal red line shows parking supply under Alternative A. The solid sloped black line represents estimated parking demand for November 5, 2011. The dashed sloped black line represents projected parking demand for the design day. During the hours in which the slopes of the parking demand curves are above the dotted red line, the model predicts congestion.

Figure 19: Alternative A, Estimated Design Day Parking Demand: Calico I



[20] The BLM is developing Calico II and III with limited expansion due to resource and capacity constraints.

Figure 20: Alternative A, Estimated Design Day Parking Demand: Calico II

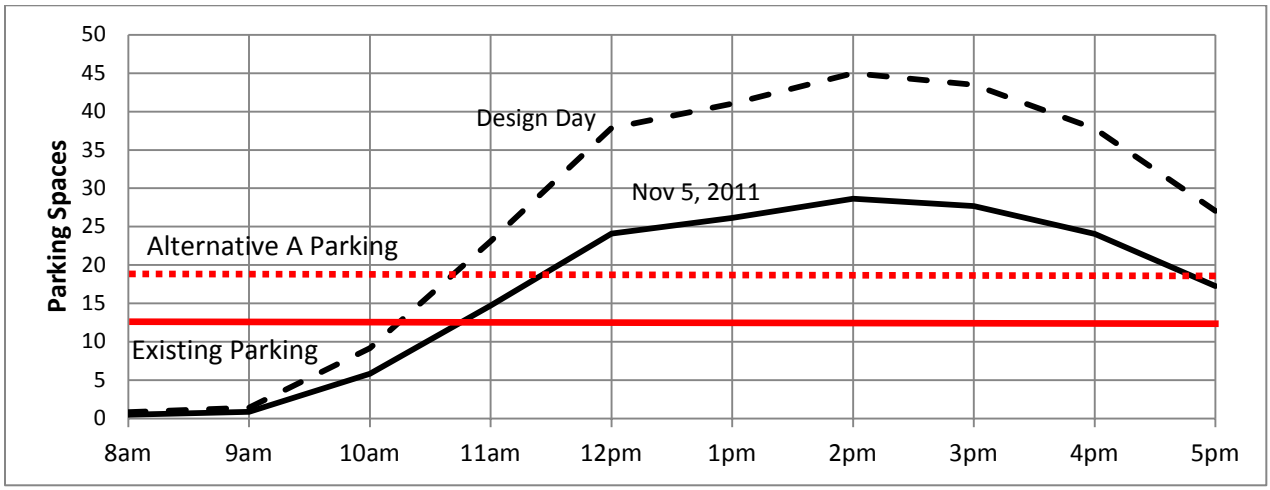


Figure 21: Alternative A, Estimated Design Day Parking Demand: Sandstone Quarry

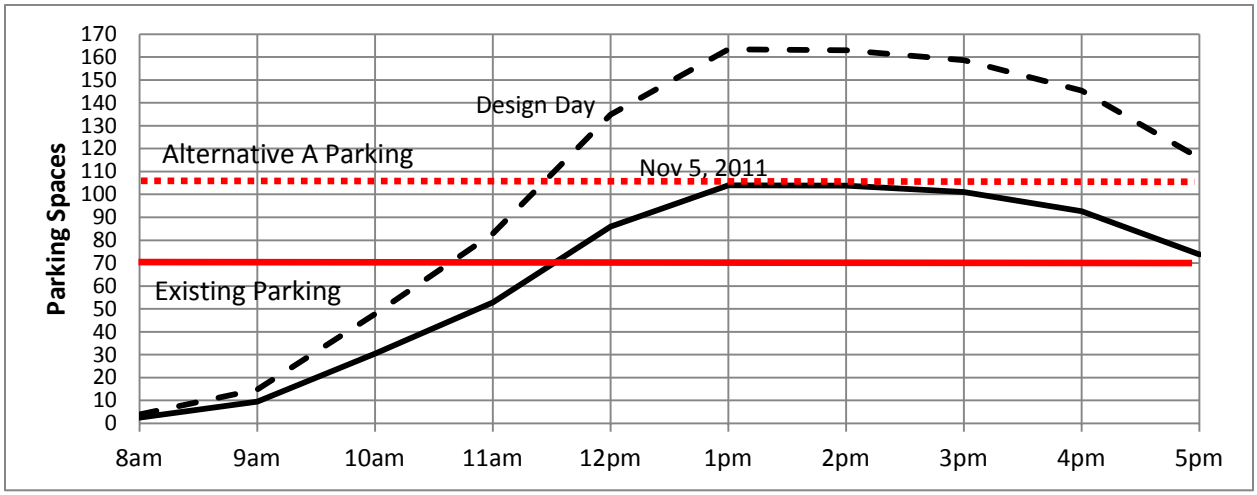


Figure 22: Alternative A, Estimated Design Day Parking Demand: Lost Creek and Willow Spring

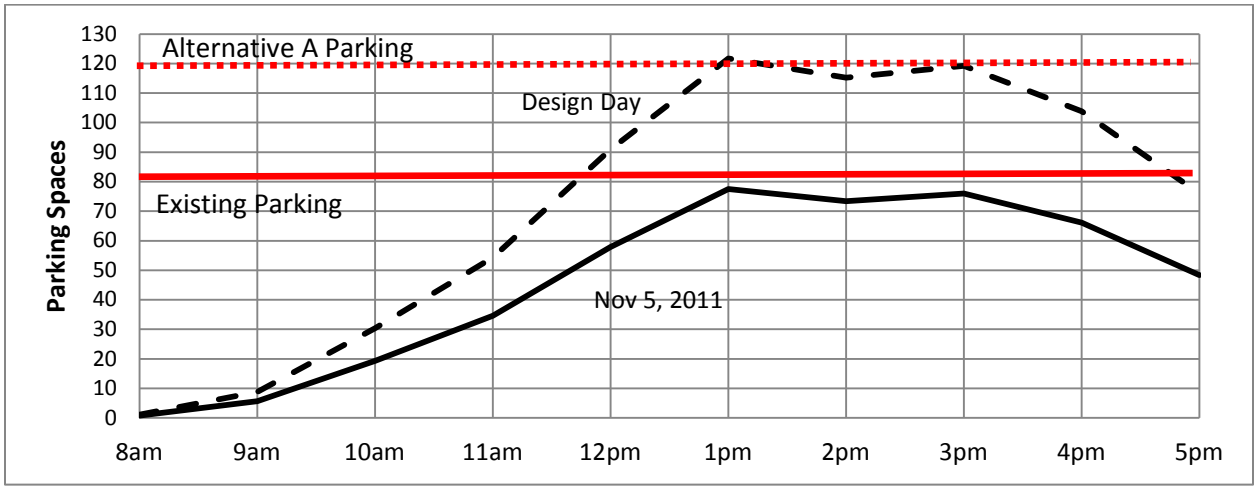


Figure 23: Alternative A, Estimated Design Day Parking Demand: Ice Box Canyon

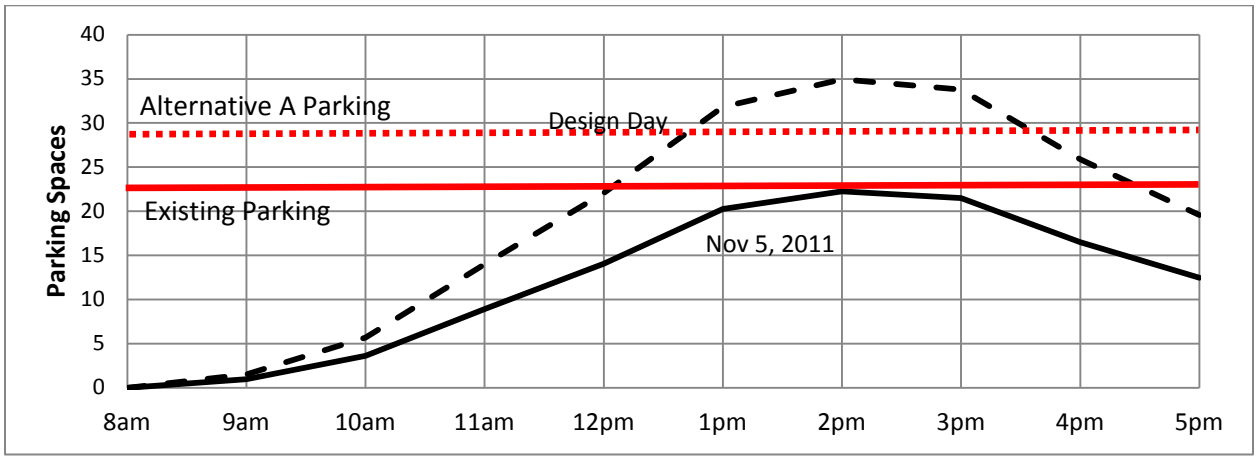
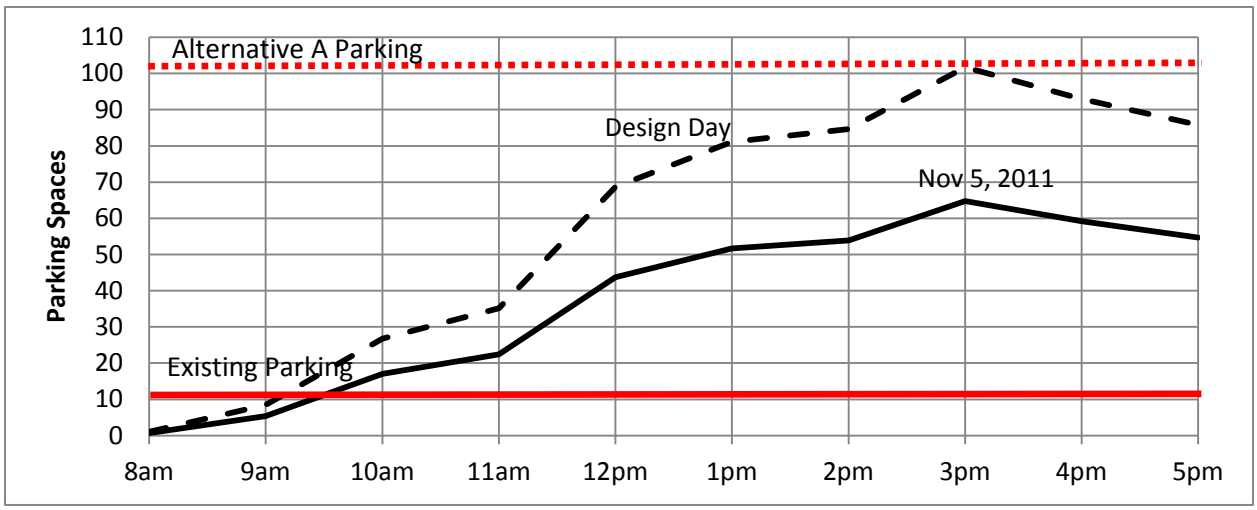


Figure 24: Alternative A, Estimated Design Day Parking Demand: Pine Creek



3.4.4.1 Interpretation of Model Results

At lots where parking expansion is unconstrained, increasing supply can effectively minimize congestion on a design day. Where parking expansion is constrained by design cost or environmental factors, parking congestion will be lower than under the No Action alternative and lower over the short term. However, with growth in visitation, in 2025 congestion levels at lots where expansion is limited will be similar to current congestion levels.

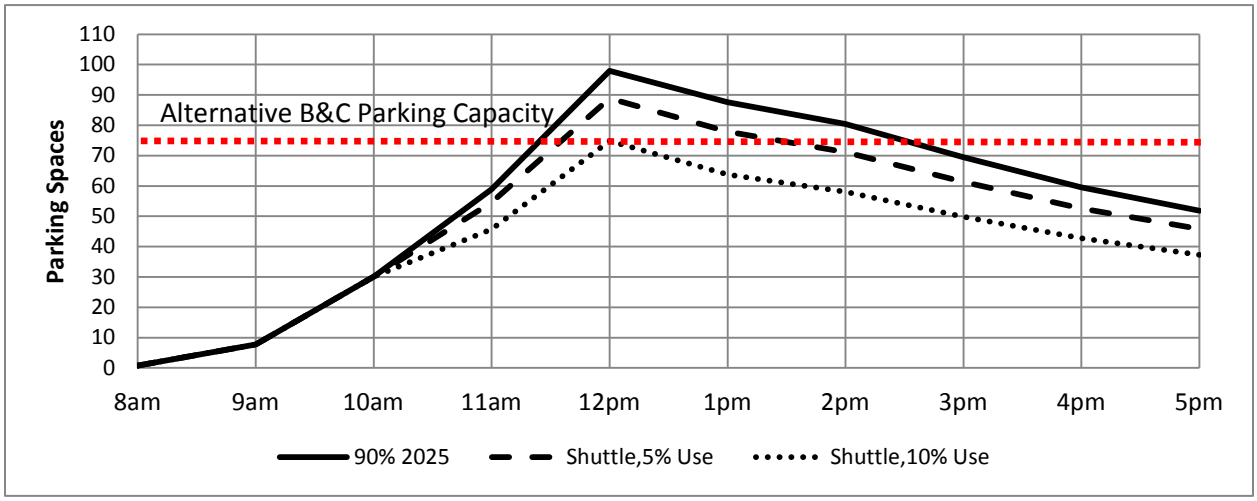
3.4.5 Parking Demand in 2025 (Alternatives B and C)

Alternatives B and C rely on a mix of supply and demand strategies to reduce congestion. The introduction of voluntary transit reduces parking demand by creating a competitive alternative to vehicle travel for some portion of visitors. Parking supply is also increased but not to the same degree as in Alternative A. The goal of this mixed strategy is to achieve a minimization of congestion on the design day while meeting study goals of minimizing resource impacts. Similar to Alternative A, expansion of Sandstone Quarry and Calico II are limited due to design cost or environmental constraints. For the other lots, parking is expanded to meet

parking demand under a high use transit scenario, where parking demand is reduced by ten percent. Table 12 describes the parking supply expansion considered under Alternatives B and C.

Project parking supply and demand levels under Alternatives B and C are displayed in the charts below. The dotted horizontal red line shows parking supply under Alternatives B and C. The solid sloped line represents estimated parking demand for the design day. The dashed sloped line represents projected parking demand for the design day with a "low use" transit system that reduces parking demand by five percent. The dotted sloped line represents projected parking demand for the design day with a "high use" transit system that reduces parking demand by ten percent.[21] During the hours in which the slopes of the parking demand curves are above the dotted red line, the model predicts congestion.

Figure 25: Alternatives B and C, Estimated Design Day Parking Demand, High and Low Use Transit: Calico 1



[21] The "high use" scenario could occur in Alternatives B or C, but Alternative C may be more likely to induce higher ridership due to the time savings of two-way transit.

Figure 26: Alternatives B and C, Estimated Design Day Parking Demand, High and Low Use Transit Calico II

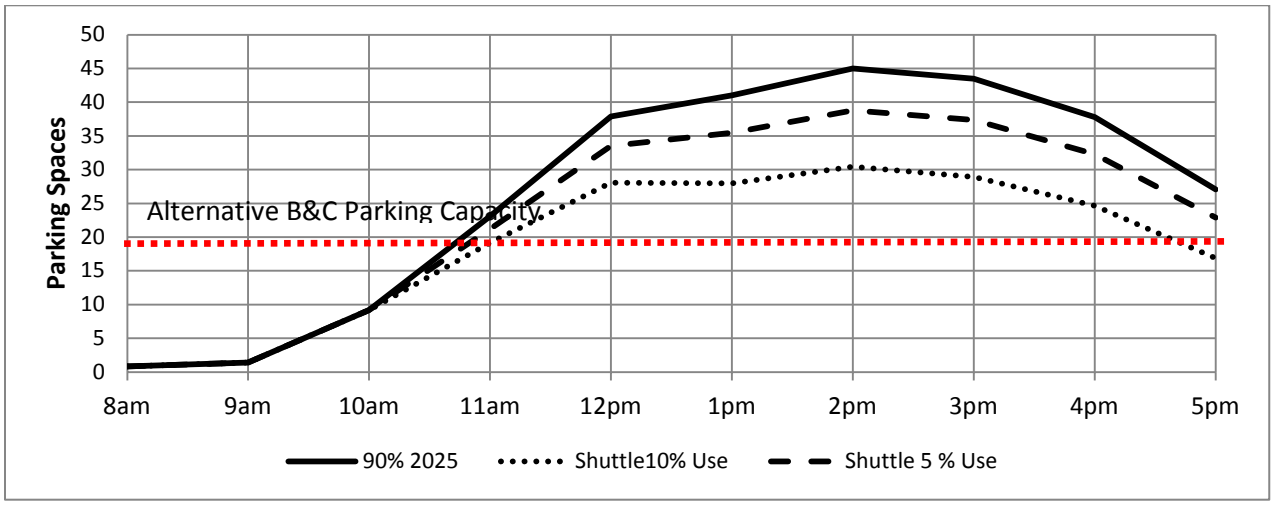


Figure 27: Alternatives B and C, Estimated Design Day Parking Demand, High and Low Use Transit Sandstone Quarry

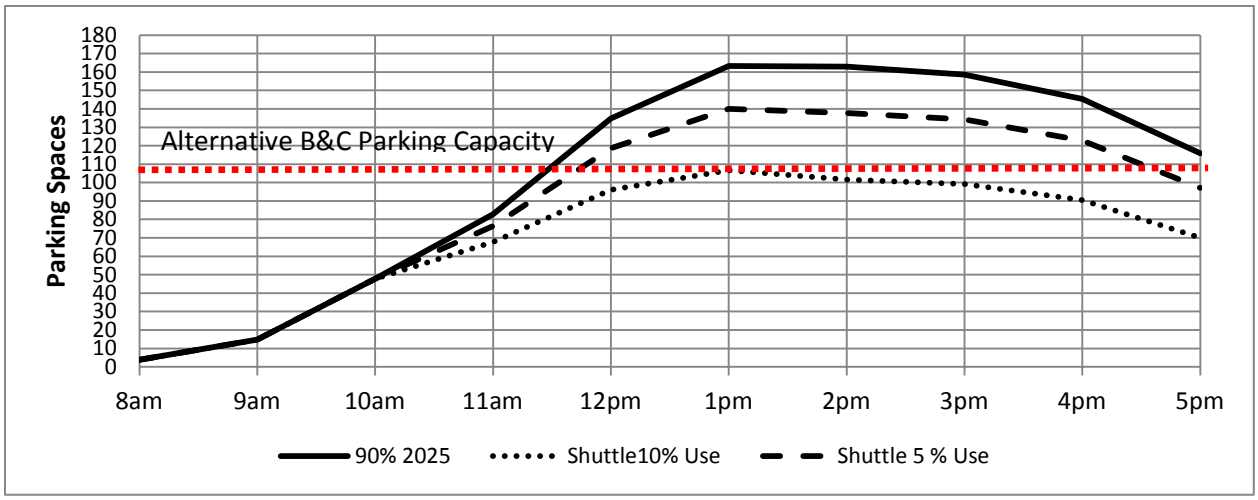


Figure 28: Alternatives B and C, Estimated Design Day Parking Demand, High and Low Use Transit Willow Spring/Lost Creek

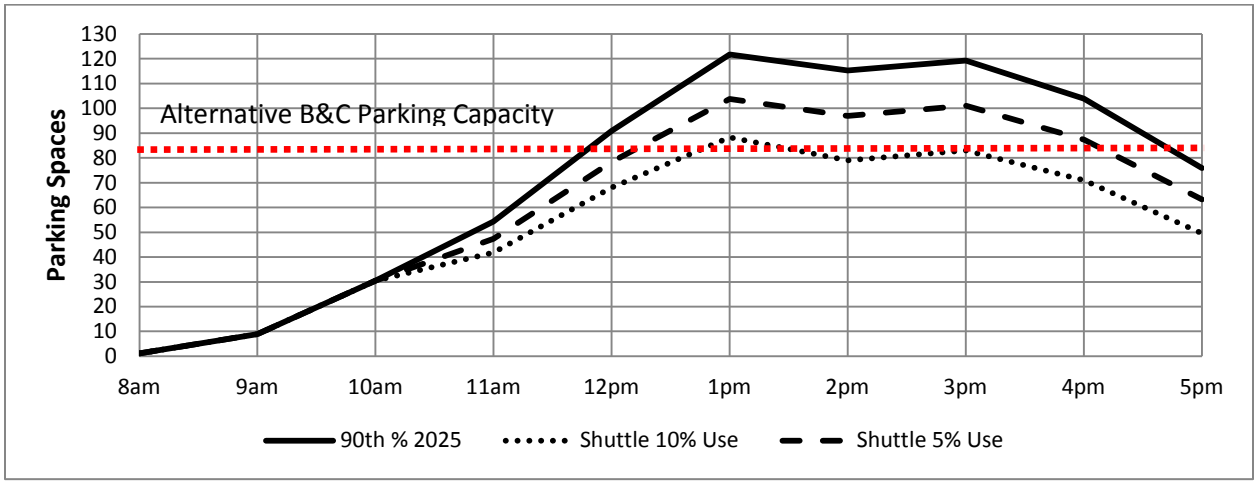


Figure 29: Alternatives B and C, Estimated Design Day Parking Demand, High and Low Use Transit Ice Box Canyon

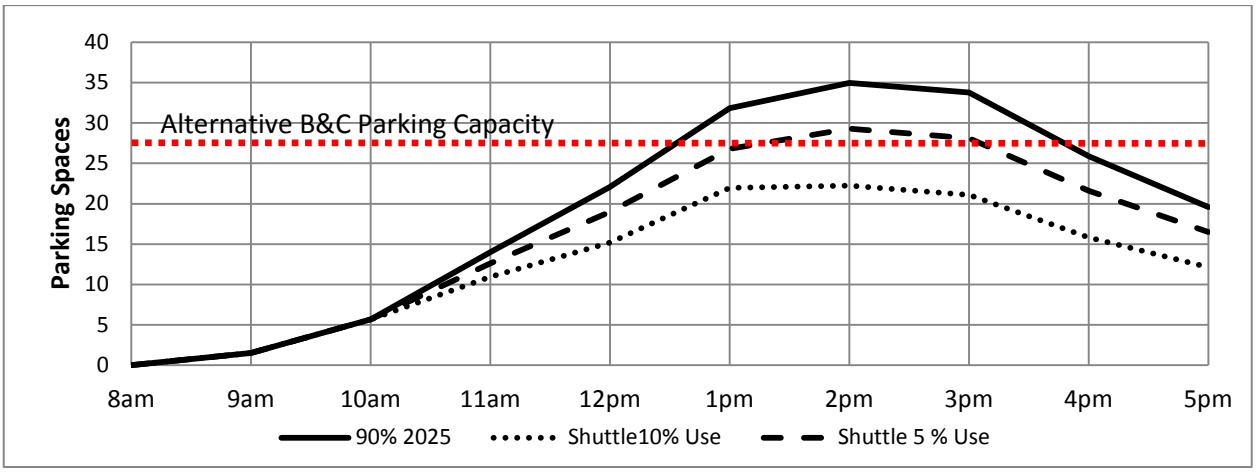
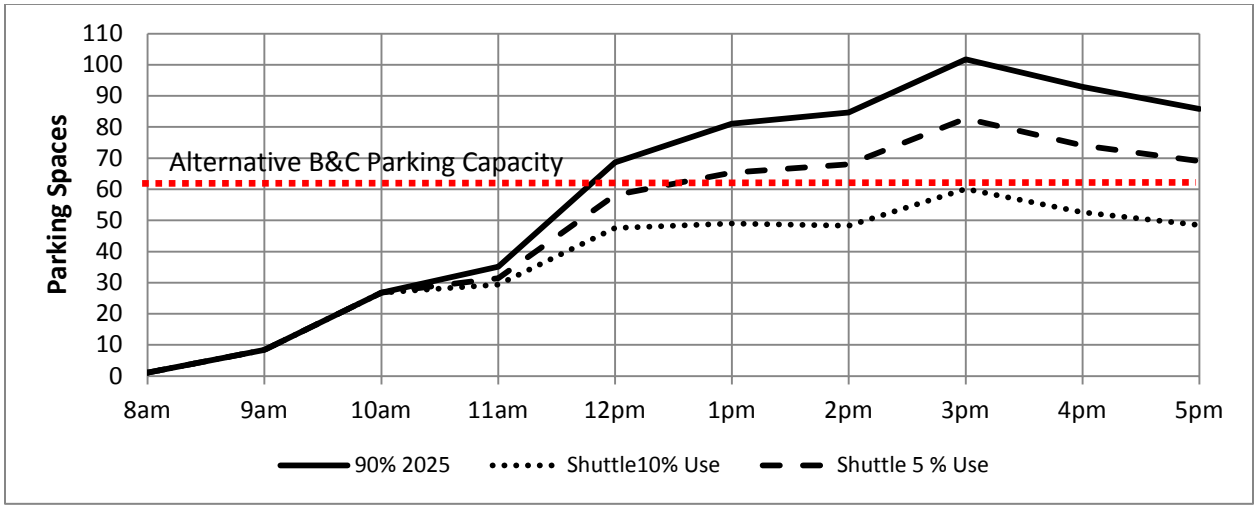


Figure 30: Alternatives B and C, Estimated Design Day Parking Demand, High and Low Use Transit Pine Creek



3.4.5.1 Interpretation of Model Results

In Alternatives B and C, parking congestion can be minimized on the design day under the high transit ridership scenario. For lots such as Sandstone Quarry and Calico II, where the maximum parking lot expansion is limited, congestion levels are lower under Alternatives B and C than in Alternative A. The differences in predicted congestion levels between Alternatives B and C are negligible; however, the increased transit service levels offered under Alternative C increase the likelihood of the high use scenario occurring.

The total number of hours of congestion at each lot is sensitive to visitor transit ridership. In the low transit ridership scenario, all of the lots experience two or more hours of congestion on the design day. Therefore, it is important for a transit system to be designed, managed, and priced to attract maximum ridership to best meet congestion reduction goals.

Transit demand will likely be inversely related to parking congestion. It is likely that as parking congestion levels increase, driving will become a less attractive option and more visitors will opt for the transit alternative. As a result, transit use is likely to be highest on peak days, when congestion is greatest, and is likely to increase over time as visitation grows. Table 16 below describes the parking supply expansion considered under Alternatives B and C, as well as the hours of congestion predicted for all four alternatives.

Table 16 Congestion Levels under Alternative B and C High and Low Use Scenarios

Lot	Capacity (spaces)	# of spaces under Alt B/C	Design Day Projected Peak Demand (spaces)	Design Day Congested Hours (No Action)	Alternative A Congested Hours	Alt B/C Low Transit Usage Peak Demand (spaces)	Low Transit Usage Congested Hours	Alt B/C High Transit Usage Projected Peak Demand (Spaces)	High Transit Usage Congested Hours
Calico I	42	75	98	8	0	89/87	2	75/73	0
Calico II	13	19/24	45	8	6	39/39	5.5	31/30	4.5
Sandstone	70	108	164	7.5	5.5	141/139	5	107/105	0
Willow/Lost	81	81	122	5	0	104/103	4.5	89/87	1
Ice Box	23	27	35	0	3	30/29	2	22/22	0
Pine Creek	11	61	102	9	0	83/82	4.5	60/59	0
Total				37.5	14.50		23.50		5.50
Average				6.25	2.42		3.92		0.92

3.5 Transit Service in Alternatives B and C

The design of an appropriate transit system is important for to enable congestion reduction in Alternatives B and C. The study team considered the four primary elements of transit service. Table 17 describes those elements and the planned service characteristics to develop a transit system that achieves the study's objectives.

Table 17: Summary of Characteristics of Transit Service

Description of element	Planned transit characteristic
Quality Service **The transit system needs to provide convenient service with benefits and sufficient frequency such that at least 10 percent of visitors prefer transit as an attractive substitute to personal vehicles.**	• Headways of 20 minutes or less • Interpretation • Service to the campground
Capacity **The transit fleet needs to be of sufficient size to accommodate anticipated use (10-12 percent of visitors).**	• 30-passenger vehicles • Headways of 20 minutes or less
Efficient and Flexible Operations **The transit system should operate on a business model that is both efficient and scalable to meet needs over time.**	• Fleet owned by BLM but privately operated and maintained • Flexible performance-based contract
Financial Sustainability **The transit system should be priced to attract sufficient ridership and financed to sustainably cover operations and maintenance costs.**	• Annual operating costs covered by potential increased annual visitor fee and transit rider fares.

Section 3.5 describes the elements of transit service and how these elements contribute to a transit system that offers quality service, adequate capacity, efficient and flexible operations, and financial sustainability.

Alternative B features two transit services: a shuttle for hikers and climbers originating at the campground, and a bus that starts and ends at the Visitor Center. Both services complete a loop of Scenic Drive, with the hiker/climber shuttle stopping at lots upon request and the bus stopping at each lot. For both of these routes, visitors choose whether to travel the Scenic Drive by car or bus, depending on their own preferences. Alternative C adds a third transit route that operates between the Visitor Center and Sandstone Quarry, with reverse-direction service on a southbound transitway dedicated to use for transit vehicles only.

3.5.1 Sources and Assumptions for Transit Analysis

Transit system design and cost estimation is dependent upon the number of visitors that will use the service, as well as capital and operating costs. The study team estimated transit ridership using precedents from other public lands agencies, as the BLM does not have specific data that would indicate transit preferences at RRCNCA. Based on the large range between the low and high ends of estimated ridership cited at other sites, the study team developed service plans for both a low (5 percent) and high (10 percent) ridership scenario for Alternative B, and 6 percent and 12 percent for Alternative C. Additionally, a shuttle aimed at hikers and climbers can help address parking shortages by reducing the number of long-term parking stays at popular parking lots. More information about precedent research for transit ridership and hiker/climber shuttles can be found in Appendix V: Precedent Research for Transit Ridership on Public Lands.

The study team used a Bus Lifecycle Cost Model, developed by the Volpe Center in partnership with the Department of the Interior, to develop a service and operations plan for transit services provided under Alternatives B and C.[22] The model provides feasible headways, costs, and bus capacity information using ridership and visitation inputs and is based on extensive transit research. The study team then compared estimates with other transit services in the Las Vegas area and at public lands sites in the region or with similar visitation patterns. The resulting costs reflect the fact that transit service will operate 112 days per year with limited hours and low mileage routes. More information on the cost analysis and sources is available in section 3.5.5.

3.5.2 Quality Service

Visitors will elect to use a voluntary transit service if the service is convenient and provides added benefits over the use of a personal vehicle. Feedback from visitors and the public (through public meetings, open houses, and written comments) indicates that visitors seek high frequency service and interpretation of RRCNCA's natural and cultural resources as primary incentives to use transit. Some visitors also liked the idea of a shuttle that allows them to experience the area without the added stresses of driving and parking. Climbers and hikers staying at the campground would avoid the need for a car to access the site. This section describes some of the basic service parameters for Alternatives B and C to provide a high-quality transit service.

3.5.2.1 Route

The one-way shuttle bus follows the Scenic Drive and stops at every parking lot, including a new lot Calico III, for a total of 13 stops (see Appendix VI: Transit Map). The service allows shuttle riders to follow visitation patterns already in place at RRCNCA and reflects the BLM's goals of reducing parking congestion while maintaining visitor access. The hiker/climber shuttle follows a similar route, but it includes a stop at the campground and stops at lots with trailheads, on request. Alternative C's two-way shuttle starts from the Visitor Center and then stops at each of the three Calico lots. The shuttle then turns around using the loop at Sandstone Quarry and stops again at the three Calico lots during its return trip to the Visitor Center. Appendix VII: Transit Route and Distances shows the routes and shuttle stops for Alternatives B and C, and the travel distance and average expected travel speed of the vehicle between the designated shuttle stops for both transit alternatives.

3.5.2.2 Schedule

The seasonal operation of the full loop shuttle, as detailed in Table 18, follows existing seasonal visitation trends at RRCNCA. Service operates when current and expanded parking is projected to be stressed. Thus daily service will be available during the spring peak from March through April, while service operates

[22] The model is based on a variety of inputs, including bus type, fuel costs, driver wages, service and schedule characteristics, maintenance and overhaul, infrastructure condition, and visitation. Resources for these inputs include the Federal Transit Administration, American Public Transportation Association, the General Services Administration, the U.S. Department of Labor, and the National Park Service, among others. More information is available online at http://www.volpe.dot.gov/coi/ppoa/publiclands/projects/busandferrycost.html

weekends only during the shoulder season, October through February and in May. No service is provided during the summer when visitation is at its lowest and when parking congestion is not a significant concern.

Table 18: Seasonal Service

Month	Service Type	Days of Operation	One-Way Shuttle Headways (Alt. B and C)	Two-Way Shuttle Headways (Alt. C)
January	Shoulder Service	Sat/Sun	20 minutes	20 minutes
February	Shoulder Service	Sat/Sun	20 minutes	20 minutes
March	Peak Service	All days	20 minutes	20 minutes
April	Peak Service	All days	20 minutes	20 minutes
May	Shoulder Service	Sat/Sun	20 minutes	20 minutes
June – September: No Service				
October	Shoulder Service	Sat/Sun	20 minutes	20 minutes
November	Shoulder Service	Sat/Sun	20 minutes	20 minutes
December	Shoulder Service	Sat/Sun	20 minutes	20 minutes

The one-way shuttle under Alternative B would provide service starting at 9:00 AM as parking lots across RRCNCA begin to fill and operate until 5:00 PM, with a total travel time around the loop of about 70 minutes. Headways, or the time between shuttles, reflect a service plan with a shuttle scheduled to arrive at least every 20 minutes. The BLM may also choose to run transit more or less often as daily demand changes with weather, special events or other factors. Flexibility in operation is important to consider if the BLM does not directly operate the service.

Alternative C adds a dedicated transitway allowing buses to turn around at Sandstone and return to the Visitor Center. In addition to the one-way transit described for Alternative B, Alternative C includes running two-way buses with stops at Calico I, II, III, and Sandstone Quarry. The combination of the two routes, each running at a frequency of 20 minutes, allows visitors to travel to the first four destinations on a bus leaving once every ten minutes. Visitors using two-way transit could save approximately 25 minutes by not driving their personal vehicle the remaining part of the loop. Higher frequencies and time savings will be valuable draws to the shuttle; thus ridership under Alternative C is more likely to achieve higher ridership. Table 18 shows the span of service and headways for both the one-way and two-way transit routes.

For both Alternatives B and C, the hiker/climber shuttle provides two trips in the morning at 5:45 AM and 7:15 AM, and climbers and hikers could use the transit service to return to the Visitor Center (those wishing to return to the campground during the afternoon and before the NCA closes could request pick-up service from the campground host). The hiker/climber shuttle also operates four evening runs after RRCNCA closes, two of which operate to the Visitor Center and two of which operate to the campground. The last run of the evening hiker/climber shuttle departs the Visitor Center approximately three hours after the NCA closes, operates around Scenic Drive to pick up any late returning hikers/climbers, returns to the Visitor Center to pick up any remaining hikers or climbers deposited by the earlier evening shuttles, and then returns to the campground. The total travel time of each hiker/climber shuttle run is schedule for 90 minutes, but it is likely be less as the shuttle does not stop at all lots.

3.5.2.3 Infrastructure to Support Transit

In addition to transit vehicles, transit service requires infrastructure in the form of fueling, transit stops, and a reverse-direction transitway (in the case of Alternative C).

Fuel

The proximity of RRCNCA to Las Vegas allows for cost-efficient access to diesel fueling stations and maintenance facilities, eliminating the need for dedicated fuel and maintenance depots at RRCNCA. Compressed-natural gas (CNG) is available in the greater Las Vegas area, but the nearest CNG station is almost 18 miles from the Visitor Center.[23] Due to the distance from RRCNCA, this study recommends the use of diesel or diesel-hybrid vehicles (diesel is available seven miles from the Visitor Center).

Transit Stops and Parking

Alternative B requires 14 stops at an estimated cost of $11,000 each. The transit stops are equipped with a paved landing area, benches, a shelter, and an information panel. A curb attached to the landing pad also provides a surface to deploy ADA accessible bus ramps. Shelters and benches can keep visitors comfortable while they await the shuttle. Bus schedules and interpretive information may also be included at stops.

The cost of the stops could be reduced if the paving and construction costs of the stops are included in any parking lot expansion or reconfiguration costs, due to consolidation of design and construction processes. Several of the stops where use is anticipated to be low could be built with fewer amenities at a cost of around $5,000 each. This study recommends high-amenity stops for the campground, the Visitor Center, Calico I, II, III, Sandstone Quarry, and Pine Creek. Alternative C would add stops at each of the three Calico lots (on the west side of the road) with a lesser level of amenities, at a cost of $5,000 each. Crosswalks and pedestrian signs would be needed to help visitors safely cross from the east side to the west side.

The parking lots at the Visitor Center and the fee booth, including the Visitor Center overflow lot, contain sufficient parking spaces to accommodate anticipated transit ridership within the first few years of operation. The BLM will explore the need for additional parking capacity for shuttle riders in the future based on a few years of ridership trends; however, no parking expansion is planned for the first five years of operation to assess the use of transit and the need for additional parking, and to keep initial costs down.

Transitway Construction

Alternative C requires the construction of a transitway. The transitway is a half to full lane constructed on the west side of the Scenic Drive from the Visitor Center to Sandstone Quarry. The transitway would include extra room for pedestrians and bicyclists to travel alongside vehicles in a counterclockwise direction, but there would be no painted or physical separation for these users, nor would there be room for vehicles to pass each other within the two-way road section. The transitway construction requires approximately three

[23] Alternative Fuels & Advanced Vehicles Data Center, U.S. Department of Energy, http://www.afdc.energy.gov/afdc/locator/stations/, accessed February 9, 2012.

miles of new pavement through widening of the existing alignment. A short (10cm) concrete curb at a cost of about $8,000 per mile would provide visual and physical separation between the transitway and the Scenic Drive. A raised curb would help to prevent conflicts between northbound buses, cars, and cyclists with southbound buses traveling along the transitway. Taller barriers provide more physical protection but are not needed due to low traffic speeds. Emergency vehicles could also use the transitway, and RRCNCA may consider allowing official BLM business, cyclists and private cars to use the transitway when the bus is not operating.[24] The reverse direction would include an automatic gate or other barrier to restrict access.

Figure 31: Concrete lane separators used to demarcate a cycle track.

Source: Streetsblog.org

3.5.2.4 Interpretation

The shuttle service would provide an opportunity for additional interpretation at RRCNCA. Surveys at other federal lands and comments from the public indicate that interpretation can be one of the main draws for voluntary riders.[25] The shuttle stops can provide a platform for interpretive displays, and the shuttle itself can be equipped with sound equipment to play recorded interpretive programs, reminders of RRCNCA regulations, and safety advice. Volunteers can also provide live interpretation for visitors either on the shuttle or at high-use parking lots. Providing live interpretation for scheduled shuttle runs, such as once an hour on weekend days, could add tremendously to the visitor experience.

3.5.3 Capacity

Given ridership estimates of 10 to 12 percent of visitors in a high-use scenario (see Section 3.5.1), the transit system must accommodate the number of visitors anticipated to use the service. The study team predicts that ridership will fluctuate by time of day, with greatest demand between 11 AM and 3 PM. Without

[24] The use of a reverse-direction transitway for non-transit uses would require additional management, design, and safety considerations. For example, opening the reverse direction to private vehicles would necessitate reconfiguration of entry and exit patterns and safety countermeasures.
[25] U.S. DOT Volpe Center, Colonial National Historical Park Shuttle Service Survey Report, February 2010, http://ntl.bts.gov/lib/42000/42100/42164/DOT-VNTSC-NPS-10-03.pdf, accessed February 10, 2012.

precedents for transit service at RRCNCA, ridership levels (and related system capacity needs) are highly uncertain. The transit system is designed to accommodate anticipated use levels and also includes the use of an initial pilot period to help adjust the size of the system during its first years of operation (see Appendix VIII: Pilot).

3.5.3.1 Vehicle Requirements & Determination

This study recommends a medium-duty, large cutaway diesel hybrid bus to operate the transit service. Ridership at RRCNCA is projected to be low enough that a traditional transit bus is not feasible, but high enough that the use of a fleet of passenger vans would increase the operating cost, primarily due to the cost of additional drivers necessary to operate the shuttle at twenty minute intervals. Figure 32 shows an example of a large cutaway vehicle.

Figure 32: Large Cutaway Bus

The BLM can purchase large cutaway buses from several manufacturers and select from a wide variety of options. These vehicles cost approximately $200,000 and have an expected service life of 12 years, and it is likely that the buses will become obsolete before they require a major overhaul.

Appendix IX: Transit Vehicle Selection includes some of the costs associated with different vehicle types. These figures are in 2015 dollars.

Alternative B requires four buses to be in active operation at any one time, while Alternative C requires seven buses. Under both alternatives, one bus will serve the hiker/climber shuttle's two morning runs. It is common practice in the transit industry to maintain a fleet of vehicles that is sufficient to account for possible break-downs and routine maintenance. While up to four or seven vehicles are necessary to operate the service schedule, should BLM implement Alternative B or C, it should acquire five or eight vehicles, respectively, for the complete operation.

3.5.4 Efficient and Flexible Operations

The transit system is designed to be flexible in scale, given the uncertainty in ridership demand over the short term and the potential for significant visitation growth over the long term. The operating system must also be sustainable for the BLM to oversee and manage.

3.5.4.1 Capital and Operating Models

The BLM should select a capital and operating model for its transit system that is sustainable from a cost and staff capacity standpoint, while also ensuring that the system is cost efficient. Procurement of a contractor to operate the system is preferable for BLM from a staff capacity standpoint and would follow successful models from peer public lands sites. The BLM must also decide whether to purchase vehicles, lease vehicles from General Services Administration (GSA), or pursue a service contract in which the contractor provides the vehicles.

An analysis using 2012 GSA lease rates and an estimated hourly cost inflated to 2015 shows that contracting ownership and operations is only slightly different than if RRCNCA owns its own fleet and contracting operations. A more detailed analysis of the comparison is included in Appendix X: Operating Model Analysis. There is minor cost differential between the former two options (see Table 19), although the cost of the latter option depends on the BLM soliciting offers from private operators.

Table 19 - Cumulative 12-year Cost of Purchase or Lease of Vehicles

	Purchase	Lease
Alternative B	$6,560,911	$6,668,480
Alternative C	$11,447,553	$11,020,964

Table 20 provides a summary of the benefits and disbenefits of each of these options. While the contractor-provided vehicle option may have a lower cost, there are significant advantages to the BLM owning or leasing vehicles. For example, the BLM may have more control over on-board interpretive elements and vehicle branding, as well as other vehicle specifications. Leasing through GSA would provide BLM with control over vehicle specifications but may have limitations regarding vehicle type.

Table 20 - Vehicle Ownership Options

	BLM purchase or lease	Vehicles included in contract
Benefits	High vehicle specificity	May have a lower overall cost
	Permanent vehicle branding	No responsibility for maintenance
	Provides flexibility on choice of operators	May be able to adjust service flexibly with other vehicles contractor may own
	Straightforward procurement	Some liability protection
Disbenefits	Maintenance needs to be specified in contract	Limited vehicle specificity
	Buses will sit idle two-thirds of the year	Lacks a sense of permanence
	Specific vehicle type may not be available through GSA (lease)	Uncertainty in costs
	Service levels are significant enough that vehicles may sit idle during the shoulder season (lease)	

The study team recommends that initially the BLM consider including vehicles in a pilot phase, described in Appendix VIII: Pilot, with results from the pilot helping to determine whether to purchase or lease vehicles. The BLM should write its operating contract to include maximum flexibility and scheduled renegotiation points based on historic performance. A flexible contract should include the ability to add or remove service to meet ridership demand.

3.5.5 Financial Sustainability

A transit system at RRCNCA must strike a balance between offering sufficient levels of service to attract riders and minimizing costs to reduce the financial burden on the BLM and on visitors. The pricing of a system, which may be funded through increases to the amenity fee[26] or charging fares to riders, may be the strongest driver of overall system ridership. Therefore, the transit system should include a pricing structure that reflects BLM's goal of reducing congestion on Scenic Drive, and incorporate revenue from additional sources where appropriate. This section first outlines the costs for transit service and then evaluates revenue sources, including sources for capital funding and pricing and fare schemes for operations and maintenance.

3.5.5.1 Costs

The costs of establishing and operating a transit system include capital, operating, and maintenance costs. The costs outlined in this section include the cost of supervision and maintenance when the shuttle service

[26] The BLM may need to consider increasing fees as part of the implementation of alternatives, but all fee changes would be the result of full analysis under a Business Plan update (scheduled for 2015).

is operating,[27] annual marketing costs, and one-time startup costs to cover final planning, contracting, and/or procurement work.

Capital and infrastructure costs for transit service in Alternative B are detailed in Figure 33. These costs are in addition to the parking lot expansions proposed in Alternative A. The total capital and operating cost for Alternative B is $1,211,000 and $405,000 respectively, not including $884,000 for construction of parking as described in section 3.2.3. The capital cost includes the purchase of five buses, the construction and placement of bus stops and shelters, as well as administrative start-up costs. As is the case with most transit services, driver labor is the dominant annual operating expense. Fuel and maintenance costs are also significant contributors to the operating cost.

Figure 33: Capital and Operating Costs for Alternative B

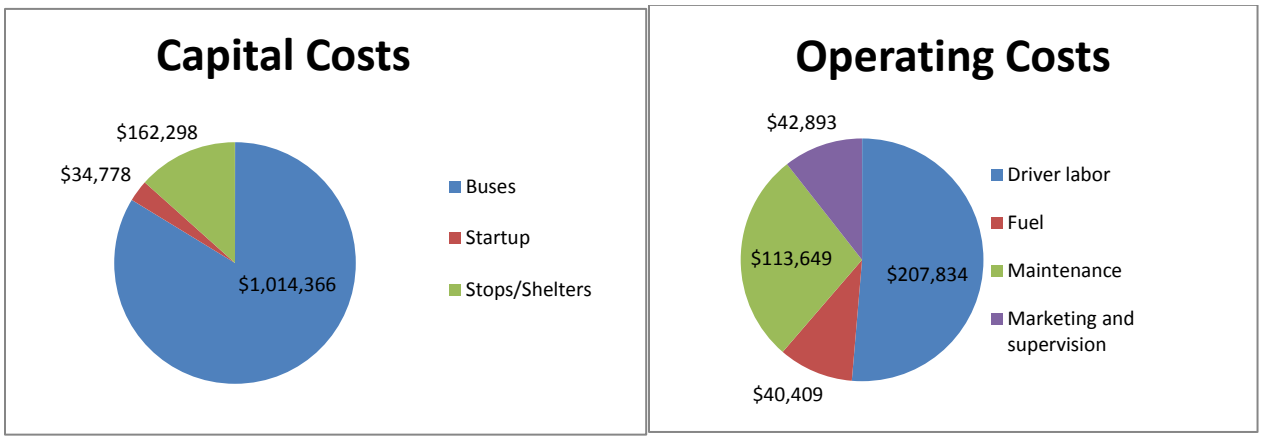


Figure 34 shows the capital and operating costs for Alternative C. In addition to buses, stops, and shelters, the capital costs include $1,750,000 to construct the transitway, three additional buses relative to Alternative B, and three additional stops, not including $884,000 for construction of parking as described in section 3.2.4. Total capital costs are $3,617,000. Figure 34 also shows the total cost of annual operations of $552,000. Driver labor is the primary component of operating costs, with maintenance and fuel being relatively low.

[27] Given the simplicity of the hiker/climber shuttle, these costs do not include a dedicated bus supervisor during the early morning.

Figure 34: Capital and Operating Costs for Alternative C

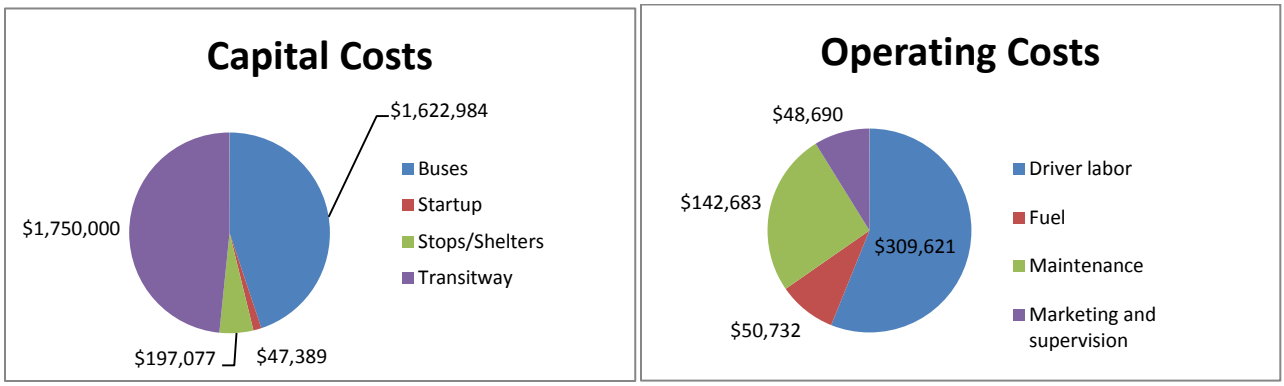


Table 21 shows the cost components for the transit model; however, these values could fluctuate over time and lend uncertainty to the model. The cost estimates are most sensitive to wage increases and less sensitive to fuel and maintenance increases, due to the relatively low annual mileage traveled by the vehicles.[28]

Table 21: Cost Assumptions

Cost Component	Rate
Driver hourly wage and benefits (per hour)	$42.89
Diesel fuel cost (per mile*)	$0.52
Maintenance cost (per mile)	$1.45

*Based on a diesel fuel cost of $4.64/gallon

All figures in Table 21 are in 2012 dollars inflated to the year 2015.[29] All cost components should be checked prior to implementation, as volatile petroleum prices and labor costs can cause changes in the overall operating cost.

[28] For example, fuel costs can fluctuate significantly, and the study team used a figure of $4.64 per gallon of diesel. A 25 percent increase in fuel cost, to over $5.75 per gallon, would raise the total annual costs by 2.8 percent.

[29] Labor costs use Bureau of Labor Statistics research, which found that transit operator wages in the Las Vegas area are in the top quartile of the nation. http://www.bls.gov/oco/ocos242.htm. Fuel costs are highly variable, but were developed using U.S. Energy Information Administration data as cited in Volpe Center/DOI Bus Lifecycle Cost Model User's Guide. Maintenance costs per mile were developed under the assumption that RRCNCA would use existing transit or commercial garages for maintenance, which puts maintenance costs at the upper range of estimated costs but avoids the capital and maintenance costs of new maintenance facilities. The User's Guide is accessible at www.volpe.dot.gov/coi/ppoa/publiclands/projects/docs/bus_lifecycle_cost_model_user_guide.pdf

3.5.5.2 Operations Revenue

The annual operating costs of transit need to be covered by revenues generated by visitor fees. The BLM could choose to incentivize transit and pay for operating costs by raising the amenity fee for visitors that do not use transit while charging transit riders a lesser transit fare. A second option for BLM is to raise the amenity fee for all visitors and offer free shuttle service, which the BLM may choose to do if the management of a joint fare-and-fee system proves too burdensome. Both options are described briefly in this section, and all fee changes are subject to discussion and approval in the RRCNCA Business Plan, which is scheduled to be updated in 2015.

Depending on ridership, annual operating costs may range from almost $8.00 to over $21.00 per rider. Dividing this cost between all visitors to RRCNCA may be justified in large part by the congestion-relief benefits that all visitors would enjoy. The cost per vehicle would amount to approximately $0.94 for Alternative B and $1.28 for Alternative C, as shown in Table 22. Visitors who elect to use the shuttle would pay a fare of $1.00 per person, realizing a cost savings of $4.00 to 5.00 per vehicle and thus providing a strong incentive to use transit. [30] This would make it much more likely that Alternatives B and C would achieve congestion-reduction goals.

Vehicles entering at the fee booth would elect whether to take the shuttle and pay the shuttle fare, or to pay the vehicle fee to drive their private vehicles. Visitors would receive a receipt stamped with the date and their mode choice, which they would display on the dashboard while on Scenic Drive or present to board the transit shuttle at a staging area at the Visitor Center. Vehicles without the proper receipt at the lots on Scenic Drive could be fined by BLM Law Enforcement.

The management system proposed for the shuttle system is a simple way to identify visitors who choose to drive while providing an incentive to use transit, but it would require some changes to the fee collection patterns and add additional responsibility for BLM Law Enforcement.[31] Should the BLM decide not to adopt such a system in the short term, BLM management could instead simply offer a free shuttle service but charge a higher amenity fee to all visitors (including transit riders). This removes the monetary incentive to use transit but simplifies fee collection and enforcement. The costs for this option are also shown in Table 22.

[30] Based on average vehicle occupancy of 2.5 and an entrance fee of $7.00

[31] The study team also considered options of staging transit prior to entering the fee booth, which would remove the need for law enforcement. However, this would require the reconfiguration of the fee booth and/or expansion of parking to accommodate transit riders. The study team does not recommend this option due to the high costs of staging transit prior to entering the fee booth.

Table 22 - Fee and Fare Options

	Alternative B	Alternative C
Free shuttle		
All vehicles	$0.94	$1.28
Shuttle riders pay nominal fare		
All vehicles entering	$1.16	$1.54
Shuttle riders only	$1.00	$1.00

3.5.5.3 Additional Revenue Sources

The study team recommends that the BLM use fees and fares to cover operating and maintenance of transit, as described in Section 3.5.5.2, but it will also need to secure additional funding. Typically, transit operating funds are more difficult to acquire than capital funds, but RRCNCA can investigate additional operating revenue sources, including potential partnerships with local outfitters, tourism sponsors, or corporations. One noteworthy example of a public-private partnership being used to raise operating revenues is at Acadia National Park, where L.L. Bean has provided over $3 million to the National Park Service as an operating subsidy for the Island Explorer shuttle and park protection.[32]

There are a variety of potential capital funding sources, including several federal grant programs. Each one is different and the BLM may need to seek grants from several sources to cover all costs. Requirements for each grant may be specific or preferential to one mode; for example, some transit-specific funding sources may prohibit RRCNCA from constructing a reverse-direction transitway that is open to non-transit uses. A summary of potential grant programs the BLM could pursue to cover capital costs (vehicle purchase and transit stop and transitway construction) is included in Appendix XI: Capital Funding Sources Available to RRCNCA. One important note is that grant programs that exist today may not exist in the future.

3.6 Evaluation Criteria

To compare the alternatives, the study team rated each alternative according to a series of evaluation criteria. The criteria serve as measures of the study objectives within the goal areas of visitor mobility, safety, visitor experience, resource impacts, and financial and operational feasibility. Each alternative, including the No Action Alternative, has benefits in one or more goal area. The evaluation criteria can show which alternatives have the greatest positive or negative impacts in a given goal area.

3.6.1 Transportation Study Objectives and Criteria

The criteria are linked to objectives within each goal area, and they are meant to serve as proxy measures for simplified comparison. Table 23 shows an overview of all goal areas, objectives, criteria, and applications

[32] L.L. Bean also receives advertising on the buses and promotional materials. Acadia Free Shuttles, http://www.exploreacadia.com/llbean.htm, accessed March 15, 2012.

of criteria to each alternative. Areas with darker shading represent greater negative impacts in the goal area, and areas with lighter shading represent greater positive impacts in the goal area.

Appendix XII: Evaluation Criteria Analysis provides an expanded version of Table 23 with the rationale behind the rating of each alternative for each evaluation criteria.

The visitor mobility objective targets Scenic Drive parking lot congestion by measuring whether lots can sufficiently accommodate all visitors. The evaluation criterion is the number of lots that cannot accommodate demand for parking and the hours of congestion for each lot on the design day (see Table 16). The study team used the parking lot demand model to estimate hourly demand on the design day compared to available parking spaces, considering reductions in demand due to transit service in Alternatives B and C. The criterion measures the number of lots in which demand exceeds capacity on the design day, and the rationale includes the estimated number of hours of congestion, providing a second measure of congestion reduction for this objective.

The visitor safety goal area has two objectives: reduction in unsafe travel conditions due to infrastructure and reduction in unsafe travel behavior. The criteria under the first objective may be measured by pedestrian and bicycle accidents, vehicle collisions, and response time of emergency vehicles. The measure for the second objective is the frequency with which parked vehicles obstruct the roadway. The BLM does not have specific data on traffic incidents, but the overall number of injuries and fatalities is extremely low. Therefore, it is difficult to predict if the alternatives would have an appreciable difference on the injury or fatality rates, and the evaluation criteria use rough comparisons of reductions of accidents from the No Action baseline.

The visitor experience goal area has as its objective that the strategy does not detract from the visitor experience. Visitor experience is a subjective measure, and the study team expects that an alternative may enhance some visitors' experience while simultaneously detracting from the experience of others. The two criteria of interpretation and travel time around the Scenic Drive for hikers and climbers are objective measures of two elements of a visitor's experience. The study team will supplement these criteria with public feedback on how the alternatives would affect their visit.

In the area of resource protection, the objectives are to preserve scenic and aesthetic, cultural, and natural resources. The criteria measure the anticipated impacts on visual, cultural, and natural resources. Without formal environmental analysis, which will be performed for one or more selected alternatives in the EA, this evaluation serves as a broad comparison of expected potential impacts from the proposed alternatives.

Finally, the goal area of financial and operational feasibility has two objectives: the strategy is fiscally feasible and sound, and the BLM is capable of operating and maintaining the proposed changes. Fiscal feasibility is measured through capital costs and annual operations and maintenance costs. For the second objective, the study team measures staff capacity for operations and maintenance by estimating the relative levels of upfront and ongoing administration that would be required for each alternative.

Table 23: Evaluation of Alternatives

Goal	Objective	Evaluation Criterion	No Action	Alternative A	Alternative B	Alternative C
Visitor Mobility	Parking lots sufficiently accommodate all visitors	Average hours of congestion per lot for the busiest 7 lots	6.25 hours	2.4 hours	3.9 hours	0.9 hours
		Number of lots that do not meet demand on the 90th percentile day in 2025	7 of 11 lots	5 of 11 lots	1-7 of 11 lots	1-7 of 11 lots
Safety	There is a reduction in unsafe travel conditions due to infrastructure	Annual number of bicycle or pedestrian injuries or fatalities	Baseline	Equal to No Action baseline	Smaller reduction from No Action baseline	Larger reduction from No Action baseline
		Annual number of vehicle collisions	Baseline	Equal to No Action baseline	Smaller reduction from No Action baseline	Smaller reduction from No Action baseline
		Response time of emergency vehicles	Slower than current	Faster than current	Faster than current	Faster than current
	There is a reduction in unsafe travel behavior	Frequency of parked vehicles obstructing roadway	Greater than current	Reduced from current number	No change/Reduced from current number	No change/Reduced from current number
Visitor Experience	The strategy does not detract from the visitor experience	Interpretation elements	Does not include interpretation	Does not include interpretation	Includes interpretation	Includes interpretation
		Travel time around Scenic Drive for hikers and climbers	Increased	No change	No change	Reduced
Resource Protection	Scenic and aesthetic resources can be enjoyed by current visitors and future generations	Visual impact of transportation infrastructure and vehicle congestion	No visible change in amount of paved areas visible from Scenic Drive, trails, or other visitor amenities	Large increase in the amount of paved areas and vehicles that are visible from the Scenic Drive, trails, or other visitor amenities	Small increase in amount of paved areas visible from Scenic Drive, trails, or other visitor amenities	Large increase in the amount of paved areas that are visible from the Scenic Drive, trails, or other visitor amenities
	Cultural resources are preserved	Impact on cultural resources	No direct impact to resource from vehicles	Potential for minor impact that could be easily mitigated or avoided	Potential for minor impact that could be easily mitigated or avoided	Potential for minor impact that could be easily mitigated or avoided
	Natural resources are preserved	Anticipated impact on vegetation, soils, hydrology, habitat, or species	Potential for impact	Potential for impact	Potential for minor impact that could be easily mitigated or avoided	Potential for impact
Financial and Operational Feasibility	Strategy is financially feasible and sound	Capital costs	$0	Parking: $2,400,000	Transit: $1,211,000; Parking: $884,000	Transit: $3,617,000 (includes $1.75 million for two-way road); Parking: $884,000
		Operations and maintenance costs (annual)	Baseline	Baseline	$364,000	$492,000
	BLM has the capability to operate and maintain	Staff capacity of operations and maintenance	BLM operates and maintains with current or anticipated staff levels	BLM can operate and maintain with support from current partners or Friends groups	BLM will need management assistance for operations and maintenance	BLM will need management assistance for operations and maintenance

3.6.2 Evaluation Results

The application of evaluation criteria to the four proposed alternatives shows the strengths and weaknesses of each alternative by goal area.

3.6.2.1 No Action Alternative

- Strengths: The No Action Alternative has the fewest immediate impacts on aesthetic, cultural and natural resources. However, an increase in vehicles in the future without new accommodations may increase impacts to resources from vehicles and humans. This alternative also has the lowest upfront costs and low annual maintenance costs, but the costs may increase in the future if new management actions are needed to handle rising visitation levels.
- Weaknesses: The No Action Alternative has the greatest negative impacts in the areas of visitor mobility, safety, and experience.

3.6.2.2 Alternative A: Parking and Management

- Strengths: Alternative A has the greatest improvements for some safety measures by removing vehicles parked in the Scenic Drive right-of-way. It also has the lowest annual operating costs.
- Weaknesses: Alternative A will add large amounts of paved areas, with the potential to impact aesthetic, cultural, and natural resources. By not removing drivers from the Scenic Drive, this alternative compares poorly in terms of safety.
- Other considerations: Alternative A has a large upfront cost and the BLM would likely require some assistance for operation and management. The alternative does not eliminate congestion from many lots, but it does reduce the hours of congestion for all lots on peak days.

3.6.2.3 Alternative B: One-Way Transit and Parking Expansion

- Strengths: Alternative B has the potential for significant reduction in lot congestion in a scenario of high transit ridership, and it significantly reduces hours of congestion in lower ridership scenarios. It also has benefits in response time of emergency vehicles and interpretation for visitor experience.
- Weaknesses: Alternative B has a significant annual operating cost, and it would likely require the BLM to seek outside assistance for operations and management. The capital costs are significant, but less than Alternative C. Alternative B has some small benefits in the area of safety, but these are difficult to quantify. This alternative has some potential for resource impacts but less so than the more intensive infrastructure expansion alternatives.

3.6.2.4 Alternative C: Intensive Two-Way Transit with Limited Parking Expansion

- Strengths: Alternative C has the potential for significant reduction in lot congestion in a scenario of high transit ridership, which may be more likely with the added benefit of two-way transit. It would also reduce hours of congestion in low ridership scenarios. This alternative has positive impacts in the areas of safety and visitor experience.
- Weaknesses: Alternative C has the highest upfront capital costs, due mostly to the widening of Scenic Drive for a dedicated transitway, which would also impact aesthetic and natural resources. This alternative has a high annual operating cost, and it would likely require the BLM to seek outside assistance for operations and management.

- Other considerations: While the capital costs are higher in Alternative C than Alternative B, Alternative C can provide a lower cost per trip because it requires fewer buses to provide more service.

3.7 Summary of Comments

The alternatives incorporate feedback that the public and user groups provided throughout the study. Following the development and analysis of the alternatives, the BLM and the study team presented an opportunity for the public to attend two public meetings, an open house on February 16, 2012, and a tabling session at the Visitor Center on February 17, 2012. In addition, the public were given the opportunity to review the summary of alternatives online and submit official comments. This section provides a summary of the comments the RRCNCA has received, including 27 written comments and many more verbal comments at the public meetings.

Commenters generally supported transit. Alternatives B and C received many more positive comments than negative comments. Many commenters preferred the two-way transitway between the Visitor Center and Sandstone Quarry. Some suggested that transit should operate more frequently than 30 to 45 minute headways, as was originally proposed. Several commenters expressed concern that trails could not handle the extra people that shuttles would accommodate. A few commenters expressed a preference for a mandatory transit system, similar to that in place at Zion National Park. Others suggested that they would only take transit if it is mandatory.

Comments regarding parking alternatives expressed support for the reestablishment of the carpool lot, parking expansion at Calico I and II, restriping and reconfiguring Pine Creek, and the establishment of parallel parking/pullouts along Scenic Drive. A few expressed concern about paving over the site.

One-third of written comments (9) focused on equestrian parking, particularly at White Rock. Comments focus on the inadequacy of horse-trailer parking due to size constraints and parking spaces taken by non-equestrian users. Equestrians were concerned that the focus of the study is on increasing paved parking, which is at odds with their needs. Equestrian must ride on the White Rock road (gravel) since equestrian use is limited to designated trails (no cross country riding) and the nearest designated trails leave the Upper White Rock parking lot (i.e. White Rock Loop and Keystone Thrust Trails). Equestrians expressed concern that there may be restrictions on their access if shuttle implementation moves forward. One commenter suggested additional horse-trailer parking at trailheads along Route 159, including at trailheads not open to the public.

Two comments noted the need for better signage, such as to allow for passing on Scenic Drive and for the designation of short-term and long-term parking. Several commenters also suggested reducing vegetative growth along Scenic Drive, as it effectively narrows the roadway, making passing uncomfortable for drivers.

3.8 Selection of Preferred Alternative

The BLM selected Alternative C as the alternative to include in the EA. The selection of Alternative C reflects the following rationale:

- The alternative provides additional parking and reconfigures lots without unduly impacting resources.
- The alternative includes a transit service with high frequency (20 minutes) and interpretation, responding to visitor and public comments on desired service characteristics.
- The alternative includes the construction of a reverse direction transitway, which could be opened to other uses when transit is not in service. Other uses may include emergency vehicle passage and reverse direction traffic for private vehicles, both of which were expressed as desired components (by BLM staff and the public, respectively).
- The transit system in the alternative can be phased to slowly introduce transit operations, through a pilot, one-way service, hiker/climber service, and two-way transit service. The BLM can adjust operating seasons, days, and hours based on capacity and demand. This system has the potential to meet long-term growth while containing the flexibility to be implemented slowly.

The BLM and the study team came up with the following additions and changes to Alternative C to be considered during its evaluation as part of the EA.

- The BLM has a goal of designing any parking and transit improvements to fit the resource capacity. The BLM recognizes the need to undertake a carrying capacity assessment that will determine how many visitors can safely use the amenities while maintaining the integrity of natural and cultural resources. The BLM would like to complete such an assessment in the next five years and use it to refine transit service levels to control the number of visitors accessing each lot. Transit is not meant to add visitors to the site, but rather to shift visitors from private vehicles to transit and to accommodate visitation growth expected at RRCNCA over the next 10 years.
- As part of the limited increases in parking capacity on Scenic Drive lots, the BLM will plan to expand the lower White Rock lot to provide parking dedicated to equestrian use. The unpaved lot would be expanded to fit approximately four to six horse trailers (the exact percentage of expansion over the current dimensions will be determined by the BLM prior to the development of EA alternatives). Signage at the lot will indicate equestrian use only and direct hikers to the upper parking area ¼ mile away.
- The BLM will run transit operations as a pilot for the first year of operation to determine the best level of service to meet demand. The pilot will primarily test frequency of operations, ridership levels, and service routes, but it will also help measure the need for refinements to the transit service plan in the areas of parking, transit stops, fee and fare structure, and accommodations for special user groups.

Alternative C introduces a new transit service as well as opening a three-mile section of the drive to two-way traffic. These raise several management considerations that will be addressed as follows:

- The introduction of two-way traffic on Scenic Drive presents potential safety concerns, especially if the reverse direction is opened to non-transit uses when the shuttle is not running. However, the BLM can use careful design of the road and inclusion of safety components to

ensure safety of all visitors and staff. The widening of Scenic Drive should ensure that the main traffic lane has sufficient room for cyclists and pedestrians.

- The BLM may need to consider increasing the visitor amenity fee to cover operations and maintenance costs for transit, subject to analysis approval in the next business plan. Visitors who ride the shuttle will pay a shuttle fare that is less than the amenity fee. The BLM would maintain its current fee booth and Visitor Center parking lot configuration by using a ticket system to indicate vehicles that have paid the higher fee to drive their private vehicles on Scenic Drive. The system may require increased enforcement, for which the BLM will need to allocate some additional staff capacity. Due to the need for business plan approval, changes to the fee structure will not be included in the EA.
- RRCNCA has parking capacity for the number of visitors predicted to use transit in the first year of its operation (approximately 150 vehicles on a design day), although the study team predicts that demand may exceed capacity in later years of operation if transit becomes a popular option for visitors. The BLM does not plan to expand parking for transit riders in the near term; instead, it will analyze additional overflow parking near the Visitor Center based on early transit ridership.
- The BLM will plan for some basic transit services to meet the needs of hikers and climbers that stay at the campground and/or require early or late service, but it will reserve detailed system planning until the demand for such a service is better understood. The following components will help the system better serve hikers and climbers while maintaining costs and management responsibility for the BLM:
    - Visitors staying at the campground will need to plan around one of two scheduled shuttle pick-up in the morning and around two return shuttles to the campground (from the Visitor Center) in the evening. Visitors that return to the Visitor Center prior to the NCA closing time could also request a pick-up by the campground host.
    - The shuttle system will include four after-hours runs for late hikers or climbers. The first will leave shortly after the NCA closing time and deposit riders at both the Visitor Center and the campground. The second and third runs will only serve the Visitor Center. The fourth run will operate three hours past closing and stop at both the Visitor Center and the campground. This final, fourth run may be operated using a smaller BLM vehicle.
    - The campground hosts can help out with picking up any hikers or climbers during the afternoon using a smaller, designated vehicle (such as a minivan or truck).

3.9 Conclusions and Next Steps

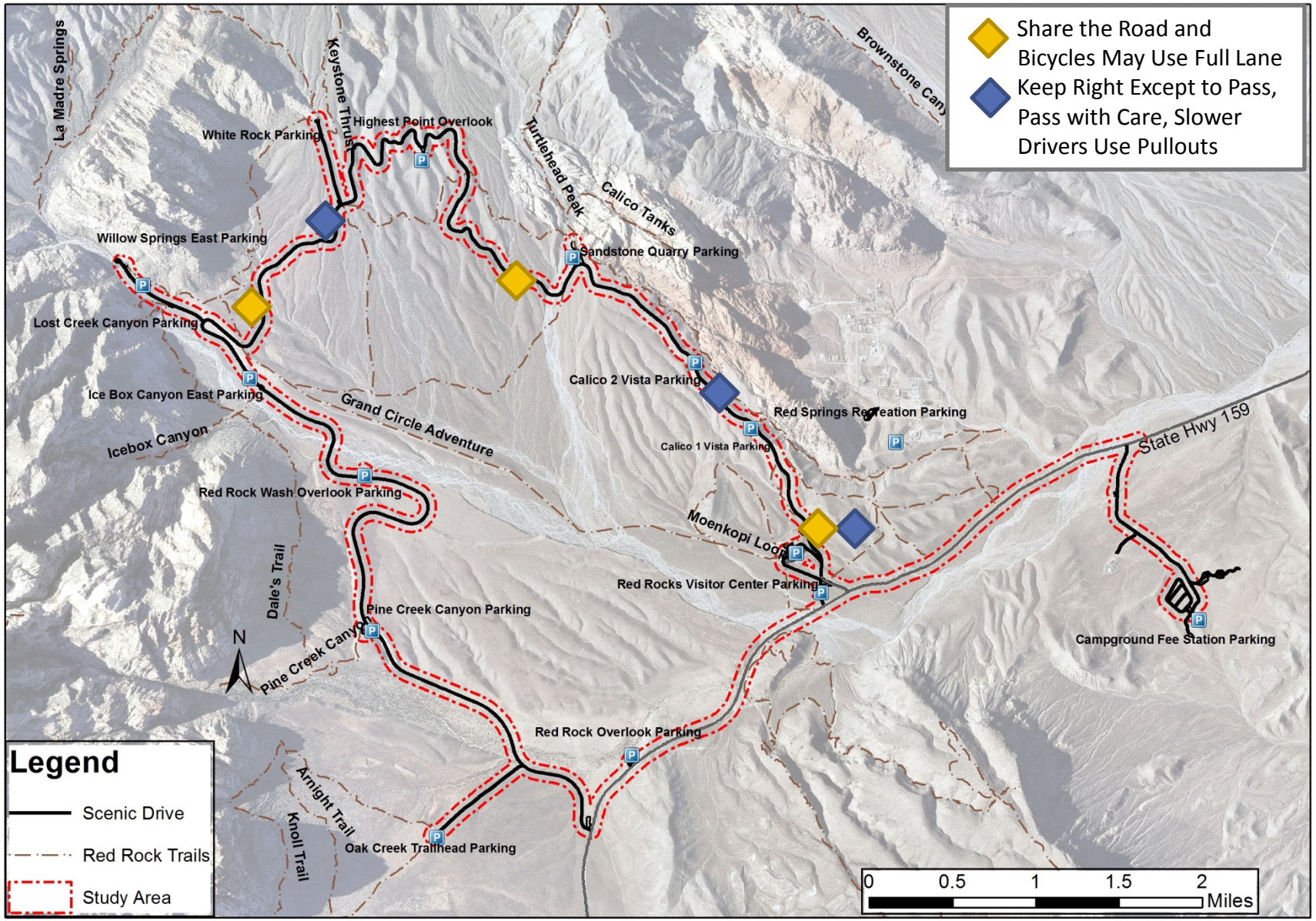
As the Transportation Feasibility Study shows, BLM has valid concerns about traffic and parking congestion at popular recreation sites within the Scenic Drive area of RRCNCA. Left unaddressed, these problems will only worsen, as the population of Clark County grows and the popularity of outdoor recreation activities, such as climbing and hiking, increases. Previous efforts to study traffic issues at RRCNCA have come to similar conclusions and identified similar solutions. However, this study goes further in providing detailed descriptions and assessments of potential solutions, focusing of strategies that are targeted, technically feasible, cost effective, and sustainable over the long term. Specifically, this study identifies and evaluates four alternatives, including a No Action alternative, and recommends

an alternative for environmental review. These alternatives can be used to inform the federal environmental review process that will be required to implement a solution.

While this study describes potentially effective strategies for addressing traffic and parking issues at RRCNCA, the implementation of Alternative C will require additional actions over the next several years. Next steps for BLM include:

- **Undertake a formal environmental review process:** An environmental review process that meets the requirements of NEPA includes identifying a purpose and need; soliciting stakeholder and resource agency input; establishing, evaluating and selecting an alternative; assessing the environmental impact of the preferred alternative; and drafting and finalizing an environmental assessment or environmental impact statement. BLM has engaged the Volpe Center to manage this process, which began in February 2012 with an initial public meeting to identify and explain the purpose and need and solicit public comments.
- **Develop an implementation plan:** An implementation plan will provide guidance to begin the engineering, design, and construction phases of the preferred alternative. It can include the following elements: refined cost estimates, a management and operations plan with defined performance metrics and roles and responsibilities, a project timeline, acquisitions plans, and design guidelines and criteria. The Volpe Center has been engaged to develop an implementation plan upon completion of the environmental review process; the scope of the plan will be tailored to the results of review process and funding availability.
- **Identify funding/revenue sources to implement the alternative:** This study identifies some potential sources of capital and maintenance funding, including sources of federal funding and revenue that could potentially be derived from visitor fees. The BLM will need to develop a more comprehensive list of potential funding sources matched to the selected alternative, which may be included in the implementation plan, and then seek funding from these sources. In addition, the BLM may consider revising the fee structure of RRCNCA to help fund transit, but if such a restructuring occurred, it would require a formal revision of the RRCNCA Business Plan, scheduled for 2015.
- **Develop Request for Information and Request for Proposals:** If the BLM chooses to proceed with alternatives that include transit services, the BLM will need to develop a formal Request for Information and Request for Proposals for a private transit service provider that can meet the specifications outlined in this report. The Request for Information should not only seek information on the qualifications of potential providers, but should also seek input on potentially cost-effective revisions to proposed performance specifications and business processes. The BLM will also need to decide whether to purchase or lease vehicles, which may be dependent upon available funding, and tailor the Requests to include vehicles, if needed.
- **Implement a Transit Pilot:** The Request for Proposals should include a pilot period where performance specifications are further evaluated and refined before any long term commitments to a specific provider or service mode are made.

Appendix I: Maps of New Signs


Share the Road and Bicycles May Use Full Lane
Keep Right Except to Pass, Pass with Care, Slower Drivers Use Pullouts
La Madre Springs
Keystone Thrust
White Rock Parking
Highest Point Overlook
Turtlehead Peak
Calico Tanks
Brownstone Cany
Willow Springs East Parking
Sandstone Quarry Parking
Lost Creek Canyon Parking
Ice Box Canyon East Parking
Grand Circle Adventure
Icebox Canyon
Calico 2 Vista Parking
Red Springs Recreation Parking
Calico 1 Vista Parking
State Hwy 159
Red Rock Wash Overlook Parking
Moenkopi Loop
Dale's Trail
Red Rocks Visitor Center Parking
Pine Creek Canyon Parking
Campground Fee Station Parking
N
Pine Creek Canyon
Red Rock Overlook Parking
Armright Trail
Knoll Trail
Oak Creek Trailhead Parking
Legend
Scenic Drive
Red Rock Trails
Study Area
0
0.5
1
1.5
2
Miles

Signage on Scenic Drive

W16-1P

R4-2

R4-16

R4-11

All signs from Manual on Uniform Traffic Control Devices for Streets and Highways, 2009 Edition. Federal Highway Administration.

Appendix II: Parking Reconfigurations and Expansions

Separate File (16 pages)

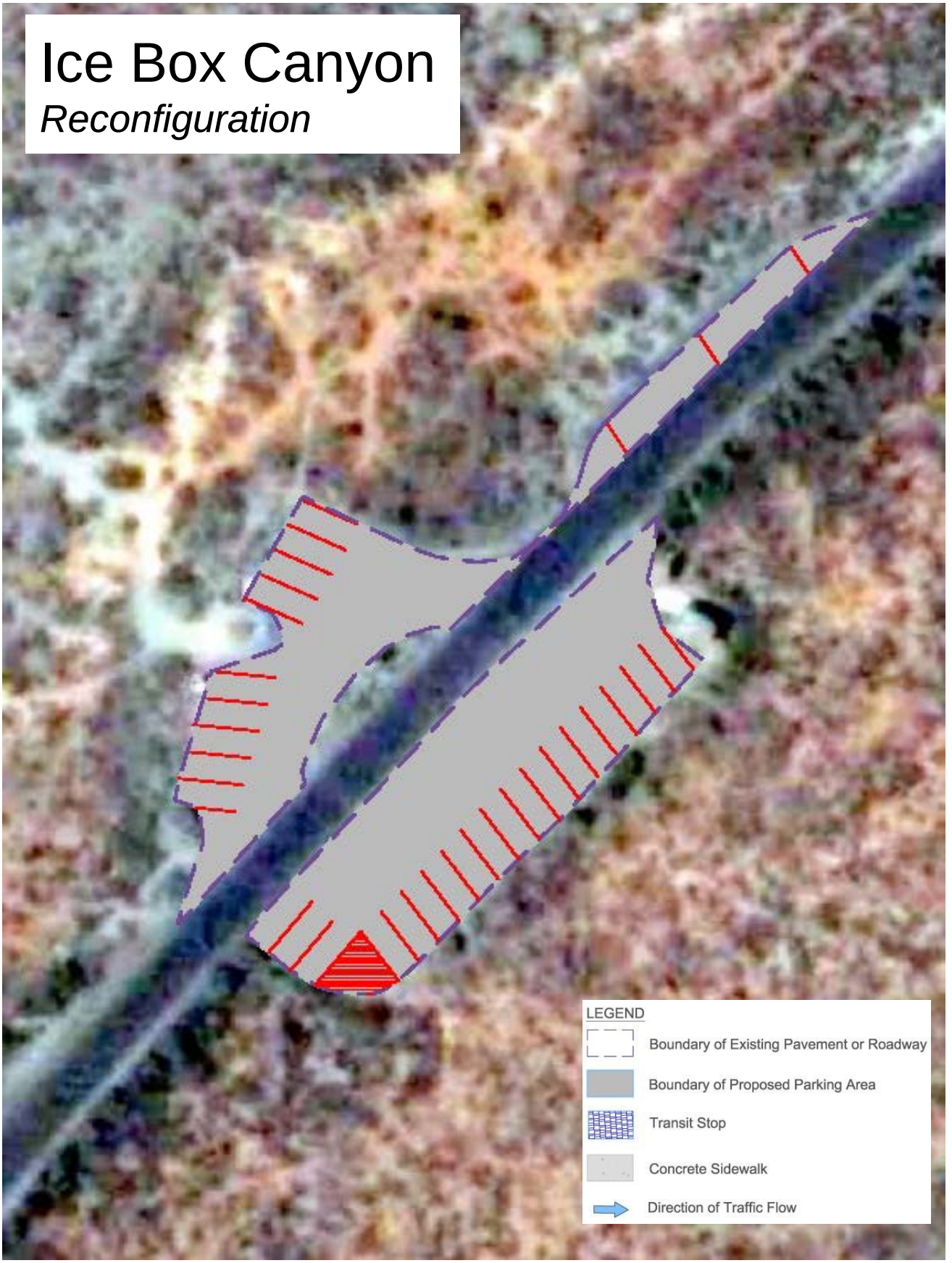
Calico Vista II

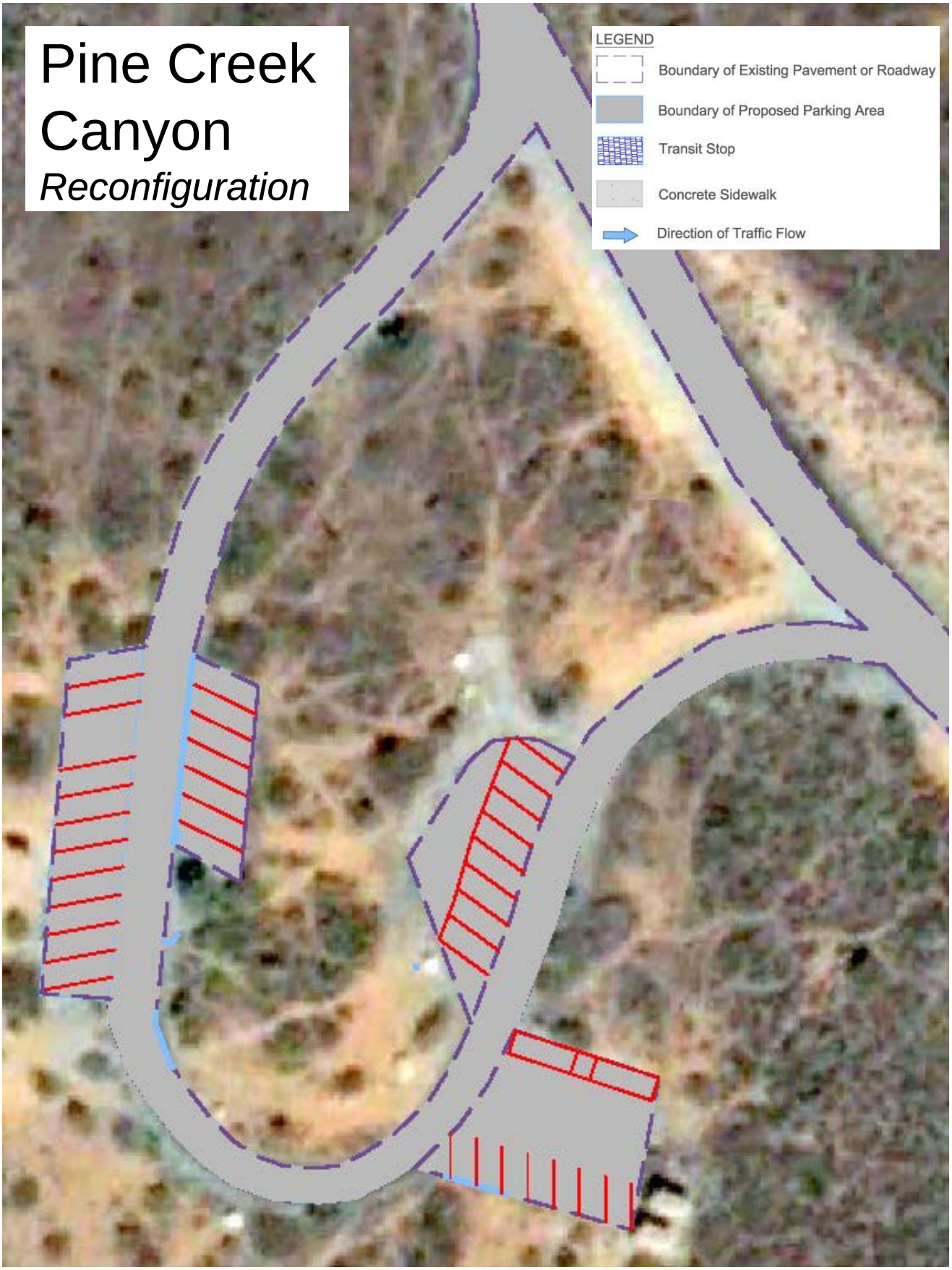
Reconfiguration

Lost Creek
Reconfiguration

Ice Box Canyon

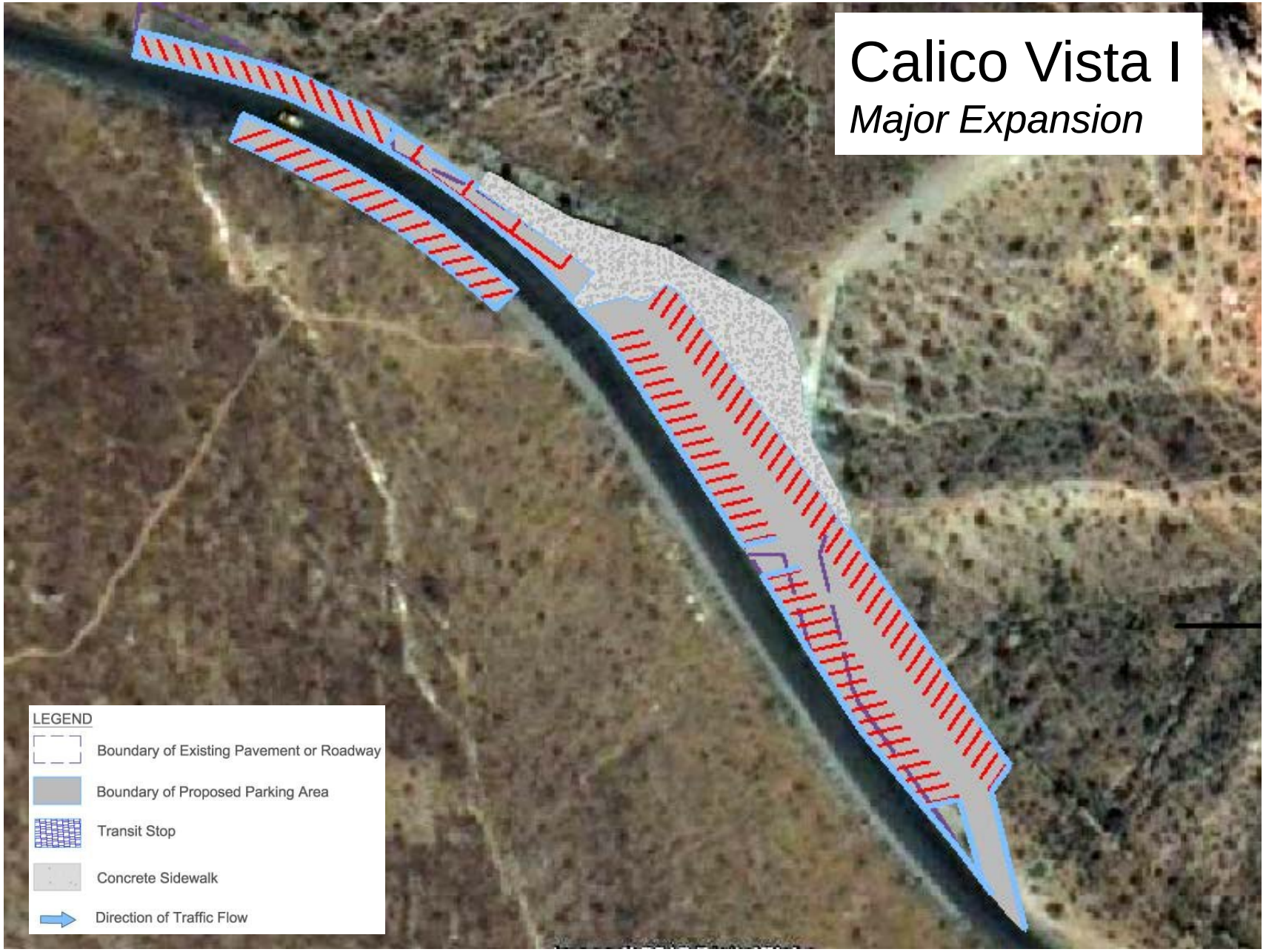
Reconfiguration




Pine Creek Canyon
Reconfiguration
LEGEND
Boundary of Existing Pavement or Roadway
Boundary of Proposed Parking Area
Transit Stop
Concrete Sidewalk
Direction of Traffic Flow

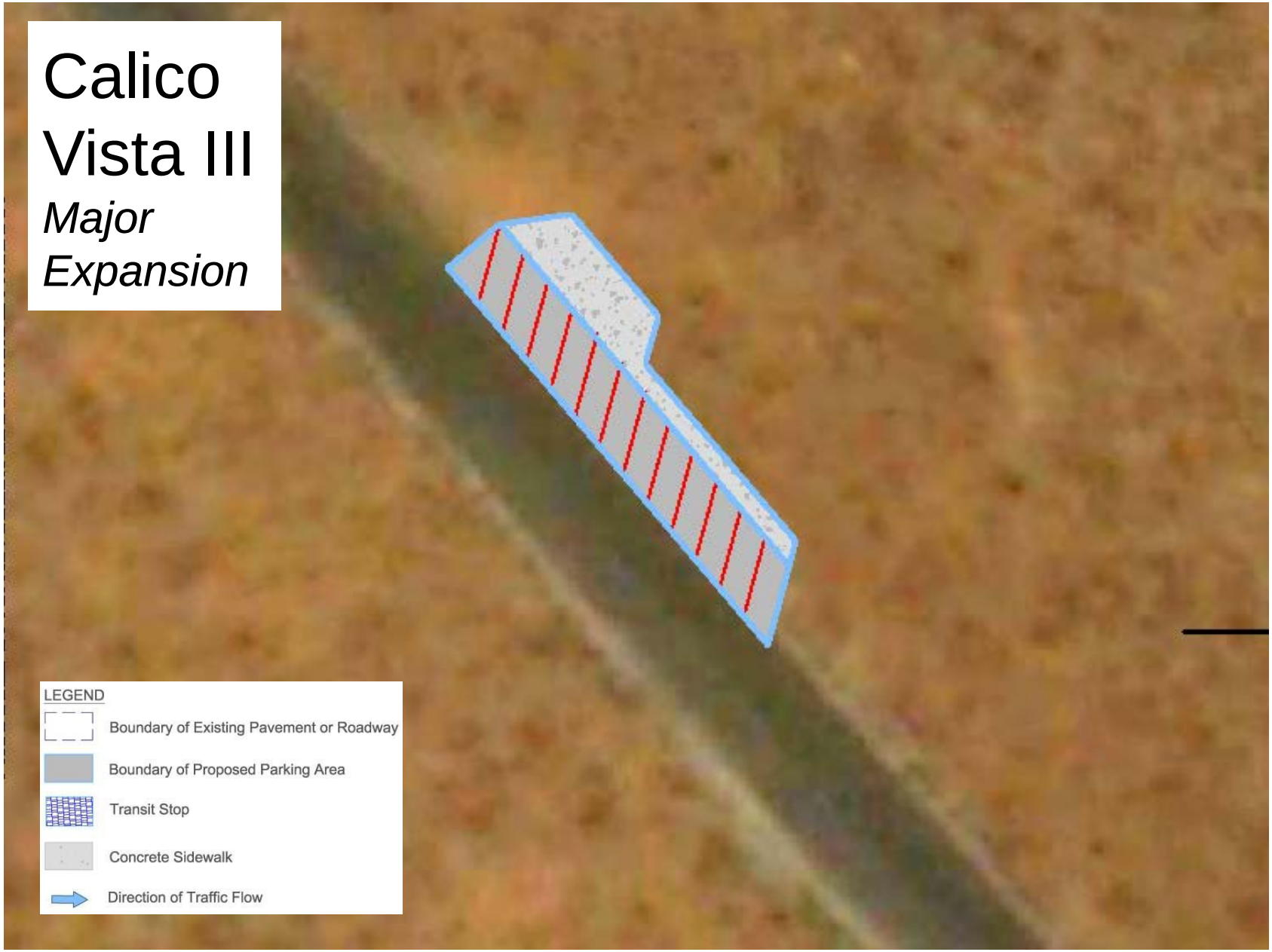
Major Parking Expansion (Alternative A)

- Examples shown for:
  - Calico I
  - Calico III (new lot)
  - Pine Creek Canyon
- Other lots will be the same as in Limited Parking Expansion


Calico Vista I
Major Expansion
LEGEND
Boundary of Existing Pavement or Roadway
Boundary of Proposed Parking Area
Transit Stop
Concrete Sidewalk
Direction of Traffic Flow

Calico Vista III

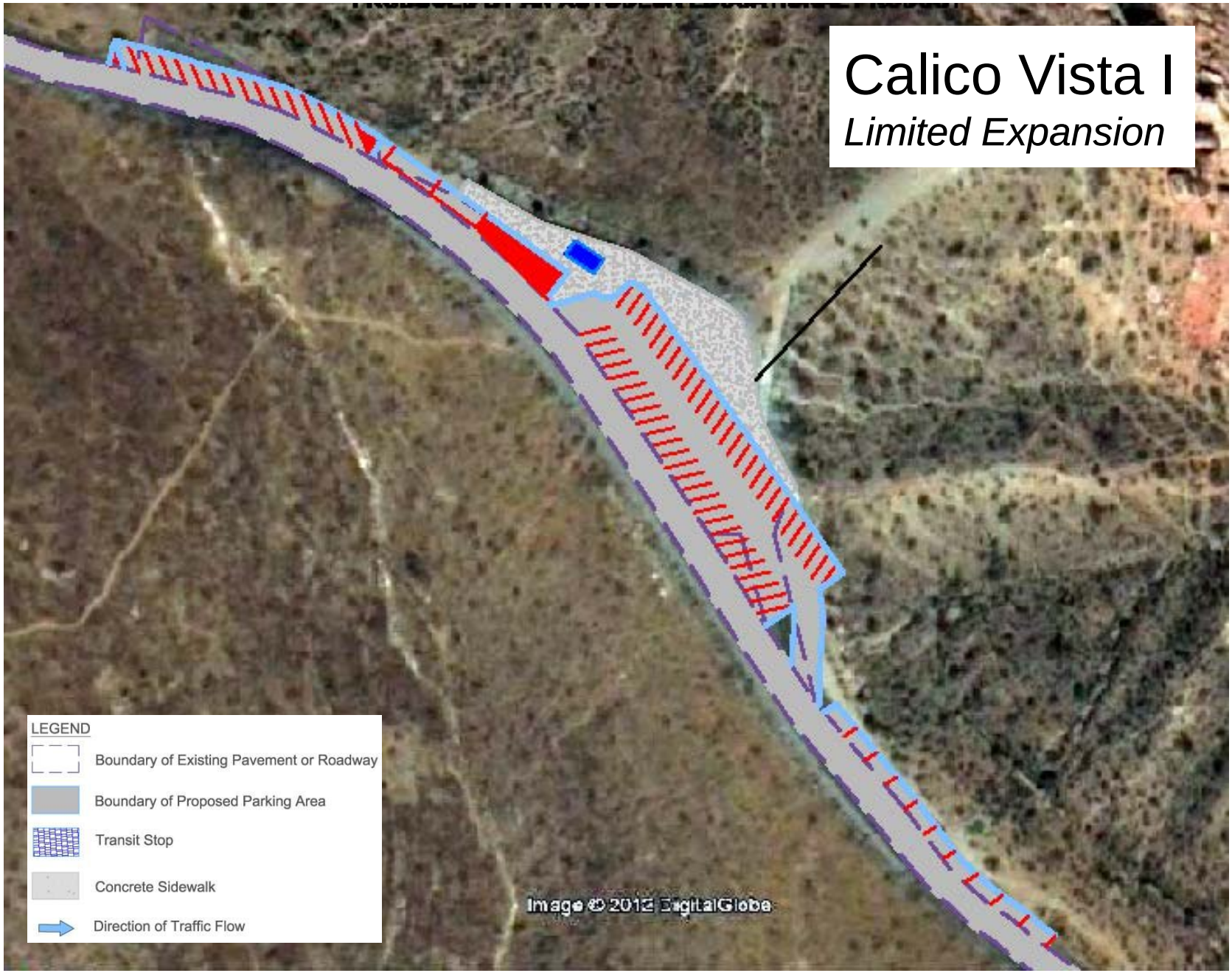
Major Expansion




Pine Creek Canyon
Major Parking Expansion
LEGEND
Boundary of Existing Pavement or Roadway
Boundary of Proposed Parking Area
Transit Stop
Concrete Sidewalk
Direction of Traffic Flow
Bus/RV Parking
Pedestrian Access to Restrooms

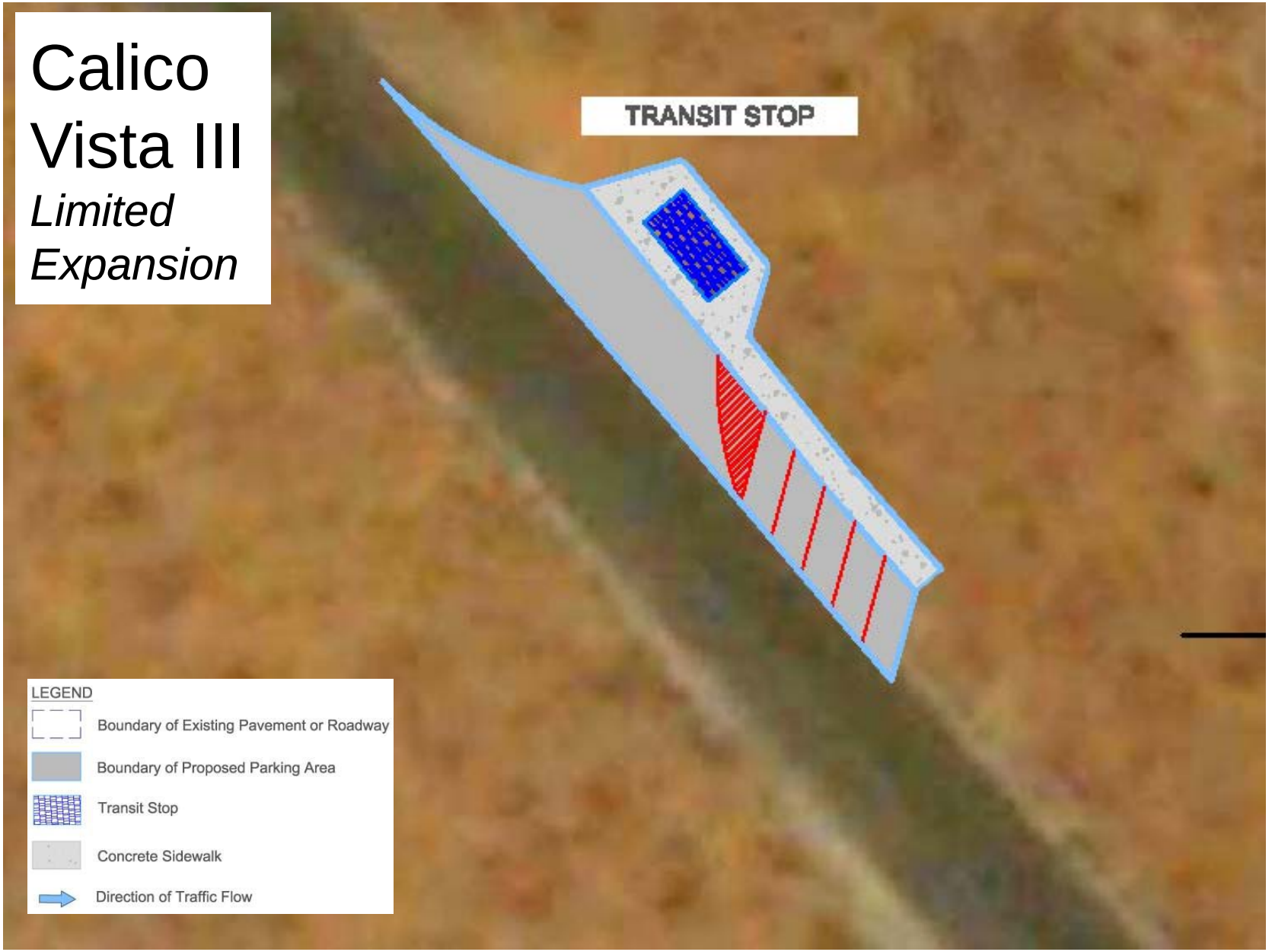
Limited Parking Expansion (Alternatives B and C)

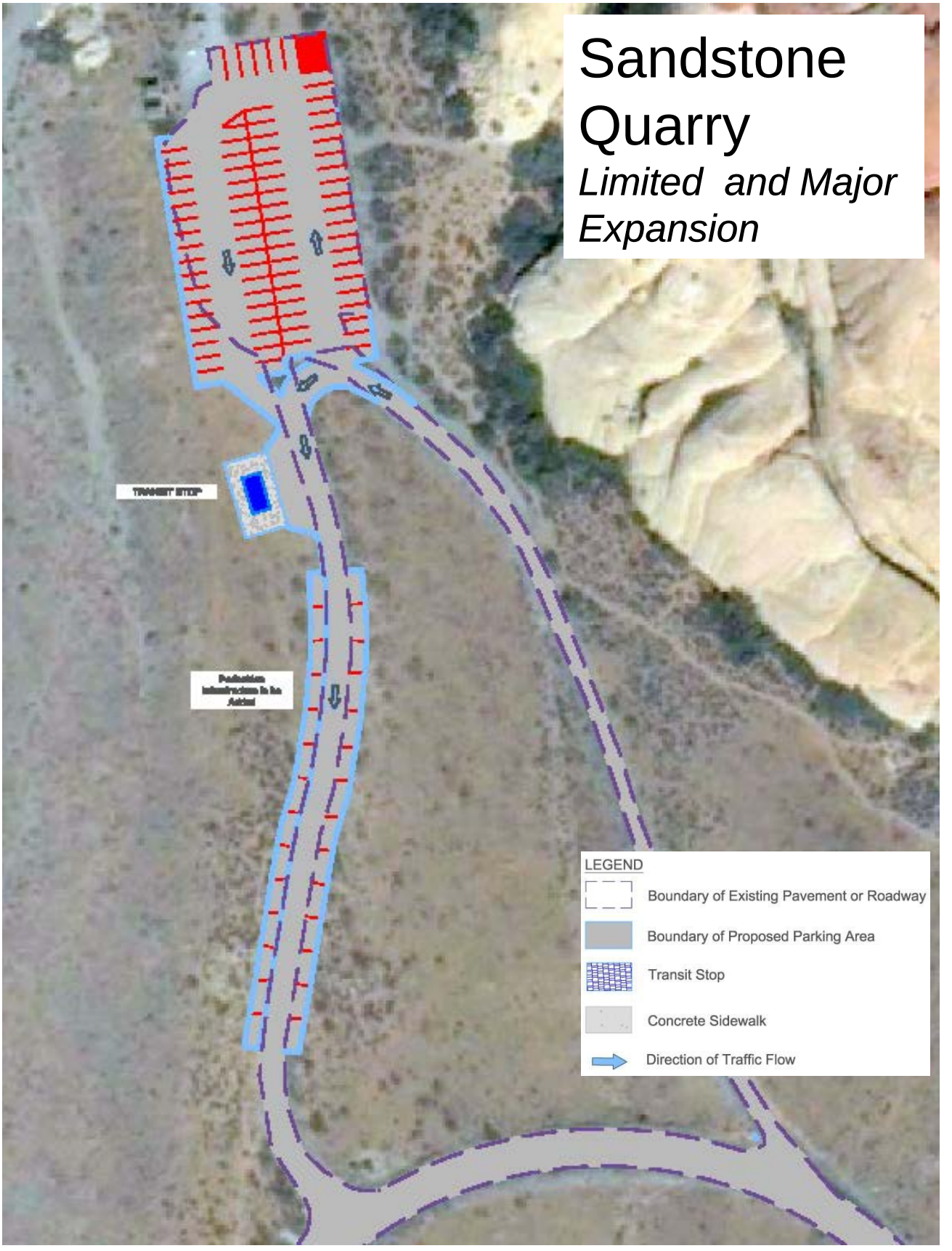
- Examples shown for:
  - Calico I
  - Calico III (new lot)
  - Sandstone Quarry
  - Pine Creek Canyon
- Reconfiguration with transit added (for Alt. B and C):
  - Lost Creek
  - Ice Box Canyon


Calico Vista I
Limited Expansion
LEGEND
Boundary of Existing Pavement or Roadway
Boundary of Proposed Parking Area
Transit Stop
Concrete Sidewalk
Direction of Traffic Flow
Image © 2012 DigitalGlobe

Calico Vista III

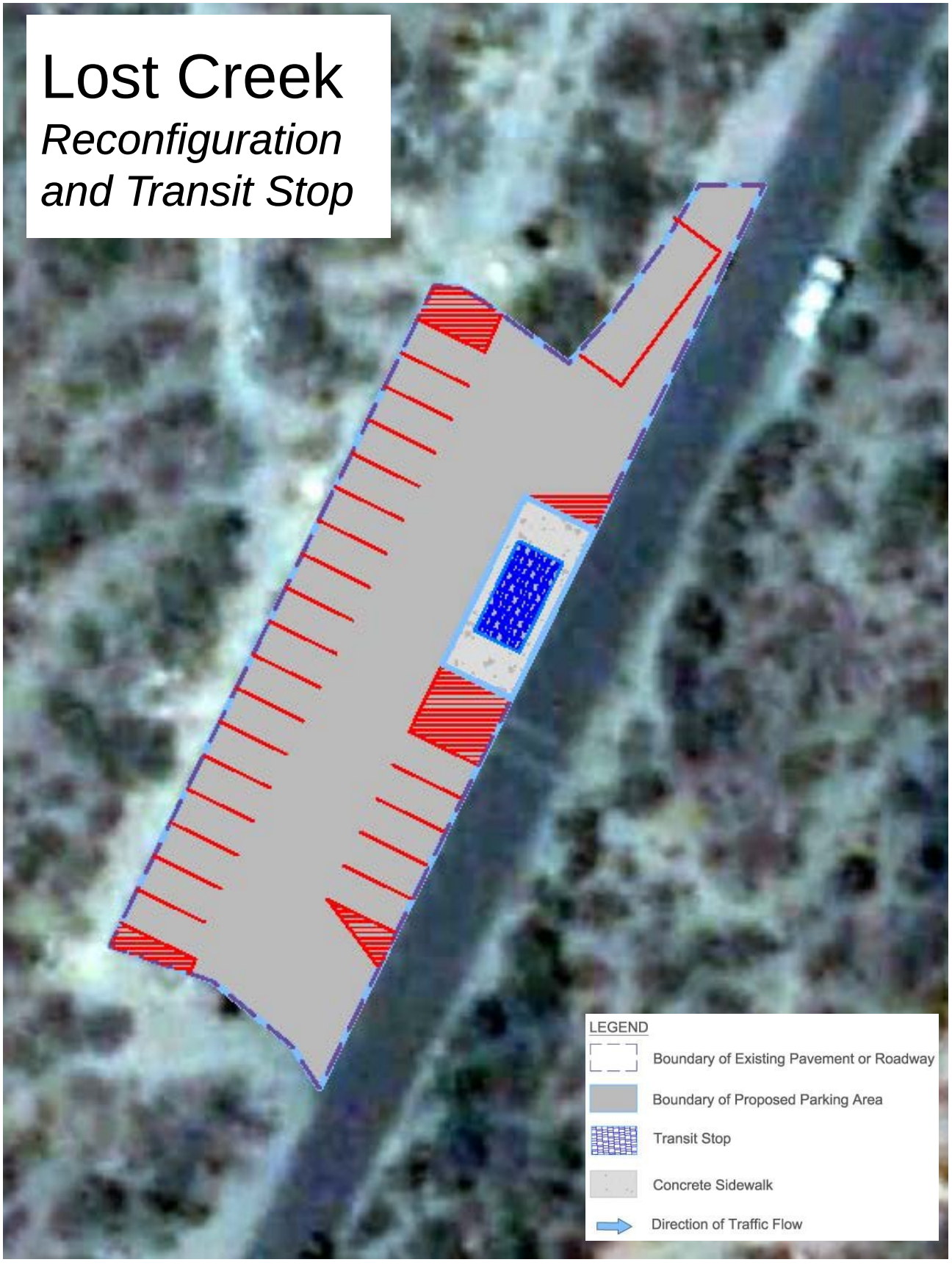
Limited Expansion




Sandstone Quarry
Limited and Major Expansion
LEGEND
Boundary of Existing Pavement or Roadway
Boundary of Proposed Parking Area
Transit Stop
Concrete Sidewalk
Direction of Traffic Flow

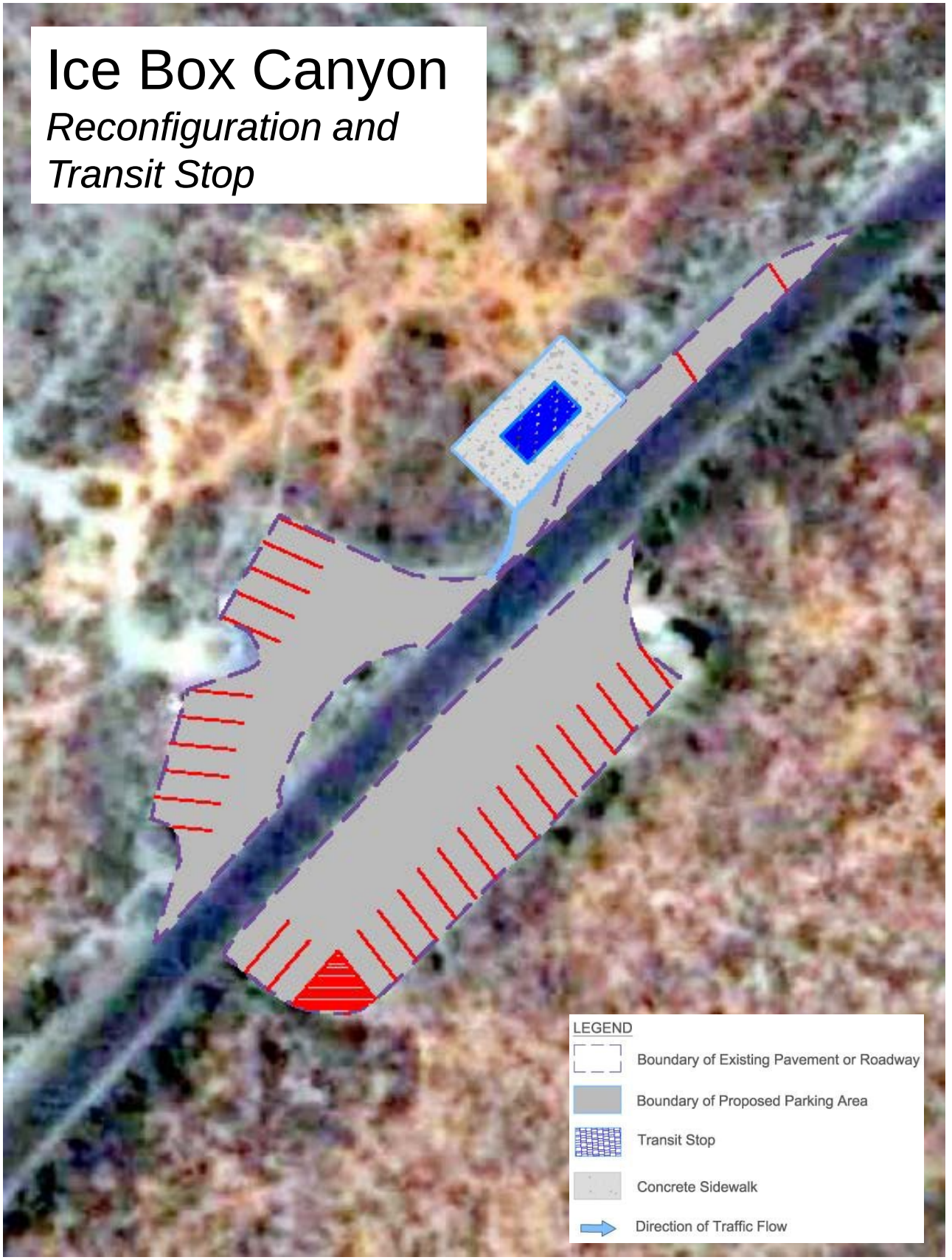
Lost Creek

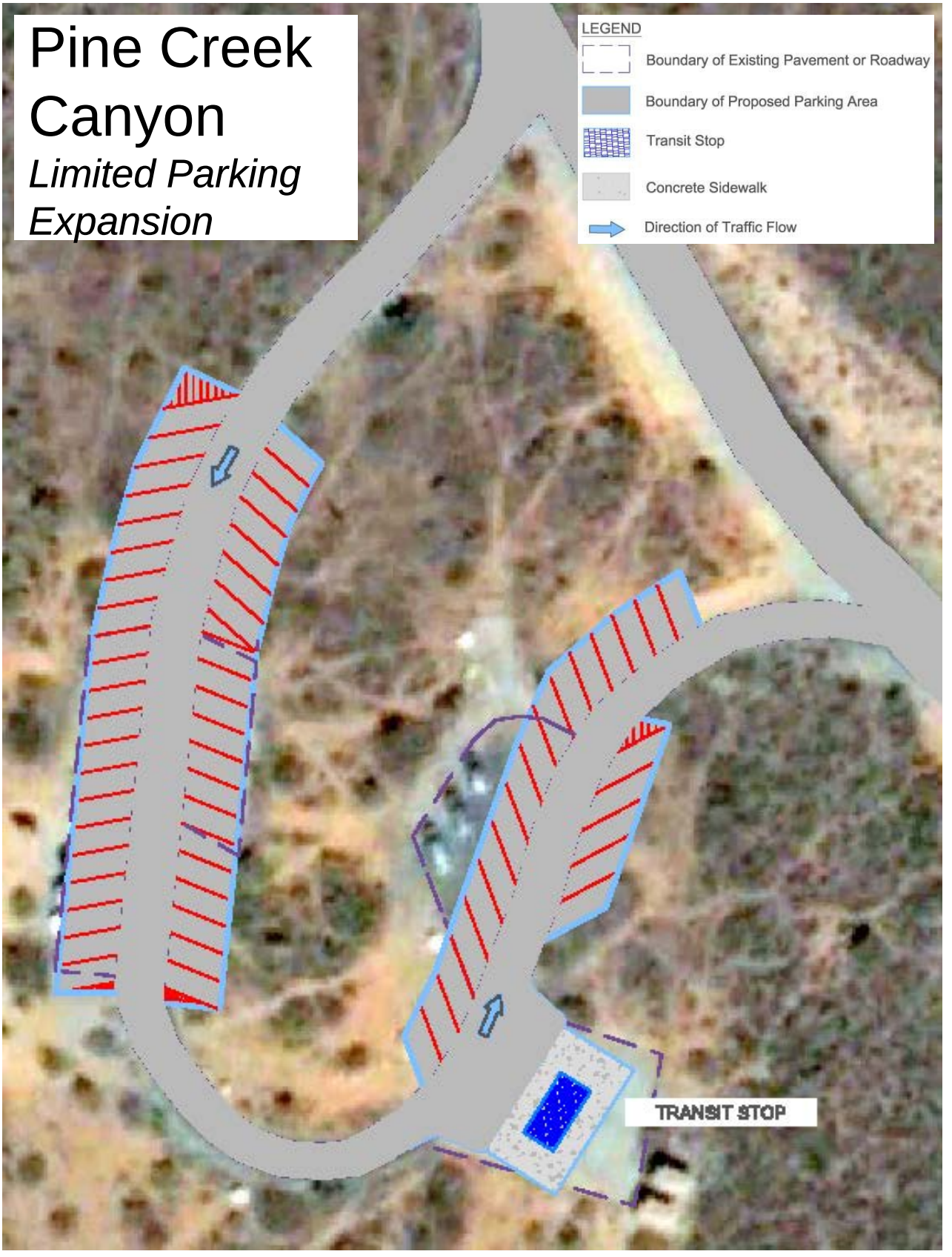
Reconfiguration and Transit Stop



Ice Box Canyon

Reconfiguration and Transit Stop




Pine Creek Canyon
Limited Parking Expansion
LEGEND
Boundary of Existing Pavement or Roadway
Boundary of Proposed Parking Area
Transit Stop
Concrete Sidewalk
Direction of Traffic Flow
TRANSIT STOP

Appendix III: Use of Traffic Counters

The BLM should use traffic counters as a management tool to track and control parking at high use lots during peak periods. Traffic counters placed at the entry and exit of parking lots can help the BLM determine when lots reach or exceed capacity. By connecting this data to dynamic message signs (DMS),[33] the BLM can alert visitors that lots are full and are closed to additional vehicles. The data from traffic counters can be connected to DMS at lot entrances, at the Visitor Center, at the fee booth, and along SR 159 to help visitors plan their visit accordingly. The system would likely be easy to install and effective at RRCNCA due to the one-way direction of Scenic Drive and the use of separate entrances and exits at several of the high use lots.

A functioning system like the one above requires the purchase, installation, and maintenance of traffic counters and DMS for all high use parking lots. It also requires programming a computer system to connect traffic counter data with parking lot capacity and to transmit data to signs in real time. Finally, it requires a minimal staff capacity for ongoing monitoring and maintenance.

System Operations and Capacity

The basic steps and logic behind the traffic counter program are as follows:

- Traffic counters are installed at all high-congestion lots with software connections to real-time monitoring in a centralized computer program.
- Traffic counters record vehicles entering lot (#ENTRIES) and vehicles exiting lot (#EXITS). The computer program stores the number of parking spaces in each lot (CAPACITY).
- When #ENTRIES - #EXITS > CAPACITY, then a DMS stationed near entrance reads “Lot Closed Temporarily.”
- When #ENTRIES - #EXITS < CAPACITY, then the sign is blank or reads “Lot open.”
- Data transmits to a sign located at the entrance to the Scenic Drive, noting the lot names of any closed lots.
- The system can be programmed such that when #ENTRIES - #EXITS = CAPACITY - 3, a message reads “LOT NAME near capacity.”

The system should use portable DMS on a seasonal basis, transporting them to storage during non-peak periods. The BLM could also choose to install permanent DMS at high congestion lots. The system can also include one or more permanent DMS at the fee booth, at another point on Scenic Drive and on SR 159.

[33] Dynamic message signs are electronic message boards that can be placed beside roads or parking lots to communicate messages updated on a real-time basis.

Establishing the system requires engineering expertise for installing the traffic counters and programming the operating system, including testing and refining the system. The BLM can use staff engineers to coordinate the installation, and they should work closely with partners at Nevada DOT and Central Federal Lands Highway Division (FHWA). Both of these partners have experience in establishing traffic counter and DMS systems. The BLM can also choose to enlist the expertise of a consultant to coordinate the installation of the system and to provide staff training on operations and maintenance of the system. If the BLM hires a consultant to design and refine the system, it may incur a one-time cost between $20,000 and $50,000.

The system would involve a small level of BLM staff capacity for initial set up and ongoing operations. The system manager (BLM or a consultant) would need to test the system during its first few months of operation. This may involve occasional manual traffic counts and checks for system accuracy. BLM staff could be trained to help with system management, including recalibrating the system, installing traffic counters, and transporting DMS. If the BLM wishes to enforce lot closures, the traffic counter system would also require additional BLM law enforcement to ticket visitors who enter or park in undesignated spaces in closed lots. However, it can also function as a self-enforcing system.

System Components and Costs

The costs for traffic counter system components are based on the Intelligent Transportation Systems in the National Parks and Federal Public Lands – 2011 Update,[34] which contains a survey of ITS technologies across public lands, and examples from two public lands sites published in the Cape Cod National Seashore Intelligent Transportation Systems Implementation Plan (2011)[35] and the Gateway National Recreation Area – Sandy Hook Unit Parking Management Study (2003).[36] The Volpe Center is the author of all three studies.

The study team recommends the use of portable DMS, which are much less expensive than permanent signs and can be removed from Scenic Drive during non-peak seasons. New portable DMS are very durable and easily transportable, relative to older signs. Portable signs are approximately $20,000 per sign, with an annual operating cost between $600 and $1,800 each and a lifespan of 14 years. Permanent DMS would cost between $50,000 and $70,000 each, with annual maintenance costs around $3,000 and a lifespan of 10 years.

Pneumatic tubes are a simple and low-cost way to count traffic entries and exits. Pneumatic tubes cost between $700 and $1,300 per installation, with some additional costs (approximately $5,000, although

[34] U.S. DOT Volpe Center, Intelligent Transportation Systems in National Parks and Federal Public Lands – 2011 Update, http://www.volpe.dot.gov/coi/ppoa/publiclands/projects/itslessons.html, accessed February 10, 2012.
[35] U.S. DOT Volpe Center, Projects – National Park Service Cape Cod National Seashore, http://www.volpe.dot.gov/coi/ppoa/publiclands/projects/capecod3_its.html, accessed February 10, 2012.
[36] U.S. DOT Volpe Center, Projects – National Park Service Gateway National Recreation Area, Sandy Hook Unit, http://www.volpe.dot.gov/coi/ppoa/publiclands/projects/nyharbor_sandyhook3.html, accessed February 10, 2012.

it will range based on the system) for receivers and software. Each parking lot would need two tubes installed – one for each direction of traffic. Annual maintenance would be between $500 and $800 per installation, with a life of 5 to 15 years. The BLM may be able to acquire or borrow pneumatic tube systems from Nevada DOT or other partners, especially for a limited pilot test. If the BLM wanted to pursue a more permanent traffic counter system, they could install an inductive loop system at a total cost of approximately $3,000 installation, or $6,000 per parking lot. The loop system is more intensive to install but would have a longer lifespan. Installation of an inductive loop system could occur if the BLM repaves the parking lots and Scenic Drive.

Appendix IV: Parking Model Validation

To verify the accuracy of the data, the study team compared its observations to the findings of the 2001 Transit Feasibility Study, which conducted a similar data collection exercise on Saturday, November 2, 2001. With a couple of notable exceptions, the 2011 observations fall roughly in line with visitation patterns observed in 2001. The table below compares the lot by lot duration of stay data collected for the 2001 Transit Feasibility Study to the data collected for the current study.

Table 24- Weekend Day Duration of Stay Distribution: 2001 and 2011

	Calico I		Calico II		Sandstone Quarry		Ice Box		Pine Creek	
	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
1-15 min	51%	46%	39%	47%	47%	33%	47%	50%	22%	33%
16- 60 min	42%	40%	18%	40%	29%	26%	19%	17%	18%	13%
61 – 120 min	5%	10%	14%	8%	18%	14%	31%	14%	33%	18%
121 min +	2%	5%	29%	4%	6%	26%	3%	19%	27%	36%

Differences in the data collected for both studies may be the result of evolving parking use patterns over time or they may be due to variances in daily use patterns. For example, the greater proportion of shorter duration stays at Calico II recorded in 2011 may be the result of rain on the day preceding data collection negatively affecting climbing conditions on the sandstone cliffs popular among climbers. Similarly, the greater proportion of long duration stays at Sandstone Quarry in 2011 may have been the result of visitor interest in the light snow covering present at higher altitudes. Given the numerous reasonable yet untestable hypotheses for differences in observed parking use patterns, the study team chose not to adjust parking stays for the purposes of the study, but rather to take the observed data as given.

Appendix V: Precedent Research for Transit Ridership on Public Lands

Transit Ridership

A survey of ridership on four voluntary bus shuttles in public lands across the United States found that about 6 to 12 percent of visitors will choose to ride a voluntary shuttle service. These survey results are consistent with an earlier estimate that 5 to 10 percent of visitors to public lands would take a voluntary transit system.[37] Ridership can be higher or lower depending on local conditions and characteristics of the service.

Survey data from currently operating shuttles can help explain why people choose to ride a voluntary system. A 2009 survey of bus riders at Colonial National Historical Park found that some of their motivations include the following[38]:

1. The desire to let someone else do the driving
2. The opportunity to hear live or recorded interpretation
3. To avoid driving in an unfamiliar area/to avoid missing a specific destination
4. Lowering environmental impact
5. Saving money on fuel and wear-and-tear

According to the *Alternative Transportation System Demand Estimation for Federal Land Management Agencies* study, a wide variety of service characteristics can influence the proportion of visitors who will choose to ride a voluntary transit system. Basic service characteristics such as schedule and route have large impacts on ridership. If a visitor has a specific destination in mind before travelling to a unit, they won't use transit unless it serves their planned destination. However, many visitors arrive without specific destinations in mind, and are willing to go where the shuttle takes them. Some service characteristics that can attract these visitors or those with a specific destination include the following[39]:

- Frequent service, with headways of fifteen minutes or less, can encourage a higher mode share for transit. A one-hour headway is the upper range of what voluntary riders will tolerate.
- Scheduling enhancements, such as starting a route on the hour and on the half hour, can make a shuttle seem more user-friendly. Clearly posted arrival times at stops or real-time countdowns can also influence a visitor to wait a few minutes and take a bus they know is coming soon.
- Amenities such as covered shelters, benches, paved stops, and gear storage areas on the bus can attract more visitors to take a shuttle.

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[37] Cambridge Systematics, Inc. and BRW Group, Inc., Federal Lands Alternative Transportation Systems Study Summary of National ATS Needs, August 2001, http://fta.dot.gov/documents/3039_study.pdf, accessed February 10, 2012.
[38] U.S. DOT Volpe Center, Colonial National Historical Park Shuttle Service Survey Report, February 2010, http://ntl.bts.gov/lib/42000/42100/42164/DOT-VNTSC-NPS-10-03.pdf, accessed February 10, 2012.
[39] U.S. DOT Volpe Center, Alternative Transportation System Demand Estimation for Federal Land Management Agencies, September 2011, http://ntl.bts.gov/lib/44000/44200/44243/ATS_Demand_Estimation_1_.pdf, accessed February 10, 2012.

- Factors that play an important part in urban transit mode choice, such as travel time, are less important to the voluntary shuttle rider in a recreational setting. The conflict between a fast travel time and frequent stops is less important in a public lands context, and having a large number of stops can actually increase ridership.
- Social considerations can influence voluntary ridership as well, with popular services attracting more riders than an empty bus stop.

Studies show that the most powerful factor affecting ridership is the fare charged to ride a system. Evidence from Reds Meadow Valley Recreation Area shows that ridership dropped by 59% when fares were increased by 400%.[40] Incremental increases and decreases in the fare at Reds Meadow Valley caused decreases and increases in ridership over three decades of service. Many federal land units with alternative transportation systems bundle their entrance fee with the increased cost of providing transportation into one seamless transaction. This allows for a perceived "free" service and prevents delays in payment onboard the transit vehicle. It also distributes the cost of the service among all visitors, both riders and non-riders, as the benefits of the system include reduced congestion for all visitors.

Hiker/Climber Shuttle Ridership

The study team reviewed four shuttle systems targeted to hikers, climbers, and cyclists as comparable examples for RRCNCA. Shuttle buses targeted to these recreational users have had success at a variety of public lands across the country. The Bizz Johnson Trail bus in California, the Appalachian Mountain Club (AMC) Hiker Shuttle in New Hampshire, Rocky Mountain National Park's Hiker Shuttle in Colorado, and the Bus-Up 90 in Washington operate in a variety of environments under public, non-profit, and concessionaire operating models. Their design allows them to meet the demands of their visitors and environments, but also share several elements, including the following:

- **Added value beyond the personal vehicle.** None of these systems is mandatory to access a recreation resource, and so the system must provide additive value if visitors are to spend the additional money, time and effort associated with parking and waiting for the shuttle. Additionally, these costs should be minimized through careful planning. The AMC Hiker Shuttle allows visitors to return to their vehicles after a one-way hike, while the Bus-Up 90 acts as a chairlift by carrying users to the summit of a long downhill cycling trail. Accomplishing either using a private vehicle would require two vehicles or a party member who stays behind.
- **Connectivity to gateway communities and other transit services.** All four of the systems have direct connections with other transit services and with gateway communities. Connecting to other services allows users to visit several sites on one trip, and opens an area to car-free

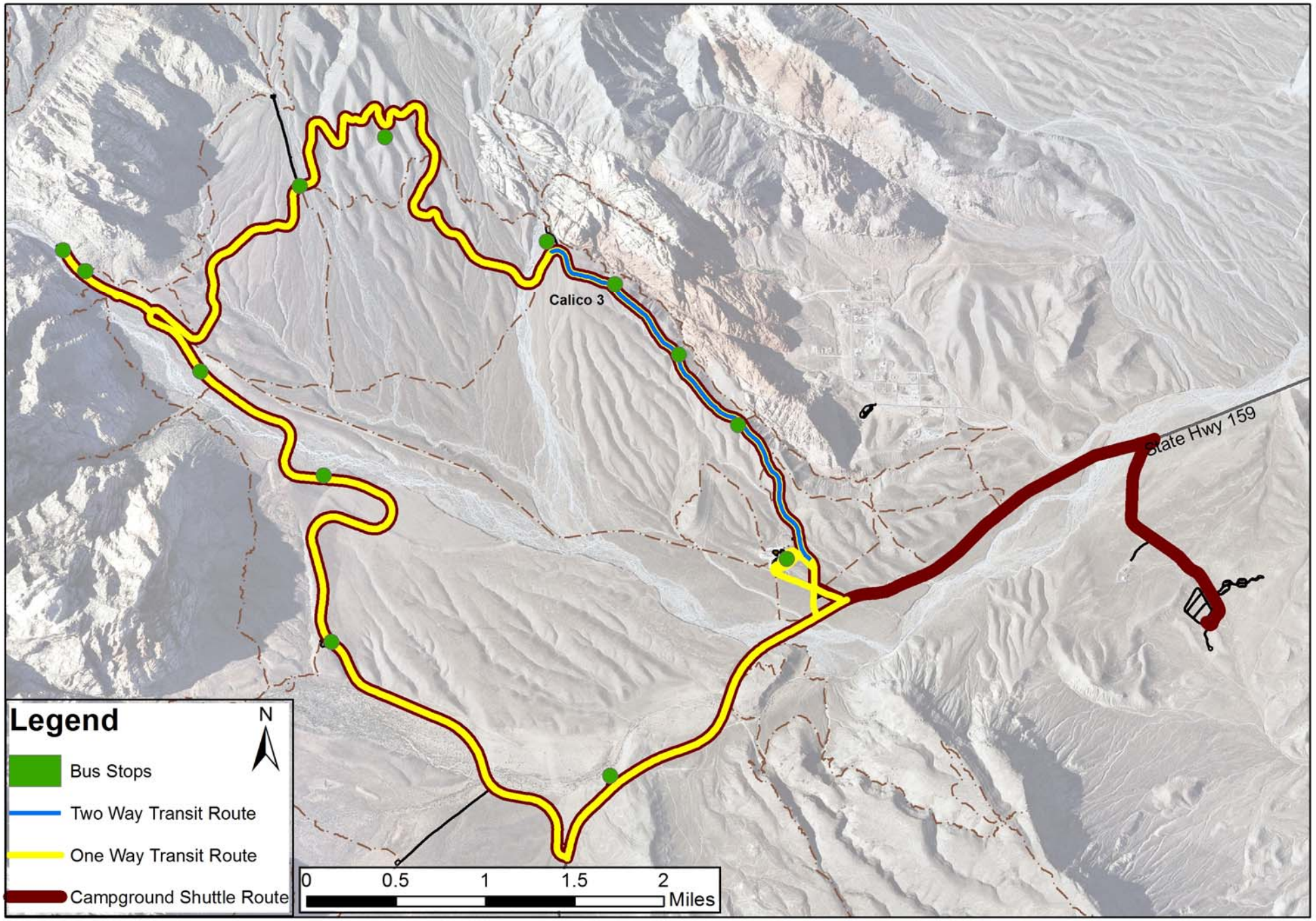
[40] *Ibid*.

visitors. All four of these voluntary recreation shuttles connect gateway communities to recreation destinations. This characteristic also increases the number of destinations that a user can visit without returning to their car. It also opens recreation destinations to car-free local residents or guests and can be used to increase awareness of public lands, as seen with the Bizz Johnson Trail Bus. Although an extension to Las Vegas is not currently feasible, the effectiveness of any transit service within RRCNCA would be improved if a transfer to RTC is available, for example at the Red Rock Casino or at the Visitor Center.

- **User fee/fare to fund service.** The operating costs of hiker shuttles all charge a user fee to recover their costs of operation. Three of the systems charge this directly to the user as they enter the transit vehicle, while Rocky Mountain National Park adds the transportation user fee into the cost of entry to the Park.

Appendix VI: Transit Map

Red Rock Canyon National Conservation Area
Transit Routes



Appendix VII: Transit Route Segments and Distances

Table 25 – One-Way Transit Segment Distances and Average Travel Speed

Segment distances	Cumulative Distance (miles)	Segment Distance (miles)	Average Speed (mph)
Visitor Center to Calico I	1.38	1.38	10
Calico I to Calico II	1.93	0.55	15
Calico II to Calico III	2.43	0.50	15
Calico III to Sandstone	2.98	0.55	15
Sandstone to High Point Overlook	5.04	2.06	15
High Point Overlook to White Rock Drive	6.19	1.15	15
White Rock Drive to Lost Creek	7.91	1.72	15
Lost Creek to Willow Springs	8.38	0.47	15
Willow Springs to Lost Creek	8.78	0.4	15
Lost Creek to Ice Box	9.55	0.77	15
Ice Box to Red Rock Wash Overlook	10. 57	1.02	15
Red Rock Wash Overlook to Pine Creek	12.26	1.69	25
Pine Creek to Scenic Drive exit lot	14.26	2	25
Scenic Drive exit lot to Red Rock Overlook lot	14.81	0.55	30
Red Rock Overlook lot to Visitor Center	17.14	2.33	30

The hiker/climber shuttle would follow the same route, with an additional stop at the campground at the beginning of the route (with stops along the Scenic Drive on a request basis). The total distance of the morning hiker/climber shuttle runs would thus be 22.85 miles.

Table 26 - Two-Way Transit Segment Distances and Average Travel Speed

Segment distances	Cumulative Distance (miles)	Segment Distance (miles)	Average Speed (mph)
Visitor Center to Calico I	1.38	1.38	10
Calico 1 to Calico II	1.93	0.55	15
Calico II to Calico III	2.43	0.50	15
Calico III to Sandstone	2.98	0.55	15
Sandstone to Calico III	3.53	0.55	15
Calico III to Calico II	4.03	0.50	15
Calico II to Calico I	4.58	0.55	15
Calico I to Visitor Center	5.96	1.38	15

Appendix VIII: Pilot

Prior to engaging in a significant transit operations contract, the Volpe Center recommends the use of a pilot test to introduce the concept of transit to RRCNCA visitors and to test variables of transit service. A pilot can help the BLM design a transit system that can best meet the needs of RRCNA and its visitors.

The pilot should include the route considered in Alternatives B, including one-way transit service on Scenic Drive and/or a hiker/climber shuttle from the campground to Scenic Drive. RRCNCA should select a route using either the preferred alternative identified in the Transportation Feasibility Study, or include multiple alternatives. The pilot can begin operations prior to the completion of the Environmental Assessment. The BLM can only implement the two-way route following construction of the transitway, which can only occur after the EA. Following completion of the transitway, the BLM should conduct a pilot of varying service options for a combination of two-way and one-way service.

Considerations

1. The pilot should closely follow the route and schedule established in Alternative B, with the purpose of testing the feasibility of transit service.
2. The pilot should be used to test for ridership demand and service preferences, especially in terms of operating hours and frequencies.
3. The pilot should include a significant data collection component to collect ridership information and to learn about willingness to pay, factors that may encourage or discourage transit use, and other route or service preferences.
4. The pilot should be as simple as possible with clear instructions to orient and welcome new users.

Management

1. The BLM sets routes and schedules, coordinates interpretation, and provides parking.
2. The BLM enters into a contract with a local transportation provider.
    a. The local transportation provider can be RTC or a private company.
    b. The contractor responsibilities include leasing vehicles, hiring drivers, running transit operation, and maintaining all equipment.
3. The BLM should work with one of RRCNCA's friends groups to assist with interpretation and funding.

Routes and Schedules

1. Operating hours and days: 9 AM through 5 PM on Saturdays and Sundays.
2. Operating season: Seasonal for one year, operating in the fall and spring peak months (starting either in October or March).
    a. The pilot should begin at the first October or March that the BLM is ready to oversee pilot operations.
3. Visitors will start at the Visitor Center, board a bus, and stop at each parking area along Scenic Drive.
    a. Each transit stop should have a temporary sign or decal and a transit information panel.

4. Headways: Transit headways should be consistent. This study recommends 20 minutes. The BLM should create a shuttle contract that is flexible, allowing for service to operate more frequently if demand is high.
5. The schedule with posted headways and approximate times of shuttle arrival at each lot will be posted at the Visitor Center and at each transit stop. Each posting should indicate language such as the following for Calico I: "Shuttle arrives at 9:10 AM and every 20 minutes thereafter. Last shuttle departs at 5:10 PM."

   The following is a list of first and last arrivals at Scenic Drive stops:

Table 27 - Sample Transit Schedule at Scenic Drive Stops

Stop	First Arrival	Last Departure
Visitor Center	9:00 AM	5:00 PM
Calico I	9:10 AM	5:10 PM
Calico II	9:14 AM	5:14 PM
Sandstone Quarry	9:20 AM	5:20 PM
Highpoint Overlook	9:30 AM	5:30 PM
White Rock Drive	9:39 AM	5:39 PM
Willow Springs	9:48 AM	5:48 PM
Lost Creek	9:51 AM	5:51 PM
Ice Box Canyon	9:57 AM	5:57 PM
Red Rock Wash Overlook	10:04 AM	6:04 PM
Pine Creek	10:09 AM	6:09 PM
Red Rock Overlook	10:18 AM	6:18 PM

Infrastructure

1. Utilize the existing Visitor Center parking for shuttle riders.
2. If overflow parking needed, use Visitor Center overflow lot and the lot near the fee booth.
3. Use temporary signage to direct visitors using the shuttle to park in designated areas.
4. Visitors to board shuttle at Visitor Center (or near fee booth, if overflow parking is in use).
5. Use decals or temporary signs to indicate shuttle pick-up at Visitor Center and shuttle stops at each lot.

Finances

1. The number of service hours for the pilot would be between 350-400 hours.
   a. 16 hours per weekend, approximately 24 weekends for the pilot
2. Work with local transit providers and contractors to determine the costs per service hour.

   a. Includes vehicle leasing, fuel, and drivers.
3. BLM staff can estimate overhead costs.
   a. Hours of BLM staff time to manage
   b. Marketing and promotional materials (including printing)
   c. Coordination of interpretive services
   d. Signage and preparation of parking and bus stops
4. Consider running tests using fees and no fees.
   a. For one operating period, charge fee of $1.00 per passenger if RRCNCA can secure a waiver to allow shuttle riders to by-pass the amenity fee. If this is the case, implement the issuance of a paper receipt that visitors must display on their dashboards as they travel Scenic Drive.
   b. For another operating period, offer the shuttle for free after visitors pay the entrance fee.

Promotion and Marketing

1. Use visual markings on transit vehicles to denote connection to RRCNCA.
   a. Apply high-quality cardboard signs using Velcro, to bus exterior
   b. Optionally use vinyl signs and large decals.
2. Advertise shuttle service widely to visitors.
   a. Post notice and instructions on BLM and friends groups' websites.
   b. Advertise for two months in advance in the Visitor Guide (handout at fee booth).
   c. Submit a press release through BLM public affairs.
   d. Create handouts/brochures with a route map to distribute at the Visitor Center.
      i. Start to distribute brochures at least four weeks in advance of pilot.
      ii. Inquire into placing brochures at hotels and casinos.
   e. Use a large, semi-permanent easel sign at Visitor Center entrance when the shuttle is operating.
   f. Use a variable message sign at the site entrance that reads, "Free shuttle available to travel Scenic Drive."
5. Guidelines for marketing materials:
   a. Keep marketing materials brief, highly-visible, and easy to understand.
   b. Use simple messages and large text.
   c. Carefully proofread all marketing materials in advance.
6. Enlist the assistance of friends groups to vet marketing materials.
7. Set up visitor education displays at the Visitor Center focused on transit use.

Data Collection

1. Ridership
   a. On two- to three-weekends during each operating period, use volunteers on each bus to record visitor boarding and disembarking at each stop.
2. Expenses
   a. BLM to track staff time in planning, marketing, and oversight

   b. Contractor to provide list of all operating and capital costs
3. Use a comment card or brief, written questionnaire to record visitor preferences:
   a. Record date, time, and type of transit route
   b. Activity (sightseeing, hiking, climbing, picnicking, photography, other)
   c. Length of stay (at site and at each parking lot)
   d. Willingness to pay (dollar amount) and sensitivity to price fluctuations
   e. Desired frequency of service
   f. Preference of transit route; introduce two-way transit idea and ask if they would be likely to use it
   g. Motivations for using transit
   h. Sources of information for learning about transit service
4. Vehicle selection and operation
   a. Drivers/interpreters to monitor how often the vehicle reached capacity and had to turn passengers away.
   b. Contractor to note any problems with visitor access or equipment storage on vehicle.
   c. Contractor to note vehicle performance on Scenic Drive, including maneuverability, access to each transit stop, and performance on steep grades.

Evaluation Questions

1. Does the service tend to be more attractive to sightseers looking for an interpretive experience or to hikers and climbers, looking to leave their cars behind? For short-term or long-term users?
   a. *If a large majority of transit riders fall into one category, the BLM should consider catering future transit to the preferences of that group.*
   b. *If there are significant numbers of transit riders in both categories, the BLM should consider both a sightseeing-based service and a hiker/climber shuttle.*
2. What are the primary visitor purposes in using a transit system?
   a. *Consider adjusting service frequency, interpretation opportunities, routes, and hours of service to attract more riders, based on indicated motivations for using transit.*
3. Which parking lots are most and least popular with transit riders?
   a. *If some lots have very few or no visitors boarding and disembarking at their stops, the BLM should consider eliminating those lots from transit service.*

Appendix IX: Transit Vehicle Selection

The following table compares standard diesel vehicles with different engines (V6 and V8) and passenger capacity to determine the best vehicle choice for RRCNCA. The recommended hybrid diesel buses have slightly different costs than those shown below, but provide the added benefit of reduced air pollution.

Table 28 - Transit Vehicle Comparison

Bus Type	Vehicle Cost	Capacity	Fuel cost	Fuel Economy (MPG)	Maint. $/mile	Engine Overhaul	Trans. Overhaul	Overhaul Mileage
30-40 foot heavy duty transit bus, diesel (V8)	$289,819	30	$4.64	5	$1.44	$23,185	$12,172	250,000
Cutaway, medium-duty bus, diesel (V6)	$144,909	30	$4.64	7	$1.44	$17,389	$12,172	250,000
Full-size passenger van, gas	$28,982	15	$4.06	14	$0.93	*	*	*

*** The service life of a full-size passenger van is short enough that overhauls are not warranted.**

Source: Volpe Bus Lifecycle Cost Model

Appendix X: Operating Model Analysis

Sources for Cost Estimates

The following series of tables are the outputs from the Bus Lifecycle Cost Model for Alternatives B and C, which was the primary model upon which the study team based its estimates for transit service costs at RRCNCA. Figure 35 shows the annual costs of operation for Alternatives B and C, as well as the cumulative cost for the entire operation over 12 years. Table 29 and Table 30 provide details for each alternative, including model inputs based on the assumptions in section 3.5. All "Year 1" costs are inflated to 2015 dollars, at an inflation rate of 3%.

The study team verified the cost estimates from the Bus Lifecycle Cost Model by comparing the costs with those of other agencies. For this exercise, the study team researched the operating costs of the Regional Transportation Commission (RTC) of Las Vegas, the local transit provider. RTC contracts all of their operations and maintenance, in a similar operations model to that recommended for RRCNCA. The RTC reports an hourly operating expense of $88.62 for scheduled service and $68.20 for demand response service from their contractors.[41] This compares to a projected cost of about $82.07 per hour for Alternative B and $71.79 per hour for Alternative C, primarily because RRCNCA requires regular transit service, similar to RTC's fixed-route service. One primary difference between RTC and the service proposed for RRCNCA is that RTC operates heavy-duty transit vehicles (for scheduled service) and provides more intensive service, increasing maintenance and other costs. Demand response service for RTC has a lower hourly cost, likely due to the use of smaller, more efficient vehicles. The similarity between costs of scheduled and demand response service is significant to RRCNCA because it provides a glimpse into actual transit service provision cost in the local Las Vegas market, and helps to verify the results of the model used in this analysis. While the model suggests that RRCNCA's cost may be in between the two costs figures for RTC, it is also important to note that RTC may enjoy a savings due to the scale of its operation.

[41] Agency profile for the Regional Transportation Commission of Southern Nevada (RTC), 2010 National Transit Database, http://www.ntdprogram.gov/ntdprogram/pubs/profiles/2010/agency_profiles/9045.pdf, accessed February 2, 2012.

Figure 35: Annual and Cumulative Cost for Alternatives B and C

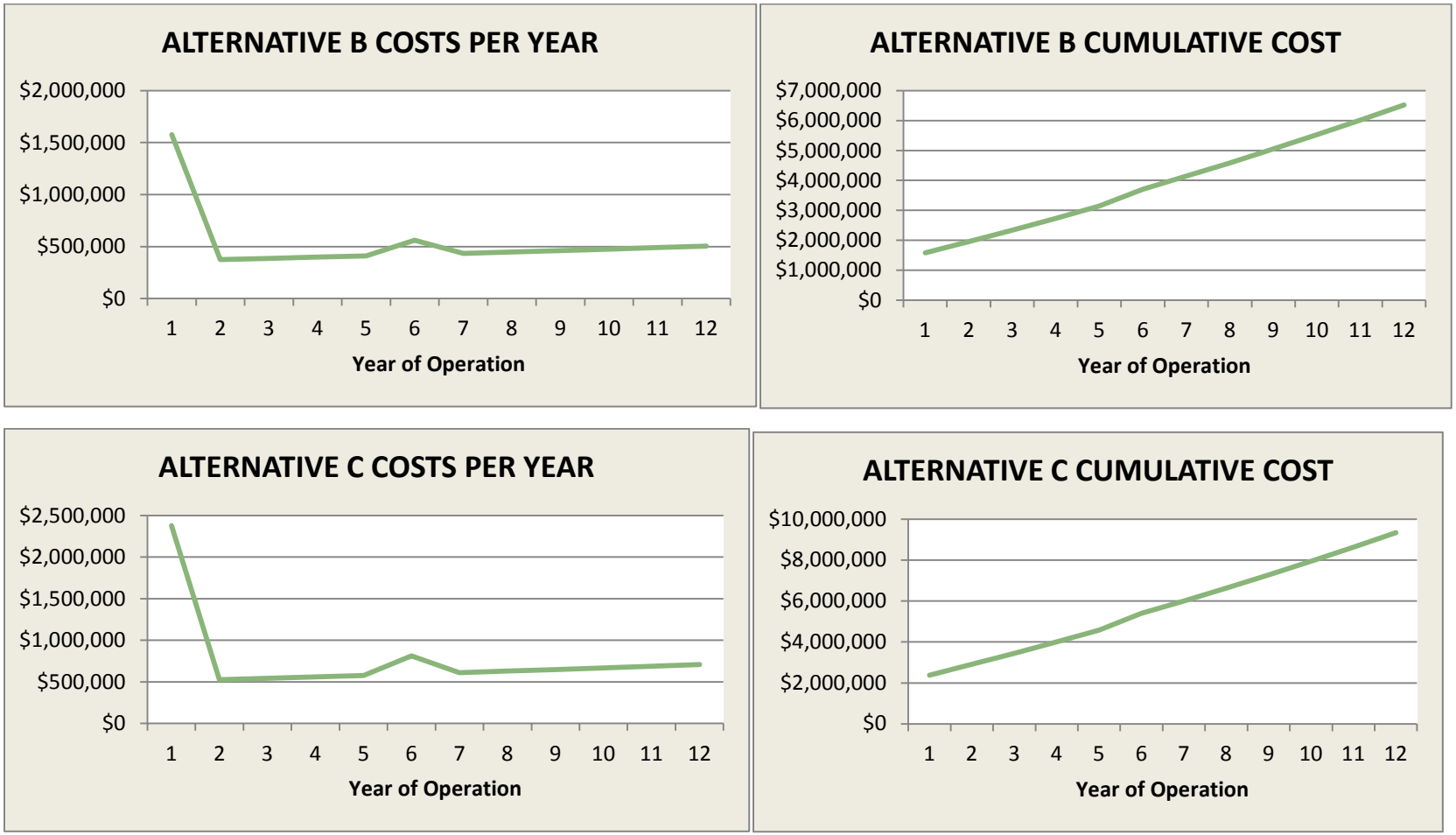


Table 29: Alternative B Shuttle Proforma

Annual O&M costs	**$404,785**
Bus type	Cutaway, medium-duty bus hybrid (V6)
Number of buses	5
VMT per fleet	78,379
VHT per fleet	4,439
Driver costs per fleet	$207,834
Fuel cost per mile	$0.52
Fuel costs (per fleet)	$40,409
Maintenance cost per mile	$1.45
Maintenance cost (per fleet)	$113,649
Overhaul mileage trigger	250,000
Engine overhaul cost	$15,000
Transmission overhaul cost	$31,300
Battery replacement (hybrid)	$27,500
Marketing costs	$42,893
Inflation rate	3.0%

Year one costs	**$1,211,442**
Purchase cost	$1,014,365
Startup costs	$34,778
Maintenance facility	$0
Fueling station	$0
Bus stops and shelters	$162,298

Costs per year							
Year	*O&M*	*Miles per bus*	*Engine overhaul*	*Transmission overhaul*	*Battery replacement (hybrids)*	*Total costs per year*	*Cumulative costs*
Year 1 O&M only	*$364,401*	*18,525*				*$364,401*	*$0*
Year 1	$1,575,843	18,525			$0	$1,575,843	$1,575,843
Year 2	$375,333	37,050	$0	$0	$0	$375,333	$1,951,176
Year 3	$386,593	55,574	$0	$0	$0	$386,593	$2,337,768
Year 4	$398,190	74,099	$0	$0	$0	$398,190	$2,735,959
Year 5	$410,136	92,624	$0	$0	$0	$410,136	$3,146,095
Year 6	$422,440	111,149	$0	$0	$137,500	$559,940	$3,706,035
Year 7	$435,113	129,673	$0	$0	$0	$435,113	$4,141,149
Year 8	$448,167	148,198	$0	$0	$0	$448,167	$4,589,316
Year 9	$461,612	166,723	$0	$0	$0	$461,612	$5,050,928
Year 10	$475,460	185,248	$0	$0	$0	$475,460	$5,526,388
Year 11	$489,724	203,773	$0	$0	$0	$489,724	$6,016,112
Year 12	$504,416	222,297	$0	$0	$0	$504,416	$6,520,528

VMT: Vehicle Miles Traveled; VHT: Vehicle Hours Traveled; O&M: Operations and Maintenance

Table 30: Alternative C Shuttle Proforma

Annual O&M costs	**$551,725**
Bus type	Cutaway, medium-duty bus hybrid (V6)
Number of buses	8
VMT per fleet	98,402
VHT per fleet	7,218
Driver costs per fleet	309,621
Fuel cost per mile	$0.52
Fuel costs (per fleet)	50,732
Maintenance cost per mile	$1.45
Maintenance cost (per fleet)	142,683
Overhaul mileage trigger	250,000
Engine overhaul cost	$15,000
Transmission overhaul cost	$31,300
Battery replacement (hybrid)	$27,500
Marketing costs	48,690
Inflation rate	3.0%

Year one costs	**$1,867,450**
Purchase cost	$1,622,984
Startup costs	$47,389
Maintenance facility	$0
Fueling station	$0
Bus stops and shelters	$197,077

Costs per year

Year	*O&M*	*Miles per bus*	*Engine overhaul*	*Transmission overhaul*	*Battery replacement (hybrids)*	*Total costs per year*	*Cumulative costs*
Year 1 O&M only	*$511,341*	*25,199*				*$511,341*	*$0*
Year 1	$2,378,792	25,199			$0	$2,378,792	$2,378,792
Year 2	$526,682	50,399	$0	$0	$0	$526,682	$2,905,474
Year 3	$542,482	75,598	$0	$0	$0	$542,482	$3,447,956
Year 4	$558,757	100,797	$0	$0	$0	$558,757	$4,006,712
Year 5	$575,519	125,997	$0	$0	$0	$575,519	$4,582,232
Year 6	$592,785	151,196	$0	$0	$220,000	$812,785	$5,395,016
Year 7	$610,568	176,395	$0	$0	$0	$610,568	$6,005,585
Year 8	$628,885	201,594	$0	$0	$0	$628,885	$6,634,470
Year 9	$647,752	226,794	$0	$0	$0	$647,752	$7,282,222
Year 10	$667,185	251,993	$0	$0	$0	$667,185	$7,949,407
Year 11	$687,200	277,192	$0	$0	$0	$687,200	$8,636,607
Year 12	$707,816	302,392	$0	$0	$0	$707,816	$9,344,423

Leasing

If the BLM chooses to lease vehicles, the total cumulative cost over 12 years is very similar to the cost of vehicle ownership, with a slight cost savings for leasing vehicles. Table 31 summarizes the GSA's lease rates and applies them to the operating needs for both Alternative B and C. This methodology relies on using the VHT (total vehicle hours) for each alternative and multiplying it by the hourly lease cost.

Table 31 - Annual Lease Cost for Alternatives B and C

	2015 GSA Lease Rates	Alternative B Seasonal Cost	Alternative C Seasonal Cost
Hourly Lease Cost	$71.03	$44,154	$521,704
Mileage fee	$0.57	$44,964	$56,452
Monthly Lease	$821.73	$26,295	$26,295
Supervision	$40,574.59	$40,575	$40,575
Total		$455,989	$636,026

Table 32 and Table 33 compare the lease costs with the cost output from the Bus Lifecycle Cost Model. On the left side of the table are the operating costs for both BLM-owned vehicles (as explained above) and the annual lease costs for 12 years. By owning vehicles, the BLM would save between $92,000 and $127,000 (for Alternative B) and between $84,000 and $117,000 (for Alternative C) per year compared to leasing if considering operating costs alone. When factoring in the total cumulative costs (right side of the table), including capital costs, the cost savings for Alternative B over 12 years is $108,568. The lease rates do not include a transit vehicle to cover breakdowns and maintenance, as described earlier in this study, since rates are based on VHT alone. This is significant because the BLM-owned cost factors in this extra $200,000. With this consideration, the cumulative leasing cost is $309,000 more than if the BLM owned the vehicles.

The results are significantly different for Alternative C. The cumulative cost difference is $426,588 in favor of leasing, not considering the $200,000 additional vehicle cost noted above. With this consideration, leasing is cumulatively about $227,000 less expensive.

Table 32 - Alternative B Lease Comparison

	Annual Operating	Annual Lease	Difference between Operating & Lease	Operating and Capital Cumulative Costs	Lease Cumulative with Capital
Year 1	$364,401	$455,989	-$91,588	$1,616,227	$653,065
Year 2	$375,333	$469,668	-$94,336	$1,991,560	$1,122,733
Year 3	$386,593	$483,758	-$97,166	$2,378,152	$1,606,492
Year 4	$398,190	$498,271	-$100,081	$2,776,343	$2,104,763
Year 5	$410,136	$513,219	-$103,083	$3,186,479	$2,617,982
Year 6	$559,940	$528,616	$31,325	$3,746,419	$3,146,597
Year 7	$435,113	$544,474	-$109,361	$4,181,533	$3,691,072
Year 8	$448,167	$560,808	-$112,642	$4,629,700	$4,251,880
Year 9	$461,612	$577,633	-$116,021	$5,091,311	$4,829,513
Year 10	$475,460	$594,962	-$119,501	$5,566,772	$5,424,474
Year 11	$489,724	$612,810	-$123,086	$6,056,496	$6,037,285
Year 12	$504,416	$631,195	-$126,779	$6,560,911	$6,668,480
			-$1,162,318	**Cumulative difference**	$107,568

Lease Cumulative with Capital does not include an additional transit vehicle to cover breakdowns and maintenance.

Table 33 - Alternative C Lease Comparison

	Annual Operating	Annual Lease	Difference between Operating and Leasing	Cumulative Costs	Lease Cumulative with Capital
Year 1	$551,725	$636,026	-$84,301	$4,169,176	$2,630,492
Year 2	$568,277	$655,107	-$86,830	$4,737,453	$3,285,598
Year 3	$585,325	$674,760	-$89,434	$5,322,778	$3,960,358
Year 4	$602,885	$695,003	-$92,118	$5,925,663	$4,655,361
Year 5	$620,972	$715,853	-$94,881	$6,546,635	$5,371,214
Year 6	$639,601	$737,328	-$97,727	$7,186,236	$6,108,542
Year 7	$658,789	$759,448	-$100,659	$7,845,025	$6,867,990
Year 8	$678,553	$782,232	-$103,679	$8,523,578	$7,650,222
Year 9	$698,909	$805,699	-$106,789	$9,222,487	$8,455,920
Year 10	$719,876	$829,870	-$109,993	$9,942,363	$9,285,790
Year 11	$741,473	$854,766	-$113,293	$10,683,836	$10,140,556
Year 12	$763,717	$880,409	-$116,692	$11,447,553	$11,020,964
			-$1,196,396	**Cumulative difference**	-$426,588

Appendix XI: Capital Funding Sources Available to RRCNCA

Included below are brief summaries of several federal funding programs for which the parking lot improvements, signs, stops and shelters for the transit service may be eligible.

Congestion Mitigation & Air Quality Improvement Program (CMAQ)

The Congestion Mitigation and Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality nonattainment and maintenance areas for ozone, carbon monoxide (CO), and particulate matter (PM-10, PM-2.5) which reduce transportation related emissions. The proposed lot reconfigurations and transit service would reduce emissions and congestion by transferring visitors from private cars to a shuttle bus. It would also reduce emissions and congestion by reducing or eliminating the number of drivers searching for parking spaces. Funds are eligible for projects that mitigate traffic congestion and improve air quality; transit projects and bicycle and pedestrian projects are eligible. Funds may be available for pilot transit operations projects. The federal share is typically 80 percent, requiring a 20 percent local match. For more information see:

http://www.fhwa.dot.gov/safetealu/factsheets/cmaq.htm

Federal Lands Transportation Program (FLTP)

The Federal Lands Transportation Program provides funding for transportation planning, research, transit operation and maintenance, preventive maintenance, engineering, rehabilitation, restoration, construction, and reconstruction of Federal lands transportation facilities, including public roads, bridges, trails, parking areas, and transit systems on or adjacent to Federal lands for which the Federal government is responsible. The Bureau of Land Management will receive funds under the FLTP in FY 2013 and 2014, although specific guidance on the amount of funding and how it will be allocated was not yet available at the time of publication. The program is administered by the Federal Highway Administration's Federal Lands Highway Office.

Federal Lands Access Program (FLAP)

The Federal Lands Access Program provides funding for transportation planning, research, engineering, preventative maintenance, rehabilitation, restoration, construction, and reconstruction of Federal lands transportation facilities, including public roads, bridges, trails, parking areas, and transit systems owned by states, tribal governments, and other local governments, that is located on, is adjacent to, or provides access to Federal lands. The Access Program also covers maintenance and operation of transit facilities. Funds are allocated to states, with more funding going to states like Nevada with large public land areas. Programming decisions are to be made within each state by a committee composed of a representative of the FHWA, a representative of the state DOT, and a representative of the appropriate political subdivision of the state. The program is administered by the Federal Lands Highway Office.

Surface Transportation Program (STP)

The Surface Transportation Program provides flexible funding that may be used by states and localities for projects on any federal-aid highway, including the National Highway System, bridge projects on any public road, transit capital projects, and intra-city and inter-city bus terminals and facilities. The federal share is generally 80 percent, requiring a 20 percent local match. For more information see:

http://www.fhwa.dot.gov/safetealu/factsheets/stp.htm

Appendix XII: Evaluation Criteria Analysis

Goal	Objective	Evaluation Criterion	No Action	Alternative A	Alternative B	Alternative C
Visitor mobility	Parking lots can sufficiently accommodate all visitors.	Average daily hours of congestion per lot for the busiest 7 lots	6.25 hours	2.4 hours	0.9-3.9 hours	0.9-3.9 hours
			See Table: Estimated Parking Demand by Lot in Alternatives Evaluation Report.	See Table: Estimated Parking Demand by Lot in Alternatives Evaluation Report.	See Table: Estimated Parking Demand by Lot in Alternatives Evaluation Report.	See Table: Estimated Parking Demand by Lot in Alternatives Evaluation Report.
		Number of lots that cannot accommodate demand on the 90th percentile day in 2025	7 lots	5 lots	1-7 lots	1-7 lots
			Calico I, Calico II, Pine Creek, and Sandstone Quarry are predicted to be congested for most of the design day; Willow Springs, Lost Creek, and Ice Box Canyon are predicted to be congested for about half of the design day.	Calico I and Pine Creek can be expanded to meet demand on the design day. The remaining lots will have less congestion than under the No Action scenario, but environmental and design constraints prevent further expansion.	Under a high transit ridership scenario, limited lot expansion will meet parking demand (or there will be less than one hour of congestion) at all lots except for Calico II. Under a low transit ridership scenario, all lots will have some congestion.	Under a high transit ridership scenario, limited lot expansion will meet parking demand (or there will be less than one hour of congestion) at all lots except for Calico II. Under a low transit ridership scenario, all lots will have some congestion.

Goal	Objective	Evaluation Criterion	No Action	Alternative A	Alternative B	Alternative C
Safety	There is a reduction in unsafe travel conditions due to infrastructure.	Annual number of bicycle or pedestrian injuries or fatalities	Baseline	Equal to No Action baseline	Smaller reduction from No Action baseline	Larger reduction from No Action baseline
			The BLM does not have specific data on traffic incidents, but the overall number of injuries and fatalities is extremely low. Therefore it is difficult to predict if the alternatives would have an appreciable difference on the injury or fatality rates.	An increase in future numbers of visitors, without reducing number of vehicles, will result in pedestrian and bicycle safety conditions similar to those of a No Action scenario. Management strategies may also support safer driving behavior.	A slight decrease in the number of vehicles on the road (due to transit) and new management strategies may result in some improved safety conditions for pedestrians and bicyclists.	A decrease in the number of vehicles on the road (due to transit) and new management strategies may result in more improved safety conditions for pedestrians and bicyclists.
		Annual number of vehicle collisions	Baseline	Equal to No Action baseline	Smaller reduction from No Action baseline	Smaller reduction from No Action baseline.
			The BLM does not have specific data on traffic incidents, but the overall number of injuries and fatalities is extremely low. Therefore it is difficult to predict if the alternatives would have an appreciable difference on the injury or fatality rates.	There will be a significant increase in the number of vehicles in parking lots and roadways, as well as increased size of parking lots, resulting in safety conditions similar to that of the No Action scenario.	A slight decrease in the number of vehicles on the road (due to transit) may offer some improved safety conditions for vehicles.	A more significant decrease in the number of vehicles on the road (due to transit) may offer more improved safety conditions for vehicles.
		Response time of emergency vehicles	Slower than current	Faster than current	Faster than current	Faster than current
			There will be a significant increase in the number of vehicles in parking lots and roadways, without new infrastructure to accommodate these vehicles, resulting in more congestion for emergency response vehicles.	While there will be more vehicles, the new parking infrastructure will remove much of the increase in new vehicles from undesignated parking in the ROW, and parking management strategies will close roads or lots during emergencies.	A decrease in the number of vehicles in undesignated parking on the ROW (due to parking expansion and transit) will improve response times for emergency vehicles. Management strategies to close roads or lots will also improve emergency response time.	A decrease in the number of vehicles in undesignated parking on the ROW (due to parking expansion and transit) will improve response times for emergency vehicles. The BLM can also open the reverse direction of the transitway for emergency vehicle use, as needed.
	There is a reduction in unsafe travel behavior.	Frequency of parked vehicles obstructing roadway	Greater than current	Reduced from current number	No change/Reduced from current number	No change/Reduced from current number
			There will be a significant increase in the number of vehicles at the site, and with no new infrastructure to accommodate these vehicles, there will likely be more parked in undesignated areas.	The significant increase in the number of vehicles at the site will be largely accommodated by increases in parking capacity.	While overall visitation will increase, some visitors will use transit and others will be accommodated by limited parking expansion. The net result will be no change, or possibly a reduction (depending on transit ridership).	While overall visitation will increase, some visitors will use transit and others will be accommodated by limited parking expansion. This alternative accommodates higher levels of transit ridership, and assumes a reduction in undesignated parking.

Goal	Objective	Evaluation Criterion	No Action	Alternative A	Alternative B	Alternative C
Visitor Experience	The strategy does not detract from the visitor experience.	Interpretation elements	Does not include interpretation	Does not include interpretation	Includes interpretation elements	Includes interpretation elements
			There is no interpretation associated with visitors' transportation experience, nor is any planned for the future.	This alternative does not include new interpretation.	The transit service will include an interpretive element, such as a recording of the site's natural and cultural features.	The transit service will include an interpretive element, such as a recording of the site's natural and cultural features.
		Time spent traveling around Scenic Drive for hikers and climbers.	Increased	No change	No change	Reduced
			An increase in the number of vehicles at the site, due to growth in visitation, will result in more congestion for climbers	New parking expansion will help offset the increase in vehicles, which should limit any congestion delays due to parking from undesignated vehicles.	If the shuttles are running at high frequencies, the shuttle can operate at higher frequencies and result in travel times equal to driving a personal vehicle.	Two-way transit will significantly decrease the travel time for hikers and climbers using Calico I, Calico II, and Sandstone Quarry. Other lots will have no change in travel time.

Goal	Objective	Evaluation Criterion	No Action	Alternative A	Alternative B	Alternative C
Resource Protection	Scenic and aesthetic resources can be enjoyed by current visitors and future generations.	Visual impact of transportation infrastructure and vehicle congestion	No visible change in amount of paved areas visible from Scenic Drive, trails, or other visitor amenities. However, major congestion will degrade visual and aesthetic appeal.	Large increase in the amount of paved areas and vehicles that are visible from the Scenic Drive, trails, or other visitor amenities.	Small increase in amount of paved areas visible from Scenic Drive, trails, or other visitor amenities.	Moderate increase in the amount of paved areas and vehicles that are visible from the Scenic Drive, trails, or other visitor amenities.
			There will be no infrastructure changes, but there may be visual impacts from more cars parking at lots and along the road.	The alternative greatly increases the parking lot areas, resulting in a large number of new, visible paved areas.	The alternative increases parking by a limited amount, and in selected areas, so there will be a small impact in visual resources.	The alternative increases parking by a limited amount, but the construction of a two-way transitway significantly increases visual impact for the first three miles of the Scenic Drive.
	Cultural resources are preserved.	Impact on cultural resources	No direct impact to resource from vehicles.	Potential for minor impact that could be easily mitigated or avoided.	Potential for minor impact that could be easily mitigated or avoided.	Potential for minor impact that could be easily mitigated or avoided.
			The No Action alternative involves no new construction and therefore no anticipated impacts. However, increased visitation may result in more human impacts on cultural resources.	All parking expansion alternatives include expansions to Sandstone Quarry, which will be designed to avoid impacting cultural resources. Any resource impacts resulting from infrastructure improvements will be mitigated.	All parking expansion alternatives include expansions to Sandstone Quarry, which will be designed to avoid impacting cultural resources. Any resource impacts resulting from infrastructure improvements will be mitigated. Added interpretation elements can also educate visitors about the sensitivity of cultural resources.	All parking expansion alternatives include expansions to Sandstone Quarry, which will be designed to avoid impacting cultural resources. Any resource impacts resulting from infrastructure improvements will be mitigated. Added interpretation elements can also educate visitors about the sensitivity of cultural resources.
	Natural resources are preserved.	Anticipated impact on vegetation, soils, hydrology, habitat, or species.	Potential for impact.	Potential for impact.	Potential for minor impact that could be easily mitigated or avoided.	Potential for impact.
			An increase in the number of vehicles on the site, without new strategies to accommodate the vehicles, will increase parking in undesignated areas. Parking in undesignated areas has significant impacts upon vegetation, soils, and habitat.	The parking expansion included in this alternative will have the greatest increase of paved areas, resulting in more impacts to natural resources. Any resource impacts resulting from infrastructure improvements will be mitigated.	The limited parking expansion included in this alternative offers the most flexibility to avoid areas of significant impact. Any resource impacts resulting from infrastructure improvements will be mitigated. Added interpretation elements can also educate visitors about the sensitivity of cultural resources.	Although this alternative includes a more limited parking expansion, it also includes significant widening of Scenic Drive. Any resource impacts resulting from infrastructure improvements will be mitigated. Added interpretation elements can also educate visitors about the sensitivity of cultural resources.

Goal	Objective	Evaluation Criterion	No Action	Alternative A	Alternative B	Alternative C
Financial and operational feasibility	Strategy is financially feasible and sound.	Capital costs	$0	Parking: $2,400,000	Transit: $1,211,000; Parking: $884,000	Transit: $3,617,000 (includes $1.75 million for two-way road); Parking: $884,000
		Operations and maintenance costs (annual)	$0	minimal	$364,000	$492,000
	BLM has the capability to operate and maintain	Staff capacity of operations and maintenance	BLM operates and maintains with current or anticipated staff levels.	BLM can operate and maintain with support from current partners or Friends groups	BLM will need management assistance for operations and maintenance.	BLM will need management assistance for operations and maintenance.
			The alternative includes no new activities, and therefore the BLM can operate and maintain under current staff levels.	The BLM can largely manage the parking expansion within their current capacity, but they may need assistance or limited additional capacity for reopening the carpool lot, closing lots during peak periods, and periodically enforcing long- and short-term parking.	The BLM will need outside assistance, such as through a contractor or concessionaire, to run the transit system, and BLM will also need additional staff capacity to manage transit operations. BLM may be able to run some transit operations with the assistance of partners or Friends groups.	The BLM will need outside assistance, such as through a contractor or concessionaire, to run the transit system, and BLM will also need additional staff capacity to manage transit operations. BLM may be able to run some transit operations with the assistance of partners or Friends groups.

BLM

The Bureau of Land Management was established in 1946 and is part of the U.S. Department of the Interior. We manage public lands, mostly in the 12 Western states, that encompass 258 million acres — an area equivalent to the size of Texas and New England combined — and 700 million acres of subsurface mineral estate.

U.S. Department of the Interior
Ken Salazar, Secretary

Bureau of Land Management
Bob Abbey, Director

For more information about Transportation on BLM lands see:
http://www.blm.gov/wo/st/en/prog/Recreation/recreation_national/travel_management.html