

ZION CANYON TRANSPORTATION SYSTEM TECHNICAL ANALYSIS

National Park Service
U.S. Department of the Interior

Zion National Park
Utah



EXECUTIVE SUMMARY



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Purpose of the Technical Analysis:

The overarching purpose and intended outcome of this analysis and subsequent implementation of recommendations is to improve the long term viability of the Zion Canyon transportation system.

Zion Canyon Transportation System Background Information

Since its implementation in 2000, the Zion Canyon shuttle system at Zion National Park has been a great success. The shuttle system consists of two loops - the Springdale (town) loop and the park loop. Passengers transfer between the two loops by walking from the fee station area, near the southern entrance to the park, to the

visitor center plaza near the park loop pick up area. The park shuttle carries visitors from the visitor center plaza to the Temple of Sinawava trailhead in the Zion Canyon portion of the park, operating seasonally, from Easter to the end of November (weekends only in November). The connecting town loop takes visitors to the park from various points in Springdale to the southern entrance. The shuttle system created



Zion Canyon shuttle on a typical summer day

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a strong connection between the town and the park. The fleet consists of 30 buses and 21 trailers, and maintenance of the buses is conducted in a facility within the park.

National Park Service representatives from throughout the country frequently reference the system as an excellent model for expanding visitor access and enhancing visitor experience. Visitors and Springdale community members who ride the shuttle are very supportive of the system and frequently comment on the experience as positive and enjoyable. A recent survey found that 95 to 98 percent of visitors like the system, and the shuttle has carried increasing numbers of passengers since service began. In 2007, Zion Canyon shuttle ridership was just under three million. Even with increased visitation and visitor access, implementation of the system has substantially reduced resource impacts in the canyon.

It's Time for a Check Up

Although the shuttle program has been a great success, the park decided it was time to reevaluate the system to determine the need for adjustments to improve its operational and financial efficiency. In 2007, the park received funding from the Alternative Transportation in the Parks and Public Lands Program (ATPPL) program and the US Department of Transportation's Volpe National Transportation Systems center to evaluate the Zion Canyon transportation system and make recommendations to improve the system and supporting facilities.



Zion Canyon transportation system stakeholder workshop session, May 2008

As a result, the technical analysis process began with a scoping meeting in early 2008. Field observations and data collection efforts were completed over the course of the spring and summer. Subsequent analysis was completed in late summer and fall. The analysis and recommendations were then compiled into a draft report in late 2008.

Involvement of the public and stakeholders has been a key component of the analysis. Initial workshops with stakeholders and the general public were held in May 2008. Additional workshop sessions with stakeholders and the public were held on November 19, 2008 to present the draft findings and recommendations of the analysis and obtain further input and comments prior to completion of the draft report. An additional stakeholder workshop was held in March 2009, and this report was then finalized in Summer, 2009.

Technical Analysis Focus

The technical analysis involved a comprehensive look at several elements related to the Zion Canyon transportation system. The analysis started with a review of relevant background studies and information. Then additional data and information was collected in the park and Springdale, including comments and input from stakeholder and public workshops. The technical analysis focused on the following areas:

- Financial analysis and related service planning scenarios
- Shuttle vehicle replacement/rehabilitation options
- Review of existing parking capacity and efficiency in Springdale and development of recommendations for parking
- Recommendations for enhancing visitor wayfinding and communications, including strategies for Intelligent Transportation Systems (ITS), as well as additional signing and information distribution
- Recommendations for improving pedestrian and bicycle connectivity, mobility, and safety in Zion Canyon and Springdale

- Assessment of existing Springdale streetscape conditions and related maintenance needs
- Recommendations to address traffic congestion problems at the south gate entrance to Zion National Park and the north end of Springdale
- Evaluation of regional transportation system planning opportunities for connectivity with the Zion Canyon transportation system
- Identification of partnership and stewardship needs, as well as funding opportunities for

long-term financial sustainability of the Zion Canyon transportation system

- Development of a specific action plan for the NPS, Town of Springdale, UDOT, and other stakeholders to implement.

Financial Analysis and Related Service Planning Scenarios

Operations and Maintenance Challenges Ahead

– Financial analysis has identified the potential for increasing challenges in the ongoing operation and maintenance of the shuttle system in the coming years. As Figures



Figure ES-1. Scenario A



Figure ES-2. Scenario B

ES-1 and ES-2 below indicate, the projected cost of operating the system is expected to eventually exceed the amount of revenue available in the coming years. Figure ES-1 below indicates that if revenue were capped at the 2008 level, costs likely would exceed revenue by 2012. As a result, the park would need to either reduce the level of shuttle service provided or find additional funding to support operations and maintenance. Refer to Section 9 for additional information.

Expanded Service Opportunities Are Limited

– Some participants in public meetings and stakeholders have suggested that the shuttle program be expanded to provide more service. Requests to extend the seasonal operation of the system, expand operating hours, and provide service further down canyon have come forward. Unfortunately, given the financial challenges the park will be facing to operate and maintain the existing service, it is anticipated that expanded service in the future would not be possible, unless additional financial support can be obtained from other sources (e.g. state, regional, or local community support).

Service Reductions – Potential Scenarios

– People have asked what potential service reductions might look like if the Zion Canyon shuttle system had to reduce its operating and maintenance costs. Service reductions could include one or more of the following options:

- Reduced hours of service during peak season (limited morning and evening service);
- Shortening the season of service – going from the current period of service (Easter through end of October and November weekends) to May through September for example;
- Increasing “headways” – extending time between shuttle service (going from 6 to 10 minute periods between shuttle pick-ups to 10 to 15 minute periods for example); and/or
- As a last resort, unless additional funding/ financial support can be obtained, some areas of service may need to be significantly reduced or eliminated altogether – such as a portion of or possibly all of the Springdale route (as financial conditions worsen).



Zion NP shuttle vehicles

Shuttle Vehicle Replacement – The shuttle system fleet has an expected operating life of ten to twelve years, and the shuttle system is now in its tenth year of operation. The park is looking at a range of options that include either rehabilitating the existing fleet or replacing the fleet with new vehicles. The estimated cost of these options ranges between \$6,000,000 and \$12,000,000. This is in addition to annual operating and maintenance costs for the shuttle system. The park will be seeking funding through federal transportation grants and other sources to support the vehicle rehabilitation/replacement program. Refer to Section 6 for more information.

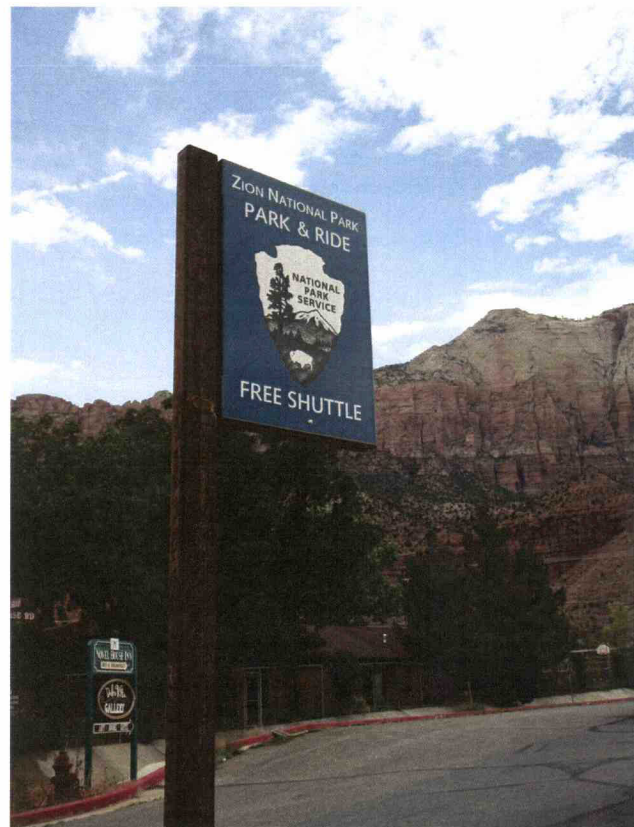
Parking Capacity and Efficiency

The Springdale/Zion National Park Partnership

– Since shuttle service was initially established in 2000, there has been a general understanding that park visitors can leave their cars at hotels and parking areas in Springdale and ride the town shuttle to the visitor center plaza to then transfer to the park shuttle. Town representatives recognized the benefits and opportunities of visitors parking, walking, and riding the shuttle in proximity to businesses. It was also understood that leaving cars at parking areas in town would result in less traffic congestion on the town’s limited road network. These benefits have been realized and continue to occur.

Issues and Problems Related to Parking and Traffic Congestion – In spite of the ongoing benefits of the park and ride relationship between Springdale and Zion National Park, traffic congestion in town has been increasing, particularly near the park entrance at the north end of town. Questions about the level of parking available in town have been raised, and some hotels and businesses previously supportive of visitors parking at their establishments to ride the shuttle have recently put up “no parking” signs. These issues have raised the need for a careful evaluation of parking capacity and problems related to parking so that effective solutions can be identified and implemented.

Is There Enough Parking in Springdale for Zion Canyon Shuttle Riders? This is a difficult question to answer, and is explored in considerable detail in Section 3. As the parking utilization analysis in Section 3 indicates, there currently appears to be sufficient parking capacity in the shared parking system throughout Springdale to serve park visitors. However, the level of available parking is constantly changing, and some private business owners are starting to restrict public parking and park visitor parking (allowing parking only for their customers). While sufficient parking exists in Springdale now for visitors, this may not be the case over the long term. As the level of shared parking available in Springdale decreases, frustrations related to traffic congestion and back up at the gate in the north part of town increase. Also visitation is increasing, which will put additional pressure on the shared parking system. Section 3 of this technical analysis presents a full range of recommendations for



The Springdale Parking Committee surveyed the usage of all existing private and public off-street parking areas in the town.

addressing the parking problems, including lower cost solutions and higher cost solutions, as summarized below.

Parking Survey Results

The Springdale Parking Committee surveyed the usage of all existing private and public off-street parking areas in the town on April 7, May 22, May 26 (the Saturday of Memorial Day weekend), July 3, and July 25, 2007. Parking areas were checked at 10:00 am, 1:00 pm, 4:00 pm and 7:00 pm. This survey showed that even during one of the busiest times of the year (Memorial Day weekend), Springdale parking areas still had capacity, as shown in Table ES-1.

**Table ES-1. Memorial Day Weekend 2007
Parking Survey Results**

Time Surveyed	Parking Utilization
10:00 am	Parking areas were 48.1 % full
1:00 pm	Parking areas were 49.6 % full
4:00 pm	Parking areas were 61.5 % full
7:00 pm	Parking areas were 63.5 % full

On the other days surveyed, parking utilization ranged from 24 to 47 percent full depending on the time of the survey. This survey did not account for the large amount of on-street parking available on Zion Park Boulevard and Lion Boulevard. During field observations August 6-9, 2008, it appeared that the on-street parking on Zion Park Boulevard was less than 20 percent utilized. On Lion Boulevard less than 50 percent of available parking was utilized during the peak period of visitation.

Parking capacity in Springdale is available, but visitors are not always using it. Because parking at the visitor center inside the park typically fills up by 10:00 am, many visitors who approach the gate for entry into the park are turned around and directed to nearby parking areas, such as Lion Boulevard. Many of these visitors have stated they were unaware of where they should park to ride the shuttle.

Finding the Right Solutions – A variety of solutions can be pursued to improve parking

efficiency and help people understand where to park. Some lower cost solutions, such as formalized parking agreements, could be implemented right away. Other more intensive solutions, including development of new parking areas either inside or outside the park, would take time to implement. Zion National Park is interested in increasing the capacity of parking inside the park near the visitor center and has identified an area where this could occur. Park management foresees that adding this parking would reduce some of the problems with visitors parking in unwanted areas of Springdale and with the parking congestion that occurs in the vicinity of the south gate on busy days. There are also some areas in Springdale where parking could be expanded or newly constructed.

These opportunities will need to be further assessed and reviewed in more detail as planning continues. A few considerations related to the ongoing assessment of where to add parking are provided below. In the near term, it is recommended that the park and town representatives first focus on some of the lower cost solutions listed below to better orient visitors to available parking areas in town. The Zion Canyon Visitor Bureau has expressed interest in assisting with some of these activities. Refer to Sections 2, 3, and 9 for more detail, including a specific Action Plan for the Zion Canyon transportation system.

Parking Recommendations

Lower Cost Solutions

- Intensify visitor wayfinding and communication efforts to help visitors find and utilize existing parking.
- Formalize parking use agreements with property owners and confirm exact locations and quantities available for visitor parking.
- More heavily promote the shuttle system and park and ride opportunities through local businesses, hotels, and community venues.
- Continue the Springdale Parking Committee efforts and initiate a Zion Canyon Transportation Committee with a broader focus.

- Initiate a community-based “parking ambassadors” volunteer program.
- Monitor effectiveness of these actions and if necessary, proceed with more extensive improvements, such as development of a new parking area either inside or outside the park.

Higher Cost Solutions/ Potential New Parking Areas

If it is ultimately determined that additional parking areas are needed to serve visitor demand, there are potential locations both inside and outside the park that could be further evaluated. The following important considerations factor into the evaluation of potential new parking improvements:

Inside the Park:

- No land acquisition would be required (less costs).
- The NPS would be responsible for maintenance of the parking area.
- Parking would provide overflow for the visitor center, and potentially would reduce some problems and parking congestion in the north part of Springdale.
- With any new parking and access improvements environmental analysis will

be required in compliance with the National Environmental Policy Act (NEPA) and other federal regulations.

- With more traffic moving through the gate at peak periods, the entrance area likely would need to be reorganized to allow more through capacity. Perhaps a “fast pass” lane or pre-visit pass purchase program could be implemented in the future. An additional entrance lane would be required for the fast pass program. (Even without a fast pass lane, a new lane may be needed with more visitors passing through the entrance to reduce gate back up.). Also, it will be important to resolve the issue of shuttles being stuck in the traffic queue (discussed in Section 7). These issues can be addressed through physical improvements in the south gate area.
- Adding parking inside the park may reduce interactions with town businesses and may reduce the amount of service needed for the town shuttle route.

Outside the Park:

- Land acquisition through a willing seller agreement would be required (higher costs).
- Either the town or another entity would need to be responsible for maintenance



Figure ES-3. A stronger sense of entry to the Zion National Park experience could be created in Springdale

of the parking area unless a cooperative agreement with the NPS is established.

- NEPA compliance may still be required given the purpose of the parking as relates to park shuttle access and/or funding sources.
- The potential for impacts to adjacent properties (visual, noise, etc.) would need to be carefully considered.
- Candidate locations should not require changes to shuttle route (should be within easy walking distance from a town shuttle stop).

Under either scenario (inside or outside the park) there are a variety of funding sources available, but given current federal economic conditions, some funding sources may be limited.

Visitor Wayfinding and Communications Recommendations

The following are recommendations for improving and intensifying visitor wayfinding and communications. If successfully implemented, the park and town should see more people using parking areas in town and riding the town shuttle to get to the park.

- Expand information about park and ride and shuttle service on key partner websites (Zion NP, town of Springdale, Washington County, UDOT, etc.).
- Update the highway advisory radio broadcast message to provide more specific information about where to park and access the shuttle.
- Create a stronger sense of entry to the Zion National Park experience in Springdale. See Figure ES-4.
- Provide “real time” variable message signs at key locations to direct visitors to parking. See Figures ES-5A and ES-5B.
- Carefully and thoughtfully enhance signing to help visitors find parking and shuttle locations.
- Better identify shuttle stops. See Figure ES-6.
- Provide information to visitors via Closed Caption TV, as well as public service announcements via TV and radio.

- Provide more detailed maps about where to park in Springdale. See Figure ES-7.
- Implement a new marketing campaign that encourages visitors to park and ride the shuttle and Zion National Park as a car free tourism experience. The campaign could include marketing and advertising activities, as well as development of brochures and other media outreach.
- Provide a visitor outreach kit to local businesses and hotels with brochures and maps that can be distributed to customers.

Refer to Section 2 for more information.

Park Road and Springdale Streetscape Conditions

The technical analysis included evaluation of existing conditions related to the park road and Springdale streetscape, including conditions at shuttle stops. For the most part, shelters, furnishings, and shuttle stop features remain in excellent condition both inside and outside the park. However, there are areas of the Springdale streetscape that will require some maintenance in the near term. These include the following:

- Several pavement pads at bus stops need to be replaced.
- The ditch structure is in need of repair in several locations.
- Some utility boxes and conduits are in need of repair.
- There is a general need for sidewalk repair and maintenance, as well as landscape maintenance along the corridor.
- Several segments of sidewalk need to be replaced, and some new segments should be added.

Refer to Section 4 for more information.

Given the costs that Zion National Park will incur related to ongoing operations and maintenance of the shuttle system, as well as vehicle replacement, it will be important to actively pursue a variety of funding and partnership opportunities to implement these needed improvements and maintenance activities. Funding sources, such as the federal

transportation enhancement and congestion management programs must be pursued.

Pedestrian and Bicycle Connectivity, Mobility, and Safety

It is anticipated that increased pedestrian and

bicycle mobility within Springdale and in the Zion Canyon portion of the park would help to expand options for visitor access and relieve pressure on the shuttle system during peak periods. The technical analysis identified missing gaps in the sidewalk system in Springdale, as
(Continued on page ES-12)



Figure ES-4A. Visual simulation of digital sign in advance of Lion Boulevard



Figure ES-4B. Visual simulation of "real time" variable message direct visitors to parking at south end of Springdale.



Figure ES-5. Visual simulation of improved shuttle stop signing

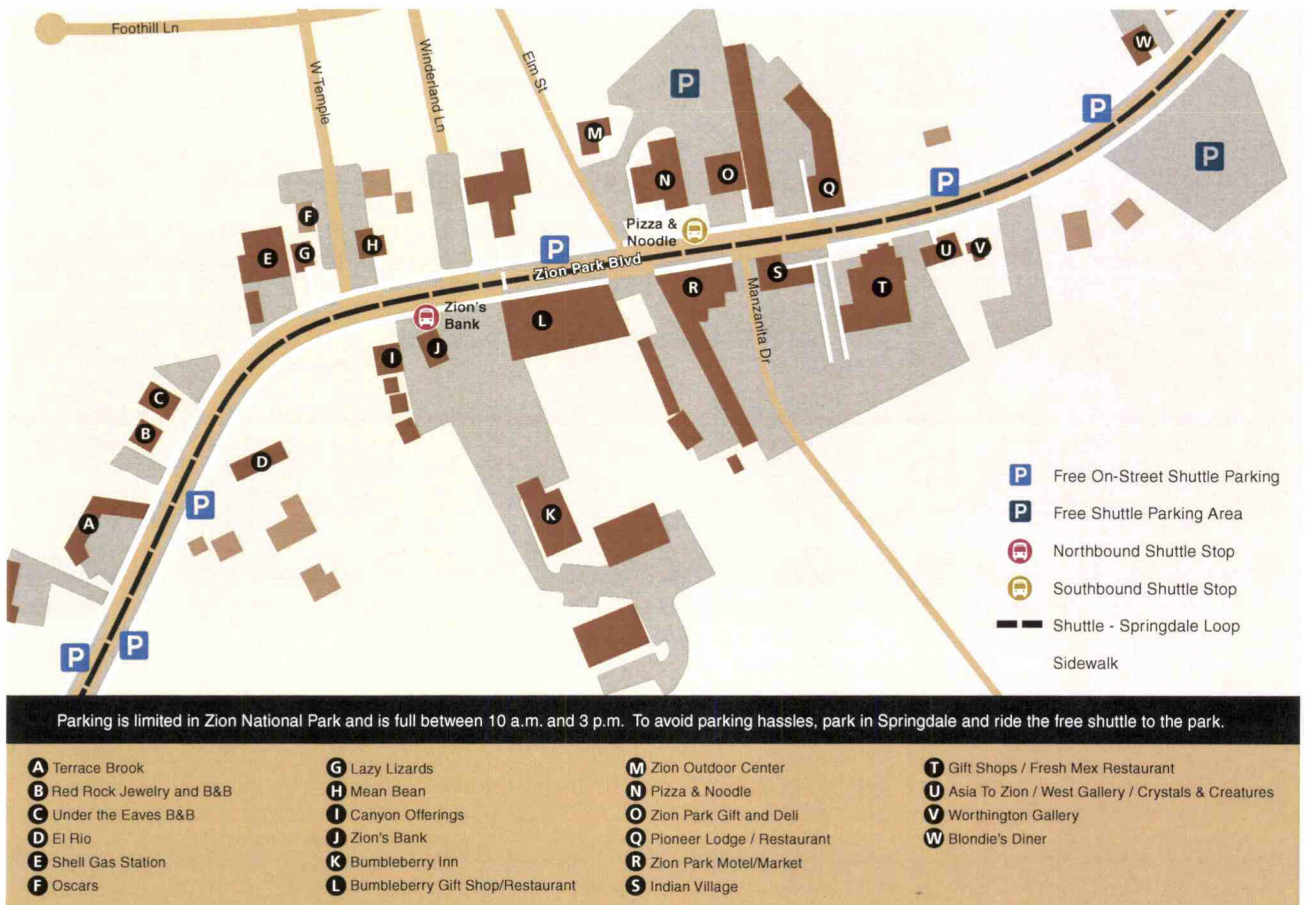


Figure ES-6. Example of a more detailed parking map that could be created for Springdale



Figure ES-7A. Visual simulation showing creation of a shared pathway along the shoulder in Zion Canyon as an extension of the Pa' Rus Trail



Figure ES-7B. Visual simulation of the extension of the Pa 'rus Trail further up Zion Canyon



Vehicles queuing at the Zion National Park entrance station (south gate)

well as locations for new pedestrian crosswalks and signing. Inside the park, potential areas for extending the Pa' Rus Trail were evaluated. See Figures ES-8A and ES-8B. Refer to Section 5 for more information.

Traffic Congestion at the South Gate to Zion NP

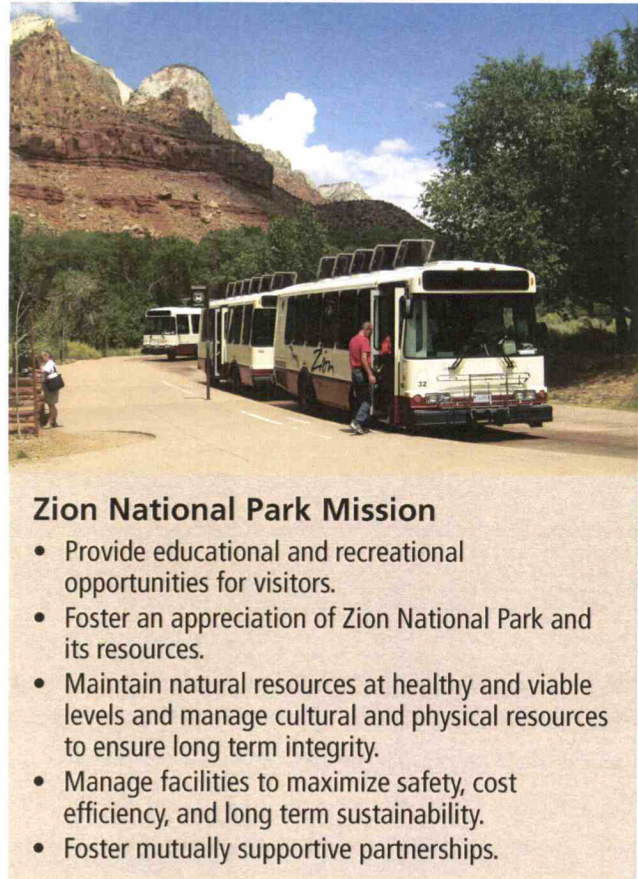
At certain times of the day on peak visitation days, visitors get caught in a traffic queue at the south gate to Zion National Park. Sometimes this queue can stretch for as much as a half mile to Lion Blvd. The queue tends to lengthen when the parking area at the visitor center inside the park closes. Many of the visitors in the queue are seeking to ride the shuttle and don't understand that they should have parked in town. This queue of idling vehicles:

- Causes driver frustration and degrades visitor experience at the entrance to the park;
- Contributes unnecessary emissions of carbon monoxide, green house gases, and other pollutants;
- Impacts the operation of the Springdale shuttle (buses must navigate the queue to reach the transfer station at the visitor center plaza).

Parking management in the vicinity of the entrance requires significant park staff resources and puts staff in the roadway directing traffic. Turning automobiles around at the gate increases the potential for accidents and conflicts with other vehicles, pedestrians, and bicyclists. The entrance area becomes filled with parked cars on both sides of the road, which negatively affects the visual experience of entering the park. Visitors who have parked in this vicinity are directed downhill to the visitor center plaza, but the route of access is not clearly intuitive, nor accessible.

Recommendations to address these problems include:

- Catching visitors further downstream and direct them to other parking areas in town through additional signing (see wayfinding and communications recommendations);
- Improving the visibility of the shuttle and heavily promote shuttle park and ride;
- Developing parking direction cards with multi-lingual instructions about where to park and catch the shuttle in Springdale;
- Creating a "bus only" lane so that shuttle buses can bypass the automobile queue; and
- If necessary in the future, providing additional parking in the park or in town to accommodate visitor needs.



Zion National Park Mission

- Provide educational and recreational opportunities for visitors.
- Foster an appreciation of Zion National Park and its resources.
- Maintain natural resources at healthy and viable levels and manage cultural and physical resources to ensure long term integrity.
- Manage facilities to maximize safety, cost efficiency, and long term sustainability.
- Foster mutually supportive partnerships.

Regional Transportation Planning Opportunities

Various agencies and interests, including the National Park Service, town of Springdale, UDOT, Dixie Metropolitan Planning Organization, Washington County, and others should continue working together to develop a strong vision for transportation in the region. Over the long term, the demand for more car-free travel experiences may create a need to connect the Zion Canyon transportation system to other private and public transportation systems in the region. For example, St. George will be constructing a new airport, which may result in more visitors seeking opportunities to fly into St. George and travel via shuttle to and from Springdale. In addition to improving transportation options for visitors, the region may identify needs to expand transportation options for citizens and workers over the long term – improving public transportation service between Springdale and other communities to the southwest, along SR 9.

A Call for Partnerships and Stewardship

Ongoing operation of the Zion Canyon transportation system will require significant resources. While Zion National Park will continue to have the primary responsibility for annual operations and maintenance of the shuttle system, the park will be faced with some tough decisions in the future. Shuttle service reductions may be needed in the coming years unless supplemental funding resources can be found. The park will seek federal funding to replace the shuttle fleet; however funding sources are becoming increasingly limited and competitive. The Springdale streetscape and shuttle facilities will require ongoing maintenance and repairs. Wayfinding and communications efforts will require near term funding, while development of new parking areas, pathways, and other improvements will require additional funding over the long term.

The shuttle system was created to operate through a park/town partnership, and it will be important for it to continue to operate this way in the future.

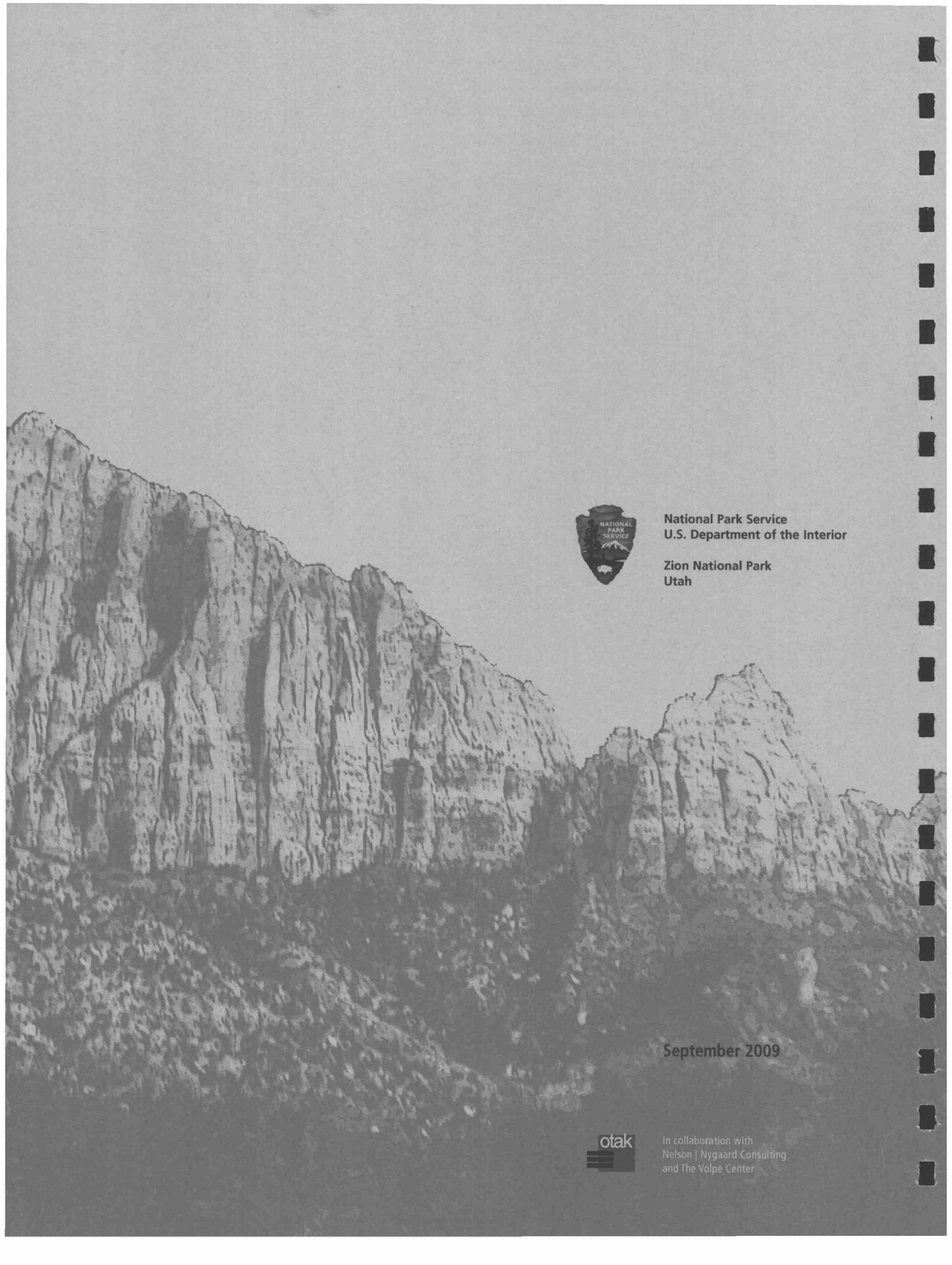
How Will All These Needs Be Met?

The Zion Canyon transportation system has been very successful. It has become a nationwide model for environmental sustainability and enhanced visitor access at national parks. Representatives from Zion National Park, Springdale, UDOT, and other agencies and organizations have been coordinating on a regular basis, but the time has come for these partners to jointly define opportunities for additional funding and resources to support the system. Ongoing partnership and stewardship responsibilities should be more clearly defined, and all parties should be working together to actively plan for the successful future of the transportation system.



As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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