Public Lands Transportation Scholar Final Report

Trams, Trails and Transit: Alternative Transportation and Sustainable Infrastructure in Sabino Canyon

April 2013

Paul S. Sarbanes Transit In Parks Technical Assistance Center

UNDERSTANDING RESOURCES SOLUTIONS

This document was prepared for the Federal Transit Administration by the Paul S. Sarbanes Transit in Parks Technical Assistance Center

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AUTHOR

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I. Abstract

Alternative Transportation in the Sabino Canyon recreation area

Author: Andrew Valdez (Through the Public Lands Transportation Scholar Program, 2012-13)

Parks and public lands can benefit from alternative transportation projects because they augment access, circulation and visitor experience while mitigating the impacts of private automobiles. After an extensive outreach and planning effort, three alternative transportation interventions were identified for the Sabino Canyon recreation area (1) The drafting of a prospectus to retain the services of a private concessionaire to provide a high quality public transit system within the recreation area (2) The design and construction of an interconnected, pedestrian only trail through the canyon proper and (3) The linking of the recreation area to the greater transit network of the city. Over a ten month period, the public lands scholar assisted the ranger district with the planning, NEPA documentation, forecasting and public scoping of these projects.

II. Introduction and Projects

The Santa Catalina Ranger District, part of the Coronado National Forest, has had an ongoing relationship with the Sarbanes Transit in the Parks (TRIP) program. Facing the pressures of urban encroachment, population growth in the metro area, the growing popularity of outdoor recreation and increased concerns with resource damage, the District has actively been seeking alternative transportation solutions to create a resilient and long term sustainable condition for the Sabino Canyon recreation area. This is important from both an environmental stewardship perspective and a public service perspective (the motto of the Forest Service is: Caring for the land and serving people)

Phase I, initiated by the district in 2008, was carried out by the John A. Volpe (VOLPE) National Transportation Systems Center. With the aim of identifying specific alternative transportation projects that could significantly benefit the recreation area, Phase I aggregated the available data and literature on Sabino Canyon and made a number of recommendations to the Ranger District. These recommendations were narrowed down from a 'blue sky' list of transportation related projects. The final recommendations are grounded in the historic, cultural, geotechnical, hydrological, sociological and political realities on the ground. Phase I culminated in the 'Transportation Analysis and Feasibility Study: Sabino Canyon Recreation Area' document, published by VOLPE in February 2010.

Of the over 40 interventions identified, three rose to the top as being the most practical, feasible, financially viable and as having the most positive impact. The three projects were (1) The drafting of a prospectus to retain the services of a private concessionaire to provide a high quality public transit system within the recreation area (2) The design and construction of an interconnected, pedestrian only trail through the canyon proper and (3) The linking of the recreation area to the greater transit network of the city.

1. Shuttle Prospectus

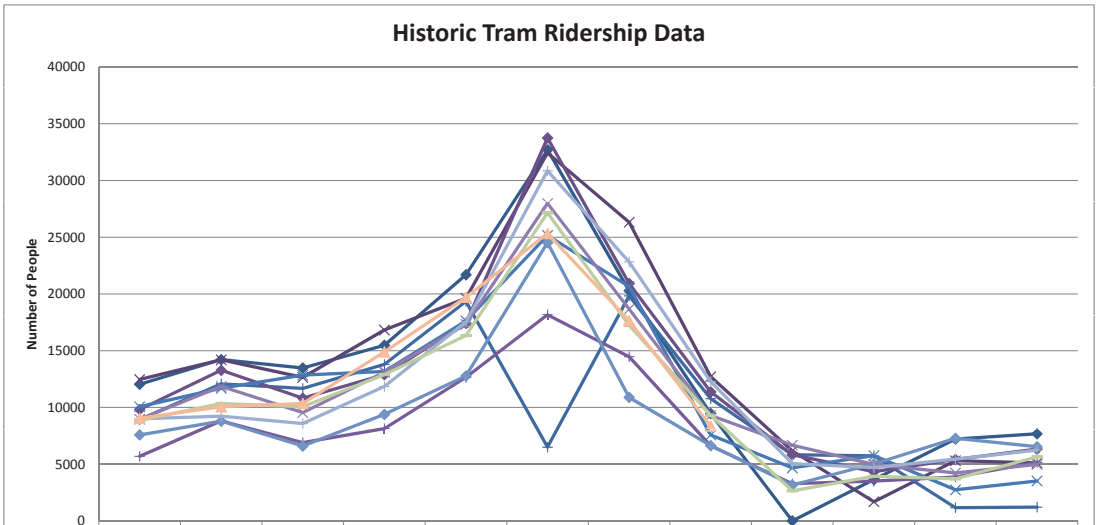
Since Forest Road 100 was closed to public vehicular access in 1978, the Forest Service has contracted with a private concessionaire to provide transit access through the canyon via a shuttle or 'tram' system. The rolling stock has not been updated since the original procurement in 1978 and there are concerns of visual, audio and air pollution originating from the vintage diesel powered units. The current special use permit is set to expire in December 2013 and as such the Forest Service is developing a new concept of operations which reflects current best practices of transit systems in federal lands (including alternative fueled vehicles and intelligent transit systems) Before the existing permit expires, the Forest Service intends to select a concessionaire through a competitive process so this important service can continue to serve the public.

a. Methodology

Primarily, to understand key issues as they relate to the shuttle, a series of scientific investigative methods were employed (1) A usage analysis (2) A shuttle user survey (3) An impacts analysis which included audio/GHG/respiratory metrics (4) A materials flow analysis and (5) A 'wells to wheels' life cycle analysis of alternative fuel GHG emissions as compared to the existing system (low sulphur diesel)

Secondarily an unscientific investigation was conducted to understand public perception of the system through a review of comment cards collected by the Forest Service and informal interviews with stakeholders and the general public.

The usage analysis took ten years of raw ridership data and plotted the aggregate ridership of the system by month to determine usage patterns over time. A clear 'high' and 'low' seasonal pattern was revealed (See figure 1)



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
2002	12041	14215	13475	15477	21695	32707	20285	9459	0	3643	7216	7675
2003	12461	14197	12643	16821	19624	32437	26328	12712	6169	1687	5303	5114
2004	8924	12070	11677	13791	19342	6502	19832	10771	5830	5733	1167	1214
2005	9816	13277	10819	12894	17417	33753	20923	11372	5830	4336	5412	6325
2006	10061	11691	12846	13172	17627	25160	20653	7579	4673	5756	2740	3518
2007	5695	8814	6898	8131	12652	18168	14468	6616	3280	3506	3865	5160
2008	7580	8790	6595	9386	12776	24520	10887	6637	3163	5020	7278	6535
2009	8964	11858	9538	13099	17329	27977	18672	9299	6677	4978	4226	4973
2010	8991	9231	8577	11849	17534	30860	22831	12280	5045	4698	5445	6237
2011	8855	10343	10065	12892	16331	27155	17250	9304	2646	3931	3704	5641
2012	9047	10063	10352	14895	19711	25327	17648	8363				

Figure 1 - Historic Ridership Data

Monthly totals were summed to calculate yearly totals and yearly totals were averaged over the 9 year period (excluding 2012, Q4 numbers were not reported at the time this document was written) to adjust for outlier years (IE years when the road was closed for a few months) to render an average yearly usage of 132,636 boardings. This equaled 16% of total visitation (See user group calculations in Sabino Canyon Scenic Trail Project, Methodology)

TOTALS	
2002	157888
2003	165496
2004	116853
2005	152174
2006	135476
2007	97253
2008	109167
2009	137590
2010	143578
2011	128117
2012 - YTD	115406

$$\frac{R_{(2002)} + R_{(2003)} + R_{(2004)} + R_{(2005)} + R_{(2006)} + R_{(2007)} + R_{(2008)} + R_{(2009)} + R_{(2010)} + R_{(2011)}}{9 \text{ YEARS}} = \textbf{132,636} \text{ Average Yearly Boardings or } \textbf{16\%} \text{ of Total Visitation}$$

R = Ridership

Figure 2 - Yearly Totals

The shuttle user survey was a one page, randomly administered, self completing questionnaire administered to visitors alighting the system at the visitor's center (See appendix A for survey) The survey (N = 78) revealed a number of important patterns:

- 85% of shuttle riders used the Sabino Canyon, as opposed to the Bear Canyon, route
- 80% of shuttle riders use the system as a 'ride' and not as 'transportation'
- 65% of shuttle riders say that transit in Sabino Canyon is either 'somewhat important' or 'very important'
- 41% of shuttle riders felt that exhaust from the engines detracted from the experience

The impacts analysis was intended to quantify the effect the current system was having on the human and ecological environments in Sabino Canyon.

NOISE

- The diesel engines were measured at 90 dB (from 6' away)
- The PA loudspeaker system was measured at 80 dB (from 6' away)

AIR POLLUTION and GHG EMISSIONS

CIDI Vehicle: Conventional and LS Diesel

Item	Btu/mile or grams/mile			
	Feedstock (Mining)	Fuel (to Refine)	Vehicle Operation	
Total Energy	347	761	5,532	BTU / Mi
Fossil Fuels	339	751	5,532	
Coal	39	41	0	
Natural Gas	222	391	0	
Petroleum	78	319	5,532	
CO2 (w/ C in VOC & CO)	30	61	437	Grams / Mi
CH4	0.575	0.211	0.003	
N2O	0.000	0.001	0.012	
GHGs	44	66	441	
VOC: Total	0.020	0.025	0.130	
CO: Total	0.032	0.033	0.412	
NOx: Total	0.154	0.101	0.291	
PM10: Total	0.015	0.023	0.034	
PM2.5: Total	0.009	0.012	0.020	
SOx: Total	0.068	0.074	0.003	
VOC: Urban	0.004	0.015	0.091	
CO: Urban	0.002	0.018	0.288	
NOx: Urban	0.009	0.045	0.204	
PM10: Urban	0.001	0.010	0.024	
PM2.5: Urban	0.001	0.006	0.014	
SOx: Urban	0.010	0.041	0.002	

Figure 3 - Life Cycle Analysis of GHG in LSD engines

Figure 3, an output from Argonne Labs GREET emissions modeler, illustrates the life cycle emissions and energy usage of fueling and operating a low sulphur diesel engine (as what the current system utilizes) The Forest Service was primarily concerned with point source impacts of the operation which are found in column 3, Vehicle Operation.

Based on the output, the current system expels (in the canyon) air pollution of: 0.034 g/Mi of PM 10, 0.02 g/Mi of PM 2.5 (airborne particulate matter) 0.412 g/Mi of CO (carbon monoxide or non-methane hydrocarbons) and 0.291 g/Mi of NOx (nitrous oxide) In addition the current system also expels (in the canyon) 441 g/Mi of GHG (greenhouse gasses)

Next, a materials flow analysis (MFA) was conducted to quantify the net yearly GHG emissions which are point sourced in the recreation area due to operation of the system:

(15 runs / day) x (30 days) x (8 months of low season) = 28,800 VMT low season
(45 runs / day) x (30 days) x (4 months of high season) = 43,200 VMT high season
+_____
72,000 Total VMT / Yr

72,000 VMT / Yr x 441g CO2e = 31,752,000g or **32.667 [US] Tons**

Figure 4 - MFA of combustion of LS Diesel

The review of the comment cards and informal interviews revealed a number of important issues related to the current operation. These are summarized below:

- There are serious concerns about air pollution in the canyon from the diesel engines
- The audio pollution from the engines and the loudspeaker system is a nuisance to non shuttle riders
- There are concerns about environmental damage from point source CO2 emissions
- The shuttle drivers are sometimes discourteous to non shuttle riders
- The system does not allow for embarkations for visitors already in the canyon which poses a safety concern for people needing emergency evacuation
- The system is seen as an important service for elderly and handicapped individuals who may not be able to access the canyon otherwise
- The personal vehicles of the shuttle drivers, when seen in the canyon, create confusion among the public since the road is officially closed to public vehicular traffic
- The public desires a way to pay for shuttle tickets with credit card

b. Constituencies

Nearly every type of group associated with Sabino Canyon (government, public, volunteer, nonprofit) is impacted by the shuttle service.

- FS staff on official business
- The public in general needing access and evacuation
- The Sabino Canyon Volunteer Naturalists (interpretation and education)
- The Friends of Sabino Canyon (as concerned stakeholders)
- Transportation professionals wanting to see best practice scenarios in federal lands
- The Sabino Canyon Volunteer Bike Patrol (sharing ROW)

All constituencies provided valuable feedback as to the importance of the service and the deficiencies of the system and operations.

c. Recommendations

Given the amount of usage the shuttle system receives and the perceived importance of the service, it was determined that the system was serving an important function for the public and should be retained (with no lapse in service, if possible) The transportation scholar recommended that the District should continue this service once a concessionaire is selected through the proposal/bid process. The issues identified through the investigation of the transit operation and its usage informed the prospectus document and functional requirements of the offering.

Functional Requirements:

- The system will feature alternative fuels technology
- The service shall be an 'alternative transportation' project as defined by Federal Lands Highway Program § 3021, b.3 Alternative Transportation in Parks and Public Lands
- The system will feature a radio dispatch protocol for emergency response
- The system will feature technology to deliver professional, pre-recorded narrative interpretation to riders
- The narrative experience will be delivered through handheld devices, headphones or other minimally intrusive equipment so as to contain the audio disturbance completely within the shuttles

- Shuttle drivers will allow embarkations for people needing emergency evacuation from the canyon
- Shuttle drivers will allow embarkations for individuals already in the canyon who wish to board the shuttle
- The permit holder will operate and maintain a credit card point of sale system for fare collection
- The system will feature a fare collection mechanism onboard the vehicular units
- All vehicles will be cleaned on a bi-weekly basis
- All vehicles will be inspected on a yearly basis by a certified mechanic
- Employees will park personal vehicles either in the public lot or in the maintenance area
- Drivers will treat riders with courtesy and respect
- Drivers will report any accidents or injuries to the district ranger or acting officer
- Drivers will be able to communicate effectively in English
- The service will have facilities for access limited & elderly individuals
- The transportation system will feature wireless communication systems (dispatch) and collision avoidance systems
- The service shall be in operation 363 days a year excluding only Thanksgiving and Christmas Day
- The permit holder will provide fee tickets to the visitors that pay for the service

d. Next Steps / Implementation

The current special use permit, under which transportation services in the canyon are authorized, expires at midnight December 31st 2013. This allows a window of ten months for the Forest to issue the offering (Appendix B) select a vendor and for the vendor to procure equipment and phase into service. At the time this document was written the draft prospectus had left the District office and was being reviewed by the developed recreation specialists and legal counsel specialists in the supervisor's office and the regional office in Albuquerque.

Once review of the document is complete and language is set the District will advertise the offering in 3 different venues: The federal clearinghouse for contracts, permits and opportunities with the US government (www.fbo.gov), the local business publication: The Daily Territorial and the Coronado National Forest's official website (www.fs.usda.gov/coronado)

Given that the current system generates nearly a million dollars of gross revenue per year, the offering is expected to garner interest among national transportation vendors.

Without dedicated staff to conduct scientific data gathering and analysis, it will be difficult to determine if the new service is a quantifiable improvement over the current one. Considering the fact that point source pollution was one of the main concerns voiced, the Forest Service should conduct a materials flow analysis once a new system is in place and

determine the net reduction (if any) of emissions in the canyon.

Additionally, the District is requiring an annual performance review of the operation which will determine deficiencies in the service, progress over time and completion of FS goals/objectives.

2. Sabino Canyon Scenic Trail

Currently, Forest Road 100 is the only way for the public to access Sabino Canyon. This ribbon of asphalt is severely constrained due to physical design, usage patterns and natural phenomena. Originally constructed during the Civilian Conservation Corps era, the road is very steep and narrow with a series of tight turns and low water crossings. The different user groups that frequent Sabino Canyon must all share the same right of way, which frequently causes conflicts. Additionally, rock slides, debris flows and floods can wash out segments of the road costing millions in repairs, stranding visitors and causing the canyon to be closed to the public for long periods of time. The Forest Service intends to develop a secondary access route in the form of a pedestrian trail so as to resolve these issues.

a. Methodology

The identified purpose and need for this project is three fold (1) a 'dry foot' evacuation route for visitors stranded in the canyon during high water events (2) an improvement in the recreation experience for pedestrian users of the canyon and (3) a resilient and sustainable access to the resource. After screening alternatives (See appendix B - NEPA Alternatives Development Report or ADR) the Forest Service selected a 'preferred alternative' which was to design and construct a grade separated, pedestrian only trail (Element ID BPE 02) This decision was based on its achievement of the stated purpose and need.

First, a user group analysis was conducted to determine the amount of pedestrian traffic that used FR 100 versus the trail system. Second, two data sets were gathered to inform the design process of the trail alignment (1) identification and mapping of the ordinary high water mark (OHWM) and (2) identification and mapping of the segments of the road which are vulnerable to debris flows and flood waters. These data sets informed the preliminary design of the trail ensuring that it would be out of the floodplain of the creek and that access points from the road to the new trail would allow visitors stranded on 'islands' of FR 100 to self extract.

The user group analysis was conducted by installing infrared and electromagnetic counters at all ingress points of the recreation area as well as all trailheads. Data was collected for one month of 'low season' namely August. This gave 4 data sets: total daily visitation for

cyclists, total vehicles per day, total usage of the trails system and total 'walk in' traffic.

(C) Average daily visitation for cyclists = 50
(V) Average vehicles per day = 550
(T) Average daily usage of the trails system = 517
(W) Average daily walk in traffic = 410
(S) Average daily use of shuttle (previously known) = 310

The following formulas were used to calculate user group splits:

C + V(2.2*) + W = 1,670 Average Daily Visitation (ADV) in low season
C / ADV = 3% (Cyclists)
S / ADV = 16% (Shuttle Riders)
T / ADV = 31% (Hikers on Trails)
+_____
50% Bike, shuttle or hike trails, other 50% run or walk the road (FR 100)

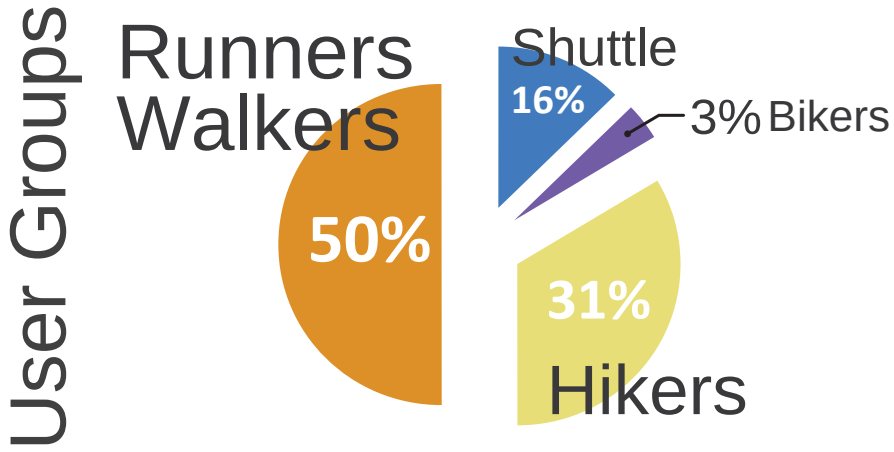


Figure 5 - User group split chart

Identification and mapping of the OHWM involved merging a digital elevation model (DEM) of the canyon and a simulated flood event of 17,000 peak CFS or 7.5 feet of water at centerline of the creek (equivalent to the previous flood event which caused damage to the road, 2006)

Identification and mapping of the vulnerable road segments involved a visual survey of the road to determine which segments had been rebuilt within the last 50 years and a literature review of engineering reports which pertained to road reconstruction. Findings of these investigations are in the Sabino Creek Flood Water Analysis report completed by the VOLPE contractor team. See appendix C.

* Estimated avg. vehicle occupancy

Next, the design parameters for the trail alignment were identified in a charette type setting. Participants included the transportation scholar, a trails consultant, a visual resource specialist and a landscape architect. Design guidelines are summarized below and in figure 6.

- Trail should be above OHWM
- Trail should link to rest room facilities
- Trail should be below riparian canopy
- Trail should be on opposite side of canyon from the road
- Trail needs to be linked to the road at key points (the 'islands' where people may get stranded)

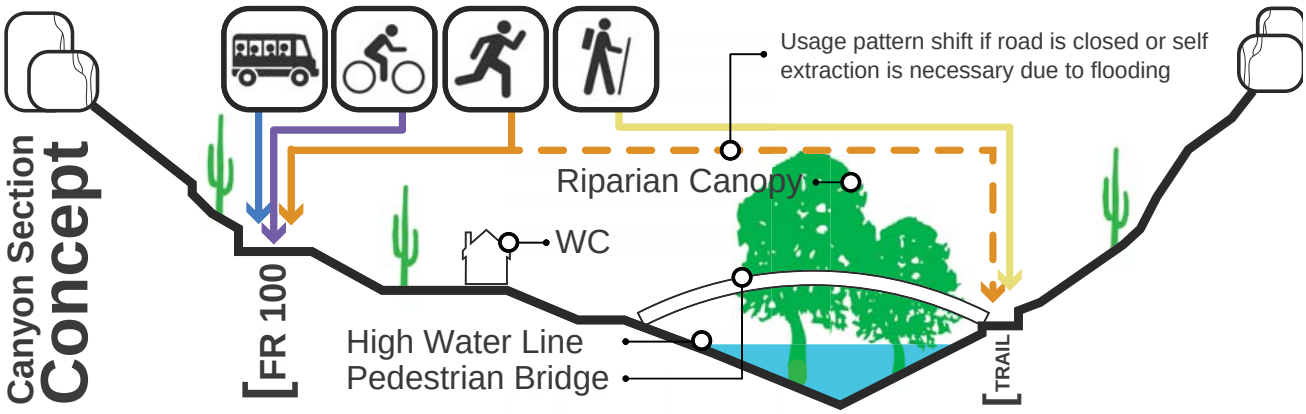


Figure 6 - Design guidelines for trail

Under these design guidelines, the new trail would accomplish all three purpose and need objectives namely: It would allow visitors to self extract from the canyon in the event of a flood, it would provide a vehicle free recreational experience in the riparian zone of the canyon, it has the potential to reduce congestion along FR 100 and it represents a way for the Forest Service to guarantee long term public access to the resource (a sustainable trail is less susceptible to damage and considerably less expensive to repair when compared to the road)

b. Constituencies

Nearly every type of group associated with Sabino Canyon (government, public, volunteer, nonprofit) is impacted by the proposed trails project:

- FS recreation and trails staff
- The general public

- The Sabino Canyon Volunteer Naturalists (interpretation and education)
- The Friends of Sabino Canyon (as concerned stakeholders)
- Transportation professionals wanting to see best practice scenarios in federal lands
- The Sabino Canyon Volunteer Bike Patrol (sharing ROW)
- The Arizona Trail Association

All constituencies provided valuable feedback as to the importance of the proposed facility as well as offering design feedback and input through iterative, small scale scoping processes.

c. Recommendations

Originally conceived as a public safety project (a 'dry foot' evacuation route) this proposed trail had questionable value for the public and Forest Service. In a typical year, up to 50 hikers can get stranded in the canyon due to high waters in the creek. Aerial rescue costs about $1,000 per person, assuming they cannot self extract. From a purely cost/benefit perspective, it would take many years for the trail to 'pay for itself' considering the preliminary estimate for construction of this trail (with all associated structures) was in excess of $2M.

However, if the project is framed as a sustainable alternative to FR 100 for access to the resource, the practicality of the project is much greater. The estimated 50 year life cycle cost to keep FR 100 open is $5.95M (2012 Dollars, Transportation Analysis and Feasibility Study, Page 29. February 2010) Because of the high cost of repairing and maintaining FR 100, its future as a safe and usable facility is in question. Historically, monies to repair washouts have come from a combination of charitable donations and ERFO (Emergency Relief, Federally Owned) funding. Neither mechanism is a sustainable source of monies and the Forest Service should rightly be pursuing other means of guaranteeing the public access and enjoyment of the resource.

Framed in this manner, the trail makes sense being easier and less costly to maintain/repair versus a road. From a cost/benefit perspective, the trail could potentially 'pay for itself' in approximately 16 years while at the same time guaranteeing long term public access to the resource.

d. Next Steps / Implementation

At the time this report was drafted, the VOLPE contractor team was in preparation for a second site visit. The identification of the preliminary alignment of the trail and the identification of access trails and bridge structures triggered this event. See appendix D for map of preliminary alignment and bridge structure sites.

The site visit will also be attended by the following Forest Service resource specialists: visual quality, geotechnical engineering and hydrology, heritage resources and archaeology and wildlife biology. After a tour of the route (which is GPS-ed and flagged) the specialists will begin to draft their findings which will catalog the impacts and potential mitigations of the project as proposed. These findings will determine the level of NEPA compliance (Categorical Exclusion, Environmental Assessment or Environmental Impact Statement) needed to authorize the project.

The goals of the site visit are as follows:

General

- Orient FS and Volpe team to the proposed mid-slope trail route, access routes to road, and proposed bridge locations
- Identify areas of potentially affected resources -- visual, biological, and cultural

Geotechnical/Geological/Engineering

- Visit all proposed structure locations (e.g., proposed bridge locations)
- Discuss structure construction methods, access, and other construction issues
- Identify areas of possible blasting/cuts and fills
- Identify geological hazard conditions and constraints

Visualizations and Photosimulations

- In coordination with FS, identify key locations for visualizations and photosimulations
- Identify potential view locations and directions and document existing visual setting at key locations
- Obtain necessary photography for visualization/photosimulation work

The funds currently allocated for this project will allow for completion of NEPA compliance and up to 80% design documents. Currently, there is no funding for construction. It is the intention of the Forest Service to have this project ‘shovel ready’ when funding does become available.

3. SunSabino Transit Link to Tucson

The Coronado National Forest is considered an ‘urban forest’ because of its proximity to a major metropolitan area. As such, the Forest is subject to pressures which are different than units which are located more remotely. Usage patterns at the site are similar to those of a city park with many locals visiting on a daily basis. During high season (January through April) the parking lot is frequently at capacity with many visitors parking illegally on N. Sabino Canyon

Road. This causes safety, queuing and congestion concerns for the Forest, Pima County and the surrounding neighborhoods. Additionally, transit dependent communities are isolated from this important cultural and ecological resource. A public transit link to Sabino Canyon could help alleviate these issues and reduce impacts on sensitive resources.

a. Methodology

In January of 2013 the public lands scholar identified the Arizona Federal Lands Access Program (FLAP) as a potential funding source for this project. Leveraging the existing relationship with the Regional Transit Authority (RTA) and the Tucson area council of governments (PAG) the scholar collaborated with the office of transit services to draft the grant proposal and submit by the February deadline.

Because timing issues, no new data was collected for the application package. The scholar did, however, use a number of existing data sets and reports for the submission including:

- Traffic counts at multiple intersections (AZDOT)
- Vehicular counts at ingress points in Sabino Canyon (USFS)
- International roughness index (IRI) studies (RTA)
- Bridge and tunnel data (City of Tucson)
- SunTran data on ridership and park n' ride usage (SunTran)

Also, the scholar performed a operations and capital cost analysis of the proposed system, which was submitted along with the application. See page 27 of appendix E. The cost analysis spreadsheet tool was developed by the VOLPE Transportation Systems Center.

Additionally, the scholar performed a mode shift analysis to project potential ridership of the system. First, visitation mode split was calculated by using pedestrian, bicycle and vehicle counters at all ingress points. Then, relative proportions were calculated based on total visitation estimates depending on the season and day of the week. Once proportions were established, the scholar calculated potential mode shift (from automobile to bus transit)

It was determined that benchmarking would be the best way to project potential usage of the transit system (usage of a transit system in a park or public land is determined to be strongly correlated to net visitation numbers - Transportation Planning Process for Transit in Federal Land Management Areas - Volume 4, Section 17) The scholar took both a best and worst case real world example (Acadia NP for best case and Denali NP for worst case) and projected that ridership of the new system would likely be somewhere in between those two numbers. See figure 7.

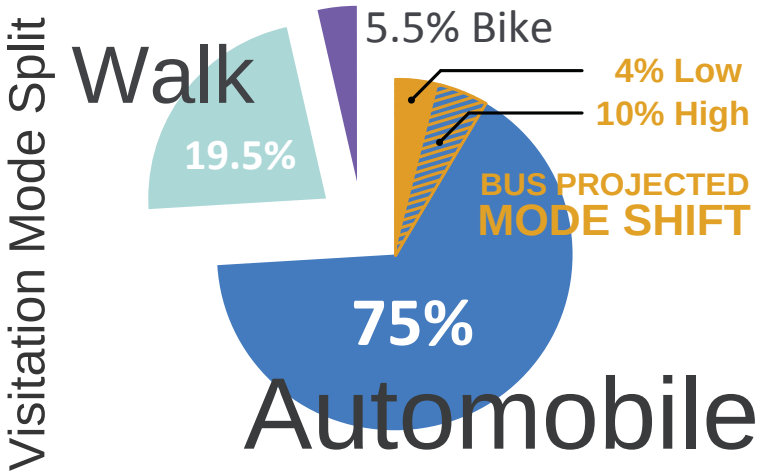


Figure 7 - Visitation mode split and projected mode shift

Projected usage of the system, depending on season and day of week, can be calculated by multiplying the estimated daily visitation by the projected mode shift estimates. Daily visitation estimates (calculated by VOLPE in the Transportation Analysis and Feasibility Study) are listed below:

- High Season, Weekend: 3,300
- High Season, Weekday: 2,420
- Low Season, Weekend: 2,420
- Low Season, Weekday: 1,540

Finally, the scholar performed a materials flow analysis to determine the VMT offset dividend of the proposed bus transit system. This was calculated by taking the estimated average round trip distance the typical visitor traveled to reach Sabino (calculated through an area code survey of visitors) and multiplying it by the number of estimated vehicle trips made to Sabino Canyon in one year (from yearly vehicle count numbers)

Approx 324,000 vehicle trips to Sabino Canyon * 9.25 Miles average distance = 3M Miles a year to drive to Sabino Canyon

This number was then multiplied by the best and worst case mode shift scenarios (4% and 10%) to determine 1) The # of round trips saved per year and 2) the approximate VMT saved per year. See figure 8.

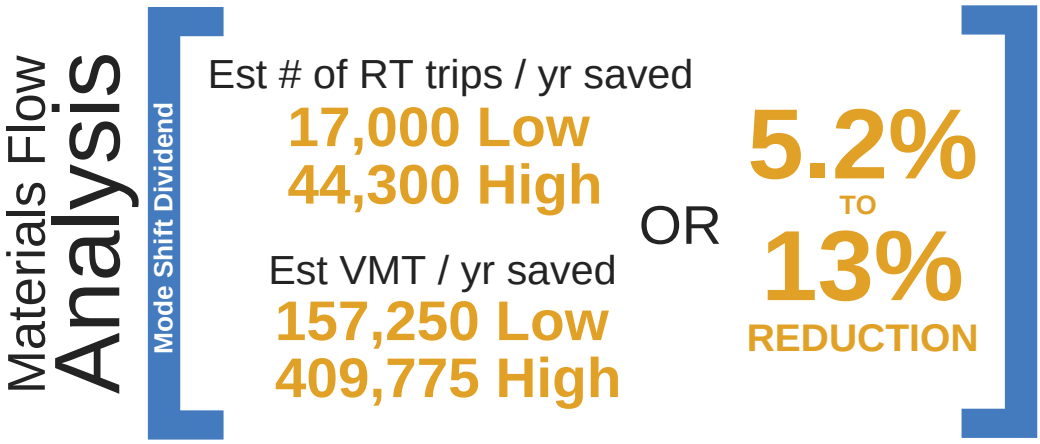


Figure 8 - Materials flow analysis of VMT offset dividend

b. Constituencies

Nearly every type of group associated with Sabino Canyon (government, public, volunteer, nonprofit) would be impacted by the proposed transit project:

- FS recreation and trails staff
- The general public
- The Sabino Canyon Volunteer Naturalists
- The Friends of Sabino Canyon
- The cycling community (grant proposal included rolling stock with bike racks)
- Tourists (international and national)

Forest Service staff were particularly enthusiastic about the potential to be able to take transit to work. Similar systems across the country, which connect urban areas to recreation areas, are frequently and consistently used by employees of land units. Fopr example YARTS, the system which connects Yellowstone NP to communities in northwestern Wyoming, has heavy National Park employee ridership (Transportation Planning Process for Transit in Federal Land Management Areas - Volume 4, Section 17)

c. Recommendations

At the time this document was written, the FLAP grant package was being reviewed by the Project Decision Committee (PDC) at the state level. The project has a high priority for the Forest Service and Sabino Canyon because it would resolve a number of transportation related issues for the unit including: Parking shortages, illegal parking, social justice and equity concerns and resource damage. The project was also specifically mentioned as a high priority in the Transportation Analysis and Feasibility Study.

If the grant is awarded, the Forest Service should pursue a bilateral relationship with the Regional Transit Authority (the submitting agency) to effectively and efficiently co-manage the facility.

d. Next Steps / Implementation

At this point, there is no further work to be done on this project. The PDC will make the determination whether or not to award the funding in May.

If the funding is awarded, the Forest Service (in conjunction with the RTA) should launch a marketing campaign to build ridership and inform the public of the new service. This could include, but is not limited to:

- Flyers on vehicles in the parking lot explaining the route and service schedule
- Explaining to the public the benefits of transit for resource protection and environmental stewardship
- Radio and/or TV announcements
- Information in the visitors center about the service
- The Friends of Sabino Canyon 'championing' the project as an example of best practices of transportation in public lands
- A 'launch party' day with free boardings and food/music in the canyon

Note: It can take up to 24 months for a new bus transit route to reach full ridership potential. If, however, the route is deemed 'unproductive' by the RTA it could be subject to cancellation/ reprogramming.

III. Connections to Wider Transportation Community

In many ways the transportation related work and research being conducted on parks and public lands represent the future of modern transportation planning in the United States. Because capacity and resource limits have been reached in many of the public land units around the country, the agencies that manage the units are forced by necessity to develop creative and alternative ways to move people to and through these sites without degrading visitor experience or sensitive ecologies.

Management strategies used by FLMAs include: Alternative fuels and propulsion systems, bicycle and pedestrian infrastructure, user group separation strategies, mandatory transit systems and alternative vehicles (aerial trams, waterborne and airborne vehicles, etc.) All of these strategies have applications for transportation systems in urbanized areas yet, due to lack of necessity, most of the 'alternative' transportation systems in municipal applications remain either small scale (because of cost) or underutilized (because of lack of convenience)

Changing the single occupancy vehicle transportation paradigm requires a two-fold approach: First is the necessary technology and infrastructure to make the 'alternative' easy, convenient and affordable, but second is the shifting of social behaviors to make the 'alternative' actually become the 'norm'.

The proliferation of alternative transportation systems on public lands can accomplish both of these goals. Firstly, by trying out new and emerging technologies FLMAs can field test previously unproven methods and systems which can then inform municipal or urban applications. The shuttle prospectus, which was drafted as part of the scholar's scope of work, stipulated that the rolling stock in the new system would be powered by alternative fuels. It did not, however, specify what kind of fuels. This puts the burden of system engineering and design on private industry, rather than the government. Applicants will develop proposals based on available technologies, the physical constraints of the road system and the demand for transit. This process gives the Forest Service the opportunity to select a concessionaire based on state of the art technology in transportation systems. If successful, the system could become a showcase for other public lands or even municipal applications.

Secondly, exposure to 'alternative' transportation systems will increase the public's comfort level with these systems and can induce behavioral changes in other settings (like commuting or recreation) In Sabino Canyon, a full 16% of visitors utilize the transit system. If the public could begin to see the parallels (through social norming, advertising campaigns, behavioral incentives, etc.) between 'transit in parks' and 'transit in cities' it could push commuter ridership higher for the Tucson area (currently at less than 3% for most census blocks)

Public land units should therefore be seen as living laboratories for field testing and increasing awareness of alternative transportation methods and systems. They can provide valuable research and data and should be seen as valuable resources for the broader professional transportation community.

IV. The Public Lands Transportation Landscape

Working as a transportation professional for the Forest Service was a challenging endeavour mainly because of how ingrained conventional transportation methods are in the culture of the agency. Conventional meaning the belief that transportation related issues can be solved by building more infrastructure.

The Forest Service owns and maintains more roads (paved and unpaved) than any other single agency in the world. The official Forest System road network includes 380,000 miles of roadway, almost eight times that of the US interstate system. In the past, these roads were constructed to facilitate timber harvesting, however today the Forest Service Road System constitutes an important component of the Nation's rural road system. It provides access for resource protection and for commercial activities or public uses such as timber harvesting, recreation outfitting, mining, and grazing. In addition, the system provides access for recreational activities such as hunting, fishing, skiing, bird watching, camping, hiking, and driving for pleasure.

Travel management, a Forest Service operational priority, is about managing use and maintenance of the FS road system. The operation is run (generally) by civil and roads engineers and the culture (generally) is that more roads, bridges, tunnels, impermeable surfaces, lanes, curbs, etc. are better than less, and that all travel related problems have a solution in concrete and steel engineering. In geotechnically challenging or ecologically sensitive environments, a more nuanced or surgical approach may be more appropriate.

Forest Road 100, part of the official FS road system, is an excellent case in point. This road in Sabino Canyon was constructed during the Civilian Conservation Corps era and winds along the bottom of a geologically unstable and ecologically sensitive desert canyon. In addition, there are 8 historic (CCC era) bridges or 'low water crossings' along the route which are constructed out of river rock. The low water crossings are an iconic symbol of Sabino Canyon and are a very important aspect of the visitation experience. It should be noted here that the low water crossings do not function as bridges but rather as dams causing buildup of sediment and water upstream.

Approximately every seven years the road washes out due to flooding and debris flows. The CCC bridges exacerbate the damage to the road because they channel water around the crossings causing erosion and frequently destroying the bridge approach aprons.

Reconstruction is very costly which (historically has) triggered an internal debate as to the best solution for maintaining public access to the canyon. The Sabino Canyon Scenic Trail project had its genesis in one of these debates, which is why long term public access to the canyon is part of the purpose and need for the project.

During the alternatives screening part of the NEPA process for the trails project, the engineering and roads crew presented a solution which involved blasting out the historic water crossings and replacing them with bridged box culverts. While this solution would likely minimize some of the flood damage in the next high water event, it would be a wholly unacceptable alternative from political, heritage resource and visual quality standpoints. It would also likely adversely impact the critical habitat of the endangered Gila Chub fish, which propagates in the pools that form upstream of the CCC bridges.

This is one small example of a situation where 'engineering' could have taken precedence over 'planning'. Fortunately, the trails project remains the preferred alternative and the CCC bridges are (for now) safe from demolition.

Given the extent of the FS roads network and the current fiscal climate, it would benefit the agency to take a 'less is more' (instead of a more is more) approach to roads, transportation and travel management.

V. Case Study

Spending ten months in a public land unit is a very short amount of time to 1) assess and understand your land unit 2) develop recommendations based on observations and data 3) implement recommendations and 4) monitor and evaluate. Most federal public lands units have been around for a very long time and the way they operate and function is likely due to many years of policy, culture and attitudes.

It is my suggestion to future scholars that they spend the first month of their assignment understanding the key forces and primary drivers of their units rather than trying to 'shake things up' upon arrival. This process builds credibility and trust and can include:

- Talking to stakeholder groups
- Building relationships with staff
- Building relationships with partner organizations
- Primary data collection
- Time in the field

After conducting this primary analysis, the scholar should be able to answer these questions:

- What makes this place tick? What are the primary drivers?
- Is this place deficient in some way?
- What is working and what is not working?
- What interventions or solutions would help?
- Should the interventions be implemented?

The last question, particularly, is important. A 'no build' option should always be on the table (and indeed always is in any formal NEPA process) Often designers, land managers, policy makers and planners feel pressure to produce concrete results when, sometimes, the no action alternative is actually best.

In addition, while this program can be seen as a 'fellowship' or 'internship' where the scholar is acting as acting as a consultant from the outside, it is my recommendation that the scholar actually function as an agency staff member when possible. Scholars should attend employee meetings, interface with the public and (if asked) generally perform the duties of any GS-7 or GS-9 agency employee. Not only will this give the scholar a richer experience but it will also help develop 'buy in' for the projects and will foster credibility with other staff. Federal agencies are, by design, bureaucratic and decentralized. Policy and funding decisions are made (generally) through multi-disciplinary processes and the scholar will need political capital among agency employees and specialists to be able to influence decision makers and line officers.

Finally, budgeting time is of critical importance and while the scholar should be part of the 'team' they should not sacrifice objectives and deliverables from the original scope of work. The scholar should use discretionary judgement in how and where to spend their short time.

VI. Professional Development

The public lands scholar program is an excellent opportunity for graduate students and recent graduates to transition into the professional world of land/resource management, planning and/or transportation. The program is highly regarded in professional circles and does function, as intended, as a 'springboard' for entry level employment in those fields.

In closing, the history of American public lands is a storied one with no real parallel in the world. The program provides an opportunity to perform what Lynn Hardy Yeakel dubbed 'the highest calling'. Public service is an honor as well as a duty and in a country which has no mandatory service requirement, the opportunity is not one to take lightly. America's national parks, forests and monuments pay incalculable dividends to the United States yet, despite this, the agencies that manage these resources are underfunded and understaffed. The scholar program opens the door for a new generation of professionals to assist these agencies and, if they choose a career in federal land management, carry on a legacy that is as important as it is unique.

Tram User Survey

A

Which route did you take today?

Sabino Canyon Bear Canyon

Including this time, how many times have you (ever) ridden the tram?

Once/Twice Three to Five Times Six or More Times

The PRIMARY reason I rode the tram today was for...

Transportation (To get from the visitor's center to a site within the recreation area)

OR

Recreation (Using the tram as a ride)

Tram Transportation in Sabino Canyon is:

Not Important At All Not Very Important Neutral Somewhat Important Very Important

Please rate the overall quality of the tram experience...

Poor Fair Average Above Average Excellent

Please write in how you think the quality of the tram experience could be improved...

Thank you for helping us improve our national forests!

Appendix B

Use Code 141

Prospectus for Transit Related Granger-Thye Concessions

Coronado National Forest
US DEPARTMENT OF AGRICULTURE
Forest Service

Photo Credit: David McCray

CORONADO
National Forest

March, 2013

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17 - Citations
18 - Alternative Fuel Vehicles Buyers Guide
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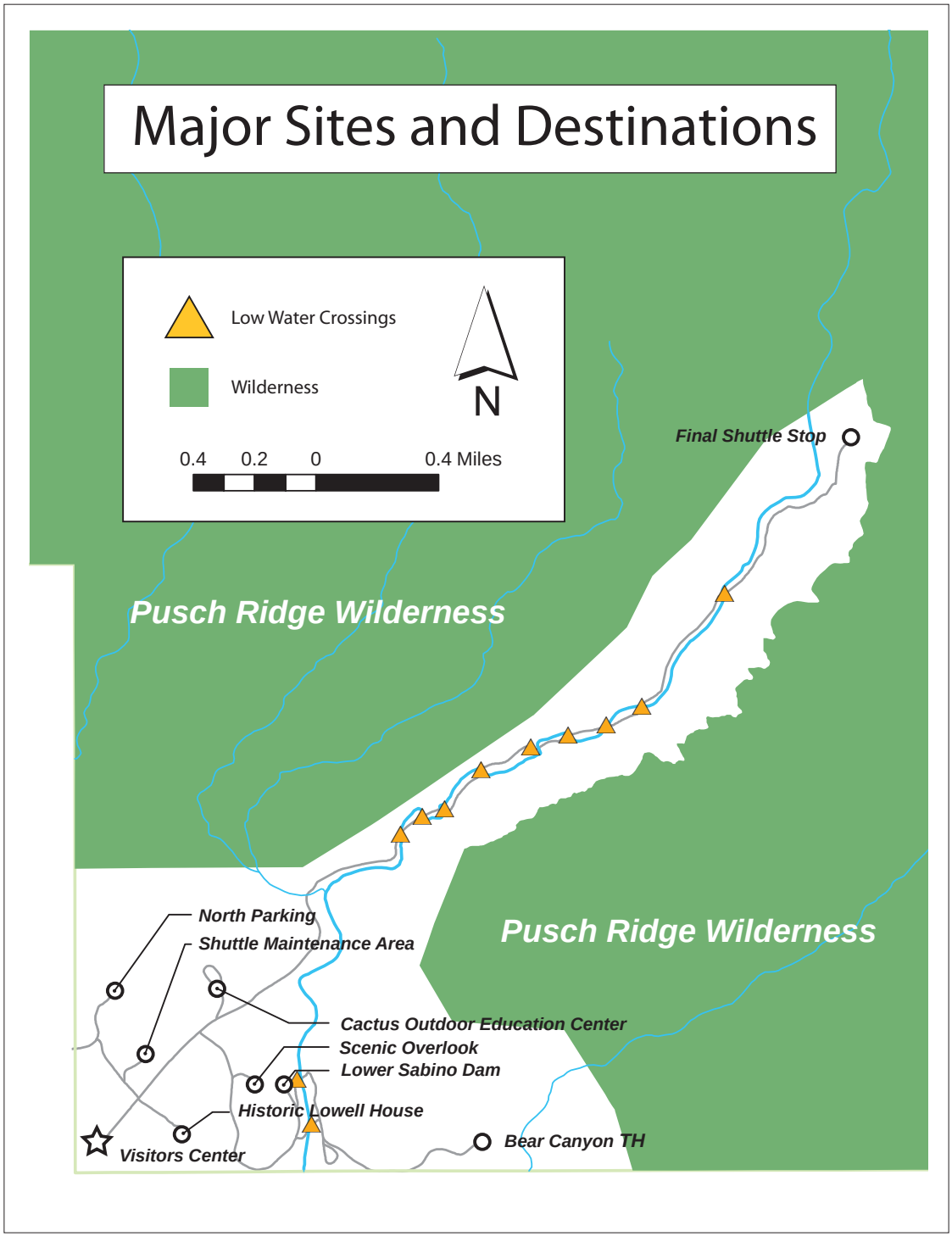
1.0 BACKGROUND AND INTRODUCTION

1.1 Basemap



Note: Road network is closed to public vehicular access

1.2 - Business Opportunity

This prospectus solicits proposals for a concession operated transit special use permit. A permit or permits to provide high-quality public service in the operation and maintenance of Government-owned recreation facilities located on the Santa Catalina Ranger District, Coronado National Forest (the Forest) will be issued to the selected applicant **(See Appendix 8 for Sample Term Special Use Permit)**

The successful applicant will be permitted to operate this business on the Coronado National Forest for a period of twenty (20) years, with the opportunity to reapply at expiry **(See Section 3.4 for more information on Term)**

The authorized officer for this business opportunity is the Forest Supervisor for the Coronado National Forest at:

300 W. Congress St.
Tucson, AZ 85701
(520) 388-8300

The current permit for this concession expires on December 31st, 2013. Over the past three years, this concession has generated the following gross revenues:

Year	Gross Revenue
2009	$ 975,000.00
2010	$ 1,040,400.00
2011	$ 925,000.00

1.3 Sabino Canyon and the Forest Service

The Sabino Canyon Recreation Area is one of the premier natural areas in southeastern Arizona. The site is located on the northern outskirts of the city of Tucson in unincorporated Pima County. The visitor center parking lot is approximately 13 miles from downtown Tucson which has a metro area population of over one million (Census, 2011) Visitation at Sabino Canyon is estimated at 1 million people per year. At peak season 2,500 people a day are in the canyon walking, bicycling, hiking, running, nature watching or riding the shuttle system.

The recreation area features a variety of cultural and ecological sites which are significant to the location's popularity. Sabino Canyon features a diversity of desert wildlife and eco-regions as well as numerous prehistoric and historic cultural sites. In 1978 the Forest Service issued a closure order for private automobiles in the recreation area with the aims of preserving sensitive resources and eliminating automotive congestion in the canyon. The Forest authorized a shuttle service, through a special use permit, to provide access to the cultural and biological resources within the recreation area.

In 1995 the Forest initiated a closure order for bicycles from the hours of 9AM to 5PM everyday and all day every Wednesday and Sunday. This time separation strategy was to assure that shuttles and bicycles would not be on the road at the same time (which had been causing user conflicts and safety concerns) Additionally, the recreation area is closed to pets with the exception of service dogs.

The mission of the USFS is "To sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations." Its motto is "Caring for the land and serving people." As the lead Federal agency in natural resource conservation, the US Forest Service provides leadership in the protection, management, and use of the Nation's forest, rangeland, and aquatic ecosystems.

1.4 Project Overview

The Forest has issued this call for proposals for qualified applicants to propose a system which shall provide three benefits to the public:

Transportation / Recreation - Moving visitors around the recreation area to access the various cultural and ecological recourses within the site.

Interpretation - Providing visitors with an interpretive experience of the desert landscapes and heritage resources unique to the American southwest.

Education - Showcases 'best practices' in alternative fuels and vehicle deployment in public lands and will function as an educational resource for the Tucson community.

1.5 - Timeline and Contact

The following time line specifies key dates that the Forest will be following in the selection process:

EVENT	DATE
Ranger District issues RFP	3/1/2013
Deadline for all questions related to RFP and application process	4/10/2013
Proposals due from applicants	4/15/2013
Enterprise team review of proposals and interviews with applicants	4/15 - 6/15 2013
Issuance of permit and drafting of final operations plan	7/1/2013
Start date for transportation contract	1/1/2014

The Forest will select two dates between the day of advertisement of the proposal and the proposal due date to host interested applicants for a walkthrough of the site and to answer questions. These dates will be disclosed on the date of issuance of the request.

The primary contact on this offering is:

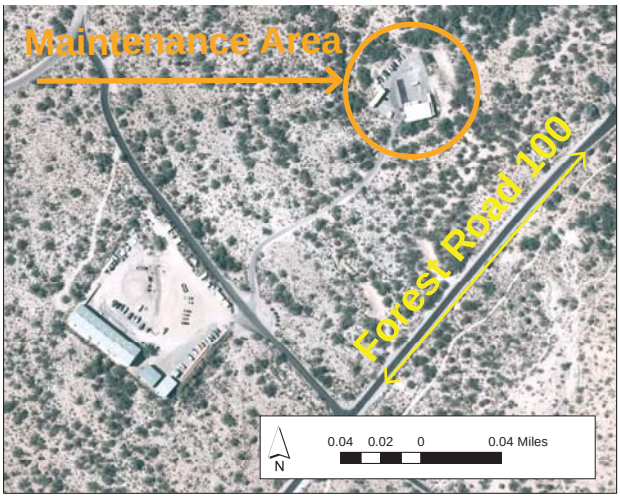
Jim Sutton - Special Uses Administrator
Phone: 520-749-7725
FAX: 520-760-2506
Email: JSutton@fs.fed.us

1.7 - Government Owned Improvements

The following improvements are authorized in the permit area: A fenced area located just north of the Sabino Canyon Ranger District Warehouse, known as the shuttle maintenance area, approximately 175 feet by 150 feet (see map on page 3 and aerial photo below) This area is intended to serve as the administrative, repair, maintenance and staging site for the transit system. Additionally, the area will serve as the location for all infrastructural elements necessary for normal function of the transit system (IE: Electrical charging station, repair bays, fuel reservoirs, office space, etc.) It is expected that this heavily impacted area will enclose most if not all of the construction and build out necessary for the project.

Also authorized is the fee/ticket booth (Federally owned, located west of the visitor center and approximately six feet by six feet) the Forest Road 100 (Federally owned, located at the bottom of Sabino Canyon, approximately 5 miles long) and the amenities located within 150' of the centerline of the road which include: restrooms, signs, benches and trash facilities. **(See Appendix 2 for Inventory of Government Furnished Property in Permit Area)**

FACILITY	LEGAL DESCRIPTION	SIZE
Office/Warehouse	Section 9, Township 13 South, Range 15 East, Gila and Salt River Meridian	2.0 ac
Fee/Ticket Booth	Section 9, Township 13 South, Range 15 East, Gila and Salt River Meridian	0.1 ac
Forest RD 100	Sections 2, 3, 4, 9, 10, and 35, Township 13 South, Range 15 East, Gila and Salt River Meridian	5 Mi
Bear Canyon RD	Section 9, Township 13 South, Range 15 East, Gila and Salt River Meridian	1 Mi
North Parking Lot	Section 9, Township 13 South, Range 15 East, Gila and Salt River Meridian	1.2 ac
Lowell House	Section 9, Township 13 South, Range 15 East, Gila and Salt River Meridian	0.25 ac



Aerial view of Shuttle Maintenance Facility and FR 100

Fee Booth

1.8 - Utilities and Waste Management

Certain utilities and infrastructure exist for the developed recreation sites identified in this prospectus. The permit holder will be responsible for securing, managing, and paying for these utilities. Applicants should contact current service providers to obtain estimated costs for the utilities. These utilities include: Electrical (Tucson Electric Power) Telephone (Century Link, Comcast, Verizon) Water (City of Tucson) Trash (Waste Management, Hometown Hauling, Saguaro Trash) Liquid waste disposal (any approved oil recycling facility)

2.0 OPERATIONS CONCEPT

2.1 Vision, Goals and Objectives

Vision: Sabino 2030

The Sabino Canyon Recreation Area transit system is a brand and service which is synonymous with the visitation experience at the recreation area. Tucson residents and visitors from the US and abroad hold the transit service in the highest regard because it exemplifies best practices of alternative transportation in public lands. Non-shuttle riders also see the service as an asset to the Tucson area and a benefit to the environment because it showcases state of the art transportation technology and functions as a living laboratory and educational facility for testing and deployment of alternative fuels technology. The service provides the maximum public good to the maximum number of people while fulfilling a social and recreational need.

Transit riders will also benefit from the service's function as a learning and interpretive experience. Sky Island Children's Forest learning labs will provide narratives which will be conveyed though onboard A/V technology. Additionally, the service will provide for interactive experiences with the desert landscape.

Goals and Objectives

GOAL 1 - Transportation: Move people safely and efficiently through the recreation area

OBJECTIVES: 1.1 - The service shall provide transit which is consistent, timely and reliable
1.2 - The service shall meet the existing demand patterns
1.3 - The service shall, within reason, be as safe as possible
1.4 - The service shall feature alternative fuels technology **(See Appendix 18 for Alternative Fuel Vehicles Buyers Guide)**

GOAL 2 - Interpretation: Provide opportunities for interpretation of the ecological and cultural resources at Sabino Canyon

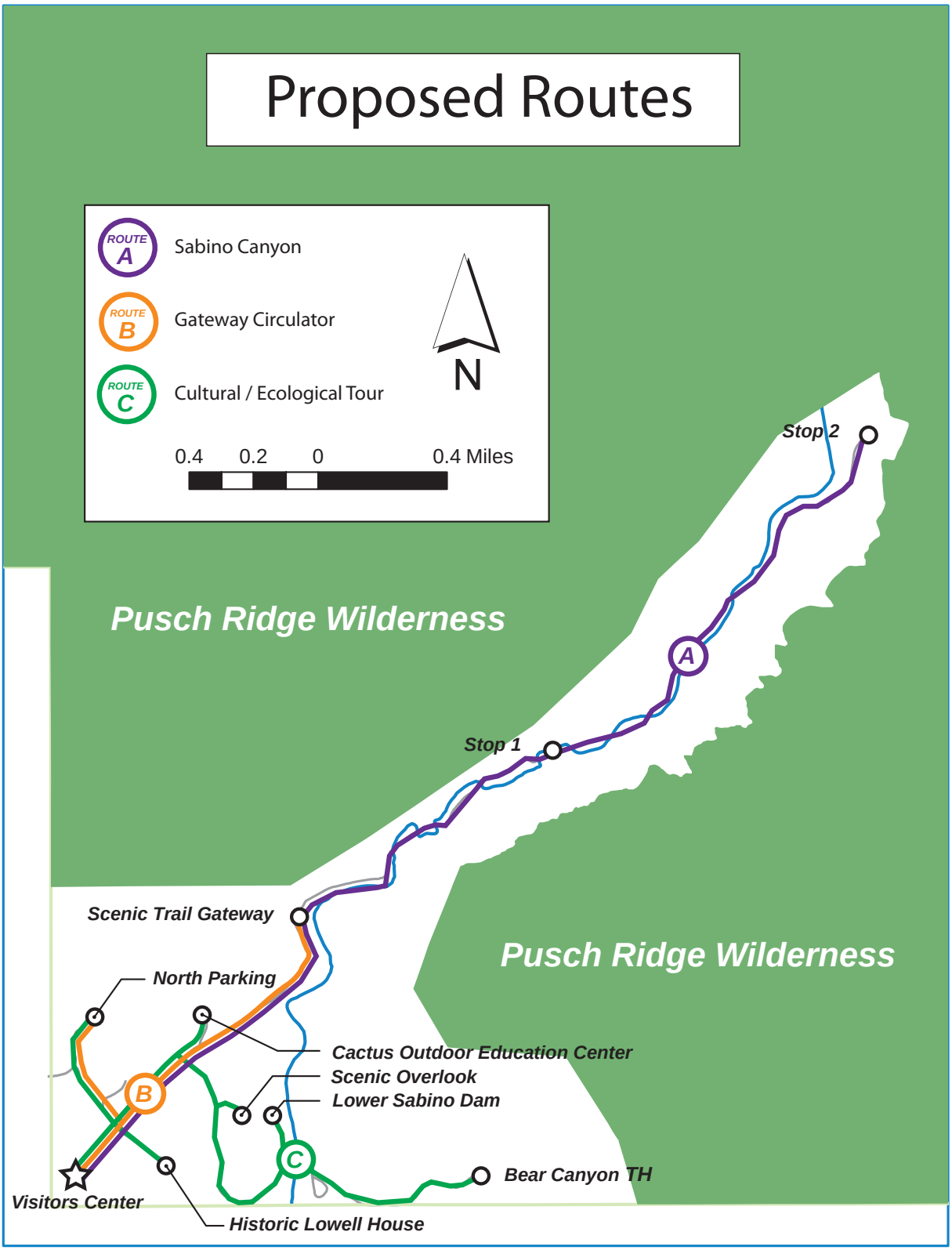
OBJECTIVES: 2.1 - The service will feature technology which will allow for interpretation of the Sonoran Desert landscape
2.2 - The interpretive technology shall not disturb visitors or wildlife outside of the shuttle units (the experience is completely contained within the shuttles)
2.3 - The interpretative narratives will be developed in collaboration with the Forest Service, the Volunteer Naturalists, the Friends of Sabino Canyon group and/or the Children's Forest team

GOAL 3 - Education: The system provides opportunities for researchers, students and the public to understand the mechanics/logistics of alternative fuels/transportation

OBJECTIVES: 3.1 - The service showcases 'best practices' with regard to alternative transportation in public lands (carbon mitigation, renewable fuels, safety, life cycle costs, etc.)
3.2 - The service conveys the importance of sustainability and environmental stewardship

The Forest is seeking a dynamic and open partnership with the selected permit holder in working towards realization of the vision and stated goals.

2.2 Proposed Fixed Routes and Schedule



Route A - Sabino Canyon

This route, because it will travel the length of Forest Road 100, will receive the heaviest usage. It will originate at the visitors center and make 2 compulsory stops on its way to the turnaround at the end of FR 100 (Stop 1, which features restroom facilities and Stop 2 which is the terminus of FR 100 - See Map on P. 4) Per riders request, the shuttle may pull over at a safe location to let riders off if they wish to disembark and either hike or interact with the landscape. This route shall feature an interpretive narrative of the ecological highlights of a desert canyon. This element can be developed in collaboration with Forest Service biologists, the Sabino Canyon Volunteer Naturalists and/or Children's Forest staff.

During high season, defined as January through May, the service will run during daylight hours (9AM to 5PM) on a minimum of 15 minute headway times and be able to accommodate the peak ridership (in the month of March) of approximately 1,100 people per day

During low season, defined as June through December, the service will run during daylight hours (9AM to 5PM) on a minimum of 60 minute headway times and be able to accommodate the average maximum daily ridership for low season months of approximately 450 people per day.

NOTE: This route contains steep (~12%) grades, narrow (~8' widths) water crossings and tight turning radii. Vehicles will have to accommodate these constraints.

Route B - Gateway Circulator

This route is solely intended to transport visitors from the two parking lots to the mouth of Sabino Canyon, thus bringing the 'front door' of the recreation area closer to the canyon itself. A node of activity will be established where passengers will disembark (where Rattlesnake Creek joins Sabino Creek) and either continue to hike up the canyon or return to the parking lots. There are restroom facilities currently at this location. This node will also be the gateway for the future 'Sabino Scenic Trail' route. Interpretation on this route is optional.

Demand for this type of service is not yet established and as such programming will have to be flexible, at least initially. The Forest Service requests a minimum of 2, 20 passenger units (or equivalent capacity) circulating between the parking lots and the trail gateway during high season, and a minimum of 1, 20 passenger unit (or equivalent capacity) circulating between the parking lots and the trail gateway during low season (during daylight hours)

Route C - Cultural / Ecological Tour

This route is intended to highlight the cultural, historical, archaeological and biological resources in the fore-region of the Santa Catalina mountains. It will link the historic Lowell House (100 year old adobe structures) Lower Sabino (site of the original Sabino Dam) the Bear Canyon trail head, a scenic viewpoint (above Lower Sabino) and the Cactus ramada outdoor learning area with the two parking lots. This route shall feature an interpretive and interactive experience that encompasses the pre-historic elements (IE - history of the indigenous Hokoham Indians, bedrock mortars, etc.) the historic elements (IE - history of the WPA and CCC in Sabino Canyon) and the ecological highlights of the Sonoran Desert landscape (IE - unique flora/fauna, climate, geology, etc.) This element can be developed in collaboration with Forest Service archaeologists, biologists, the Sabino Canyon Volunteer Naturalists and/or Children's Forest staff.

Demand for this type of service is not yet established, however it will likely be comparable to the existing Bear Canyon route estimated approximately at 100 people per day during high season. The service shall accommodate this demand during daylight hours on a minimum of 60 minute headway times. Service during low season (summertime) is optional.

2.3 Auxiliary Programming / Routes

School Visitation

The recreation area receives approximately 10,000 student visitors a year (or approximately 100 students per weekday during school season) which need to be transported from the northern parking lot to both the Cactus environmental education site and to Lower Sabino (approx. 4 miles round trip - see map) Historically these students were shuttled with private automobiles. The permit holder shall develop programming which will accommodate the student visitors. This will mitigate the impacts of private gasoline automobiles in a natural area and will educate children about alternative fuels and transportation.

Regional Circulator

The ranger district is interested in exploring augmentation of the service to include transportation to the recreation area from one or more of the regional transit hubs or vacation resort hotels. Additionally, links to the regional transit system could be considered.

Moonlight Rides and Special Events

Historically, there have been evening rides into Sabino Canyon during full moon cycles (about once a month) April through November. These have proven to be popular and the Forest wishes to continue this service. The narrative experience could be modified for this program to highlight local mythology and/or history. Furthermore, the Forest may require special (one time or temporary) transit programming to accommodate large groups or special events.

2.4 Functional Requirements

The permit holder will be required to meet the following minimum expectations and responsibilities listed below **(See Appendix 6 for Sample Annual Operating Plan)**

- The service shall be an 'alternative transportation' project as defined by Federal Lands Highway Program § 3021, b.3 Alternative Transportation in Parks and Public Lands*
- The system will feature a radio dispatch protocol for emergency response
- The system will feature technology to deliver professional, pre-recorded narrative interpretation to riders
- The narrative experience will be delivered through handheld devices, headphones or other minimally intrusive equipment so as to contain the audio disturbance completely within the shuttles
- Shuttle drivers will allow embarkations for people needing emergency evacuation from the canyon
- Shuttle drivers will allow embarkations for individuals already in the canyon who wish to board the shuttle
- The permit holder will operate and maintain a credit card point of sale system for fare collection
- The system will feature a fare collection mechanism onboard the vehicular units
- All vehicles will be cleaned on a bi-weekly basis
- All vehicles will be inspected on a yearly basis by a certified mechanic
- Employees will park personal vehicles either in the public lot or in the maintenance area
- Drivers will treat riders with courtesy and respect
- Drivers will report any accidents or injuries to the district ranger or acting officer
- Drivers will be able to communicate effectively in English
- The service will have facilities for access limited & elderly individuals **(See section on accessibility under Section 2.5)**
- The transportation system will feature wireless communication systems (dispatch) and collision avoidance systems
- The service shall be in operation 363 days a year excluding only Thanksgiving and Christmas Day
- The permit holder will provide fee tickets to the visitors that pay for the service

***See Citations at Appendix 17**

2.5 Operations Process and Responsibilities

Staff and Personnel

The permit holder will be in charge of all staffing and human resource issues as they pertain to the transit system. This may include, but is not limited to, vehicle operators (drivers) management staff, legal counsel, bookkeeping, service technicians, contractors and other specialists required to maintain the operation of the service.

The Forest Service is committed to equal opportunity in employment and in the awarding of contracts for goods and services. In connection with the performance of work under this prospectus the applicant agrees not to refuse to hire, discharge, promote or demote, or to discriminate in matters of compensation against any person, otherwise qualified, solely because of race, color, religion, natural origin, gender, age, military status, sexual orientation, marital status, or physical or mental disability.

The permit holder further agrees to insert the above clause in all subcontracts executed in relation to the plan for the site. The permit holder shall develop a written policy statement to inform all employees, job applicants, service recipients, and applicants for services of the organization's commitment to ensuring equal opportunity. The policy statement shall be signed by the organization's executive officer and be consistent with corporate objectives of the permit holder and the Forest. The permit holder shall comply with all employment laws and practices, and conduct its operations within the requirement of all federal, state and municipal jurisdictions having authority.

Financial Elements and Record Keeping

Records of accounts between the Forest and the permit holder shall be maintained according to Generally Accepted Accounting Principles (GAAP) and shall be available to the Forest representative at mutually convenient times for a period of 3 years after the closing date. The permit holder is responsible for setting prices and collecting fares.

The permit holder must provide use and revenue reports to the Forest Service. Use reports must be completed monthly and at the end of the fiscal year. At a minimum, monthly and year-end use reports must include:

- Boarding numbers broken down by month, week, day and hour
- Usage by route

In addition, year-end use reports must include:
- Total taxes paid
- Total fee to government
- Total gross revenue

Scheduling

The transit service is intended to be flexible to demand patterns and changes, as such the routes may be subject to alteration, augmentation, consolidation or elimination if, on a mutually agreed basis, they are deemed to warrant such. It is the desire of the Forest for the permit holder to work towards realization of the operations concept (Section 2.0)

Accessibility

The Architectural Barriers Act of 1968 (ABA) and Section 504 of the Rehabilitation Act of 1973 require new or altered facilities to be accessible, with few exceptions. In 2004, the Architectural and Transportation Barriers Compliance Board (Access Board) issued revised accessibility guidelines for buildings and facilities subject to the ABA and the Americans with Disabilities Act (ADA). These new guidelines are called the ADA/ABA Accessibility Guidelines. In 2006, the Forest Service issued the Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG). The FSORAG addresses types of recreational facilities, including developed recreation sites, that are not covered by ADA/ABA Accessibility Guidelines*

Any Government maintenance, reconditioning, renovation, or improvement must meet ADA/ABA Accessibility Guidelines, where applicable, as well as the FSORAG. The FSORAG and the ADA/ABA Accessibility Guidelines are posted on the Forest Service's website at http://www.fs.fed.us/recreation/programs/accessibility. Questions regarding ADA/ABA Accessibility Guidelines may be referred to the Access Board at www.access-board.gov. Questions regarding the FSORAG may be referred to the accessibility coordinator for the local National Forest. The permit holder is responsible for ensuring effective communication with visitors with disabilities, including persons with impaired vision or hearing, so that all visitors may obtain information on accessible services, activities, and facilities.

Liability Insurance

The successful applicant must have liability insurance covering losses associated with the use and occupancy authorized by the permit arising from personal injury or death and third-party property damage in the minimum amount of $2,000,000.00 for injury or death to one person per occurrence; $2,000,000.00 for injury or death to more than one person per occurrence; and $100,000.00 for third-party property damage per occurrence, or in the minimum amount of $2,000,000.00 as a combined single limit per occurrence. Insurance policies must name the United States as an additional insured.

Bonding

The permit holder will furnish a surety / performance bond in the amount of $40,000.00. The bond may take the form of corporate surety, Treasury bills, notes or other negotiable securities, cash deposits, irrevocable letters of credit, assignment of savings accounts, or assignment of certificates of deposit. The authorized officer may reevaluate the need for or the amount of the bond after the first operating season.

Resource Concerns

Wildlife Biology - Narrative script shall be developed in coordination with wildlife staff to ensure accurate, interesting and educational interpretation of the unique and endangered biology in Sabino Canyon.

Heritage Resources - Drivers shall treat the 9 historic low water crossings with extreme care and caution. The rock work on the bridge pilasters is vulnerable to passing vehicles.

Operations Plan and Permit Holder Responsibilities

An operations plan, to be reviewed and/or revised on an annual basis, will be prepared in consultation with the authorized officer. The operating plan shall outline steps the holder will take to protect public health, safety and the environment and shall include sufficient detail and standards to enable the Forest to monitor the holder's operations for compliance with the terms and conditions of the permit. It is also the intent for this service (and the associated equipment and infrastructure) to remain technologically relevant. Technological relevance will also be addressed in the operations plan. During the annual review the authorized officer will conduct a performance review of the permit holder's operation year to date.

As a general rule, the holder will be required to conduct the day-to-day activities authorized by the permit. Some, but not all, of these activities may be conducted by someone other than the permit holder, but only with the prior written approval of the authorized officer. The permit holder will continue to be responsible for compliance with all the terms of the permit. Maintenance, reconditioning, renovation and improvement (MRRI) are defined in the permit (FS-2700-4h, clause IV. e) Holder MRRI is defined as maintenance, reconditioning, or renovation that neither materially adds to the value of the property or appreciably prolongs its life. The work serves only to keep the facility in an ordinary, efficient operating condition. From an accounting or tax perspective, it is work that may be expensed, but not capitalized. In fulfilling these responsibilities, the holder must obtain any licenses and certified inspections required by regulatory agencies and follow state and local laws, regulations, and ordinances and industry standards or codes applicable to the permitted operation. The permit holder, at its expense, will be required to perform holder MRRI under a holder MRRI plan (FS-2700-4h, clause II.d) The holder MRRI plan will describe required holder MRRI and its frequency. The holder MRRI plan will become part of the permit holder's annual operating plan*

3.0 FOREST SERVICE CONCESSION PROGRAMS AND POLICIES

3.1 General Information for Applicant

Government-owned concessions are authorized by special use permits issued under Section 7 of the Granger-Thye (GT) Act, 16 U.S.C. 580d* as well as the Term Permit Act of 1915 (16 U.S.C. 497) Implementing regulations is authorized under section 36 CFR Part 251, Subpart B. All applications must be consistent with these requirements **(See Appendix 19)**

In exercising the rights and privileges granted by the special use permit, the permit holder must comply with all present and future federal laws and regulations and all present and future state, county, and municipal laws, regulations, and other legal requirements that apply to the permit area, to the extent they do not conflict with federal law, regulation, or policy. The Forest Service assumes no responsibility for enforcing laws, regulations, and other legal requirements that fall under the jurisdiction of other governmental entities.

The Forest reserves the right to reject any and all proposals, to waive irregularities or to re-advertise based on the best interest of the public and/or the Forest Supervisor.

Applicant shall be responsible for the cost of preparing, producing and providing the proposal regardless of the outcome of that proposal. Applications submitted in response to this prospectus are subject to cost recovery pursuant to 36 CFR 251.58(c)(1)(ii) and (c)(3)(iii)* Applicants must submit a processing fee of $200.00 to cover the cost of the prospectus and review of the application. Payments due the United States for this application must be paid in the form of a bank draft, money order, or cashier's check payable to the USDA-Forest Service.

This permit is subject to cost recovery which allows the Forest to allocate personnel costs of over 50 hours per year associated with administration of the permit to the permit holder.

Payments will be credited on the date received by the designated Forest Service collection officer or deposit location. Additionally, the selected applicant will be responsible for the costs of preparing and issuing the permit and conducting a Financial Ability Determination (FAD) unless the Forest Service has conducted a FAD for the applicant within the past year. If a FAD has been completed for the applicant within the last 12 months, the applicant will be responsible for the cost of adjusting it to reflect any change this selection will have on the applicant's financial ability.

Under the federal Freedom of Information Act all proposals, once submitted, become a matter of public record and shall be available for public review.

All applicants that submit a proposal will be advised in writing of their status as soon as determinations are made. Work on a final operations plan will begin within five (5) days of the notification of selection. The permit will allow the holder to operate a transit system and collect compensation for that service.

The Forest Service reserves the right to close all or a portion of any areas authorized in this permit for repair, construction; floods, snow, extreme fire danger, or other natural events; wildlife protection; or risks to public health and safety. The Forest Service shall not be liable to the permit holder for lost revenue, operating costs, or any other losses resulting from these closures. However, for fee calculation purposes, the permit shall be placed in non-use status as provided by FSH 2709.11, section 31.23*

If the Forest Service requires the permit holder to provide a service for the agency, the permit holder will be compensated for that use.

Forest Orders may be issued to address a variety of management concerns on a particular forest.

3.2 Graduated Rate Fee System and the Granger-Thye Offset Program

The Government is obligated to obtain fair market value for the use of its land and improvements. The minimum fee is the concession's average gross revenue for the past three years multiplied by the current 30-year Treasury bond rate. The minimum fee will be adjusted at the end of the first five years of the permit term if the permit is longer than five years.

Minimum Fee Calculation Example:

Year Gross Revenue
2009 $ 975,000.00
2010 $ 1,040,400.00
2011 $ 925,000.00

Total $ 2,940,400.00 ÷ 3 = $ 980,133.00 = Average Gross Revenue

Average gross revenue multiplied by the current 30-year Treasury bond rate = the minimum annual fee. In the following example, the 30-year Treasury bond rate is 2.8 percent.

$ 980,133.00 x 0.028 = $ 27,443 minimum annual fee

Applicants may propose a fee below the minimum, provided they can document why this amount represents fair market value. However, the Forest Service may reject the proposed fee if the agency determines that it does not reflect fair market value.

The annual fees due the United States for those activities authorized by this permit shall be calculated on sales according to the following schedule:

Kind of Business	Break-even point (Sales to GFA) (Percentage)	Rate Base (Percentage)	Balance of Sales Rate (Percentage)
Grocery	70	75	1.13
Service, food	70	1.25	1.88
Service, car	70	1.30	1.95
Merchandise	70	1.50	2.25
Liquor Service	60	1.80	2.70
Outfitting/Guiding	50	2.00	3.00
Rental and Services	30	4.50	6.75
Lodging	40	4.00	6.00
Lifts, Tows, and Ski Schools	20	2.00	5.00

1. A weighted-average break-even point (called the break-even point) and a weighted-average rate base (called the rate base) shall be calculated and used when applying the schedule to mixed business. If the holder's business records do not clearly segregate the sales into the business categories authorized by this permit, they shall be placed in the most logical category. If sales with a different rate base are grouped, place them all in the rate category that shall yield the highest fee. Calculate the fee on sales below the break-even point using 50 percent of the rate base. Calculate the fee on sales between the break-even point and twice the break-even point using 150 percent of the rate base. Calculate the fee on sales above twice the break-even point using the balance of sales rate.

2. The minimum annual fee for this use, which is due in advance and is not subject to refund, shall be equal to the fee that would result when sales are 40 percent of the break-even point. This fee shall be calculated and billed by the Forest Service during the final quarter of the holder's fiscal year, using the most recent GFA figure and previously reported sales data for the current year, plus, if the operating season is still active, estimated sales for the remainder of the year.

Applicants must propose the fee to the Government as a percentage of the concession's adjusted gross revenue. One percentage may be proposed for the entire permit term, or the percentage may vary each year. However, if a consolidated fee payment will be proposed, one percentage rate must be proposed for the entire period of consolidated payments

The proposed fee to the Government also must be included in the business plan as an expense item in the cash flow projections**.** The fee to the Government may be offset in part (up to the minimum fee amount) by the value of Government maintenance, reconditioning, renovation, and improvement (MRRI) performed at the permit holder's expense in accordance with a Granger-Thye (GT) fee offset agreement **(See Appendix 9 for Sample GT Offset Agreement)**

Granger-Thye Offset Program

The federal government owns all the improvements at the developed recreation sites covered by this prospectus. Under Section 7 of the Granger-Thye (GT) Act* and the terms of the permit, the permit fee may be offset in whole or in part by the value of Government maintenance, reconditioning, renovation, and improvement (MRRI) performed at the permit holder's expense. Government MRRI is defined as maintenance, reconditioning, renovation, or improvement that arrests deterioration, improves and upgrades facilities, and appreciably prolongs the life of the property

Government maintenance, reconditioning, renovation or improvement, whether performed by the holder or the Forest Service, shall be performed at the sole discretion of the authorized officer. See FS-2700-4h, clause IV.e* All Government MRRI shall be enumerated in an annual GT fee offset agreement signed by the holder and the Forest Service in advance of the operating season. Alternatively, a multi-year fee GT fee offset agreement can be prepared for consolidated fee payments.

Either the holder or the Forest Service may perform GT fee offset work. This determination will be made annually. When the holder performs GT fee offset work, if it includes construction that costs more than $2,000, it is subject to the Davis-Bacon Act and the fee offset agreement must contain Davis-Bacon Act wage provisions. Additionally, indirect costs may be offset provided the holder submits either a currently approved indirect cost rate or accounting procedures and supporting documentation to determine an indirect cost rate.

The holder's claims for GT fee offset must be documented using the GT Fee Offset Agreement. This form requires the holder to itemize allowable costs incurred for an approved GT fee offset project and to certify the accuracy and completeness of claims.

When the Forest Service performs GT fee offset work, the holder will deposit fee payments into a Forest Service account. The Forest Service will perform GT fee offset work under a collection agreement and offset those costs against the permit holder's annual permit fee. The Forest Service's indirect costs may be offset at the agency's approved rate. The Forest Service and the holder will agree on the work to be performed in advance of each operating season.

3.3 - Submission Format and Evaluation Criteria

Response Format

1. Six (6) bound and one (1) unbound copy of the proposal must be submitted to:

Jim Upchurch, Forest Supervisor
ATTN: Coronado National Forest
300 W. Congress St.
Tucson, AZ 85701
(520) 388-8300

2. All proposals must be received no later than close of business (4:30 PM) on March 15th, 2013

3. Proposals delivered by facsimile or e-mail will not be accepted

4. No formal bid opening will occur. Applicants will be contacted if there are any questions with respect to their proposal. All applicants will be notified if they have been selected to participate in the interview process

5. The information in this prospectus is from generally reliable sources, but no warranty is made as to its accuracy. Each applicant is expected to make an independent assessment of the business opportunity offered in this prospectus

6. Applications must be signed. The person signing for an entity must have authority to sign for that entity. Applicants must include their address, telephone number, facsimile number, and email address

7. Partnerships, limited liability companies (LLCs), associations, or other unincorporated entities must submit a certified copy of the partnership agreement or other documentation establishing the entity or a certificate of good standing under the laws of the state where the entity is located

Application Package Requirements

Applications must be in writing and must include or address the following:

OPERATIONS PLAN: Applicants must submit a proposed annual operating plan that addresses all required and optional services. Applicants can utilize the sample annual operating plan to organize their response to this section. The successful applicant's proposed operating plan will then be reviewed and/or revised by the authorized officer. The final operations plan will be attached to and become a part of the special use permit, however in the case of a discrepancy the permit will override. This section should address sections 2.4 (Functional Requirements) and 2.5 (Operations Process) of this document.

Applicants must specify whether another party will assist with any of the operational aspects of the concession, and if so, must include the other party's name, address, telephone number, e-mail address, and relevant experience.

ORGANIZATION / TEAM EXPERIENCE: Identify the members of your team, their expertise and involvement in the project. Also describe your organization's history in deployment, planning, design, construction or management of similar projects and/or facilities. Have you or your agency now or ever been suspended, debarred or otherwise deemed ineligible for award of contracts by the federal government? If yes, please provide a detailed description.

OTHER PROJECTS: Please identify any existing or planned projects/facilities which your organization is involved in.

PUBLIC ENGAGEMENT: It is the intent of the Forest to provide this service as an amenity to the people of Tucson and to national and international visitors. The service should be dynamic and responsive to changing visitor needs. Please describe how your organization will engage the public in understanding and accommodating these needs.

BUSINESS PLAN: Applicants must submit a business plan. This part of the application package must be a separate document. The business plan provides a thorough analysis of an applicant's vision of the proposed business as well as a thorough financial analysis. A good business plan is essential for running a successful business, maintaining and improving the business, and raising needed capital. Applicants must furnish a detailed description of their experience relating to operating and maintaining transit systems. The description must include experience in private business, public service, or any nonprofit or other related enterprises. The business plan should also include a financial plan with a 5 year proforma, P&L statements and projected cash flows. Applicants are encouraged to contact their local small business development council (SBDC) if they need assistance in completing their business plans. Alternatively, applicants who have already received a review of their business plan from an SBDC or the Forest Service for the current fiscal year may submit a copy of the review report **(See Appendix 13 for Sample Business Plan)**

PERFORMANCE EVALUATIONS: Applicants who have experience in managing Forest Service or other Government concessions must provide copies of the most recent annual written performance evaluations for each Forest Service or other concession the applicants have operated or are operating. All applicants will be subject to yearly performance evaluations **(See Appendix 5 for Performance Evaluation Form)**

STAFFING: Applicants must address appropriate staffing to meet customer service and cleanliness standards. The holder will be responsible for furnishing all personnel for the transit system and for adequately training and supervising their activities under the terms of the permit. The holder must meet requirements of federal and state laws governing employment, wages, and worker safety. Applicants should address worker hours and schedules. Applicants also should address staff training for effective customer service, conflict resolution, area-specific emergency procedures, and dissemination of recreation and tourism information.

SUPERVISION AND MANAGEMENT: Applicants must designate an individual to serve as the agent of the holder for purposes of administration of the permit by the Forest Service. The designated agent must periodically review employee performance on site and must be available to resolve repair needs within 24 hours of discovery or notification. The holder will be responsible for the conduct of its employees and ensuring that employees are not under the influence of intoxicating beverages or narcotic drugs while on duty or representing the holder. Applicants also must include a policy for removing employees who engage in inappropriate conduct

Applicants should describe employee uniforms, insignia, name tags, and the applicants' policy for ensuring a clean, professional appearance by staff while on duty. The permit holder's employees may not wear any component of the Forest Service uniform. Additionally, applicants should address their policy for vehicle maintenance and appearance; types of vehicles to be used for operations (vehicles may not be driven off designated roads or trails); and signage to identify the concessionaire to the public.

FINANCIAL RESOURCES: Applicants must submit a complete set of all financial statements for the last three fiscal years that have been audited, reviewed, or compiled by a certified public accountant (CPA). For any financial statements that were only compiled by a CPA, applicants must complete FS-6500-24 Financial Statement for certification of the accuracy of the financial statements.

Applicants must complete FS-6500-24 for any of the last three fiscal years they were in business for which a financial statement was not audited, reviewed, or compiled by a CPA. An applicant who has had a financial ability determination (FAD) conducted within the past year should include a statement to that effect along with the forest name, contact name and telephone number, Additionally, applicants must identify any pending applications or new permits obtained from the Forest Service since the FAD was completed.

In completing FS-6500-24, LLCs must list the name of the company in block 1, the names and interests of the principals in block 5, and their members should be listed in block 6. In addition, LLCs must complete the certification in Part (D) (1) of FS-6500-24. An applicant who has not been in business for the last three fiscal years, and therefore cannot submit audited, reviewed, or compiled financial statements or an FS-6500-24, must submit three fiscal years of projected financial statements compiled by a CPA using the forecast method. Any financial information submitted by applicants must conform to generally accepted accounting principles (GAAP) or other comprehensive bases of accounting.

Any previously prepared financial documents that are submitted must be unredacted and in their original form, including footnotes **(See Appendix 14 for Financial Statement Forms)**.

Applicants must show at least 25 percent of the first year's operating costs in liquid assets. Liquid assets are assets that are readily converted into cash. Applicants also must complete blocks 1 through 5 of form FS-6500-25, Request for Verification and submit the signed and dated form with the application. The Forest Service will forward the FS-6500-25 for the most qualified applicant to the Albuquerque Service Center for processing. **(See Appendix 15 for Verification Request Forms)**.

The auditor assigned to conduct the FAD will send a copy to each financial institution with which the applicant does business. The financial institutions must complete blocks 6 through 15 of the form and mail the completed form to:

Prospectus for Transit and Related Granger-Thye Concessions, Coronado National Forest 31 [USDA Forest Service, Albuquerque Service Center], Attention: Auditor, ASC-B&F, 101 B Sun Ave NE, Albuquerque, NM87109.

REFERENCES: Please provide three (3) references related to similar projects that your team has been involved with in the past ten (10) years

PROCESSING FEE: Bank draft, money order, or cashier's check payable to the USDA-Forest Service for $200.00 **(See Section 3.1)**

Evaluation Criteria

Descending in order of importance, the Forest evaluation panel will score each proposal on a fixed weight method:

- Proposed annual operating plan
- Business plan, business experience, and references
- Financial resources
- Recreational experience improvement (for all visitors)
- Resource protection/stewardship
- Fees charged to the public
- Fee to the Government

The Forest Service will consider only the applicant's written application package and any past performance information obtained by the Forest Service. During the evaluation process, the evaluation panel may contact any references, including all federal, state, and local entities that have had a business relationship with the applicant. The evaluation panel also may consider past performance information from other sources.

Selection Process

An evaluation panel assembled by the Forest will review, score and rate the proposals according to the evaluation criteria set forth above. Finalists will be scheduled for a presentation before an interview panel, to be assembled by the Forest. Based on the submittal received and the oral interview, the interview panel will rank the proposals in order of preference and make a recommendation to the authorized officer (the Forest Supervisor)

The Forest Service will consider only the applicant's written application package and any past performance information obtained by the Forest Service. During the evaluation process, the evaluation panel may contact any references, including all federal, state, and local entities that have had a business relationship with the applicant. The evaluation panel also may consider past performance information from other sources.
The evaluation panel will make a recommendation to the authorized officer as to which applicant offers the best value to the Government. The authorized officer will make the selection decision. All applicants will be notified of the successful applicant via certified mail.

The Forest Service will conduct a FAD on the selected applicant as a prerequisite to issuing a special use permit, unless the agency has a current fiscal year FAD conducted by the Albuquerque Service Center or SBDC for another Forest Service unit.

The Forest Service reserves the right to rescind the prospectus at any time before a special use permit is issued. If the Forest Service rescinds the prospectus, application fees will be returned.

3.3 - Terms, Qualifications and Reservations

All applicants have an equal opportunity to apply. Except for members of Congress, Resident Commissioners, and current Forest Service employees, any individual or entity may apply.

The Forest Service does not guarantee a profitable operation. Rather, applicants are responsible for reviewing the prospectus and making their own determination concerning business viability.

The Forest Service will select the application that offers the best value to the Government. The Forest Service reserves the right to select the successful applicant based on a trade-off between the fee to the Government and technical merit.

The Forest Service is not obligated to accept the application with the highest return to the Government.

The Forest Service reserves the right to select the successful applicant based solely on the initial application, without oral or written discussions.

The Forest Service reserves the right to reject any or all applications and to rescind the prospectus at any time before a special use permit is issued.

Any oral statement made by a representative of the Forest Service shall not modify the requirements of this prospectus. If it is determined that an error or omission has been made or additional information is required, a written amendment will be sent to each person or entity receiving a copy of this prospectus.

If there is a conflict between the terms of the prospectus and the special use permit, the terms of the permit will control.

3.4 - Permit Term

The permit term will be for a period of 20 years. Upon expiration of the permit, continuation of the permitted activity will be at the sole discretion of the authorized officer and will be subject to a competitive offering. A new prospectus will be issued during the final year of the permit term. If the decision to select a permit holder is appealed, a permit will not be issued until the appeal has been resolved, unless operation is needed during the appeal, in which case a permit with a term of one year or less may be issued.

3.5 - Post Selection Requirements

Once an applicant has been selected, the following information must be submitted and approved by the Forest Service prior to issuance of a special use permit:

- A final annual operating plan containing all the items included in the annual operating plan submitted in response to the prospectus
- An annual GT fee offset agreement (if proposing a GT fee offset program)
- Documentation of required liability insurance and, if applicable, property insurance
- Documentation of bonding, if applicable
- Required deposits and advance payments
- Documentation that utility services have been obtained in the name of the selected applicant
- A state business license and any other required federal, state, or local certifications or licenses

The successful applicant will be required to submit all these items within 30 days of the date of the selection letter. If these requirements are not met within the 30-day period, a special use permit will not be issued. The applicant who receives the next-highest rating may then be selected for the special use permit, subject to the same requirements.

National Forest Service
U.S. Department of Agriculture

Sabino Canyon Recreation Area
Arizona

NEPA ALTERNATIVES DEVELOPMENT REPORT
PROPOSED TRAILS PROJECT

Sabino Canyon

Prepared for:
Coronado National Forest
Santa Catalina Ranger District
5700 N Sabino Canyon Road
Tucson, AZ 85750

Spring 2013

1.0 - Project Background

The Santa Catalina Ranger District, part of the Coronado National Forest, has had an ongoing relationship with the Sarbanes Transit in the Parks (TRIP) program. The TRIP program is intended to provide technical assistance for transportation related projects in parks and public lands in the United States.

Facing the pressures of urban encroachment, population growth in the metro area, the growing popularity of outdoor recreation and increased concerns with resource damage, the District has actively been exploring alternative transportation solutions through the TRIP program. It is the goal of the District to create a sustainable and resilient condition for the Sabino Canyon Recreation Area by addressing existing access and circulation issues with innovative transportation solutions. Environmental stewardship and public service will be balanced in this approach (the motto of the Forest Service is: Caring for the land and serving people)

TRIP Phase I, initiated by the district in 2008, was carried out by the John A. Volpe (VOLPE) National Transportation Systems Center. With the aim of identifying specific alternative transportation projects that could significantly benefit the recreation area, Phase I aggregated the available data and literature on Sabino Canyon and made a number of recommendations to the District. These recommendations were narrowed down from a 'blue sky' list of transportation related projects. The final recommendations are grounded in the historic, cultural, geotechnical, hydrological, sociological and political realities on the ground. Phase I culminated in the 'Transportation Analysis and Feasibility Study: Sabino Canyon Recreation Area' document, published by VOLPE in February 2010.

Among a number of other recommendations, the Study identified a solution for managing pedestrian use of Forest Road 100 (the paved access route at the canyon floor) This solution employs the development of an at-grade or grade-separated trail at or near the canyon floor.

No trail directly services or follows Sabino Creek, the perennial stream for which the recreation area is named. Instead, Forest Road 100 is the only canyon floor access route into the resource. This route is also shared with a regularly scheduled motorized shuttle service and with recreational bicyclists. The road makes eight crossings of Sabino Creek as it meanders into the canyon, each ford utilizing a low water crossing constructed during the Civilian Conservation Corps era.

The study underlines the need for an evacuation route out of Sabino Canyon during its infrequent, severe flash floods and other emergencies. Flash floods can and do strand hikers, a situation fraught with significant hazards for visitors who try to cross the surging water. Warnings are routinely posted at crossings and informational public contacts are made during flooding events. Despite these regular and ongoing efforts visitors still get stranded. The

current operational response for stranded hikers is to initiate a swift water rescue operation which can entail aerial rescue. Infrequent floods also have a secondary effect of restricting visitor access long after the water has receded. Because the primary pedestrian access is along Forest Road 100 and vulnerable low water crossings, damage to these features can force pedestrian closures in response to safety and reconstruction needs.

Of the 81% of total users which are pedestrian oriented (as opposed to shuttle riders or cyclists) 3 of 5 of this user group will use the road (as opposed to the trails system) because it is the only canyon floor access to the resource. This shared use generates conflicts between pedestrian, bicycle and shuttle users. Such conflicts have been managed through time separation strategies. The opportunity to route pedestrians away from the recreation area's internal roads through a new trail will provide the opportunity to create a more attractive and less motorized visitor experience, reduce user conflicts, improve overall visitor safety and will provide the public a guaranteed access to the resource when the road is impassible.

Phase II of this project, of which this document is a part, will accomplish the design and National Environmental Policy Act actions required to improve the Sabino Canyon Recreation Area trail system and prepare for eventual delivery of these benefits through future project construction.

2.0 - Purpose and Need

As outlined in section 1.0, the purpose and need for this project consists of three dimensions, in descending order of importance:

Purpose	**Need**
Safety	Frequent flood events make the road impassible to pedestrian traffic. This causes visitors to be stranded up in the canyon which precipitates evacuation procedures. Large scale rescue operations are undertaken approximately every 5 years.
Visitor Experience	Forest Road 100 is frequently congested with as many as 3 different user groups sharing the right of way at the same time. Additionally, there is no pedestrian only way to experience the canyon.
Sustainability	Forest Road 100 is expensive to repair and maintain and funding for these operations may not always be available (ERFO) Additionally, when the road is closed, the public cannot access the resource.

3.0 - Overview of Alternatives

From its genesis in the Transportation Analysis and Feasibility Study, this project has always been envisioned as a grade separated trail along the canyon floor, adjacent to Forest Road 100 (Element ID BPE 02 - Create a grade separated pedestrian trail) Because of the impacts and scope of the project, eight other alternatives were considered and then subsequently ranked against the preferred alternative:

BPE 03 Stripe an at-grade bike and/or pedestrian trail using the existing road width, widening where possible

INF 01 Create alternate trail network that avoids stream crossings and facilitates evacuation

INF 04 Widen the bridges and bridge approaches

INF 05 Redesign bridges to improve flow and reduce sedimentation issues; keep historic look but change engineering

INF 07 Develop new bridges for pedestrians off of the existing roadway network

MGMT 01 Create and disseminate a disaster evacuation, rescue, and communication plan

MGMT 02 Develop aggregation points to shelter-in-place

MGMT 03 Develop flood detection and early warning system

4.0 - Description of Alternatives

BPE 02 - Create a grade separated trail along Sabino Canyon (FS Preferred Alternative)

Description: This element proposes the creation of a path/trail for pedestrians which would be separate but parallel to the canyon road. Connections between the exiting canyon road and pedestrian path would need to be made at trams stops or other key points along the route (rest room facilities) In the fore canyon, the existing unpaved trail that connects the parking lot to the canyon could be upgraded/widened to encourage more use.

Costs: A grade-separated trail would have high capital expense mainly due to the geotechnical constraints of the canyon. A trail as described (parallel to the road) would necessarily cross a number of side canyon drainages, so the path would need to be engineered with bridges or crib walls to safely traverse these features. Additionally, a large amount of earthwork would be required for this alternative because the walls of the canyon are steep and rocky. Finally, the access points (from the road to the new trail) would need to be bridged where Sabino Creek is between the road and the proposed alignment. The cost of pedestrian trail construction ranges considerably depending on the stability of the terrain, the number of stream crossings, and the ability to choose an alignment without excessive grades. Research shows that new trail construction in a desert environment is approximately $45,000 per mile excluding any bridge or suspension structures.

Safety: If properly sited and designed, there should be minimal risk to users of the trail from flooding or debris flows. Furthermore, the path could also be used for high water evacuation. To encourage pedestrian use, the trail prism should be at least 6' wide to allow safe and comfortable passing in both directions. Finally, cyclists and the tram operation both benefit from reduced pedestrian use, and thus less congestion, of the canyon road.

Cultural Landscape, Natural Environment, Historic Resources: This project would precipitate the disturbance of one or both canyon walls due to the construction and public usage of the facility. Additionally, the project will likely increase sedimentation and disturbances in the creek during the construction phase. Cultural and archaeological concerns are minimal since most historic and prehistoric sites are located in the flat area outside the mouth of the canyon. Wildlife concerns are notable because of the critical habitat of the Gila Chub endangered fish.

Technical Feasibility, Anticipated Response, Disruption: The technical feasibility is unknown but likely to be challenging due to the steep, narrow nature of the canyon. User disruption during construction could be high as a result of shutdowns of the road during construction. Once the trail is complete, user conflicts should be lessened because of separation. Initial pre-scoping of this alternative revealed support among key stakeholders including: Friends of Sabino Canyon, Southern Arizona Search and Rescue and the Sabino Canyon Volunteer Naturalists.

Next Steps: At the time this document was written, a preliminary alignment was identified along the eastern canyon wall. This alignment also included 6 access points from the road to the trail. If selected as the action alternative, impacts of the construction and use of the trail will be determined under NEPA procedures with FS specialists and VOLPE contractors.

BPE 03 - Stripe an at-grade bike and/or pedestrian trail using the existing road width, widening where possible

Description: To address user conflicts between the tram and bicyclists and pedestrians, this element would widen and/or stripe the current road to define space for bicyclists and pedestrians. These types of paths work well for those visitors that are already familiar with them. For many first-time visitors, the striped pathway may be confusing and could result in poor compliance. Poor compliance lessens the value of such striped routes and could create potential head-on conflicts between first-time visitors to the canyon and cyclists. Additional liability rests on the USFS to properly maintain signage, striping, and other pavement markings, as well as managing the accident data and taking action on that basis.

Costs: Striping alone would have little capital or maintenance cost. Widening the existing road would have high capital expense, but less than a completely segregated bike/pedestrian trail. The capital and maintenance costs of recreational bike and pedestrian trails range considerably depending on the stability of the terrain, the number of stream crossings, and the ability to find an alignment without excessive grades (see BPE 02)

Safety: Effects of striping are unclear. Forest Service representatives have suggested striping may be ineffective. Pedestrians and cyclists tend to ignore striping; those visitors who ignore striping and are listening to personal audio devices may cause greater opportunity for conflicts and collisions. To minimize conflicts and increase the probability of success, the amount of room granted to pedestrians and cyclists only (and not shared with the tram), should be a minimum of 10 to 12 feet wide.

Cultural Landscape, Natural Environment, Historic Resources: Striping the existing road would have little effect on the cultural landscape, natural environment, or historic resources. Construction of an at grade shared-use path would introduce a new man-made structure, thus the impact to the historic and cultural resources would be adverse. Significant environmental impact is expected in the relatively steep canyon.

Technical Feasibility, Anticipated Response, Disruption: On its own, striping is technically feasible and would result in little disruption. Existing users would likely be ambivalent about such a change, with some liking the idea and others ignoring the striping all together. The technical feasibility of widening the road to create a shared-use path is unknown but likely to be challenging. User disruption during construction would be high as a result of shutdowns during construction. Once the trail is complete, user conflicts should be lessened. Anticipated response by pedestrians and particularly bicyclists is likely to be positive.

Next Steps: Next steps include conducting a survey and geotechnical study to confirm technical feasibility and identify potential alignments, and develop a preliminary design and cost estimate.

INF 01 - Create alternate trail network that avoids stream crossings and facilitates evacuation

Description: This project would involve the linking of the road to the Phoneline Trail with a series of connector trail segments. Phoneline is approximately 300' above the canyon floor on the eastern canyon wall. The 'connections' would be switchback type trails and the trailheads (or access points) would be spaced at regular intervals along the road so as to facilitate self extraction in a flood.

Costs: Trail construction of this kind would be equivalent to the previous estimate ($45,000 per mile) but ongoing maintenance costs would be significant due to run-off, erosion, and debris flows during the monsoon season.

Safety: These trails would likely be very steep making safety and access somewhat of an issue for mobility impaired individuals. The disturbances caused by the construction and use of the trail may undermine the slope and increase mass movement of the slope above (i.e. landslides)

Cultural Landscape, Natural Environment, Historic Resources, Disruption: Cultural and archaeological concerns are minimal since most historic and prehistoric sites are located in the flat area outside the mouth of the canyon. However, this project may increase sedimentation and disturbances in the creek because of the increased potential for erosion.

Technical Feasibility and Anticipated Response: It is unclear whether this element is technically feasible. The canyon walls may be too steep to facilitate construction of a usable path. Furthermore, visitors would require education about the existence, purpose, and function of the trail, and signage would have to be created to facilitate wayfinding in the event of an emergency. Public response is likely to be ambivalent.

Next Steps: A consultation with geo-technical engineers to provide an initial assessment as to the technical engineering feasibility and approach should be the next step.

INF 04 - Widen the bridges and bridge approaches

Description: This option is a proposal to widen the approaches to and the decking of the historic low water crossings. This would reduce conflicts between cyclists, walkers and tram users. The design would replicate the historic look of the existing bridges but would create a wider road prism. It is possible that this project could be done when major reconstruction of the bridges are needed due to damage from a flooding event or other major maintenance overhaul activities (opportunistic reconstruction)

Costs: Costs would be highly dependent on the manner in which the bridges are widened. The project could be very labor intensive due to the stone work detailing that would be required to replicate the historic look. A reinforced concrete flat slab simple span is estimated at $160 per square yard.

Safety: This action would improve visitor circulation at the water crossing bottlenecks by reducing congestion. This action would not change the baseline frequency of evacuation operations unless the new structures were designed to not inundate during flood events.

Cultural Landscape, Natural Environment, Historic resources, Disruption: This action would significantly impact the cultural and historic features in the canyon. The low water crossings were built during the Civilian Conservation Corps era (c. 1935) and are eligible for induction into the National Register of Historic Places. Alteration of these would require local, state and federal level studies/authorizations. Water flow in the creek would also be altered depending on the engineering of the new structures which could impact the riparian vegetation as well as the habitat of the endangered Gila Chub. Construction of the new structures would also be disruptive to visitor flow.

Technical Feasibility and Anticipated Response: Pending a bridge structural and engineering assessment, it is unclear if this proposal is technically feasible at an acceptable cost. Initial public scoping of this idea proved it to be very unpopular.

Next Steps: The next step would be to conduct a preliminary structural and engineering assessment.

INF 05 - Redesign bridges to improve flow and reduce sedimentation issues; keep historic look but change engineering

Description: This element proposes to change the profile of the existing bridges to increase the volume of water flowing underneath.

Costs: Cost estimates are highly dependent on the particular bridge but, due to the nature of the intervention, demolition and construction costs would be significant. This element would require complete removal of the existing bridge structures and re-grading the vertical profile of the road approach at either end. Additionally, this alternative may require dredging, and additional drainage structures including rip rap and river barbs (structures that re-direct the flow to a desired channel)

Safety: This element would increase safety because it would allow the road to function as an all weather evacuation route. The crossings, instead of functioning as dams, would function as bridges to allow water and sediment to pass through them.

Cultural Landscape, Natural Environment, Historic resources, Disruption: This action would significantly impact the cultural and historic features in the canyon. The low water crossings were built during the Civilian Conservation Corps era (c. 1935) and are eligible for induction into the National Register of Historic Places. Removal of these would require local, state and federal level studies/authorizations. Water flow in the creek would also be altered depending on the engineering of the new structures which could impact the riparian vegetation as well as the habitat of the endangered Gila Chub. Demolition of the old structures and construction of the new structures would also be disruptive to visitor flow.

Technical Feasibility and Anticipated Response: It is unclear whether this element is technically feasible. The required vertical profile of the road approaches may be too great. It may not be possible to physically remove the existing bridges. Initial public scoping of this idea proved it to be very unpopular.

Next Steps: A consultation with bridge and geo-technical engineers to provide an initial assessment as to technical engineering feasibility and approach.

INF 07 - Develop new bridges for pedestrians off of the existing roadway network

Description: The current configuration of Sabino Canyon's roads and trails leaves visitors and the infrastructure vulnerable to flooding. In addition, the narrowness of the bridges limits concurrent passage of trams and pedestrians. This element would retain the existing narrow historic bridges for tram use while constructing a separate bridge at each stream crossing for pedestrians. Three new pedestrian bridges may be located in the following locations:

- Downstream of vented low water crossing 1;
- Downstream of crossing 3; and
- Upstream of crossing 4.

Costs: Costs are dependent on both the design and the span length. Span length also determines the number of columns and footings needed. However, a pedestrian bridge is lighter and requires a lower load bearing capacity than an equivalent span that would serve motorized traffic. Unit costs (per pedestrian bridge) can equal $750,000147, but in the context of the Sabino Canyon road would probably be far less.

Safety: Risks of flood occurrences would be unchanged, but evacuation could be facilitated by the separate bridges which would also allow unimpeded access by first responder equipment. User conflicts between the tram and pedestrians would be resolved at the narrowest sections of the road on the bridges.

Cultural Landscape, Natural Environment, Historic Resources, Disruption: New bridges would introduce a new element to the cultural landscape. The effect on historic resources (e.g., the existing bridges) could be adverse because of adverse visual impact. Design of the new pedestrian bridge could help, however, to mitigate the visual impact – particularly on the approaches to the two bridges. Construction is likely to disturb the streambed edges. It is unlikely to degrade water quality because usage is limited to pedestrians only (i.e., no contaminant runoff). Disruption due to construction is likely to be moderate to high since the current road and bridges are needed for construction staging. Closures are likely during construction. Technical Feasibility and Anticipated Response: There are no known technical difficulties. Public response is likely to be mixed, since this element radically changes the road prism and is likely to be seen by some as a major impairment to the cultural landscape.

Next Steps: Some visualization studies should be undertaken first along with a public process for review and input. More detailed cost estimates should be developed.

MGMT 01 - Create and disseminate a disaster evacuation, rescue, and communication plan

Description: Sabino Canyon and the surrounding Santa Catalina Mountains are susceptible to flash flooding, especially during the monsoon season (mid-June through September). The floods that occurred in 2006 demonstrated the susceptibility of transportation infrastructure to flooding and debris flows by destroying sections of road and bridge approaches. During flood events, the road and bridges are virtually impassable by pedestrian and vehicle traffic. A disaster plan created to facilitate evacuation, rescue, and sheltering of visitors would significantly improve safety in Sabino Canyon. The plan should include methods of detecting impending flood events and evacuation trails and aggregation points for sheltering-in-place. The plan should consider how to communicate to visitors regarding general and acute risks of flooding, what to do in case of flooding, and necessary considerations for evacuation, rescue, and sheltering-in-place.

Costs: A disaster evacuation, rescue, and communication plan can likely be in place within a 6-month to 1-year time period for $50,000 to $200,000, depending on the level of detail.

Safety: A disaster evacuation, rescue, and communication plan would assist visitors in evacuating or sheltering-in-place prior to a flash flood event. Such a plan would assist Forest Service personnel and state and county rescue workers in evacuating and retrieving visitors.

Cultural Landscape, Natural Environment, Historic Resources, Disruption: A disaster plan itself would have little consequence to the built environment, though physical improvements resulting from the plan such as signage, alert systems, and sheltering components may affect the natural view shed. Similarly, the plan itself would not impact the natural environment. Historic resources would not be affected by a disaster plan. By its nature, a disaster disrupts recreation in Sabino Canyon. The disaster plan would seek to minimize this disruption and facilitate evacuation, rescue, or sheltering in an orderly manner.

Technical Feasibility and Anticipated Response: A disaster evacuation, rescue, and communication plan is technically feasible, although feasibility of additional safety infrastructure would have to be considered by the planning process itself. Creation of an evacuation plan was favorably received by Forest Service staff and key Sabino Canyon stakeholders and can reasonably be expected to be of high importance to the general public. Its creation is necessary and should not be dependent on public enthusiasm.

Next Steps: A planning effort may naturally evolve from the "Monsoon Safety Awareness" campaign the Forest Service and members of the safety and rescue community have cultivated for the past two years.
Potential partner organizations include:

- American Red Cross Southern Arizona Chapter;
- City of Tucson, Departments of Transportation and Stormwater Management;
- National Weather Service;
- Northwest Fire/Rescue District;
- Paluda Insurance Agency;
- Pima County Office of Emergency Management and Homeland Security;
- Pima County Health Department;
- Rural/Metro Fire Department;
- Southern Arizona Rescue Association;
- Tohono O'odham Nation;
- Tucson Electric Power;
- Tucson Fire Department; and
- Vaisala, Inc.

While that effort has focused on general flood safety, a disaster evacuation, rescue, and communication plan may be more specific to the geography, hydrology, and natural and built infrastructure in Sabino Canyon itself.

MGMT 02 - Develop aggregation points to shelter-in-place

Description: It is generally easier to rescue a concentrated group than dispersed individuals. To facilitate group rescues and evacuations, Sabino Canyon Recreation Area should have safe, signed areas where visitors can collect and wait out a flooding event together. These areas should be located to facilitate access by rescue crews, either by helicopter in the case of emergency, or by foot/vehicle after flooding has subsided. A covered facility should be considered and equipped with emergency supplies or emergency communications equipment. Challenges related to this element include how many supplies would be available and what visual impact would they have, and how would emergency supplies be protected against theft and vandalism. Appropriate locations for aggregation points include: (1) Intersection of Telephone Line Trail and Bear Canyon Trail, (2) Opposite Rattlesnake Creek (on South Side), (3) Tram Stop 1 at Rattlesnake Creek, (4) Tram Stop 7, and (5) others identified by a disaster evacuation, rescue, and communication plan (see MGMT 01)

Costs: Costs would include those required for physical infrastructure and for communications efforts. Physical infrastructure includes basic signage ($18 each) and improvements to areas to be designated aggregation points. Communications efforts include all efforts to inform visitors about the existence and function of the aggregation points. Exact requirements and costs would be identified during the creation of a disaster evacuation, rescue, and communication plan (see MGMT 01)

Safety: This element should improve visitor safety during flood events by providing and communicating safe locations for visitors to wait out storms and to provide specified locations to facilitate evacuation if needed.

Cultural Landscape, Natural Environment, Historic Resources, Disruption: There would be little impact to the cultural landscape, natural environment, or historic resources of this element if only signs are used to note the locations of the aggregation points. A compromise would need to be found between highly-visible signs and those that blend in with the natural landscape but may not be as visible to visitors. Allowing for helicopter landings would likely have some impact on the surrounding environment.

Technical Feasibility, Anticipated Response: A group shelter-in-place scheme would be technically feasible, and require little disruption to the canyon. Positive response to signed aggregation points is anticipated. Covered shelters and storage of emergency equipment may be seen as taking away from the natural environment and may be subject to vandalism. The Southern Arizona Rescue Association (SARA) may be willing to sponsor or monitor the materials stored at the shelter facilities.

Next Steps: The next steps include working with SARA to determine the most appropriate locations for aggregation points. It would make sense for this to be part of a larger safety/ emergency plan for Sabino Canyon (see MGMT 01)

MGMT 03 - Develop flood detection and early warning system

Description: Despite the existence of modern weather forecasting equipment in and above Sabino Canyon, there is no system to combine and interpret precipitation and stream flow readings, predict or detect potential flood events, and communicate flood conditions to canyon visitors. This element suggests improving the current data collection system, creating a detection/prediction system, and using a communication technique such as an air-raid siren to warn visitors of impending flash floods. This element would provide additional data for early warning of potential flood events. The National Weather Service (NWS) and Pima County Regional Flood Control District monitor weather, precipitation and stream flow with gages in Pima and the surrounding counties using the NWS's Automated Local Evaluation in Real Time (ALERT) system. Four gauges provide precipitation data every 12 hours or at every millimeter of precipitation. They are located at: Sabino Creek @ Dam (2160), Sabino Creek 0.6 miles south of Marshall Gulch (2290), Mount Lemmon (1090), and White Tail (2150). The U.S. Geological Survey collects stream-flow data at Sabino Canyon Dam. The gauge (09484000) provides real-time information about water discharge, gauge height, precipitation, and battery voltage. USFS can work with the NWS Tucson Weather Forecast Office, the Pima County Regional Flood Control District, and the USGS to add stream gauges and/or precipitation gauges within the canyon watershed in order to better model and monitor water flow. This data could be made available to USFS staff and integrated with development of a flood detection and early warning system.

Costs: Specific costs for research, design, and implementation of such a flood detection and warning system must be determined by weather prediction professionals. Air-raid sirens range roughly between $20,000-$80,000 per siren, with the total number of sirens depending on the range of the signal and the size of the park 150151152153. A stream flow gauge with cellular or radio communications device may cost between $5,000 and $7,000, while a precipitation gauge with cellular or radio communications device may cost between $3,500 and $5,000.

Safety: Improved stream flow monitoring will not have a direct impact on preventing damage from flooding, but it will likely improve safety with respect to flooding by providing timely information so that visitors may evacuate or seek shelter prior to the arrival of the flood water. No user conflicts are expected from increasing water flow monitoring.

Cultural Landscape, Natural Environment, Historic Resources, Disruption: The cultural landscape will be negatively impacted by the addition of the monitoring devices. It is expected that most of the monitoring devices would be located toward the headwaters of the Creek, beyond the area that most visitors see. Some back-country visitors' wilderness experience will be impacted, and vandalism of the equipment may be of some concern. Furthermore, air-raid sirens may be placed at one or more visible locations within Sabino Canyon in order for warning alerts to effectively reach visitors. Visible placement may interrupt the continuity of the view shed of the natural environment. The signal of an air-raid siren may disturb wildlife in the canyon, although it is anticipated the siren would only be used on occasion under the direst flooding circumstances. The air-raid siren would have no impact on historical resources. Under normal circumstances, limited visitor disruption is expected. In extreme events the air-raid siren is actually intended to disrupt visitors in the canyon and provide a signal to evacuate or shelter-in-place.

Technical Feasibility and Anticipated Response: Implementing a flood detection and warning system is technically feasible but must be paired with proper evacuation and rescue planning, education of and communication with canyon visitors, and operations, management, and maintenance of the system (see MGMT 01 and MGMT 02). For example, prior to implementing flood detection and warning system, safety and evacuation officials must create a rescue and evacuation plan that specifies what actions visitors should take depending on their locations in the canyon. Officials need to communicate this plan and information about the flood warning system to visitors so that they know how to interpret the sirens. Officials must identify an organization to operate, manage, and maintain the system. Interest for a flood detection and early warning system was high both among Coronado National Forest Service staff and key stakeholders of Sabino Canyon and can reasonably be expected to be well received by the general public.

Next Steps: Next steps are to coordinate with NWS, Pima County Regional Flood Control District, and USGS to add additional sensors to the regional monitoring system and develop tools to provide immediate access to impending high water events to USFS Sabino Canyon staff. Such a system should be integrated with efforts to create a disaster evacuation, rescue, and communication plan (see MGMT 01 and MGMT 02)

Sabino Creek Flood Water Analysis

DRAFT

Prepared For:

United States Forest Service (USFS)

Prepared By:

Research and Innovative Technology Administration (RITA)
Volpe National Transportation Systems Center

December 2012

Approach

The extent of the historic high water mark in Sabino Canyon was unknown at the time of this analysis. The goal was to develop maps that visually outline the extent of Sabino Creek flood waters during a major flood event. GIS Software from Environmental Science Research Institute (ESRI) was utilized in order to determine what the elevation of the flood waters were at 33 cross-sections of Sabino Creek. A Digital Elevation Model[1] (DEM) with a resolution of 1/9th arc seconds (3 meters) was used to model the canyon in 3 dimensions. Transect lines were drawn perpendicular to the flow direction of the creek at 33 locations along the creek bed. Each transect line was broken up into 500 evenly spaced points and X, Y, and Z information was calculated for each point in NAD 1983 UTM Zone 12N coordinates. This information was exported into comma separated value (CSV) files. These points gave 33 distinct profiles for Sabino Creek. A computer program was written that read each of the CSV files and calculated the flow rate at each cross-section for water height increments of 0.1 meters. The program utilizes the Gauckler–Manning formula to calculate flow rates and assumes that the creek bed has an average slope of 0.032 downstream and a manning coefficient of 0.025. A flow rate of 17,000 cfs [2] was used in order to calculate the elevation of the flood waters in this analysis. This is the flow rate that was experienced by the canyon during the July 2006 flood. The cross-section water elevations were used to create a three dimensional surface that represents the surface of the flood waters in Sabino Creek during a 17,000 cfs flow event. This surface was then compared against the existing DEM using ESRI 3D analysis tools to determine the extent of the flood waters. The results of the analysis are presented in this report.

[1] DEM File downloaded from USGS National Elevation Dataset. Data was dated April 2011. (**http://ned.usgs.gov/**)

[2] Flow rate was taken from SABINO CANYONRECREATION AREA ERFO IMPROVEMENTS DESIGN STUDY REPORT CORONADO NATIONAL FOREST AZ ERFO 100(991)

Sabino Canyon

Legend

- Sabino Creek Dam
- Sabino Canyon Bridges
- New Concrete
- New Pavement
- Sabino Creek
- Sabino Canyon Road
- Major Flood Event Extent
- Shuttle Stops
- Bathrooms
- Phoneline Trail

1 2 3 4 5 6 7 8 9

N

0 460 920 1,380 1,840
Meters

Sabino Canyon

Legend

- Sabino Creek Dam
- Sabino Canyon Bridges
- New Concrete
- New Pavement
- Sabino Creek
- Sabino Canyon Road
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- Phoneline Trail

N

0 150 300 450 600 Meters

Sabino Canyon

Legend

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- New Pavement
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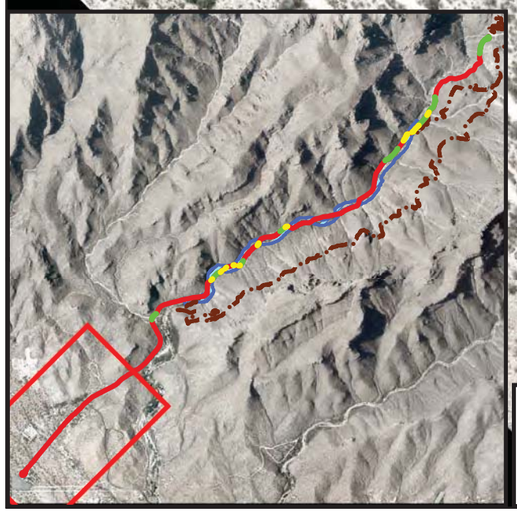
- Shuttle Stops
- Bathrooms
- Phoneline Trail



N

0 130 260 390 520
Meters

1

Sabino Canyon

Legend

- Sabino Canyon Bridges
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- Major Flood Event Extent
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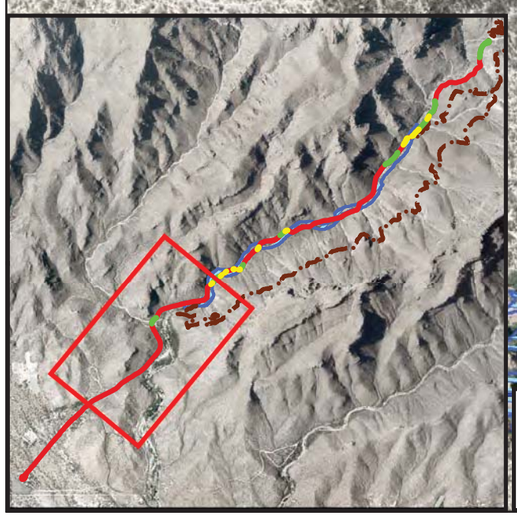

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2 3 4 5

N

0 130 260 390 520
Meters

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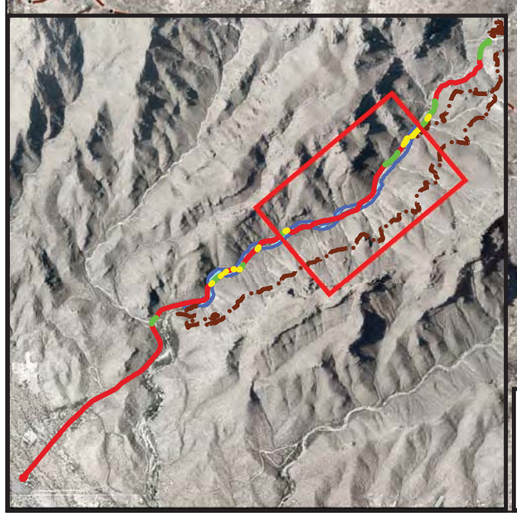
5

6

7



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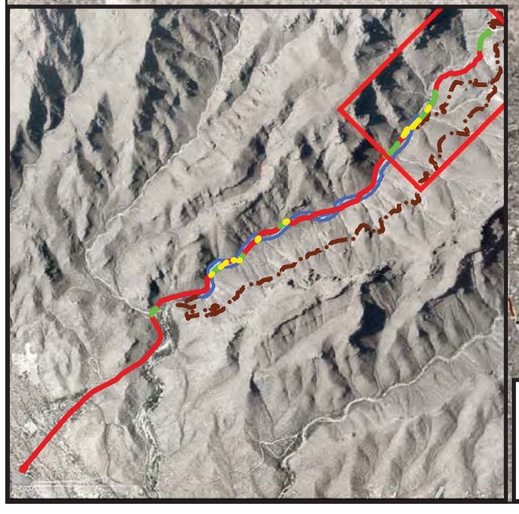
7

8

9



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Meters

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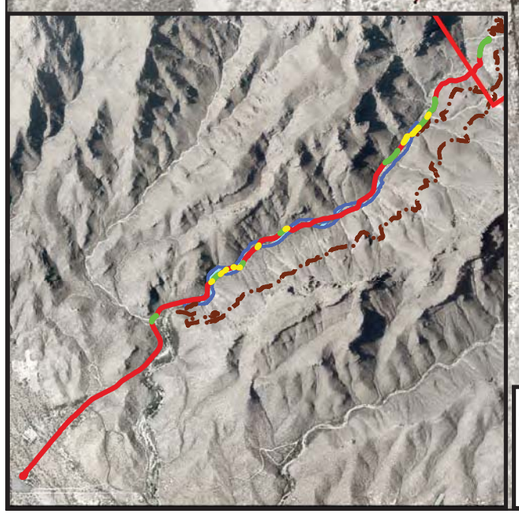


0 130 260 390 520 Meters

SABINO CANYON: PROPOSED MID-SLOPE TRAIL

U.S. DEPARTMENT OF TRANSPORTATION
VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER

SABINO CANYON
TUCSON, ARIZONA

- PROPOSED MID-SLOPE TRAIL
- PROPOSED ACCESS TRAIL
- PROPOSED CREEK BRIDGE CROSSINGS
- PROPOSED TRAIL HEAD
- EXISTING SHUTTLE STOPS
- EXISTING BATHROOMS
- EXISTING LOW WATER CROSSINGS
- SABINO CREEK
- CENTERLINE OF EXISTING ROAD
- ESTIMATED HISTORIC HIGH WATER (2006) FLOOD LEVEL
- EXISTING TELEPHONE LINE TRAIL
- EXISTING CONTOUR LINES (METERS ABOVE SEA LEVEL)

0 0.1 0.2 0.3 0.4 0.5 Miles

N

Arizona Access Program Project Application

General Information:

The Programming Decisions Committee (PDC) of the Arizona Access Program will review project applications and rank them based on weighted selection criteria developed by the PDC. The selection criteria are reflective of needs in the state of Arizona and Federal regulations and guidelines.

It is important to note that the top ranked project is not guaranteed funding and the approved list of projects will be agreed upon by the PDC. Project approval resides with the PDC. The PDC will select a balanced program made up of some large projects with smaller projects used to maximize funding and address critical needs. Access Program funds are eligible for design, construction, or reconstruction and are not intended for maintenance (chipseal, potholes, etc.) projects.

Access Program projects require a non-federal match of 5.7%. By submission of an application you are acknowledging the match requirement and indicating that funds are available. If the project is selected you will be expected to enter into an agreement for the completion of project scoping by Central Federal Lands that will result in a more accurate project scope, schedule and budget. If the PDC and the applicant agree with the project scope and cost then an agreement for the project will be executed with the applicant agreeing to provide 5.7% of the project cost as non-federal match.

Instructions:

Applications must be received by **February 28, 2013** to be considered.

1. All project applications must be submitted using the Arizona Access Program Project Application form. Complete the project application to the best of your ability. It is the responsibility of the entity proposing a project to supply the necessary information to complete the project application. It is understood that data may not be available for all of the project application questions, but the agency may use anecdotal information as a substitute.
2. Complete Project Application Signature Pages.
3. Email your completed application package to cfl.planning@dot.gov

If you are considering this application for your project and would like assistance in completing this form, contact:

Stephanie Lind, Transportation Planner

Central Federal Lands Highway Division
Attention: Stephanie Lind
12300 West Dakota Ave, Ste 380B
Lakewood, CO 80228
Phone: 720-963-3555
stephanie.lind@dot.gov

Additional information on the Access Program is located at www.cflhd.gov/programs/flap/az

Checklist of Requirements for Certification:

- ☑ Signed support page/letter from applicant and applicable Federal Land Management Agency (back pages)
- ☑ Verification in application that match requirements are met
- ☑ Project maps (include one identifying termini)
- ☑ Up to 5 photos of project location
- ☑ Video tour of project limits (optional but strongly encouraged), mailed in an electronic format
- ☑ Supplemental alternative transportation worksheet (alternative transportation projects only) Link to form

Arizona Access Program Project Application

General Project Information

D. Project Identification (fill out what is applicable)

Facility Name: Sabino Canyon Bus Circulator Route	Local Route #: N/A
Other (local) Facility Names/Designator (if any): N/A	
Agency with Jurisdiction (authority to control traffic): Pima County and City of Tucson	
Agency currently maintaining facility: Pima County and City of Tucson	
Functional Classification: ☐ National Highway System ☐ Arterial ☑ Major Collector ☐ Minor Collector ☐ Local Road	
Termini (mileposts or landmarks): Begin: Tohono Tadai Transit Facility	End: Morris K Udall Park
Project Length: 17 Miles	
Road Width, Existing: 95' to 50' ROW	Road Width, Proposed: No Change
Posted speed limit of facility: 35 to 45 MPH	Proposed speed limit: No Change
Project is designed to the following standard: ☐ AASHTO ☐ State ☑ Local Government ☐ Federal Lands Highway (FLH)	

1. **Provide a brief summary of the project** (stay within space provided):

   The proposed project will link the Sabino Canyon Recreation Area (part of the Coronado National Forest) to Tucson's greater transit network with distinctively branded, cutaway style bus shuttles. The system will feature alternative fuels technology.

2. **Description of project need: summarize the need for this project, what purpose does this project serve (**List physical and functional deficiencies, anticipated changes in road use, or known safety problems. Describe consequences and actions that will be taken if Access Program funding is not received).

   This project would accomplish a number of important goals which would be beneficial to the Forest Service and the city of Tucson:
   - It would provide transit dependent communities access to open space and recreational opportunities
   - It would alleviate traffic congestion along Sunrise and Sabino Canyon Road
   - It would alleviate on-site parking congestion
   - It would reduce the carbon footprint of the recreation area by reducing the number of vehicle trips
   - It would reduce carbon emissions in the recreation area by reducing net vehicular usage

   If funding is not received, the district will have to continue manage the symptoms of high private automobile usage which include: Illegal parking on public ROW, long traffic queues for ingress/egress and resource damage due to carbon emissions.

3. **Description of the proposed work (**Provide a summary of the work required to complete this project:)

   The project will entail: Route programming, scheduling, procurement of rolling stock, branding / marketing, and operations / maintenance. The physical build out will entail bus shelters and/or stops.

4. Key Items of work (check all that apply):

☐ Paving	☐ Road base or surface Course	☐ Major concrete structures
☐ Major culverts	☐ Safety enhancements	☐ Earthwork
☐ Bridges	☐ Minor drainage improvements	☐ Bicycle/Pedestrian facilities
☐ Technical study	☐ Roadside safety structures	☑ Transit Facilities

☑ Other (specify): Branding and marketing

Note: Applications that include alternative transportation elements (transit, bicycle, pedestrian, etc), please fill out the supplemental worksheet for alternative transportation, it can be found at: http://www.cflhd.gov/programs/flap/documents/AlternativeTransportationWorksheet.pdf

5. Right-of-Way Acquisition:

Is right-of-way acquisition required? ☐ Yes ☑ No ☐ Not Applicable If "no" then proceed to Utilities item

Classification of right-of-way required for project:
☐ Extensive (5 or more owners) ☐ Minor (1-5 owners)

How does the applicant plan to acquire and pay for right-of-way?

N/A

Estimate how long will it take to acquire right-of-way? Describe the key issues and circumstances.

N/A

6. Utilities: Identify utilities in the roadway corridor.

N/A

Would relocation be required? ☐ Yes ☐ No

How does the Cooperator plan to pay for utility relocation?

N/A

Estimate how long will it take to coordinate or relocate utilities? Describe the key issues and circumstances.

N/A

E. Access Mobility and Connectivity:

1. What FLMAs are accessed by this project:

Name of FLMA	Site(s) or Major Destinations Accessed	Distance from Project (miles)	Annual Visitation Estimate
United States Forest Service	Sabino Canyon Rec. Area	Direct Access	1,000,000

2. Provide any available traffic data from recent counts or other documented sources:

	Current	20-Year Projection	Data Source
Average Daily Traffic (ADT)	5,253 Vehicles	~ 6,500 Vehicles	Inductive loop traffic counts (PAG)
Seasonal Average Daily Traffic	7,354 Vehicles	~ 8,500 Vehicles	Inductive loop traffic counts (PAG)
Recreation Visitor Days (RVD)	365	365	Never closed
% ADT as FLMA visitors/users	18 %	18 %	Vehicle counts at fee station (10yrs)

Note: If no data (i.e., counts) are available, please estimate range. (< 200, 200-500, 500-1000, > 1000 vehicles per day)

3. Describe how the project will provide access to high use FLMA recreational site(s):

A large proportion of daily traffic to Sabino Canyon comes from the surrounding neighborhoods in the Catalina Foothills (along Sunrise road) This user segment, projected at 25% to 35% of total visitation, comes to the recreation area regularly (3-5 times per week) to exercise. Convenient bus service from these neighborhoods would improve access while reducing private automobile usage.

Additionally, the proposed project would link two important transit nodes to the Recreation Area: the Tohono TADAI Transit Center and the newly expanded transit hub at Morris K Udall Park. The Tohono center is a regional hub with local, city and greyhound bus service and the Udall transit hub is a multi-modal facility adjacent to a high use municipal park. The proposed route, with the linkages to the transit nodes, would improve access to Sabino Canyon for the city and region.

4. Describe how the project is addressing parking shortages, if applicable:

During high season (from January to April) the 300 stall parking lot is frequently at capacity, especially during mornings and weekends. Despite the relatively high turnover, visitors sometimes have to circle the lot a few times to find a space.

Additionally, parking shortages can cause visitors to park illegally on Sabino Canyon road causing safety concerns.

5. **To what extend does the project improve or provide linkages to alternative modes**? Explain in detail. Alternative mode improvements could include transit, bicycles, pedestrians, equestrians, park-and-rides, etc. *Note: This will not apply to all projects.*

   Sabino Canyon features an on-site transit system to take people from the visitors center to numerous sites and landmarks within the recreation area. The proposed service would allow for a convenient transfer between the two systems. Cycling the road along the canyon is also a popular activity so including bicycle stowage on the rolling stock would incorporate this user group as well. Finally, the proposed system would also drop visitors off at the trailheads, increasing pedestrian connectivity.

6. **What is the anticipated usage for the alternative transportation system?** *Note: This may not apply to all projects. Applications specifically for alternative transportation facilities should attach the Alternative Transportation Worksheet, located here: Link*

   Benchmarking is the most accurate way of forecasting usage for this type of system (urban area to public land or park) Both Denali National Park and Acadia National Park have similar systems.

   The Denali system (Doyon/Aramark) captures 4% of visitation, the Acadia system (Island Explorer) captures 10% of visitation. Assuming a 7% capture for Sabino (taking the average of the two) this would equal ~70,000 fares per year OR a reduction of ~30,000 RT vehicle trips per year OR a reduction of ~283,000 VMT.

7. **Does the project provide for a new mode on the corridor:** [✔] Yes [ ] No

   If so, what modes: All day bus transit service along a corridor where there currently is very limited service

8. **Describe how the project will reduce congestion and travel time:**

   Less net vehicle trips to the recreation area (because of mode shift) necessarily means less congestion in the parking lot and the adjacent roads. Additionally, only visitors who park a vehicle in the parking lot have to pay the $5.00 daily use fee. This provides an incentive to arrive via an alternative mode (25% of visitation walk or bike in currently) The proposed project would provide an additional 'fee free' mode of arrival potentially increasing mode shift and decreasing congestion.

   Additionally, visitors arriving by bus will not have to queue at the fee station because a priority lane will be opened adjacent to the existing lane exclusively for shuttles/busses.

9. **How will the project enhance the experience of visitors to the relative FLMA?** (e.g.: enhanced way-finding, interpretation at vehicle pull-off, etc):

   The arrival sequence via private automobile is unimpressive (parking in the middle of a large lot) and can cause confusion among first time visitors who cannot locate the canyon. The proposed system would drop visitors off within view of the canyon and short walking distance to the visitor's center and on-site transit system enhancing wayfinding.

   The departure sequence is also problematic. There are 2 schools whose parking lots empty onto Sabino Canyon road and at times when parents are picking up or dropping off their children, this road is very congested making the left turn out of the parking lot very difficult. Less cars in the parking lot would mean less wait time to exit.

10. How will the project improve connectivity of the transportation network?

The project would link 3 important activity nodes in northern Tucson namely: the Sabino Canyon recreation area, the Morris K. Udall park and transit hub and Tohono TADAI transit Center. The route would provide access between and among these activity nodes as well as from the numerous neighborhoods in northern Tucson.

See video tour of the route at: http://www.youtube.com/watch?v=YiGYkuKyFyA

11. Is the project located on a designated scenic byway: ☐ Yes ☑ No

If so, which one(s)_____

12. How does the route connect to other recreational corridors?

In 2 different locations (River and 1st, River and Sabino Canyon) the proposed route would cross the Rillito River Path, a 12 mile multi use recreation corridor which travels east/west along the city's northern boundary. Access would be developed between the River Path and the proposed system.

Additionally, at the TADAI Transit Center, the proposed route is within 1/8 of a mile of the Mountain Avenue Bikeway, a major north/south bicycle thoroughfare which links the Rillito River Path to the University of Arizona.

F. Economic Development

1. Describe how the project supports economic development at the local, regional, or state level:

Between the visitors center (gift shop) the on-site shuttle system and the parking facilities, Sabino Canyon generates approximately $2,000,000.00 of direct revenues annually.

Furthermore, Sabino Canyon is one of the top 5 most visited attractions for tourists coming to Tucson. Sabino draws national (approx. 30% of total visitation) as well as international (approx. 20% of total visitation) tourism which provides indirect revenues for the city and surrounding areas.

Finally, because of the increased exposure this project will give to the Forest Service and the Catalina Ranger District, net usage of recreation facilities (campgrounds, ski facilities, lodges, restaurants) will increase. Mt. Lemmon, also on the Catalina District, features all these amenities. These 'special use' amenities are managed and operated by private concessionaires, generally local entrepreneurs.

The project could drive visitation numbers up, buoying direct as well as indirect revenues, tourism, special uses and economic development.

2. **Describe any economic benefit for Federal Lands due to the project** (e.g. renewable, non-renewable or recreational resources):

While this project will not generate any additional fee revenues through Sabino Canyon's rec fee program (because transit riders would not have to pay the fee) however it will likrly buoy usage fees (campsites, lodge remtals, camping fees, etc.) in other areas of the District or Forest. Increased exposure to the Forest Service and its programs can increase the public's knowledge, perception and comfort level with developed recreation (and the associated fee programs) Forest wide.

G. Condition:

1. **What is the current road condition (using standard pavement condition ratings)?**

The most recent International Roughness Index (IRI) study determined the route to have an average rating of 168.5 (Sunrise and Sabino Canyon road) within the 'Acceptable' range.

2. **List structures and load ratings included in the project, if any:**

National Bridge Inventory Structure #	Bridge Dimension Length x Width	Bridge Load Rating
10341	124.6m x 17.8m	MS 18

3. **How would the proposed project affect maintenance and operating costs of the existing transportation network?**

Operations of the proposed system is calculated at $50.00 per service hour. Maintenance costs of the facilities along the route (roads, bridges, culverts, sidewalks, curbs) are not expected to be impacted beyond normal wear and tear. See cost model (attached) for detailed breakdown of project costs.

H. Safety:

1. **Describe any known safety risks** (e.g. crash sites, inadequate sight distance, roadside hazards, poor vertical/horizontal alignment, hazardous intersections, inadequate lane and shoulder widths, etc):

   NONE

2. **How will the project correct safety issues noted above? Describe the benefits of the project** (ex: if available, include crash reduction factors or benefit/cost to support your answer):

   N/A

Arizona Access Program Project Application

I. Funding, Coordination and Cost:

1. Project Cost Estimate

Fill in amount for appropriate scope items given the Central Federal Lands unit cost listed after each item. When applicable, unit cost is based on a two-lane road. Check all that apply. (If detailed estimate exists for this project it may be used instead of this standard calculation, or if project doesn't fit well into this estimating format.)

☐ Bridge replacement

Square Feet (SF) of Bridge: _____ x $250/SF = $ _____

☐ Pulverize and aggregate surfacing

Number of Miles: _____ x $200k/mile = $ _____

☐ 3R (i.e., Pulverize/Pave)

Number of Miles: _____ x $600k/mile = $ _____

☐ Light 4R (i.e., Regrade Road Template)

Number of Miles (gravel only): _____ x $700k/mile = $ _____

Number of Miles (asphalt): _____ x $900k/mile = $ _____

☐ Medium 4R (i.e., Widening, Minor Wall Work)

Number of Miles: _____ x $1.5M/mile = $ _____

☐ Heavy 4R (i.e., Major Widening, Major Wall Work)

Number of Miles: _____ x $3.0M/mile = $ _____

☐ Right of way . . . . . $ _____

☐ Utilities . . . . . $ _____

☑ Other: Rolling Stock - 40' Cutaway Shuttle Busses (30 pax)

Unit: 2 x $ 100,000.00 /unit = $ 200,000

ESTIMATED TOTAL COST OF PROPOSED PROJECT: $ 200,000 Capital

2. Funds requested from Federal Lands Access Program: $ 200,000 Capital + $435,000 Operations/Yr

3. What is the amount and source of project match:

Regional Transit Authority transit element (5.7% of total)

4. Describe any other funding contributions to project (include cost sharing and in-kind donations):

N/A

5. Percentage of project funds leveraged (not from Access Program): 5.7 %

6. **Describe any other improvements planned or programmed for the transportation facility in the next 20 years:**

   Normal expansion of capacity and access programs (all new roads projects include a multi-modal component) No new major facilities or projects currently planned for.

7. **What tribal, state, regional, or local plans has this project been included** (e.g.: Regional Transportation Plan, Capitol Improvement Program):

   Imagine Greater Tucson (IGT) is a region wide, multi jurisdictional, community driven strategic planning process that was initiated in October 2010. Participants include: the Pima Council of Governments (PAG) the Regional Transit Authority (RTA) SunTran, the City of Tucson, the City of Marana, the City of Oro Valley, the City of Vail, the City of Sahuarita and the Arizona Department of Transportation (ADOT) As result of the community engagement process, improved access to outdoor and recreational opportunities surfaced as a 'shared regional value' which this project would accomplish.

   This project is also consistent with the Regional Transit Authority's 5 year Transit Improvement Plan (TIP)

8. **Describe how or why this project is consistent with each approved FLMA plans as applicable** (e.g., Forest Land Management Plan, US Fish and Wildlife Regional Transportation Plan, etc):

   The proposed project is consistent with the February 2010 Transportation Analysis and Feasibility Study conducted by the USDOT Volpe Center (prepared for the US Forest Service) This study identifies public transit access to Sabino Canyon as an important resource management tool.

   The project is also consistent with the draft update of the Coronado Forest Plan, which specifically mentions improved public access to Forest system roads, trails and recreation opportunities.

9. **Who are the key partners in this project** (What role have these partners played on this project to date? Describe the support or opposition that this proposed project may receive from outside organizations or the public. Also, include State, and community coordination efforts completed to date.):

   The Forest Service is the designated Federal Land Management Agency which will benefit from the improved access, the Regional Transit Authority (RTA) is the organization that owns the facility and will be submitting the grant application and the Paul Sarbanes Transit in the Parks program (TRIP) provided technical assistance for the drafting and planning of the proposed project.

J. Natural and Cultural Resource Protection

1. Describe any environmental work or permitting that is completed on this project:

NONE

2. Identify any known natural or cultural resources associated with this project):

Negative Impact	Positive Impact	Resource
☐	☐	Wetlands/Water Resources
☐	☐	Threatened & Endangered Species
☐	☐	Sensitive Species
☐	☐	Other biological resources (fisheries, wildlife, species of concern, etc)
☐	☐	Wild & Scenic River
☐	☑	Non-attainment areas (air quality)
☐	☐	Historic & archaeological resources
☐	☐	Native American areas/concerns
☐	☐	Wilderness or roadless areas
☐	☑	Parks & recreation areas/wildlife refuge (Section 4(f)/6(f))
☐	☐	Hazardous materials
☐	☑	Air, noise, and/or visual impacts, list Less air pollution, private automobiles
☐	☐	Other, please explain_____

3. Provide narrative explaining the extent of potential impacts or improvements resulting from the proposed project on all the environmentally sensitive resources that apply (e.g., project will replace historic bridge, project goes through critical habitat, project involves a unique wetland complex, etc.):

Project stays completely on existing ROW. No augmentation, new alignments or infrastructure (other than bus stops / shelters) is currently being proposed.

4. **Describe any opportunities to address existing environmental concerns** (reduction in road-related sedimentation, fish passage improvements, dust abatement, managing visitor access, directing vehicles away from sensitive natural resources, etc.):

   This project should not only be seen as an access opportunity, but also as a tool for managing visitation.

   Transportation to (and within) parks and open spaces can be used to disperse visitors temporally as well as spatially. Times when the recreation area is at or near capacity, access could be restricted or limited. Conversely, when there are periods of low usage access could be incentivized. This would render less of a sawtooth visitor distribution pattern and ease carrying capacity concerns.

   The proposed project is also an opportunity to reduce net (citywide) carbon emissions through mode shift (less net vehicle trips, less net VMT) and through carbon offsets attained by use of alternative fuels.

5. **How does the project incorporate Context Sensitive Solutions (CSS):**

   The following stakeholder groups have expressed interest and enthusiasm (through comment cards, public outreach feedback, community meetings and informal interviews) in public transit access to Sabino Canyon: Friends of Sabino Canyon, the Sabino Canyon Volunteer Naturalists, elderly and transit dependent residents of Tucson, staff of the Catalina Ranger District, the Sabino Canyon Volunteer Bike Patrol and members of local city government.

   Because the City of Tucson an auto oriented town (in culture and in built environment) the proposed service will have to distinguish itself from the normal city bus system to attract 'choice' riders or those who have cars but choose an alternative mode. The on-site shuttle system (established in 1978) is an amenity which is associated with the visitation experience at Sabino Canyon. The proposed project can leverage the shuttle's recognition to build ridership among Tucson residents so that they see the system as an extension of the existing transit program and not as a city bus that happens to pass by Sabino. This can be accomplished with distinctive color schemes on the rolling stock, branding and marketing campaigns.

   The service is intended to be flexible to the needs and demand patterns of the public. The RTA will conduct data collection (ridership numbers, comments, usage surveys, etc.) to dynamically manage the facility to ensure the service is meeting the needs of all affected stakeholders.

Project endorsement can be printed, signed and submitted as separate PDF, or signed electronically.

K. Project Endorsement - Agency with Title or Maintenance Responsibility

By signing this sponsorship form, the FLMA representative certifies that the projects provides access to, is adjacent to, or are located within a Federal recreational site or Federal economic generator.

1. Agency submitting application: Regional Transit Authority
2. Name of authorized agency official: Cherie Campbell
3. Title: Interim Executive Director
4. Signature: Cherie Campbell
   Digitally signed by Cherie Campbell
   DN: cn=Cherie Campbell, o=RTA, ou, email=ccampbell@pagnet.org, c=US
   Date: 2013.02.28 11:00:54 -07'00'
5. Date: 2-28-13
6. Email: ccampbell@pagnet.org
7. Telephone: 520-792-1093
8. Comments on proposed project (letter of support allowed, please attach):

   Point of contact for this project is: James McGinnis, Transit Mobility and Management Planner

   Email: jmcginnis@pagregion.com

   Phone: 520-792-1093 (x505)

Arizona Access Program Project Application

Project endorsement can be printed, signed and submitted as separate PDF, or signed electronically.

L. Project Endorsement - Federal Land Management Agency

By signing this sponsorship form, the FLMA representative certifies that the projects provides access to, is adjacent to, or are located within a Federal recreational site or Federal economic generator.

1. Federal Land Management Agency (FLMA) supporting project: United States Forest Service
2. Name of FLMA representative: R. Stan Helin
3. Title: District Ranger
4. Signature: R Stan Helin
   Digitally signed by R Stan Helin
   DN: cn=R Stan Helin, o=Forest Service, ou=District, email=shelin@fs.fed.us, c=US
   Date: 2013.02.27 13:59:14 -07'00'
5. Date: February 27, 2013
6. Email: shelin@fs.fed.us
7. Telephone: 520-405-9246
8. Comments on proposed project (letter of support allowed, please attach):

Supplemental Alternative Transportation Worksheet

General Information:

This worksheet was created to provide supplemental information on alternative transportation projects applying for Federal Lands Access Program (Access Program) funds. The application still needs to be completed, this worksheet is only supplemental.

Alternative transportation project elligibility includes provisions for pedestrians and bicycles and transit operations and maintenance. To be eligible, the transit service or alternative transportation facility must be located on, adjacent to, or provide access to Federal lands for which the title or maintenance responsibility is vested in a State, tribe or local government.

All Projects:

A. Project Identification (fill out what is applicable)

Federal Land Management Area (FLMA) site(s) accessed:

Sabino Canyon Recreation Area

Define (if applicable) when "peak" and "off-peak" visitation occurs:

Peak: January through April Off Peak: May through December

Number of daily visitors to site(s):

Peak Season: 2,400

Off-Peak Season: 1,440

Average number of vehicles to site(s) per day:

Peak Season: 1,500

Off-Peak Season: 900

Current Level of Service (LOS) at peak visitation:

Ingress (un-signalized) B
Egress (un-signalized) C to D depending on time of day

Current carrying capacity of existing roads (if known):

Hourly capacity per lane on all existing roads in proposed project: 1,108 Cars/lane

What percent of that capacity is the unit operating at during peak periods:

>100% for parking facilities
80% to 90% for carrying capacity (from a resource degradation standpoint)

Discuss an off/on-site parking shortages during peak visitation and location:

Currently there is one, 300 stall parking lot for use by the public. During peak visitation, this lot can be completely full with visitors circling the lot for up to 20 minutes searching for an open spot. Additionally, some visitors park illegally on Sabino Canyon road in public ROW. This causes safety concerns.

Supplemental Alternative Transportation Worksheet

B. Transit Projects Only:

1. **When will the service be available (year-round, seasonally, what dates):**

   Year-round, 45 minute headways

2. **Days of the week:** ☑ Sunday ☑ Monday ☑ Tuesday ☑ Wednesday ☑ Thursday ☑ Friday ☑ Saturday

3. **From** 6:00 **a.m. to** 7:00 **p.m.**

4. **Describe the transit route(s) (miles served, number of stops, service hours):**

   The route would begin at the Tohono TADAI transit center in northwest Tucson which has park and ride facilities. The route travels north on 1st avenue to Orange Grove, east on Orange grove to Sunrise, east on Sunrise to the Recreation Area, south on Sabino Canyon road to Udall Park - then back on the same route. The route would stop approximately every mile and at major activity nodes along the 17 mile corridor

5. **Describe current and proposed ridership estimates (daily and annually):**

   Peak Season: Current: None Proposed: 35,000 Annual (4 months) OR 291/day

   Off-Peak Season: Current: None Proposed: 35,000 Annual (8 months) OR 145/day

6. **Describe any variability in service operations:**

   No variability in programming, will be consistent throughout year

7. **What revenue is will be collected to support the service (describe fare pricing, discounts, pass programs, etc):**

   Fare collection and fees will not differ from the system currently in place for the city bus system (SunTran) Fares will be collected onboard through SunShuttle ticketing facilities ($1.25 per one way trip) and SunTran passes will be valid for this system. The Forest Service may wish to sell special passes to visitors who wish to only utilize the proposed system (and not the greater Tucson bus system)

8. **Describe the number, type, and age of current fleet:**

   NONE: Proposal is requesting new rolling stock

9. **Describe the service area of the proposed transit system:**

   Metropolitan Tucson

10. **Describe any marketing, wayfinding, or other information that will be disseminated to promote the usage transit:**

    Signage and pamphlets in visitor's center, leaflets in parking lot, announcements on the radio, advertisements in the newspaper, distinctive branding and imaging, updates to transit website, map updates, new bus stops/shelters.

11. **Please attach any service agreement between the applicant and the applicable FLMA.**

12. **Attach a detailed cost estimate with information on the amount of funds requested by type and year.**

Supplemental Alternative Transportation Worksheet

C. Bicycle and Pedestrian Projects Only

1. **Describe the length, width, and surface type for the bicycle and/or pedestrian infrastructure:**

2. **How many bicycle or pedestrian users currently access the FLMA unit(s):**

3. **How many bicycle or pedestrian users will access the FLMA unit(s):**

4. **Describe any marketing, wayfinding, or other information that will be disseminated to promote the usage of the facility:**

United States Department of Agriculture **Forest Service** **Coronado National Forest Supervisor's Office**

300 W. Congress
Tucson, Arizona 85701
Phone (520) 388-8300
FAX (520) 388-8305
Deaf & Hearing Impaired 711

File Code: 7740
Date: February 12, 2013

Dear Programming Decisions Committee Members,

This letter is to show support for the Federal Lands Access Program grant being proposed by the Regional Transit Authority and the Catalina Ranger District. For years the district has been interested in linking the Sabino Canyon Recreation Area (within the Catalina District) to the transit network of the greater Tucson system. With a relatively modest change in service programming and hours, the transit operator (SunTran) will be able to integrate regular service to this high use area.

Main benefits of this augmentation in service are three fold:

First, the proposal would provide access to the resource for transit dependent communities.

Second, the service would alleviate congestion along Sunrise and North Sabino Canyon roads. Because much of our daily use comes from the adjacent neighborhoods, a convenient access method would present an attractive options for this segment of users.

Third, in high season our parking lot is over capacity which causes people to park illegally along public rights of way. A transit option could alleviate this safety concern.

Furthermore, an extensive study conducted by the USDOT's John A Volpe Transportation Systems Center identified this intervention as imperative to the protection of this sensitive area. Sabino Canyon is an important economic driver (through tourism) for the Tucson metro area as well as being a cultural and ecological resource for the community. If awarded, this grant will help ensure the public continued access and enjoyment of this unique place in the desert. Thank you.

Sincerely,

JIM UPCHURCH
Forest Supervisor

cc: Stan Helin

RTA
Regional Transportation Authority

177 N. Church Avenue, Suite 405, Tucson AZ 85701
Phone: (520) 770-9410 Fax: (520) 620-6981

RTAmobility.com

February 28, 2013

Dear Programming Decisions Committee Members,

This letter is to show support for the Federal Lands Access Program grant application submitted by the Regional Transit Authority and the Catalina Ranger District. For years the district has been interested in linking the Sabino Canyon Recreation Area (within the Catalina District) to the transit network of the greater Tucson system. The RTA is charged with implementing a seamless regional transit system and a public transportation connection to Sabino Canyon; an important asset in our community is an important piece of that goal.

The primary benefit of this transit improvement includes:

Providing access to the recreation area for transit dependent members of our community.

The service would alleviate congestion along Sunrise and North Sabino Canyon roads.

In high season the Sabino Canyon parking lot is over capacity which causes people to park illegally along public rights of way. A transit option could alleviate this safety concern.

In addition to providing access to Sabino Canyon, the proposed transit route will also provide job access to concentrations of employment opportunities that currently have no access to public transit.

Furthermore, an extensive study conducted by the USDOT's John A. Volpe Transportation Systems Center identified this intervention as imperative to the protection of this sensitive area. Sabino Canyon is an important economic driver (through tourism) for the Tucson metro area as well as being a cultural and ecological resource for the community. If awarded, this grant will help ensure the public continued access and enjoyment of this unique place in the desert.

Sincerely,

Cherie Campbell

Cherie Campbell
Interim Executive Director
ccampbell@pagnet.org
(520) 792-1093

FS Agreement No. 13-MU-11030505-017
Cooperator Agreement No.

MEMORANDUM OF UNDERSTANDING
Between The
REGIONAL TRANSPORTATION AUTHORITY OF PIMA COUNTY, ARIZONA
And The
USDA, FOREST SERVICE
CORONADO NATIONAL FOREST

This MEMORANDUM OF UNDERSTANDING (MOU) is hereby made and entered into by and between the Regional Transportation Authority of Pima County, Arizona, hereinafter referred to as "RTA," and the USDA, Forest Service, Coronado National Forest, hereinafter referred to as the "U.S. Forest Service."

Background: This MOU is consistent with a recommendation set forth by the Transportation Analysis and Feasibility Study (February 2010). This study was commissioned by the Catalina Ranger District to address access and circulation issues in the Sabino Canyon Recreation Area and was authored by the John A. Volpe Systems Center, part of the U.S. Department of Transportation.

Title: Sabino Canyon Transit Access

I. PURPOSE: The purpose of this MOU is to document the cooperation between the parties to establish a framework for public transit route from the existing transit infrastructure of the City of Tucson to the Sabino Canyon Recreation Area in accordance with the following provisions.

II. STATEMENT OF MUTUAL BENEFIT AND INTERESTS:

This MOU is mutually beneficial and in the best interests of both the RTA and the U.S. Forest Service because it addresses access, mobility, equity, sustainability, resource management and circulation goals for both agencies.

In consideration of the above premises, the parties agree as follows:

III. RTA SHALL:

A. Submit a Federal Lands Access Program (FLAP) Grant Proposal for a new Sun Shuttle route that will connect Sabino Canyon Recreation Area (SCRA) and the Sun Tran Transit System.
B. If the FLAP Grant is awarded purchase transit vehicles and implement public transportation services in accordance with the grant application.
C. Have the authority to set fares and the rules for riding the Sabino Canyon transit route in accordance to the larger regional system.

D. Set ridership performance measures that will dictate changes in the service hours, frequency of service, and route modifications, if at minimum, standards are not met under the original operating plan.
E. Provide the matching requirement for the Federal funds awarded through this grant program.
F. Ensure all transit vehicles have racks to accommodate bicycles.
G. Meet all Federal Transit Administration requirements associated with providing the service.

IV. THE U.S. FOREST SERVICE SHALL:

A. Allow the RTA permission to enter the SCRA parking lot to pick-up/drop-off public transportation passengers.
B. Provide a space within the Visitor Center at SCRA for dissemination of RTA brochures and advertisement of services for the public free of charge.
C. Maintain and clean the transit stop within the SCRA parking lot.
D. Provide RTA with requested information and data, as may be reasonable, for documenting project initiation, progress, and completion.
E. Have facilities that will be consistent with the Architectural Barriers Act (ABA) of 1968.
F. Close the Visitor's center on Thanksgiving Day and Christmas Day.
G. Open the Recreation Area 365 days a year, 7 days a week, 24 hours a day unless closed due to large scale public safety issues (floods, fire, etc.).

V. IT IS MUTUALLY UNDERSTOOD AND AGREED BY AND BETWEEN THE PARTIES THAT:

A. Under this MOU, each party directs its own activities and uses its own resources.

B. If exchange of funds, property, services, or anything of value does arise both parties agree that both parties will have to enter a different type of instrument (s).

C. PRINCIPAL CONTACTS. Individuals listed below are authorized to act in their respective areas for matters related to this agreement.

Principal Cooperator Contacts:

RTA Cooperator Program Contact	Cooperator Administrative Contact
Name: James McGinnis, Transportation Mobility Management Planner, Pima Association of Governments Address: 177 N. Church Ave., Suite 405 City, State, Zip: Tucson, AZ 85701 Telephone: 520 792 1093 x 505 FAX: 520 260 6981 Email: jmcginnis@pagregion.com	Name: Jeremy Papuga, Director, Transit Services, Pima Association of Governments Address: 177 N. Church Ave., Suite 405 City, State, Zip: Tucson, AZ 85701 Telephone: 520 792 1093 x 477 FAX: 520 260 6981 Email: jpapuga@pagnet.org

Principal U.S. Forest Service Contacts:

U.S. Forest Service Program Manager Contact	U.S. Forest Service Administrative Contact
Name: R. Stan Helin, District Ranger, Santa Catalina Ranger District Address: 5700 N. Sabino Canyon Rd. City, State, Zip: Tucson, AZ 85750 Telephone: (520) 749-7700 FAX: (520) 749-7723 Email: shelin@fs.fed.us	Name: Andrea Sepulveda, Grants Management Specialist, Coronado National Forest Address: 300 W. Congress City, State, Zip: Tucson, AZ 85701 Telephone: (520) 388-8310 FAX: (520) 388-8331 Email: asepulveda@fs.fed.us

D. NOTICES. Any communications affecting the operations covered by this agreement given by the U.S. Forest Service or RTA is sufficient only if in writing and delivered in person, mailed, or transmitted electronically by e-mail or fax, as follows:

To the U.S. Forest Service Program Manager, at the address specified in the MOU.

To RTA, at RTA's address shown in the MOU or such other address designated within the MOU.

Notices are effective when delivered in accordance with this provision, or on the effective date of the notice, whichever is later.

E. PARTICIPATION IN SIMILAR ACTIVITIES. This MOU in no way restricts the U.S. Forest Service or RTA from participating in similar activities with other public or private agencies, organizations, and individuals.

F. ENDORSEMENT. Any of RTA's contributions made under this MOU do not by direct reference or implication convey U.S. Forest Service endorsement of RTA's products or activities.

G. NONBINDING AGREEMENT. This MOU creates no right, benefit, or trust responsibility, substantive or procedural, enforceable by law or equity. The parties shall manage their respective resources and activities in a separate, coordinated and mutually beneficial manner to meet the purpose(s) of this MOU. Nothing in this MOU authorizes any of the parties to obligate or transfer anything of value.

Specific, prospective projects or activities that involve the transfer of funds, services, property, and/or anything of value to a party requires the execution of

separate agreements and are contingent upon numerous factors, including, as applicable, but not limited to: agency availability of appropriated funds and other resources; cooperator availability of funds and other resources; agency and cooperator administrative and legal requirements (including agency authorization by statute); etc. This MOU neither provides, nor meets these criteria. If the parties elect to enter into an obligation agreement that involves the transfer of funds, services, property, and/or anything of value to a party, then the applicable criteria must be met. Additionally, under a prospective agreement, each party operates under its own laws, regulations, and/or policies, and any Forest Service obligation is subject to the availability of appropriated funds and other resources. The negotiation, execution, and administration of these prospective agreements must comply with all applicable law

Nothing in this MOU is intended to alter, limit, or expand the agencies' statutory and regulatory authority.

H. USE OF U.S. FOREST SERVICE INSIGNIA. In order for RTA to use the U.S. Forest Service insignia on any published media, such as a Web page, printed publication, or audiovisual production, permission must be granted from the U.S. Forest Service's Office of Communications. A written request must be submitted and approval granted in writing by the Office of Communications (Washington Office) prior to use of the insignia.

I. MEMBERS OF U.S. CONGRESS. Pursuant to 41 U.S.C. 22, no U.S. member of, or U.S. delegate to, Congress shall be admitted to any share or part of this agreement, or benefits that may arise therefrom, either directly or indirectly.

J. FREEDOM OF INFORMATION ACT (FOIA). Public access to MOU or agreement records must not be limited, except when such records must be kept confidential and would have been exempted from disclosure pursuant to Freedom of Information regulations (5 U.S.C. 552).

K. TEXT MESSAGING WHILE DRIVING. In accordance with Executive Order (EO) 13513, "Federal Leadership on Reducing Text Messaging While Driving," any and all text messaging by Federal employees is banned: a) while driving a Government owned vehicle (GOV) or driving a privately owned vehicle (POV) while on official Government business; or b) using any electronic equipment supplied by the Government when driving any vehicle at any time. All cooperators, their employees, volunteers, and contractors are encouraged to adopt and enforce policies that ban text messaging when driving company owned, leased or rented vehicles, POVs or GOVs when driving while on official Government business or when performing any work for or on behalf of the Government.

L. PUBLIC NOTICES. It is the U.S. Forest Service's policy to inform the public as fully as possible of its programs and activities. RTA is encouraged to give public

notice of the receipt of this agreement and, from time to time, to announce progress and accomplishments. Press releases or other public notices should include a statement substantially as follows:

"Recreation Program Managers of the U.S. Forest Service, Department of Agriculture, desire to make recreation opportunities available to all members of the public. With the additional transit line providing service to the SCRA we will be able to provide a more accessible and enjoyable experience to the public who we serve."

RTA may call on the U.S. Forest Service's Office of Communication for advice regarding public notices. RTA is requested to provide copies of notices or announcements to the U.S. Forest Service Program Manager and to The U.S. Forest Service's Office of Communications as far in advance of release as possible.

M. U.S. FOREST SERVICE ACKNOWLEDGED IN PUBLICATIONS, AUDIOVISUALS AND ELECTRONIC MEDIA. RTA shall acknowledge U.S. Forest Service support in any publications, audiovisuals, and electronic media developed as a result of this MOU.

N. NONDISCRIMINATION STATEMENT – PRINTED, ELECTRONIC, OR AUDIOVISUAL MATERIAL. RTA shall include the following statement, in full, in any printed, audiovisual material, or electronic media for public distribution developed or printed with any Federal funding.

In accordance with Federal law and U.S. Department of Agriculture policy, this institution is prohibited from discriminating on the basis of race, color, national origin, sex, age, or disability. (Not all prohibited bases apply to all programs.)

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

If the material is too small to permit the full statement to be included, the material must, at minimum, include the following statement, in print size no smaller than the text:

"This institution is an equal opportunity provider."

O. TERMINATION. Any of the parties, in writing, may terminate this MOU in whole, or in part, at any time before the date of expiration.

P. DEBARMENT AND SUSPENSION. RTA shall immediately inform the U.S. Forest Service if they or any of their principals are presently excluded, debarred, or suspended from entering into covered transactions with the federal government according to the terms of 2 CFR Part 180. Additionally, should RTA or any of their principals receive a transmittal letter or other official Federal notice of debarment or suspension, then they shall notify the U.S. Forest Service without undue delay. This applies whether the exclusion, debarment, or suspension is voluntary or involuntary.

Q. MODIFICATIONS. Modifications within the scope of this MOU must be made by mutual consent of the parties, by the issuance of a written modification signed and dated by all properly authorized, signatory officials, prior to any changes being performed. Requests for modification should be made, in writing, at least 30 days prior to implementation of the requested change.

R. COMMENCEMENT/EXPIRATION DATE. This MOU is executed as of the date of the last signature and is effective through the end date of the FLAP grant agreement up to 5 years, whichever is sooner, at which time it will expire. In the event a FLAP grant is not awarded to the RTA this MOU will expire upon notification of non-award.

S. AUTHORIZED REPRESENTATIVES. By signature below, each party certifies that the individuals listed in this document as representatives of the individual parties are authorized to act in their respective areas for matters related to this MOU. In witness whereof, the parties hereto have executed this MOU as of the last date written below.

Cherie Campbell 2-28-13

CHERIE CAMPBELL, Interim Executive Director, Date
Regional Transportation Authority of Pima County, Arizona

The foregoing MOU has been reviewed, pursuant to A.R.S. §11-952 (D), by the undersigned, who has determined that it is in proper form and is within the powers and authority granted under the laws of the State of Arizona to the RTA.

2-28-13

THOMAS BENAVIDEZ, Legal Counsel Date
Regional Transportation Authority of Pima County, Arizona

For Karen Carter 2/28/13

JIM UPCHURCH, Forest Supervisor Date
U.S. Forest Service, Coronado National Forest

The authority and format of this agreement have been reviewed and approved for signature.

Andrea G. Sepulveda 2/28/13

ANDREA G. SEPULVEDA Date
U.S. Forest Service Grants Management Specialist

Cost Summary

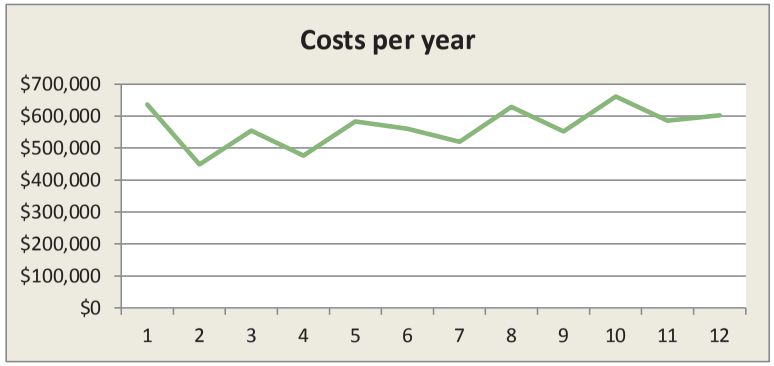
Which worksheet did you use? Basic Schedule

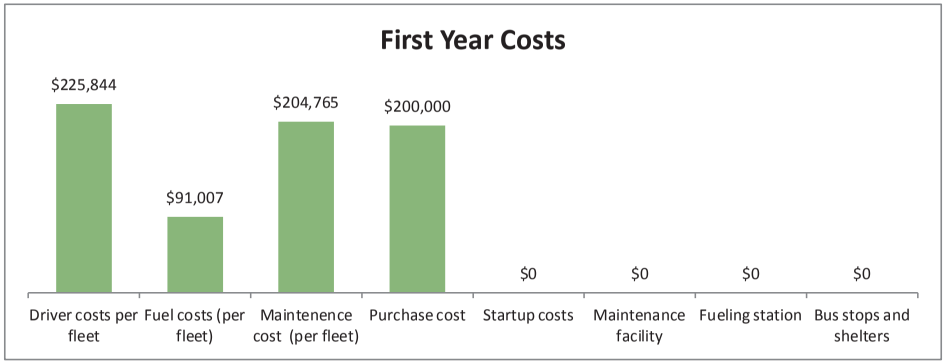
Annual O&M costs	$435,609
Bus type	Cutaway, medium-duty bus hybrid (V6)
Number of buses	2
VMT per fleet	204,765
VHT per fleet	9,034
Driver costs per fleet	$225,844
Fuel cost per mile	$0.44
Fuel costs (per fleet)	$91,007
Maintenance cost per mile	$1.00
Maintenence cost (per fleet)	$204,765
Overhaul mileage trigger	250,000
Engine overhaul cost	$15,000
Transmission overhaul cost	$31,300
Battery replacement (hybrid)	$27,500
Marketing costs	$5,000
Inflation rate	3.0%

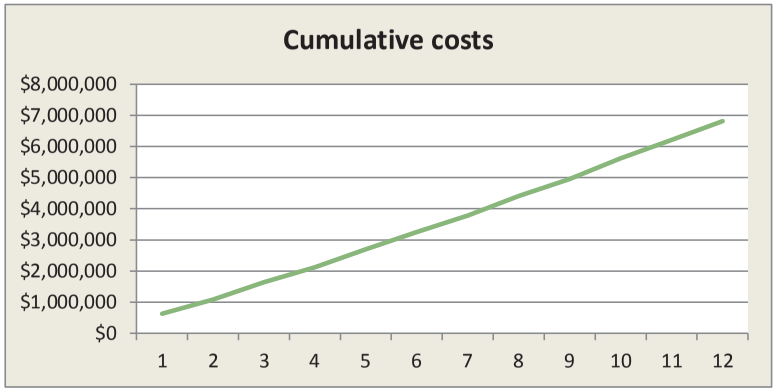
Year one costs	$200,000
Purchase cost	$200,000
Startup costs	$0
Maintenance facility	$0
Fueling station	$0
Bus stops and shelters	$0

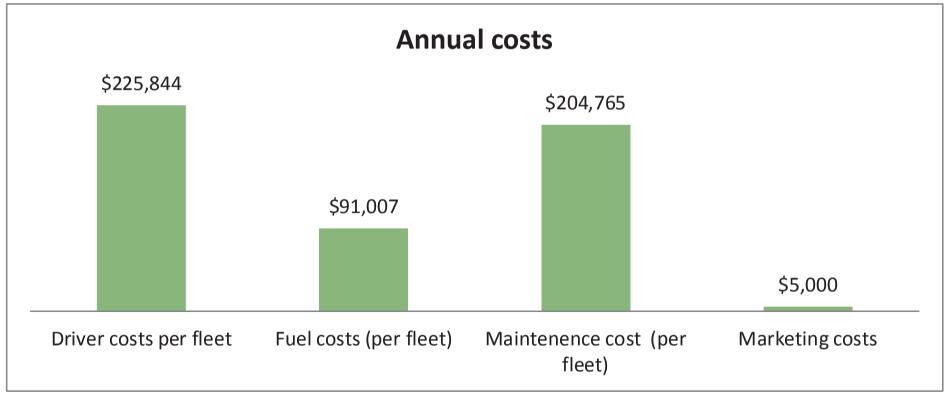
Costs per year

Year	*O&M*	*Miles per bus*	*Engine overhaul*	*Transmission overhaul*	*Battery replacement*	*Total costs per year*	*Cumulative costs*
Year 1 O&M	*$435,609*	*102,383*				*$435,609*	
Year 1	$635,609	102,383			$0	$635,609	$635,609
Year 2	$448,677	204,765	$0	$0	$0	$448,677	$1,084,286
Year 3	$462,137	307,148	$30,000	$62,600	$0	$554,737	$1,639,023
Year 4	$476,001	409,530	$0	$0	$0	$476,001	$2,115,025
Year 5	$490,281	511,913	$30,000	$62,600	$0	$582,881	$2,697,906
Year 6	$504,990	614,295	$0	$0	$55,000	$559,990	$3,257,896
Year 7	$520,140	716,678	$0	$0	$0	$520,140	$3,778,036
Year 8	$535,744	819,060	$30,000	$62,600	$0	$628,344	$4,406,379
Year 9	$551,816	921,443	$0	$0	$0	$551,816	$4,958,196
Year 10	$568,371	1,023,825	$30,000	$62,600	$0	$660,971	$5,619,166
Year 11	$585,422	1,126,208	$0	$0	$0	$585,422	$6,204,588
Year 12	$602,984	1,228,590	$0	$0	$0	$602,984	$6,807,572



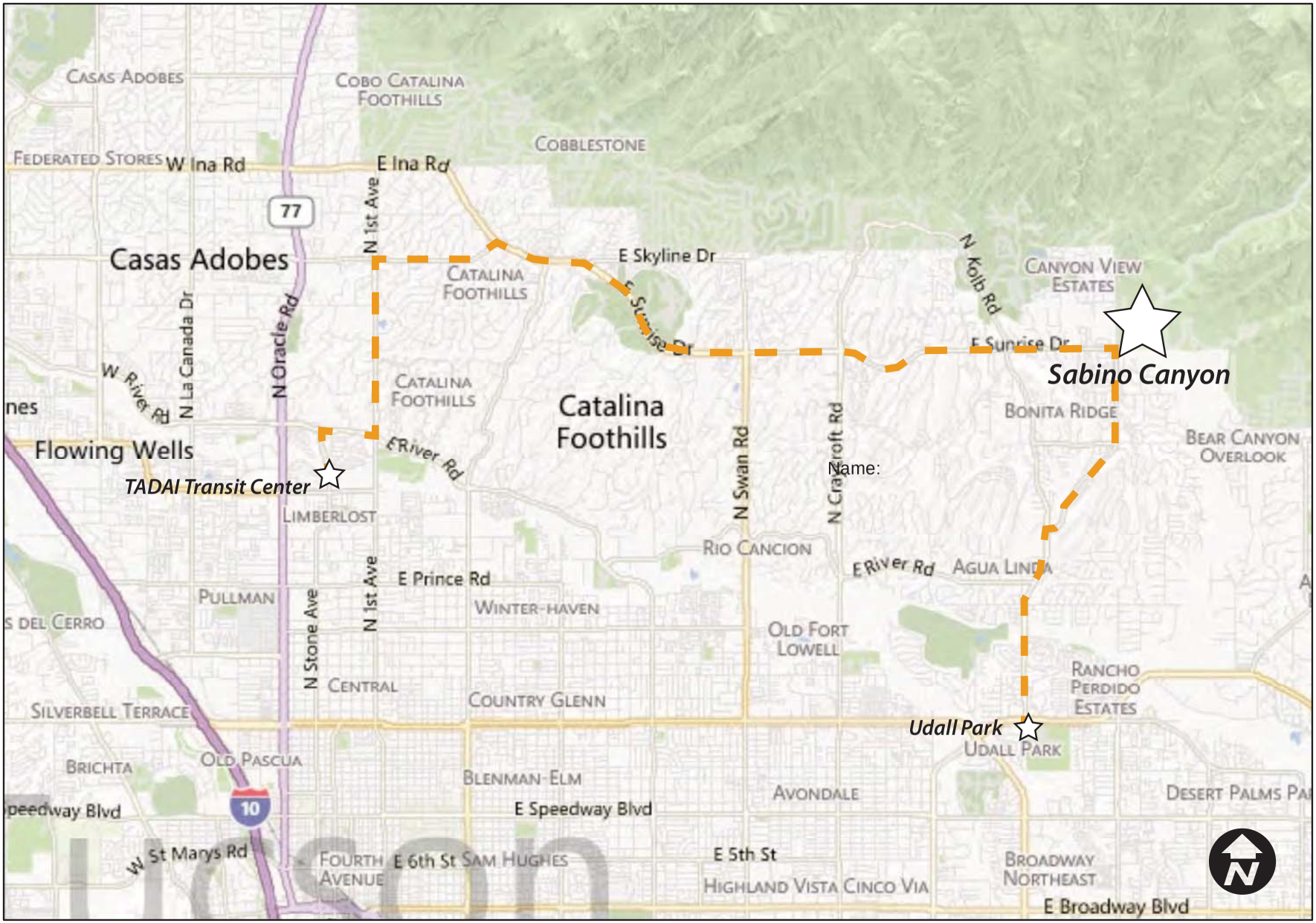






Proposed Route Map

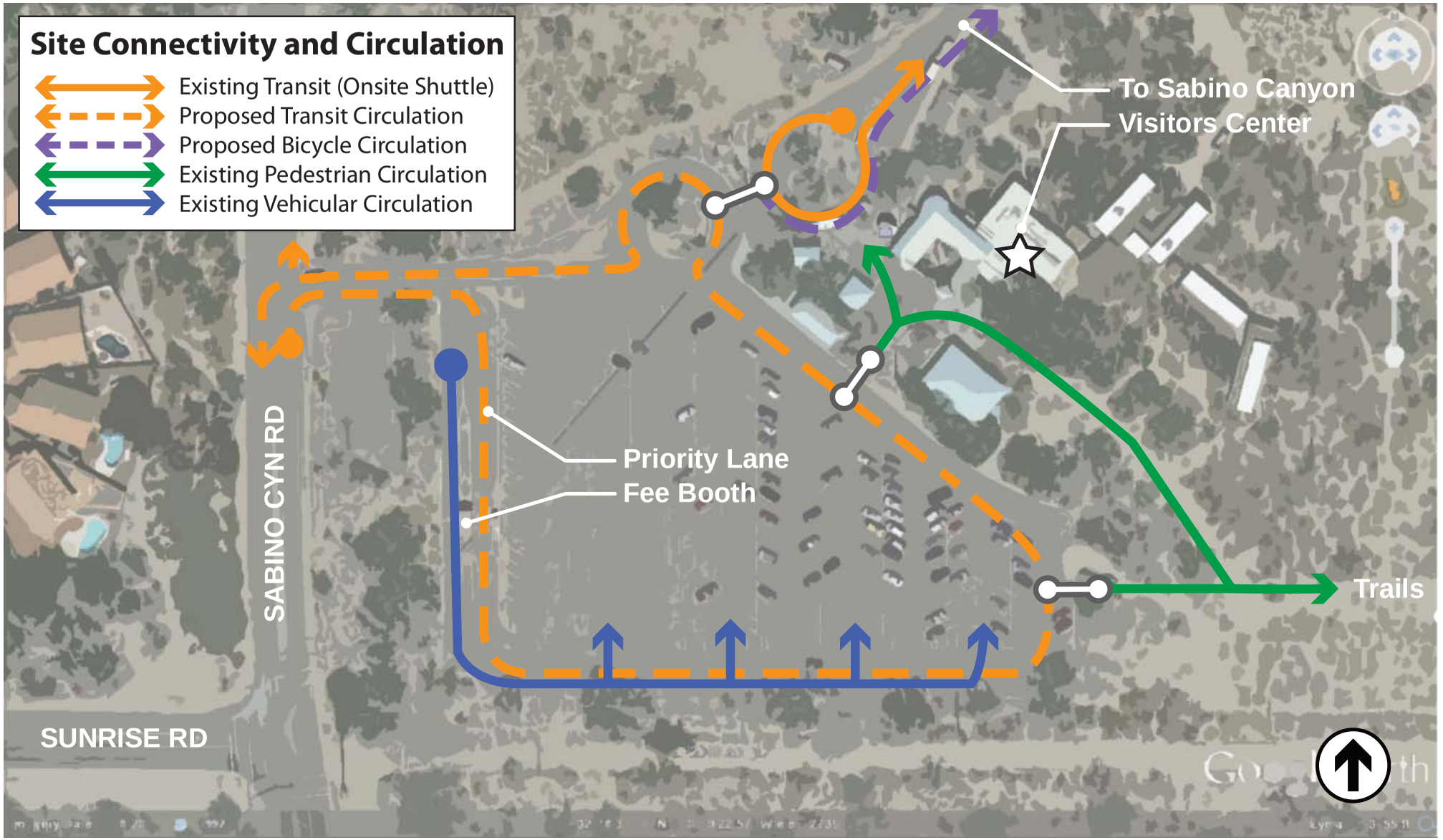
North Tucson



3 1.5 0 3 Miles

Sabino Canyon Recreation Area

Parking Facilities



Sabino Canyon Recreation Area

5700 N Sabino Canyon Road - Route Destination

Tohono TADAI Transit Facility

Stone and Whetmore - Route Origin

Morris K Udall Park

Sabino Canyon and Tanque Verde - Route Terminus