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DRAFT

TETON PASS CORRIDOR MANAGEMENT CONCEPTS: Capital & Operational Options & Scenarios

Technical Memorandum by:
FHWA Central Federal Lands & LSC Transportation Consultants

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In partnership with:



LSC Transportation Consultants

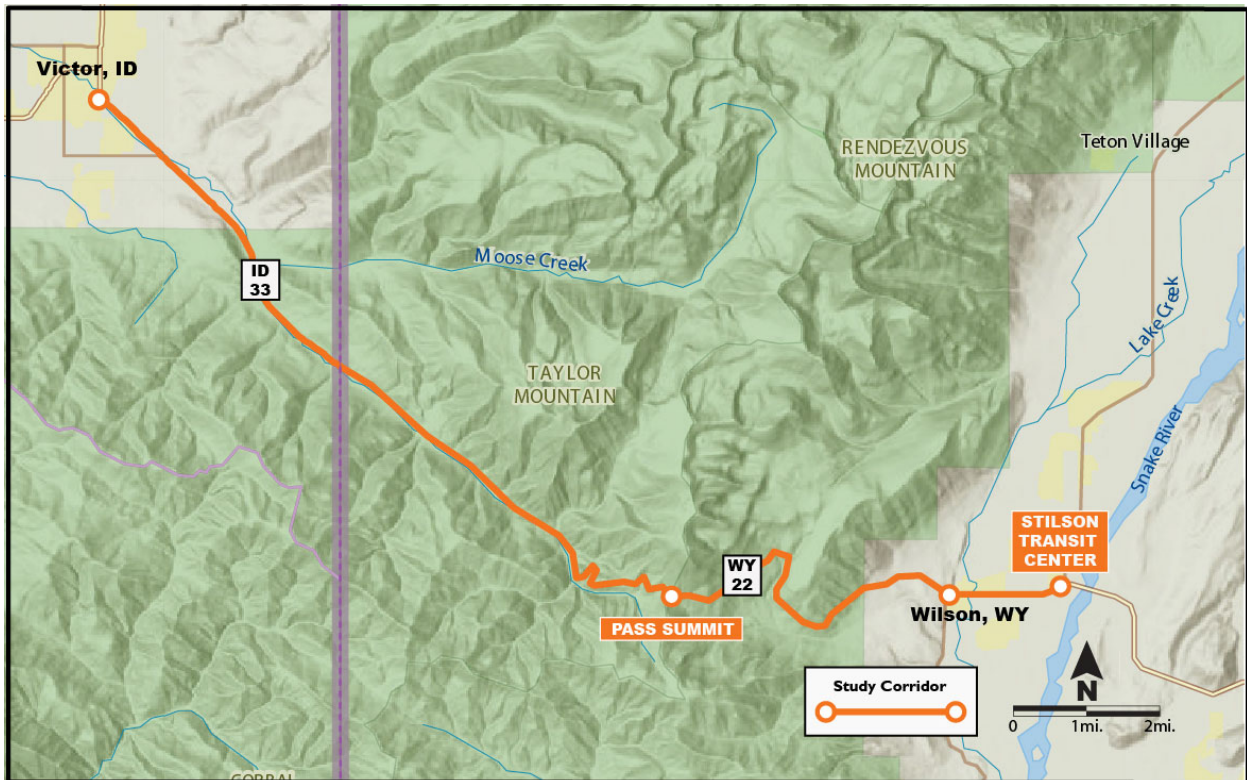
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Introduction

The growth in popularity of outdoor activities has impacted many recreational areas and transportation routes across the American West. Along the **Teton** Pass corridor between Wilson, Wyoming and Victor Idaho, these impacts have become particularly acute where congestion and informal/illegal usage of the right-of-way creates hazardous conditions for roadway users and recreationists. Extreme weather can exacerbate this circumstance, leading to accidents, injuries, and fatalities.

Central Federal Lands has provided this technical memorandum to a coalition of local partners (Wyoming Department of Transportation, US Forest Service, and Teton County) to provide decision makers with a range of capital and operational improvements for consideration to alleviate the safety, access, congestion and parking concerns along this crucial transportation route. The study corridor (below), is approximately 24 miles from the Stilson Transit Center just east of Wilson, WY, west to the Victor Transit Center in Victor, ID.



Operational Interventions

An increasingly common strategy in similar recreational areas around the American West is the establishment of a **parking management program accompanied by a recreational shuttle service**. This is referred to as the **Multimodal Access Focus**. In broad terms, this approach is intended to address the negative impacts of auto access without reducing (or even potentially expanding) the public's access to recreational amenities.

This section presents an evaluation of such a program for the Teton Pass corridor. First, the required transit operating scenarios are developed, along with costs, ridership and passenger revenue estimates. Parking management options are then reviewed. Parking revenues and costs are then estimated, and an overall financial forecast for the program identified.

Note that this analysis focuses on four winter service scenarios that differ in two key ways. Winter service scenarios are developed for a program on the **east side of Teton Pass only**, as well as for the **full corridor on both sides of the pass**. For both of these, options are developed for a weekend/holiday program only versus a full 7-day-a-week program. For summer service, weekend/holiday and 7-day-a-week scenarios are developed, focusing on the east side connections only.

Additionally, two other scenarios are evaluated, **Parking Management Only Focus** and **Transit Only Access Focus**.

Multimodal Access Focus

This analysis first focuses on potential intercept parking locations. Next, route length and running time is evaluated. The potential ridership is then estimated, to define the necessary service capacity and frequency.

Intercept Parking Options

A shuttle program solely between the trailheads would not result in a significant solution to the study issues, but instead would largely shift the issues between the trailheads. Experience in similar corridors indicates that an intercept parking strategy is needed to meet study goals. As such, a key point to start the evaluation of transit options is to define the intercept parking location(s). These options are discussed below.

- Downtown Wilson

The Wilson core area consists of multiple businesses with relatively small parking areas. Using this area as intercept parking could quickly impact parking availability for these businesses. Roadway shoulder areas available for parking are also limited and are often unavailable due to snow storage.

- Stilson Lot

Using the Stilson Lot east of Wilson has several advantages. It generally has sufficient parking capacity to accommodate Pass parking (as discussed below). It provides the opportunity for direct transfers to the highly used South Teton Area Rapid Transit (START) routes, allowing residents and visitors of Jackson and Teton Village to access Teton Pass without using a car. The planned Stilson Lot Transit Center would also provide an amenity for shuttle passengers to wait for the shuttle bus, as well as to purchase transit passes.

An important question regarding use of the Stilson Lot for Teton Pass visitors is the availability of parking spaces. Information from the Teton Village Association (which manages the skier use of the lot) indicates that it is currently designed for 882 spaces but given the inefficient parking pattern associated with an unstriped gravel lot and the impacts of snow storage, the effective capacity (absent parking attendants) is approximately 735. The available counts indicate that the 2019/20 winter was a period of peak parking activity (prior to COVID). These counts indicate the following:

- Average daily peak parking: 422 vehicles.
- More than 500 cars were parked on 19 individual days, 600 or more cars on 6 days, and 700 or more cars parked (specifically 735) on one day.

In the winter of 2018/19, the average daily parking count was 382. More than 500 cars were parked on 12 days and the busiest overall day saw 592 parked vehicles. It appears from anecdotal information that overall, Jackson Hole Mountain Resort visitation has been lower since the pandemic. From this information it can be concluded that **at least 100 and possibly up to 130 vehicles could be parked at the Stilson Lot without limiting the number of vehicles parked for JHMR on all but a peak winter day.** As discussed below, parking demand is expected to be well within this number.

- Trail Creek Trailhead

The Trail Creek trailhead lot (also known as Old Pass Road) has capacity of 56 spaces, many of which are typically used for trail users. There would not be sufficient capacity to also serve a successful shuttle program, without substantial expansion.

- Victor Depot

The parking need on the Idaho side of the pass is expected to be substantially lower. There may be adequate available parking at or adjacent to the Victor Depot for intercept use.

Conclusion

Based on this review, route options are developed that use the Stilson Lot as the east side intercept. If winter service is provided to the Idaho side of the pass, the Victor Depot area is assumed as the intercept location.

Conceptual Route Configurations

Given the relative population and level of visitation, it is estimated that approximately 75 percent of the demand for a winter recreational shuttle program is generated on the Wyoming (east) side of the pass and the remaining 25 percent on the Idaho (west) side. As such, one option would be to provide a shuttle only from the east side of the pass.

A trip between the Stilson Lot and the top of Teton Pass (via Trail Creek Trailhead) is 9.0 miles in length and requires approximately 18 minutes of running time only. Including time spent loading/unloading passengers and gear, this would require approximately 50 minutes to complete a round trip. Including driver break and recovery time (and to address some delays) a 60 minute schedule could be operated with a single vehicle. Turning around a shuttle vehicle at the top of the pass is probably feasible on the south side if snow is plowed and vehicles prohibited in parking in the area.

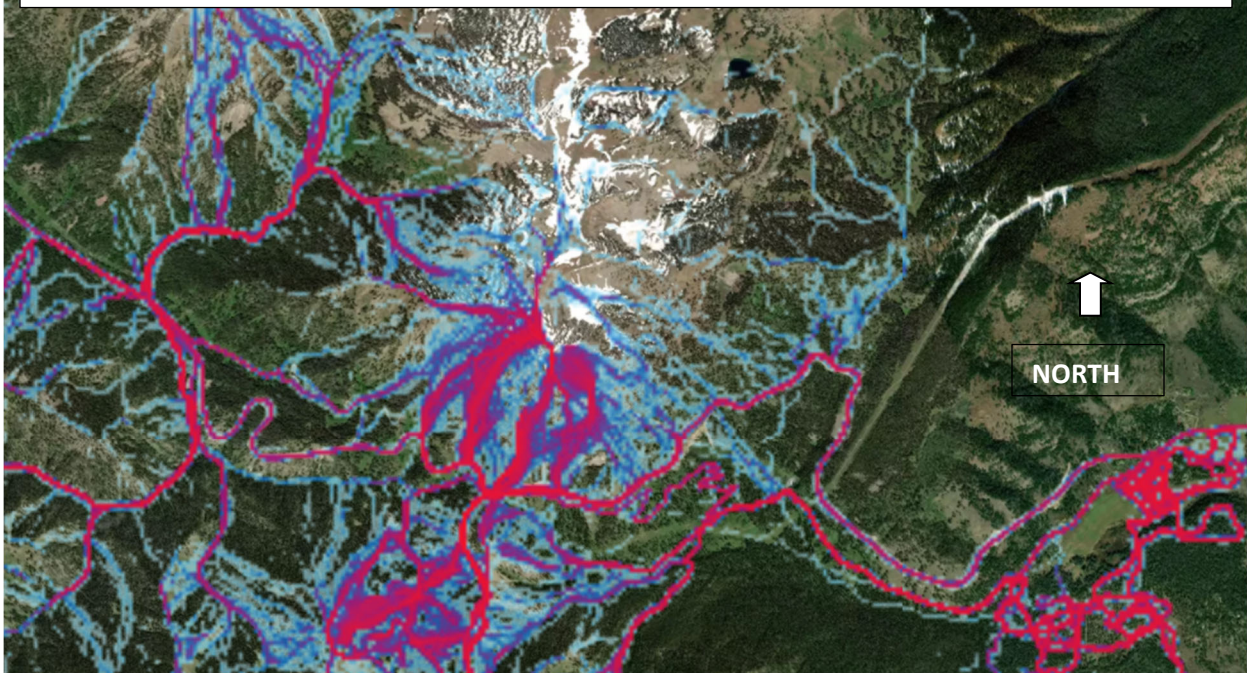
An option would be to extend the route to the Coal Creek parking area. This would add 9 to 10 minutes of additional running time. It could not be accomplished reliably within an hour round-trip, unless the Trail Creek Trailhead Lot is dropped from the route.

Potential stops were defined based on the following:

- An inventory of parking locations provided in the *Existing Conditions Assessment: Technical Memorandum #1, Teton Pass Corridor Study* (Federal Highway Administration, April 2022).
- A preliminary review of driver sight distance using Google Street View.
- A review of backcountry user app data generated from the Strava website. While this data does not provide total daily use numbers, it does provide an indication of the relative activity levels among Strava users (which are probably a reasonably valid sample of all recreationalists).¹ A screenshot of the winter user pattern is presented as Figure A. Areas of light device tracking is shown in blue, while heavy use areas are shown in red. This maps indicate that the peak concentrations of winter activity along the highway is at the top of the pass. There are also high levels of activity at two locations on the north side of the highway just to the west of the pass (approximately 0.25 and 0.55 to the west) where there are no defined parking areas. There is also substantial activity on both sides of the road at the Coal Creek North parking lot.

¹ This data can be found and explored at <https://www.strava.com/heatmap#12.36/-111.01687/43.52368/hot/all>

Figure A: Strava Winter Activity Heatmap

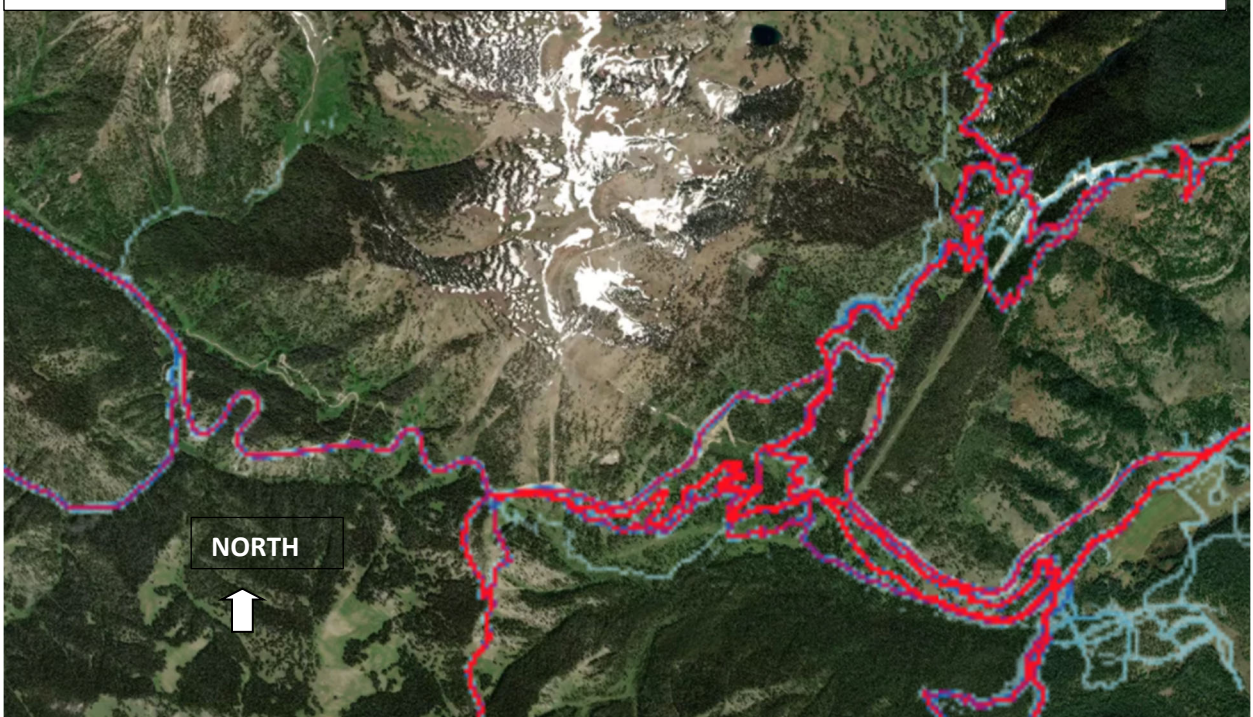


Similar summer Strava maps are shown in Figures B and C for hiking and biking, respectively. These show differing patterns of relative use. Hiking activity is particularly strong from the bottom of Old Pass Road, the Phillips Bench trailhead area, the top of the pass (in both directions) and Coal Creek. Biking is more prevalent between the top of the pass and Old Pass Road trailhead as well as from Phillips Bench both to the north and south. Relatively little biking activity is shown at Coal Creek or north from the top of the pass.

Figure B: Strava Summer Hiking Activity Heatmap



Figure C: Strava Summer Biking Activity Heatmap



There is useful trail use data available for summer activity on the various trails. As summarized in Table A, a series of “spot” counts ranging from a few days to two weeks were conducted in 2018 through 2021. Summarized by major trailhead, they provide some useful indications regarding activity patterns:

- The Phillips Bench area is particularly popular, followed closely by the Old Pass trailhead. While the Teton Pass use levels appear lower, these do not include motorists making quick stops. The area east of the pass has relatively low use according to these counts.

TABLE A: Summary of Recent Summer Use Data by Trailhead

Trailhead/Trail	Count Period		Average Daily Count			% in Peak Hour	Estimated Avg. Length of Stay (Hrs)	Hours of Over 5% of Daily Activity in Either Direction	
	Start Date	End Date	Weekday	Weekend	Total			From	To
Phillips Bench									
Arrow	8/8/2021	8/31/2021	39	91	54	15%	1.5	9:00 AM	7:00 PM
Jimmys Mom	8/2/2019	8/9/2019	97	131	105	14%	NA	8:00 AM	7:00 PM
Phillips Connector	8/2/2019	8/9/2019	68	68	68	14%	NA	10:00 AM	5:00 PM
Ski Lake	7/14/2021	8/6/2021	199	285	220	17%	3	8:00 AM	5:00 PM
Overall			403	575	447	16%	2.5	8:00 AM	6:00 PM
Old Pass									
Black Canyon	7/16/2019	7/22/2019	356	409	371	12%	3	9:00 AM	6:00 PM
Black Canyon	8/11/2019	8/18/2019	124	173	143	12%	3	10:00 AM	2:00 PM
Old Pass	7/20/2018	8/5/2018	135	196	157	8%	2	8:00 AM	4:00 PM
Overall			375	487	414	10%	2.5	9:00 AM	4:00 PM
East of Pass									
Fuzzy Bunny	8/28/2019	9/3/2019	14	19	15	20%	NA	8:00 AM	5:00 PM
Teton Pass									
S. Teton Pass	8/11/2019	8/18/2019	150	153	151	10%	NA	9:00 AM	4:00 PM
History Top	8/20/2019	8/26/2019	98	151	113	18%	NA	10:00 AM	3:00 PM
Old Pass Rd Top	8/20/2019	8/26/2019	39	63	46	14%	NA	9:00 AM	7:00 PM
Overall			287	367	310	13%	NA	9:00 AM	5:00 PM

July 1 - Aug 31, 2022 Average Daily Count		
Black Canyon Bottom	272	Summary By Trailhead Area
Ski Lake	212	
Old Pass Road	167	Phillips Bench
History Trail Top	126	Old Pass
Black Canyon Top	125	East of Pass
Antennae Access Road	101	Teton Pass
Fish Creek Access	95	352
BPA Road	87	
Jimmys	74	
Parallel Trail	63	
Old Pass Road Top	57	
Arrow Trail	36	

Source: Friends of Pathways automated counts.

- Average weekday counts are roughly 25 percent lower than average weekend day counts.
- The period when activity is relatively high (at least 5 percent of daily activity per hour, in either direction) is generally from 8 AM to 7 PM overall. This period tends to be longer at Phillips Bench and shorter at the other locations.

- For some trails, it is possible to compare the outbound and inbound trend line to estimate an average length of stay. From the data available, this is generally 2.5 hours on average.

In 2022, the Friends of Pathways maintained a more consistent set of counters on various trails between July 1 and August 31, as shown in the bottom of Table A. This indicates a similar pattern of overall use as seen in the previous years, with the Phillips Bench and Old Pass (bottom) trailheads generating 439 and 409 user counts respectively, followed by Teton Pass at 352 and the area east of the Pass lower at 99. Note that all of these counts are one-way observations, so a trail user making an out-and-back trip would be counted twice.

Based on this review, the route options and stops shown in Figure C were identified. The “East Side Route” option is shown in blue, while the “Full Route” option adds the portion shown in green. The East Side option would serve the following stops:

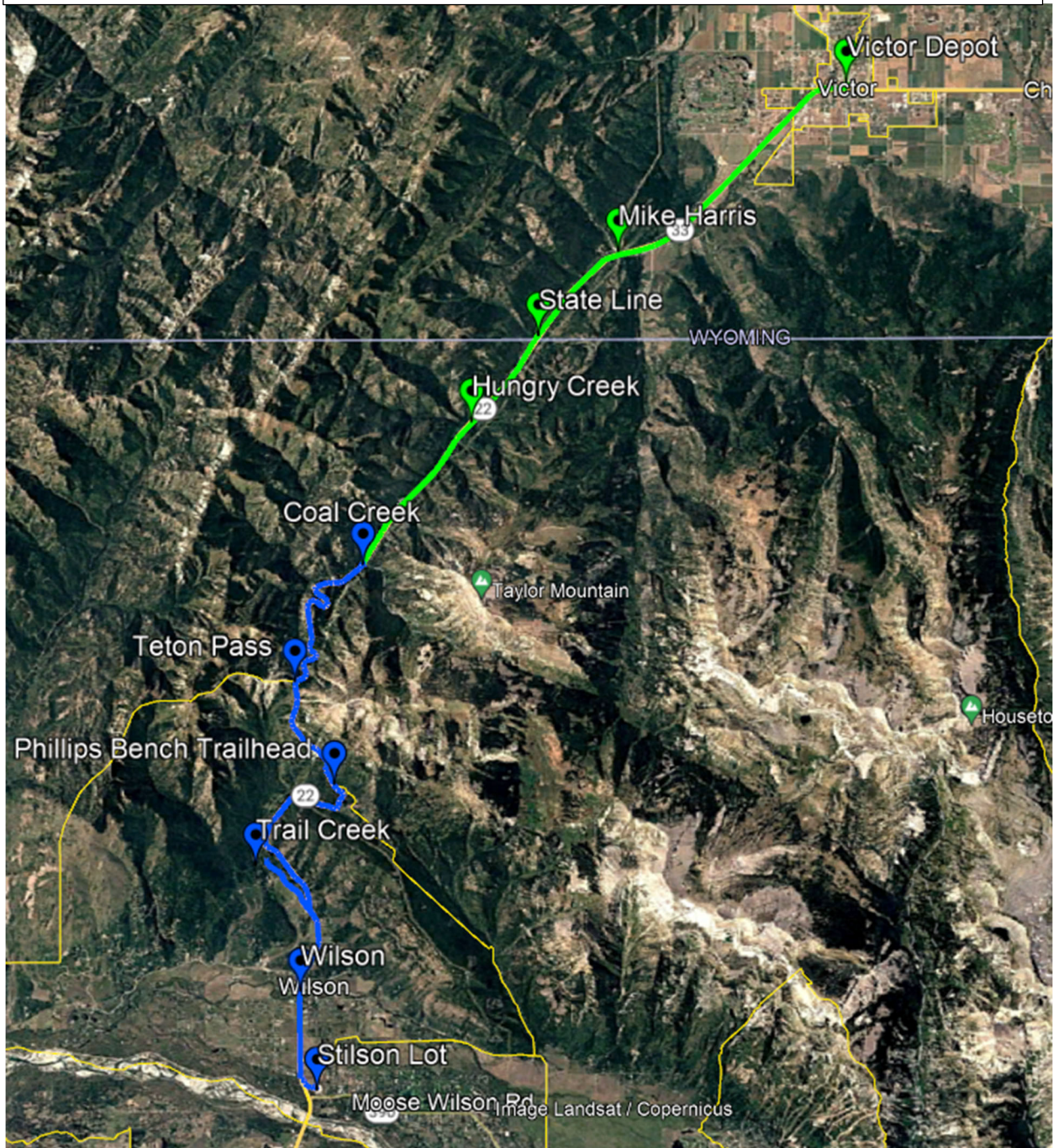
- **Stilson Lot**
- **Wilson** – At the existing START stops adjacent to Nora’s Fish Creek Inn on the south side and Hungry Jack’s General Store on the north side. These stops are intended to serve residents/guests in Wilson rather than park-and-ride activity, which should be directed to Stilson Ranch.
- **Trail Creek Trailhead**
- **Phillips** – This is a busy area, with moderate activity on the north side of the highway. The optimal location for a stop is at or near the existing Phillips Bench Road. However, a stop at this location may not have adequate sight distance for drivers to turn left (east) given the horizontal curve just to the west that limits the ability to judge an adequate gap in the high-speed downhill eastbound traffic. If the proposed parking area on the north side of the highway at the western end of this area is designed with an access point to the west of this curve, it would be possible to provide drivers exiting the parking area with adequate sight distance in both directions.
- **Quarter Mile East of Pass** – A stop could serve a proposed parking lot on the south side of the highway. There is a substantial level of skier activity at this location, and it also could serve the trail users in the summer. Driver sight lines are good.
- **Teton Pass** – With the vehicle pulling out on the south side of the highway.
- **Coal Creek** – This area sees a substantial level of winter activity and parking capacity. It could provide a good location to turn around the bus on the East Side route option.

The Full Route option would add the following stops

- **Hungry Creek** – Pulling into the parking area on the south side in both directions.

- **State Line** – Pulling into the parking area on the south side in both directions.
- **Mike Harris** – Also pulling into the parking area off the highway to the south.
- **Victor Depot** – Serving the bus pullout immediately in front of the depot.

Figure C: Potential Transit Route Options



This route is 20.9 miles in length (including Trail Creek Trailhead) and requires 33 minutes to drive one-way under good conditions. Including time to serve the 10 stops in each direction, to load/unload passengers and gear, and to provide a driver break, a 2-hour round-trip time would be required.

Ridership Analysis

Ridership Analysis: Winter

The analysis of daily and annual ridership was developed based on the guidance provided in the *Transportation Planning Process for Transit in Federal Land Management Areas* (US DOT Federal Transit Administration, April 2008). This analysis was conducted for both the East Route option and the Full Route option, and also for weekend/holiday service only versus 7-day-a-week service. The days that would be served under weekend/holiday service are shown in Table B. Alternatively, consistent service is assumed to be operated daily from approximately December 14th to the end of March. This analysis is presented in Table C, and consists of the following steps:

TABLE B: Calendar of Limited Service Days					Service Days		
Week Start Date	Sun	Mon	Tue	Wed	Thur	Fri	Sat
12/14							
12/21							
12/28							
1/4							
1/11							
1/18							
1/25							
2/1							
2/8							
2/15							
2/22							
3/1							
3/8							
3/15							
3/22							
3/29							

Total # of Days = 42

- The number of trailhead parking spaces served by the route is summed. Note that the proposed Phillips lot is assumed. Reflecting lower utilization, a 50 percent reduction factor is applied to the Mike Harris and State Line trailheads.
- Due to the shortness of a winter day at this latitude and the relatively long duration (several hours or more) of winter backcountry activities, daily parking space turnover is relatively low compared with summer activity. A turnover rate of 1.75 vehicles per space on average is assumed.

TABLE C: Analysis of Ridership, Capacity, Intercept Parking and Fare Revenue

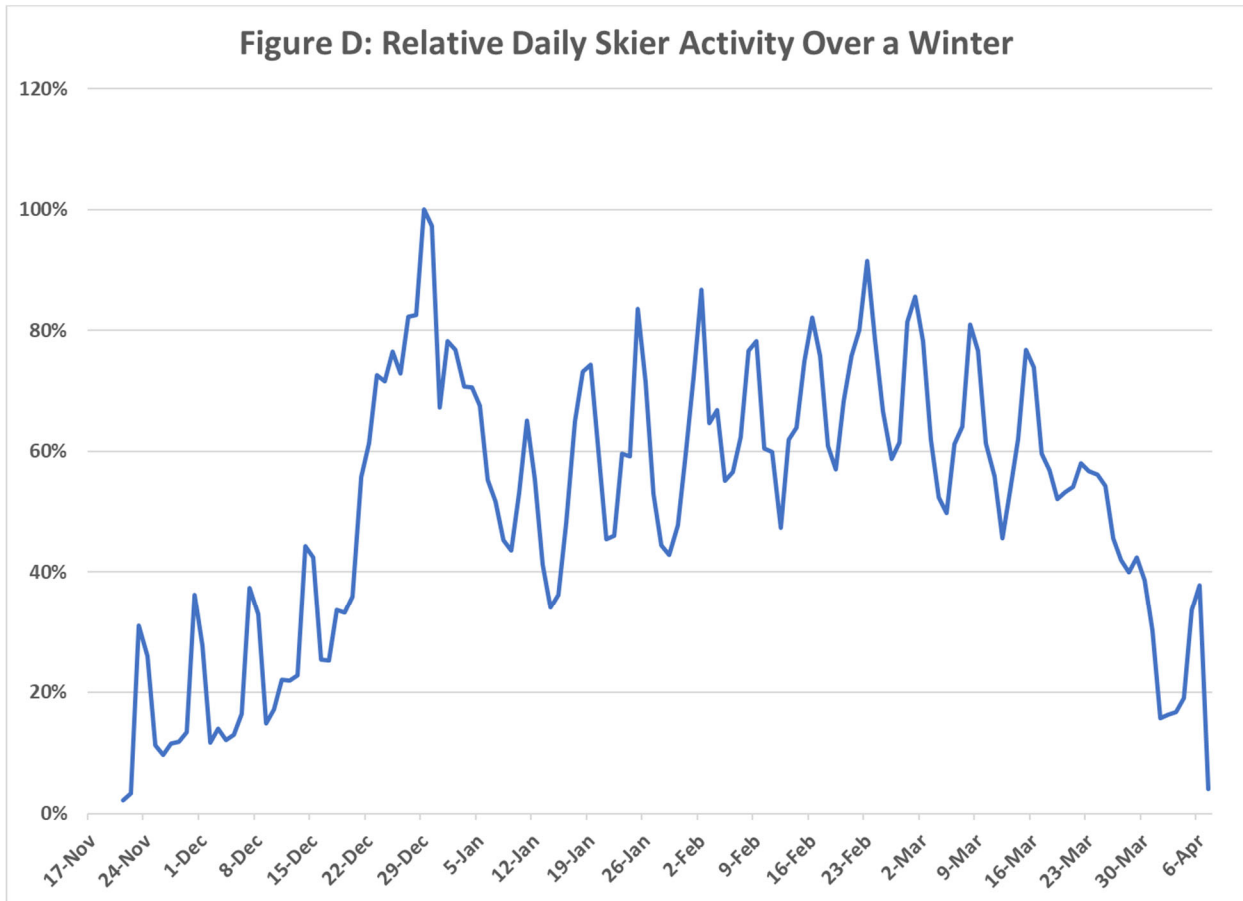
	East Route			Full Route		
	Weekend/ Holiday	Week- day	Total	Weekend/ Holiday	Week- day	Total
Number of Parking Spaces at Trailhead Stops						
Trail Creek Trailhead			56			56
Phillips Proposed Lot			58			58
East of Pass			34			34
Top of Pass			58			58
Coal Creek North						81
State Line (1)						42
Mike Harris (1)						29
Total Spaces Served			206			358
Ridership & Capacity Analysis						
Turnover (Vehicles per Space per Day)	1.75					
Weekday/Weekend Use Ratio		0.75			0.75	
Total Vehicle per Day in Served Parking Lots		361	270	627	470	
Avg. Persons per Vehicle	2.4					
Persons per Day in Served Parking Lots		865	649	1504	1128	
Transit Mode Share	20%					
Transit Round Psgr-Trips		173	130	301	226	
Transit 1-Way Psgr-Trips		346	260	601	451	
Percent Directional Demand in Peak Hour	30%					
Percent Demand in Peak Direction		100%	100%	75%	75%	
Required Hourly Directional Capacity		52	39	68	51	
Bus Capacity	30					
# of Bus Departures per Hour		2	2	3	2	
Hourly Directional Capacity		60	60	90	60	
Percent of Peak Hourly Directional Demand Served		116%	154%	133%	118%	
Ratio of Avg Daily to Peak Weekend Daily		0.79	0.67	0.79		0.67
# Days of Service per Year		42	107	42		107
Annual Ridership		11,500	24,800	20,000		43,100
Intercept Parking Analysis						
Ratio of Intercept Parking to Diverted Trailhead Parking	1.2					
Intercept Parking Demand: East Side			49			64
Intercept Parking Demand: West Side			--			21
Transit Fare Revenue Analysis						
Assumed Cost per Transit Day Pass	\$5.00					
Annual Transit Revenue		\$28,800	\$62,000	\$50,000		\$107,750

Note 1: A 50 percent reduction factor is applied reflecting lower utilization.

- For service options that include weekday (non-holiday) service, a factor was applied to reflect lower weekday use compared with weekend/holiday use. To define this factor, daily downhill skier figures were obtained from a nearby resort, as shown in Figure D². This data reflects the weekly peak in recreational winter activity on the weekends and also reflect the consistently

² The name of the specific resort is proprietary.

high activity over the Christmas/New Year's holiday period. Analysis of this data indicates that the ratio of average non-holiday weekday ridership to weekend/holiday ridership is 0.75.



- Multiplying the number of served trailhead spaces by the turnover rate and the weekday/weekend ratio yields the total number of vehicles per day in the served parking lots.
- Per the *Existing Conditions Assessment Technical Memorandum #1 – Teton Pass Corridor Study* (as well as typical occupancy rates seen in other recreational areas), an average vehicle occupancy of 2.4 is applied to identify the number of persons per day parking in the served lots.
- A transit mode split figure of 20 percent is then applied. This figure is based on data presented in the *Transportation Planning Process for Transit in Federal Land Management Areas*. Note that the figure can vary substantially depending on the cost of parking versus the cost of transit fares, as well as the availability of parking at the trailheads, public awareness of the shuttle program and other factors. Applying this figure and multiplying by 2 to convert rider round-trips to rider one-way trips yields the estimate of daily one-way passenger-trips. As indicated, this totals 346 passenger-trips on the East Route option over a weekend day and 260 over a weekday, and 601 and 451 respectively for the Full Route option.

- This daily figure can next be used to estimate the peak hourly directional transit capacity needed to serve the ridership. Due to the short length of a winter day, demand can be relatively concentrated in the peak hours, particularly in the morning (around 9 AM to 10 AM). A factor reflecting that 30 percent of transit passengers in one direction need to be accommodated in the peak hour is assumed. For the Full Route option, an additional factor reflecting that 75 percent of this peak-hour demand will be in one direction (to/from the east) is also applied. This yields a required hourly directional capacity of up to 52 passengers for the East Route option and 68 for the Full Route option.
- A bus capacity of 30 passengers is assumed for purposes of this analysis. This is a realistic seating capacity for a 35-foot long bus (such as a large cutaway vehicle) that has seating for 4 removed to provide a gear storage rack near the front of the bus.³
- The number of departures can then be varied to identify the minimum number of peak hourly departures that is needed to serve the peak hourly directional demand. As shown, 2 departures an hour (or service every half-hour) provides a ratio of capacity to demand that exceeds 100 percent, except that 3 departures per hour is needed on weekends/holidays for the Full Route option.
- The variation in recreational activity data reflected in Figure D was then used to define the ratio of demand for the average day over the course of the winter season, for both weekend/holiday and for full 7-day-a-week options. Specifically, the ratio of the average weekend/holiday activity to the peak weekend/holiday activity was found to be 0.79, while the ratio of the average day (including weekdays) to the peak weekend/holiday was 0.67. Multiplying the daily ridership by these figures and by the days of service yields the following annual ridership estimates:
 - East Route Weekend/Holiday Service – 11,500 passenger-trips per year
 - East Route 7-day-a-week Service – 24,800 passenger-trips per year
 - Full Route Weekend/Holiday Service – 20,000 passenger-trips per year
 - East Route 7-day-a-week Service – 43,100 passenger-trips per year

Table C also presents the estimates of peak parking demand at the intercept lots. With East Side only service, up to 49 vehicles would be parked at the Stilson Lot at the peak time on a peak day (well within the spaces currently available). With Full Corridor service, Stilson Lot peak parking would increase to 64 vehicles, and 21 vehicles would be parked at the Victor Depot.

Ridership Analysis: Summer

The analysis of ridership potential in summer (for an east side program only) is based on the available trail use counts, and shown in Table D. A transit mode share of 14 percent is applied assuming a paid parking program, and 7 percent assuming no parking management. Both figures assume an hourly service frequency, which tends to reduce the attractiveness of transit service. This indicates daily transit

³ Using smaller vehicles is possible but would greatly increase the total operating cost of the service.

ridership of up to 134 passengers per day without paid parking and 269 with paid parking. The peak hourly transit ridership can be estimated by applying the overall factor of trail use occurring in the peak hour, peak direction (16 percent). This indicates passenger loads up to 10 per hour without paid parking and 21 with paid parking. This is well within the capacity of a single bus operating hourly.

TABLE D: Summer Ridership Analysis						
Trailhead	Weekday	Weekend D	Avg Day	Weekday	Weekend D	Avg Day
Existing Daily Trail Counts						
Phillips Bench	369	526	409			
Old Pass	398	516	439			
East of Pass	92	125	99			
Teton Pass	326	417	352			
Coal Creek	249	333	282			
Transit Mode Split	Free Parking			Paid Parking		
	7%			14%		
Daily Transit Ridership						
Phillips Bench	26	37	29	52	74	57
Old Pass	28	36	31	52	72	61
East of Pass	6	9	7	52	18	14
Teton Pass	23	29	25	52	58	49
Coal Creek	17	23	20	52	47	39
Total	100	134	112	260	269	220
Peak Load	8	10	9	20	21	17
		<u>Weekend</u>	<u>7-Day/Wk</u>		<u>Weekend</u>	<u>7-Day/Wk</u>
Days per Year		31	98		31	98
Annual Ridership		4,200	11,000		8,300	21,600
Assumed Cost per Transit Day Pass				\$5.00		
Summer Transit Revenue		\$21,000	\$55,000		\$41,500	\$108,000

The optimal service plan given the ridership demand, required service frequency, route length and round trip cycle times discussed above would be as follows:

- For the East Side scenarios, two buses would cycle between Stilson Lot and Coal Creek, stopping in each direction at Trail Creek Trailhead. Each bus would make 9 round trips per day, with the first westbound departure at 8:00 AM and the last eastbound departure at 5:00 PM.
- For the Full Corridor scenarios, four buses would be used to provide half-hourly departures over a two-hour cycle length from 8:00 AM to 5:00 PM. This would provide sufficient capacity on weekdays. On weekends and holidays, a fifth bus would operate between Stilson Ranch and Coal Creek (without stops at Trail Creek) to provide adequate capacity on the east side. This additional bus would not be shown in the schedule as a separate departure time, but rather would be operated flexibly as a “tripper” bus responding on the published half-hourly schedule as needed to accommodate variation in demand.

As an aside, a service model was considered that would operate the buses in an on-demand basis. For instance, scheduled departures could be operated from the intercept locations in the morning, but then return trips in theory could be made based on ride requests from cellphone as recreationalists get back to the trailheads. This, of course, requires cellphone coverage. The nationwide coverage maps by two major wireless providers were reviewed: while AT&T purports to have 100% 5G coverage over the corridor, Verizon indicates only a few spots of service west of the Stilson Lot. Given this uncertain coverage and the issues that could result from passenger’s not being picked up in winter conditions, an on-demand service plan is not viable.

The calculation of annual service quantities is shown in Table E. The annual vehicle-hours of service ranges from 756 for weekend/holiday East Side service up to 4,230 for consistent service over the entire corridor. Vehicle-miles of service each year ranges from 13,608 up to 87,916.

TABLE E: Teton Pass Transit Service Winter Alternatives

December 14 Through March 31

	# Days of Service	Daily Hours of Service			Route Round Trip Length (Mi)	Daily Round Trips	Annual			Number of Vehicles	Route Cycle Length (Hours)
		Start	End	# Hours			Vehicle-Hours of Service	Vehicle-Miles of Service	Transit Operating Cost		
Weekend Only Alternatives											
East Side Focus											
Half-Hourly Service	42	8 AM	5 PM	9	18	18	756	13,608	\$66,200	2	1.00
Full Corridor											
Half-Hourly Service	42	8 AM	5 PM	9	41.8	18	1,512	31,601	\$135,500	4	2.00
Tripper Bus - Stilson to Coal Creek	42	8 AM	5 PM	9	19.6	9	378	7,409	\$33,500	1	1.00
TOTAL							1,890	39,010	\$169,000	5	
7-Days-A-Week Alternatives											
East Side Focus											
Half-Hourly Service	107	8 AM	5 PM	9	18	18	1,926	34,668	\$168,700	2	1.00
Full Corridor											
Half-Hourly Service	107	8 AM	5 PM	9	41.8	18	3,852	80,507	\$345,300	4	2.00
Tripper Bus - Stilson to Coal Creek	42	8 AM	5 PM	9	19.6	9	378	7,409	\$33,500	1	1.00
TOTAL							4,230	87,916	\$378,800	5	

A "cost model" was developed based on the marginal costs incurred by the existing East Jackson START microtransit service. That contract includes drivers and dispatcher costs along with the provision of vehicles. For 2022/23, and considering the incremental costs of operating larger vehicles, that cost (based on discussions with the START Interim General Manager) is expected to be \$75 per vehicle-hour. In addition, START pays the fuel costs directly. At current (high) fuel prices, that cost is equal to approximately \$0.70 per mile (over the entire fleet). The resulting cost model for the Teton Pass service is as follows:

$$\text{Annual operating + vehicle costs} = \$75 \times \text{annual vehicle-hours of service} + \$0.70 \times \text{annual vehicle-miles of service}$$

Applying this equation, the service alternatives range in cost from **\$66,200 per year up to \$378,800 per year**. Note that these figures do not include any administrative costs, such as for contract administration.

As an aside, the START Interim General Manager indicates that **the public transit START program does not have the capacity to provide Teton Pass service directly using START drivers, given that the organization is already challenged with staffing sufficient drivers to serve the existing winter service plan. There may be the potential, however, for START to take a role in administering a private contract to operate service and/or to help obtain federally funded vehicles to reduce the annual costs.**

The analysis of summer service options is presented in Table F, using the same methodology as discussed above. One vehicle would be operated hourly between the Stilson Lot and Coal Creek. If operated weekends only, this would incur a cost of \$29,900, while expanding to 7-day-a-week service increases the cost to \$94,400.

TABLE F: Teton Pass Transit Service Summer Alternatives											
June 1 through Labor Day Weekend											
# Days of Service	Daily Hours of Service			Route Round Trip Length (Mi)	Daily Round Trips	Annual			Number of Vehicles	Route Cycle Length (Hours)	
	Start	End	# Hours			Vehicle-Hours of Service	Vehicle-Miles of Service	Transit Operating Cost			
Weekend Only Alternatives											
Hourly Service	31	8 AM	7 PM	11	18	11	341	6,138	\$29,900	1	1.00
7-Days-A-Week Alternatives											
Hourly Service	98	8 AM	7 PM	11	18	11	1,078	19,404	\$94,400	1	1.00

Performance Analysis

Table G presents a performance evaluation of the transit alternatives. A standard measurement of the productivity of a transit service is the passenger-trips served per vehicle-hour of service. In this case, a higher value reflects a better alternative. As shown, the most productive is the summer service (assuming a paid parking program) on weekends/holidays only at 24.3. Of the winter alternatives, weekend east-side service would have a productivity of 15.2. All winter alternatives, however, are in a relatively narrow range. Cost effectiveness is best measured by the cost per passenger-trips. In this case, a lower value reflects a better alternative. The best alternative by this measure is also the summer weekend/holiday service, at \$3.60 per passenger-trip, while the least cost-effective option (winter full corridor service on all days) would require \$8.79 per passenger-trip.

TABLE G: Performance Review of Transit Alternatives		
Alternative	Productivity - Passenger-Trips per Vehicle-Hour	Cost Effectiveness- Cost per Passenger-Trip
Winter		
East Side - Weekend/Holiday	15.2	\$5.76
East Side - All Days	12.9	\$6.80
Full Corridor - Weekend/Holiday	10.6	\$8.45
Full Corridor - All Days	10.2	\$8.79
Summer (Assuming Paid Parking)		
Assuming Free Parking		
East Side - Weekend/Holiday	12.3	\$7.12
East Side - All Days	10.2	\$8.58
Assuming Paid Parking		
East Side - Weekend/Holiday	24.3	\$3.60
East Side - All Days	20.0	\$4.37

Discussion of Fares

The ridership estimates presented above assume that service is provided either free-fare or that fares are modest (on the order of \$2- per one-way trip or less). If fares were set to fully cover the operating cost of the service (the values shown in the right-hand column of Table F), the round-trip fare cost for a two-person travel party for winter East Side Weekend/Holiday service would be on the order of \$23 ... high enough to be a substantial deterrent to ridership, which in turn would reduce farebox revenues. Unlike more constrained situations where all auto access can be controlled (such as Zion National Park), there will always be an option for auto access to Teton Pass trailheads, which in turn makes ridership more sensitive to fares. In sum, financially supporting a transit program wholly on fares is not viable.

A reasonable fare strategy would be to charge \$5 for a day pass. As an individual would only have to handle cash (or some other form of payment) once over the course of the day, overall boarding delays would be reduced. These day passes could be pre-purchased (such as at the Stilson Lot transit center and the Victor Depot) and simply validated by the driver, to also speed boarding. In addition, there would only be a need to check for day passes in the uphill direction. At this fare level (and assuming no discount fares for children, elderly, or other groups), total winter transit revenues would range from \$28,800 up to \$128,500, as shown in the bottom of Table C, above. For summer service, fare revenues would range from \$21,000 up to \$108,000, as shown in Table D.

If there is a desire to provide a benefit for “locals” that frequently use the service, a season pass could also be available (such as for \$30).

- Parking Management Alternatives

Establishing parking fees is an important element of a comprehensive transportation management plan for a recreational corridor. Parking fees are a key driver in a shift in travel mode from auto use to transit use. In addition, parking fees can generate revenue to fund all or a portion of transit operating and capital costs. There are several potential approaches to imposing parking fees, as discussed below.

- Entrance Stations

A time-honored tradition at major recreation sites is the staffed entry station, often found at state parks and major national park sites. It can require a substantial footprint for an entry kiosk and associated vehicle queuing area and requires high level of staffing. This approach works best for a popular activity center with one or two entrance points. In contrast, the Teton Pass area consists of scattered smaller facilities, with little opportunity to accommodate the “footprint” of this approach. For these reasons, this is not considered further.

- Pay and Display Paid Parking

“Pay and Display” parking consists of validation machines placed adjacent to a parking lot. These machines typically accept credit and debit cards only (no cash). Motorists either are provided with a paper receipt for placement on their dashboard or enter a vehicle license number. Solar powered models are available that avoid the need to run power lines to each machine. However, a reliable cellphone signal is required, which may be a problem on Teton Pass. While there are many examples of ticket kiosks operating in winter conditions (including Aspen Colorado and Truckee California), they can be easily damaged by snow removal operations outside of a controlled streetscape. In a remote area such as along Highway 22, moreover, it can be expected that vandalism would be an ongoing and serious problem.



One example of an innovative pay and display system is along the Nevada State Route 28 corridor on the East Shore of Lake Tahoe. The profits made from the fees go to maintaining the Tahoe East Shore multipurpose trail, which provides access to the very popular Nevada Lake Tahoe State Park. The specific prices range from \$1.00 to \$7.00 depending on the hour, day, and season, designed to encourage use in the lower-demand periods. Major plusses to this system are the implementation of mobile payment and using your license plate as a tag instead of using a printable ticket.

- Iron Ranger Paid Parking

Another very common and long-used parking management option is the traditional “iron ranger” by which parkers self-register, place cash into an envelope that is inserted into a sturdy steel pipe and place the receipt on their dashboard. This has the advantage of avoiding the need for internet access and being substantially more able to stand up to difficult snow conditions. Staffing is still needed for snow removal and retrieving/managing the money. However, as cash is the only form of payment and as society is moving away from the common use of cash, this could be a serious inconvenience for users.



Corridor Access Pass Program

National Forests in more populous portions of the American West have implemented regional recreation fee programs. Some examples are discussed below:

- **Northwest Forest Pass (Pacific Northwest)** -- This pass gives access to a large region in the states of Oregon and Washington. This pass costs \$30 annually, or \$5 for a day pass. All Forest Service operated areas that require a fee recognize the pass. It can be transferred from person to person in the same household and is counted as per vehicle when used at a national forest site. Table H presents data regarding three of the participating National Forests that are most similar to Teton National Forest, in eastern Oregon and eastern Washington. A total of 167 sites are covered by the Northwest Forest Pass program in these National Forests, which generates an average of \$15,131 in revenues per site.

National Forest	State	Annual Recreation Fee Revenues	Number of Fee Sites	Annual Revenue per Site
<u>Northwest Forest Pass (Partial List of National Forests)</u>				
Wallowa-Whitman	OR	\$162,915	17	\$9,583
Deschutes	OR	\$1,175,385	58	\$20,265
Okanogan-Wenatchee	WA	\$1,188,573	92	\$12,919
<i>Total</i>		\$2,526,873	167	\$15,131
<u>Southern California Adventure Pass</u>				
Los Padres NF	CA	\$180,710	31	\$5,829
San Bernardino	CA	\$889,285	20	\$44,464
Angeles	CA	\$218,823	47	\$4,656
Cleveland	CA	\$1,116,698	4	\$279,175
<i>Southern California Avg</i>		\$2,405,516	102	\$23,583
<i>Total</i>		\$4,932,389	269	\$17,108

Source: Annual Recreation Fee Reports for individual national forests.

- **Coronado National Forest (AZ)** -- Located in southeastern Arizona, Coronado National Forest has various fee options, more than other National Forests, with entry options for one day users, for a week, and for an annual pass. The prices are \$8.00, \$10.00, and \$40.00 per vehicle respectively. They accept all Interagency passes. Parking is limited in the forest and has been prohibited in popular areas such as Sabino Canyon and Bear Canyon since 1978. However, to supplement this, shuttles are offered at these two locations in exchange for a per person fee. The shuttles run every day from 9 am to 4 pm. For Sabino Canyon, it costs \$15.00 for adults, \$8.00 for children under 12, and \$8.00 for one-way rides. For Bear Canyon, the prices are \$8.00 for adults, \$5.00 for children under 12, and \$5.00 for one-way rides.
- **White River National Forest (CO)** – This National Forest has two recreational parking management areas:
 - **Maroon Bells Scenic Area** has an Annual Pass, good for only this area at \$25, along with a **Day Pass** (single entry) for \$10. It is required (along with a trailhead parking reservation) between mid-May and the end of October (and seasonal snow closures limits the number of days outside this period when auto access is possible). Auto access is prohibited between 8 AM and 5 PM, when access is by bus or bike only.
 - **Vail Pass Winter Recreational Area** has a Seasonal Pass, offered from November to April. Daily use is \$10 per day and \$65 for the entire season (November through April). Children under the age of 15 gain free entry. Passes are available through the ranger district offices on at an on-site kiosk.
- **Southern California Regional Passes.** The “Adventure Pass” is a parking fee requirement for a total of 106 recreational locations in four National Forests in southern California (the Angeles, Cleveland, Los Padres and San Bernadino National Forests). This Pass allows parking at a variety of campgrounds, trailheads, picnic areas, snow play areas and shooting ranges. A daily pass is \$5, with an annual pass at \$30. As shown in Table H, a total of 102 sites are included in this fee program. While the revenues per site vary widely between the various National Forests, the overall average is \$23,583 per site per year.

A corridor parking fee program could be established for the Teton Pass corridor. To provide a consistent program, it would optimally be applied to all public parking areas along the highway within both the Bridger-Teton National Forest and the Caribou-Targhee National Forest, from Trail Creek Trailhead on the east to the Mike Harris parking area on the west. There is a myriad of potential options that could be considered for this fee program. A reasonable approach would be as follows:

- Provide both a day pass option for \$10 per vehicle as well as an annual pass option for \$60 per year. (This ratio of 6 is consistent with other National Forest fee programs).

- Passes could be available online (through printing out a pass) or in person at local offices, such as the following:
 - Caribou-Targhee NF Teton Basin Ranger District Station in Driggs
 - Bridger-Teton NF Jackson Ranger District in Jackson
 - Stilson Lot Transit Center
 - Victor Depot
 - County offices
 - Chambers of Commerce

There may also be the possibility of selling passes through retail establishments (outdoor equipment stores, etc.) for a handling fee.

- Adequate enforcement is key to the success of the program. This would probably require one additional Highway Patrol staff member, averaging 6 hours per day of total enforcement time. Note that enforcement would be needed both within the pay areas as well as nearby shoulder areas where parking is prohibited (but which may well still occur in an unsafe fashion).
- One option to the access pass program would be to allow the seasonal pass to be valid both for parking use as well as transit use. This would need to be at a higher rate (such as \$80 per year) to offset the loss of transit revenues. It could be used by recreationalists who drive to trailheads on off-peak days but choose to use the shuttle on peak days when parking may not be available at the trailheads.

Parking Revenues

An estimate of parking fee revenues is presented in Table I, for the four scenarios defined above. These estimates utilize the parking turnover rate and ratio of parking demand by day discussed regarding the transit ridership estimate. In addition, the following is assumed:

	Winter Fee Program -- December 15 through March 31						Summer Fee Program - June 1 Thru Labor Day	
	Weekend/Holiday Option			7 Day a Week Option			Weekend/ Holiday	7 Day a Week
	East Side	West	Total	East Side	West	Total		
		Side	Corridor		Side	Total		
Number of Spaces (1)	184	165	349	184	165	349	184	184
Peak Day Turnover Rate	1.75							
Peak Day Total Vehicles	322	289	611	322	289	611		
Ratio of Avg Daily to Peak Weekend Daily	0.67			0.8				
Average Daily Total Vehicles	216	193	410	254	193	410		
Days per Season	42			107			31	98
Total Seasonal Vehicles	9,072	8,106	17,220	27,178	20,651	43,870	10,664	27,832
Assumed Parking Fee Structure								
Daypass	\$10						\$10	
Season Pass	\$60						\$60	
Percent Using Season Pass	25%						20%	
Average Days of Use per Season Passholder	10						8	
Percent Scofflaws	20%						20%	
Average Revenue per Vehicle	\$7.20						\$7.60	
Total Seasonal Revenue	\$65,300	\$58,400	\$124,000	\$195,700	\$148,700	\$315,900	\$81,000	\$211,500

Note 1: A 50 percent reduction is applied to the Mike Harris and State Line parking area reflecting lower utilization.

- Absent available information, it is assumed that 25 percent of winter parking occurs using season pass. Anecdotally, a high proportion of the use of the trailheads in winter consists of “locals” that would tend to access the area multiple times per season. However, some locals will not access the pass the necessary six days per winter needed to make a season pass the economical choice. In summer, there are more recreational options for local residents, indicating that a lower proportion would use a pass and that the average use per passholder would be lower.
- In addition, a proportion of parking activity will consist of “scofflaws” that do not pay. This proportion will depend on the level of enforcement as well as signage. A 20 percent scofflaw rate is assumed.

Applying these factors, an overall parking revenue of \$7.20 per parking vehicle is defined for winter and \$7.60 for summer. As shown, the resulting winter parking revenues range from \$65,300 for a weekend/holiday program on the east side only up to \$315,900 for a 7-day-a-week program over the whole corridor. In summer, revenues of \$81,000 for weekend/holiday and \$211,500 for 7-day-a-week service is estimated.

Parking Program Costs

A parking management program incurs substantial costs. As indicated in Table J, these costs are estimated as follows:

	Winter				Summer	
	Weekend/Holiday Option		7-Day-a-Week Option		Weekend/ Holiday	7 Day a Week
	East Side	Full Corridor	East Side	Full Corridor		
Total Days of Season	42	42	107	107	31	98
Average Daily Hours of Enforcement	4	6	4	6	4	4
Annual Hours of Enforcement	168	252	428	642	124	392
Cost per Hour of Enforcement (1)	\$50					
Total Cost of Enforcement	\$8,400	\$12,600	\$21,400	\$32,100	\$6,200	\$19,600
Administrative/Legal Fees	\$20,000	\$30,000	\$20,000	\$30,000	\$20,000	\$20,000
Marketing/Website	\$20,000	\$20,000	\$20,000	\$20,000	\$10,000	\$10,000
Credit Card Processing Fees	3.5%	\$2,300	\$4,300	\$6,800	\$11,100	\$2,800
Total Costs	\$50,700	\$66,900	\$68,200	\$93,200	\$39,000	\$57,000

Note 1: Includes enforcement vehicle operating costs

- The additional enforcement staff is estimated to work an average of 4 hours per day (more on peak days, less on off peak days) for the East Side options, and 6 hours per day for the Full Corridor options. An hourly cost of \$50 per hour (including enforcement vehicle operating costs) is assumed, based on typical rates. Over the course of the winter season, this incurs a cost ranging from \$8,400 to \$32,100. In summer, the full program would incur a cost of \$19,600.
- Costs are incurred for administrative functions (contracting, fund reconciliation, etc.) as well as for court costs and staff time for attending court. These are estimated to range from \$20,000 to \$30,000 per winter season, and \$20,000 per summer.
- The program will incur marketing costs, such as advertising in local papers and radio, social media posting, etc. In addition, website costs will be incurred. A budget of \$20,000 is assumed for this function in winter, regardless of the scope of the program, and an additional \$10,000 in summer..
- A 3.5 percent credit card processing fee is assumed.

In total, parking fee program costs will range from \$50,700 up to \$93,200 in winter, and \$39,000 to \$57,000 in summer.

Total Coordinated Shuttle/Parking Program Financials

Finally, the various cost and revenue figures can be combined to define the overall ability of the coordinated shuttle/parking program to “self-fund” without additional revenues. As shown in Table K, in winter the Weekend/Holiday Only options are forecast to operate at a modest net deficit (\$22,800 for

the East Side only and \$26,500 for the Full Corridor option). The 7-Day-A-Week winter option would also yield a deficit for the Full Corridor option. However, the 7-Day-A-Week option for the East Side service option generates a modest net revenue, of \$20,800 for East Side option. The relatively good financial performance of the 7-Day-A-Week options reflects that the fixed costs are spread over a larger program, and that the trailhead activity (and associated parking and shuttle revenues) are not dramatically lower on non-holiday weekdays than on weekends and holidays. In summer, both weekend/holiday and 7-day-a-week options yield a modest net revenue (\$11,600 and \$13,600, respectively).

Conclusion

In sum, this evaluation indicates that a winter shuttle and parking fee program is viable for the Teton Pass corridor, particularly if operated 7 days a week and particularly if focused on the East Side only. A summer shuttle and fee program is also viable. Between transit passenger revenues and parking fees, the operational costs of the program (both transit and parking management costs) could be funded. With a relatively modest level of additional funding (\$48,500 per year), the winter program could be implemented for the full corridor. It should also be noted that a consistent 7-day-a-week service would be easier for a transit service contractor to staff, as it would provide a more consistent position over the course of the winter.

TABLE K: Summary of Coordinated Shuttle/Parking Program Annual Operating Costs and Revenues						
	Winter				Summer	
	Weekend/Holiday Option		7-Day-a-Week Option		Weekend/ Holiday	7 Day a Week
	East Side	Full Corridor	East Side	Full Corridor		
Revenues						
Parking Revenues	\$65,300	\$124,000	\$195,700	\$315,900	\$39,000	\$57,000
Transit Revenues	\$28,800	\$50,000	\$62,000	\$107,750	\$41,500	\$108,000
Total Revenues	\$94,100	\$174,000	\$257,700	\$423,650	\$80,500	\$165,000
Costs						
Parking Program Costs	\$50,700	\$66,900	\$68,200	\$93,200	\$39,000	\$57,000
Transit Costs	\$66,200	\$169,000	\$168,700	\$378,800	\$29,900	\$94,400
Total Costs	\$116,900	\$235,900	\$236,900	\$472,000	\$68,900	\$151,400
Net Revenues	-\$22,800	-\$61,900	\$20,800	-\$48,350	\$11,600	\$13,600

Phasing Opportunities

An initial program focusing on the east side (between Stilson and Coal Creek) is a logical first phase. Whether this first phase is limited to one or the other season will depend on overall management goals for the corridor and available funding. If this first phase includes both seasons, it would be logical to start with summer service and use the “lessons learned” from the first season to adjust service before the more-difficult winter season.

Vehicular Access Focus

Under this scenario, a parking fee program would be instituted for the Teton Pass corridor without any expansion of transit service. To provide a consistent program, it would optimally be applied to all public parking areas along the highway within both the Bridger-Teton National Forest and the Caribou-Targhee National Forest, from Trail Creek Trailhead on the east to the Mike Harris parking area on the west. There is a myriad of potential options that could be considered for this fee program. A reasonable approach would be as follows:

- Fees would be enforced either in winter only (December 14th through the end of March) or in both winter and summer (adding June 1 through Labor Day). Enforcement during these periods seven days a week is recommended, given that weekday activity not significantly lower than weekend/holiday activity.
- Provide both a day pass option for \$10 per vehicle as well as an annual pass option for \$60 per year. (This ratio of 6 is consistent with other National Forest fee programs).
- Passes could be available online (through printing out a pass) or in person at local offices, such as the following:
 - Caribou-Targhee NF Teton Basin Ranger District Station in Driggs
 - Bridger-Teton NF Jackson Ranger District in Jackson
 - Stilson Lot Transit Center
 - Victor Depot
 - County offices
 - Chambers of Commerce

There may also be the possibility of selling passes through retail establishments (outdoor equipment stores, etc.) for a handling fee.

- Adequate enforcement is key to the success of the program. This would probably require one additional Highway Patrol staff member, averaging 6 hours per day of total enforcement time. Note that enforcement would be needed both within the pay areas as well as nearby shoulder areas where parking is prohibited (but which may well still occur in an unsafe fashion).

This program is estimated to generate \$315,900 of revenues in the winter season and \$211,500 in summer, for a total of \$527,400 if implemented in both systems. Between enforcement, administrative, and marketing costs, a winter program over the full corridor would incur \$93,200 in program costs for winter operations. Adding \$57,000 for summer operations, implementing the program in both seasons would incur \$125,200 in annual costs. Subtracting costs from revenues, the program would generate a net operating revenue of \$222,700 over the winter season, or \$402,200 over both seasons. These net operating revenues could potentially be invested in capital improvements along the corridor, including parking and trails enhancements.

Phasing Opportunities

This scenario could potentially be phased in several ways:

- Establishing the program in winter only in initial years, before expanding to summer.
- Establishing the program on the east side of the pass between the Trail Creek Trailhead and Teton Pass, before expanding to the west side.
- Implementing the program on weekends/holidays only, before expanding to seven days a week.

Transit Access Focus

Under this scenario, a transit shuttle program would be established without the imposition of any parking fees. Geographically, there are two viable service area options:

- An East Side program extending from the Stilson Lot on the east (providing connections with other START services as well as park-and-ride opportunities) to Coal Creek Trailhead on the west, with other stops as follows:
 - Wilson – At the existing START stops adjacent to Nora’s Fish Creek Inn on the south side and Hungry Jack’s General Store on the north side. These stops are intended to serve residents/guests in Wilson rather than park-and-ride activity, which should be directed to Stilson Ranch.
 - Trail Creek Trailhead
 - Phillips Bench
 - Quarter Mile East of Teton Pass
 - Teton Pass
 - Coal Creek
- A Full Route option would add the following stops
 - Hungry Creek – Pulling into the parking area on the south side in both directions.
 - State Line – Pulling into the parking area on the south side in both directions.
 - Mike Harris – Also pulling into the parking area off the highway to the south.
 - Victor Depot – Serving the bus pullout immediately in front of the depot.

Options could also be considered for service in winter only, summer only, or both seasons.

- For the East Side scenarios in winter, two buses would cycle between Stilson Lot and Coal Creek, stopping in each direction at Trail Creek Trailhead. Each bus would make 9 round trips per day, with the first westbound departure at 8:00 AM and the last eastbound departure at 5:00 PM.
- For the Full Corridor scenarios in winter, four buses would be used to provide half-hourly departures over a two-hour cycle length from 8:00 AM to 5:00 PM. This would provide sufficient capacity on weekdays. On weekends and holidays, a fifth bus would operate between Stilson Ranch and Coal Creek (without stops at Trail Creek) to provide adequate capacity on the east side. This additional bus would not be shown in the schedule as a separate departure time, but rather would be operated flexibly as a “tripper” bus responding on the published half-hourly schedule as needed to accommodate variation in demand.

- Summer transit service was considered for the “East Side” only. A single bus operating an hourly service would be sufficient to serve the expected ridership demand. This bus would operate from 8 AM to 7 PM.

A reasonable fare strategy would be to charge \$5 for a day pass. As an individual would only have to make a transaction only once over the course of the day, overall boarding delays would be reduced. These day passes could be pre-purchased (such as at the Stilson Lot transit center and the Victor Depot) and simply validated by the driver, to also speed boarding. In addition, there would only be a need to check for day passes in the uphill direction. If there is a desire to provide a benefit for “locals” that frequently use the service, a season pass could also be available (such as for \$30).

The resulting ridership, costs and revenues associated with the various options are shown in the following table. As indicated, up to 43,100 riders could be generated by winter service and 11,000 riders by summer service. Without parking fees to encourage a shift from auto to transit use, none of the options yield a net positive operating revenue.

	Winter				Summer East Side	
	Weekend/Holiday Option		7-Day-a-Week Option		Weekend/ Holiday	7 Day a Week
	East Side	Full Corridor	East Side	Full Corridor		
Season Ridership	11,500	20,000	24,800	43,100	4,200	11,000
Revenues	\$28,800	\$50,000	\$62,000	\$107,750	\$21,000	\$55,000
Costs	\$66,200	\$169,000	\$168,700	\$378,800	\$29,900	\$94,400
Net Revenues	-\$37,400	-\$119,000	-\$106,700	-\$271,050	-\$8,900	-\$39,400

Phasing Opportunities

One phasing option would be to initiate summer service first, allowing the ability to use this relatively small (one vehicle) service to adjust services without the issues of snow removal. Initiating winter service on the East Side first also provides the ability to ramp up with a two-bus service before expanding to a five-bus full corridor winter service.

Considered Capital Improvements

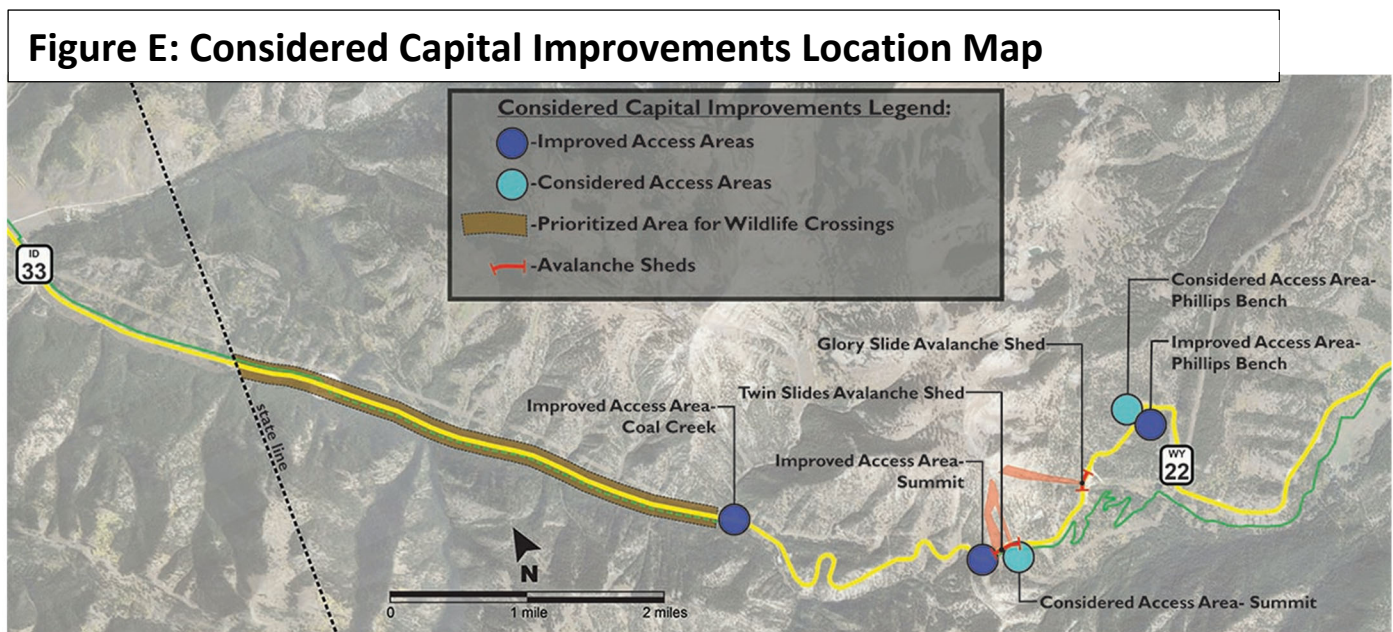
The study corridor is increasingly becoming a year-round world class recreation destination. With this increasing recreation activity, the most popular access areas to get to the backcountry are getting overrun with congestion from vehicles trying to find parking and are becoming unsafe areas for pedestrian circulation.

There are also increasing environmental concerns to the traveling public along the corridor with wildlife collisions happening more frequently particularly along the 3.75 mile stretch between the Coal Creek access area in Wyoming to the Idaho state line. To add, avalanche dangers are a continual threat to the safety of the traveling public and recreationists and traffic flow along the corridor particularly coming down from Mt. Glory along the Twin Slides and Glory Slide.

This section highlights considered capital project improvements along the corridor. These considered project elements include:

- Improved Access Areas: existing access areas in need of formalization and safety enhancements for vehicle and pedestrian circulation
- Considered Access Areas: non-developed areas close to existing access areas that could, with development, alleviate existing problems with pedestrian and vehicle circulation, and enhance safety for all users and visitors
- Wildlife Crossings: as wildlife collisions continue to be a threat to human safety and wildlife degradation, wildlife crossings could mitigate these threats
- Avalanche Sheds: avalanche sheds placed across the Teton Pass Highway could mitigate safety hazards to the traveling public and drastically lessen temporary closures of the highway due to increased avalanche activity

Figure E shows approximately where the identified considered capital improvements are located along the study corridor.



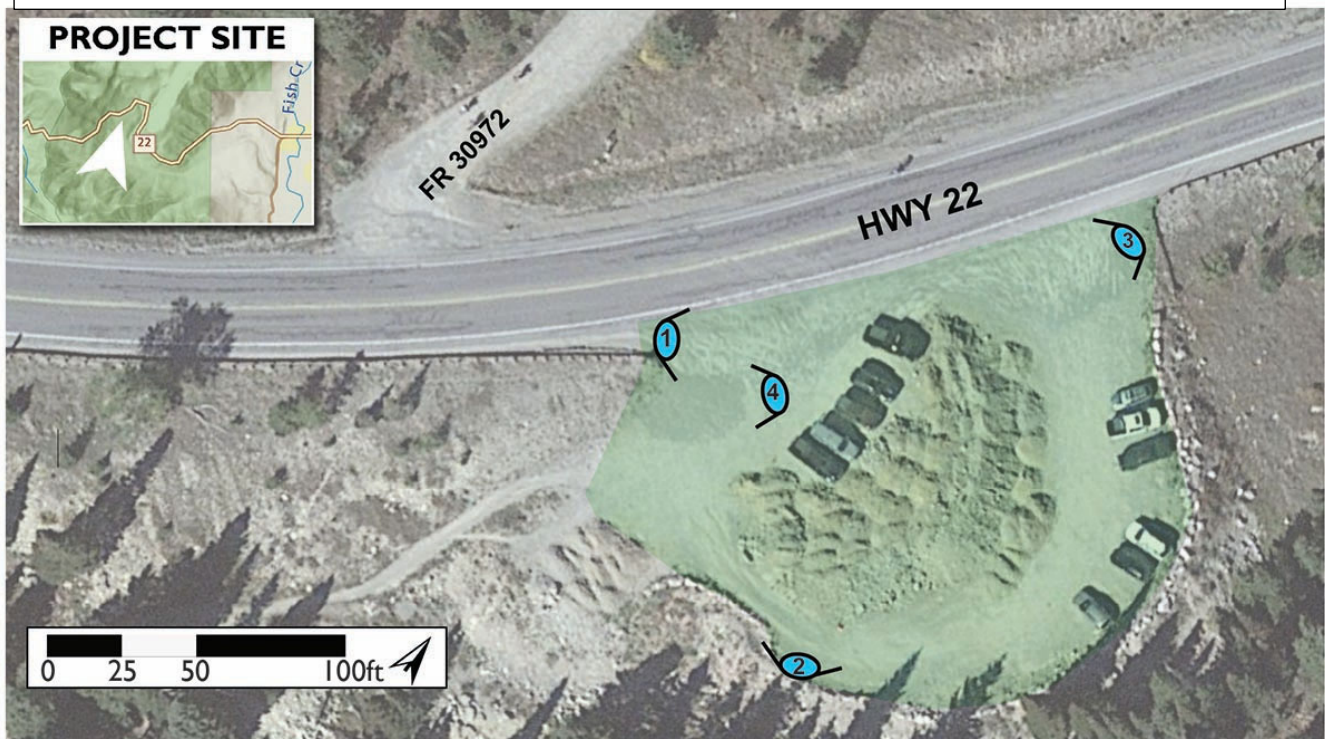
Improved Access Area: Phillips Bench

Current Condition: This access area is owned by WYDOT and is informally used for vehicle parking to access recreation activities including hiking and mountain biking south of the area and across the highway to the popular Ski Lake and Phillips Ridge areas. The area is also used by WYDOT for dirt and gravel material storage and is not snow plowed. Other constraints include:

- Area is approximately 22,800 SF, but with the approximate 6K SF center area that is used by WYDOT for dirt/gravel storage piles, this limits vehicle capacity and poses problems for circulation
- Area is not level and has an approximate 15 ft. elevation change across the site which limits vehicle capacity and circulation, and a potential safe recreational shuttle pick-up and drop-off staging area
- With the 90-degree turn in the highway just to the east, this poses site line distance dangers for pedestrians crossing the highway

Existing aerial and site images:

Figure F: Phillips Bench Access Area Existing Images

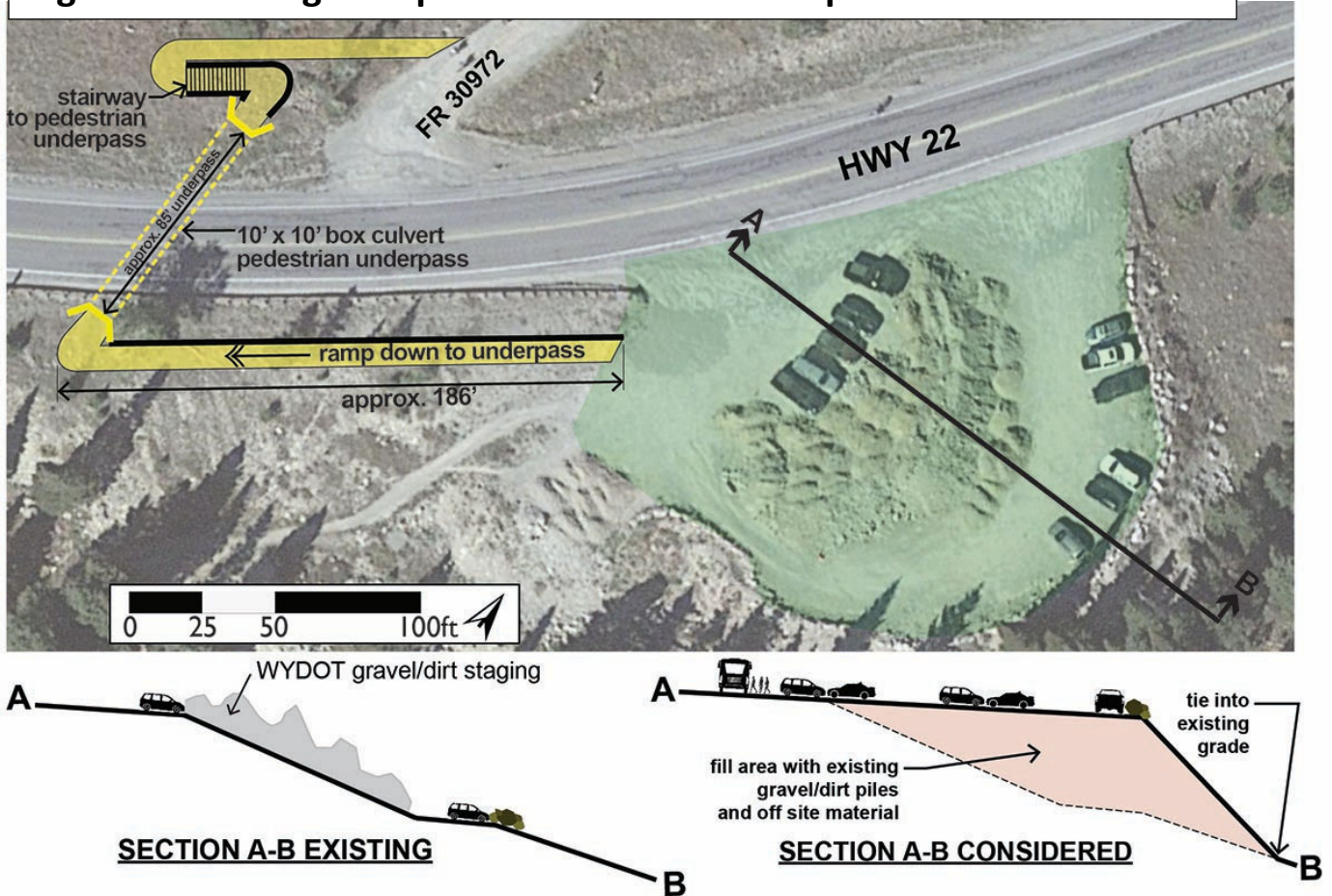


Existing site images:



Considered Condition: A formalized and paved recreational access area graded evenly across the site to safely accommodate maximized parking and recreational shuttle staging with amenities, and improvements to pedestrian circulation that includes a highway underpass.

Figure G: Existing Phillips Bench Considered Improvements



FHWA engineer's high level cost estimate for design, engineering and construction:

- all elements and improvements = **\$5.7 million**
- broken out pedestrian undercrossing associated cost estimate = **\$3 million**

Pedestrian undercrossing project precedent- FHWA Western Federal Lands Greater Yellowstone Trail completed pedestrian crossing in Summer 2022 accessing Mike Harris Campground (right)

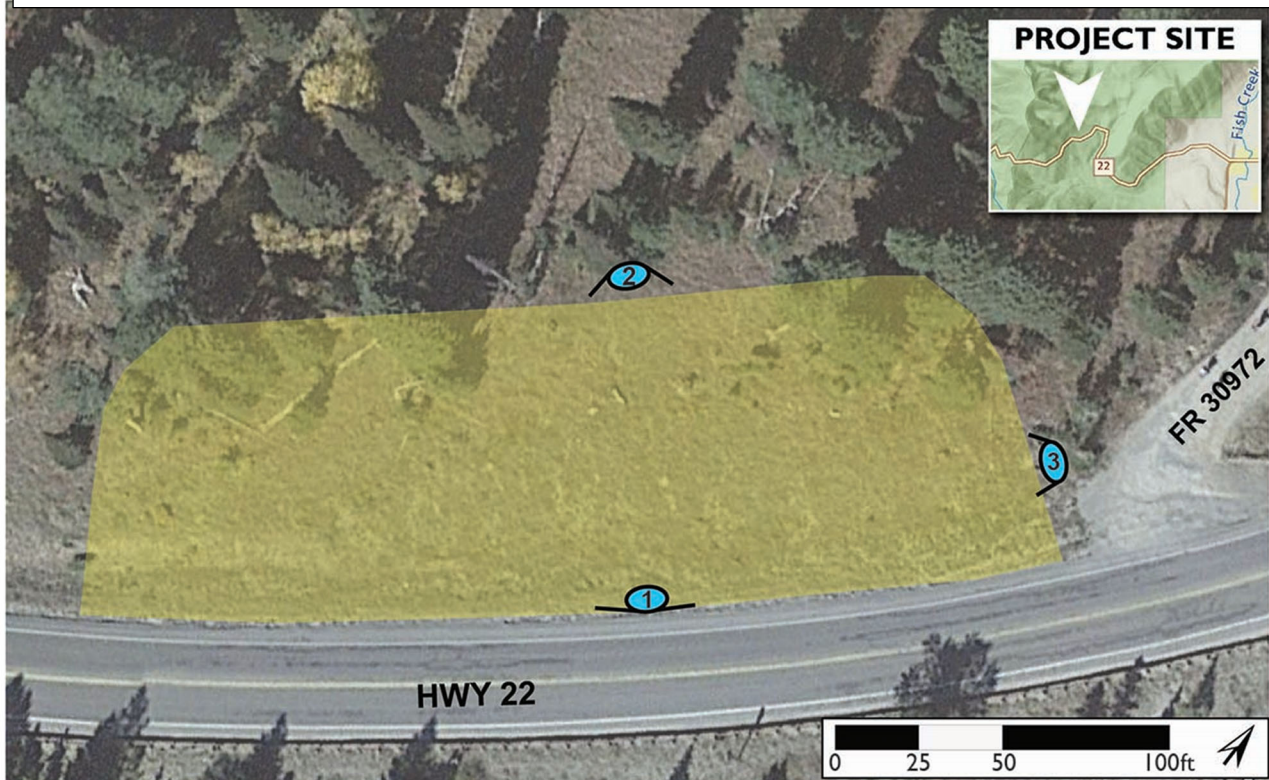


Considered Access Area: Phillips Bench

Current Condition: an approx. 38K SF non-developed area adjacent to WY SR 22 and Forest Rd. 30972 that accesses Phillips Bench recreation areas.

Existing aerial and site images:

Figure H: Phillips Bench Considered Alternate Access Area



Existing site images:



Considered Condition: A formalized and paved recreational access area that accommodates recreation access including snowmobile loading/unloading, and recreational shuttle with amenities.

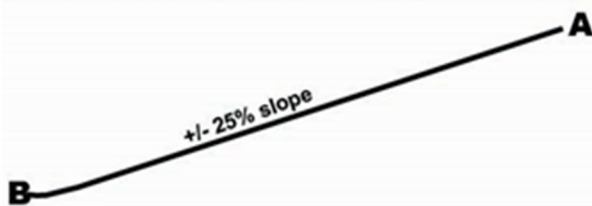
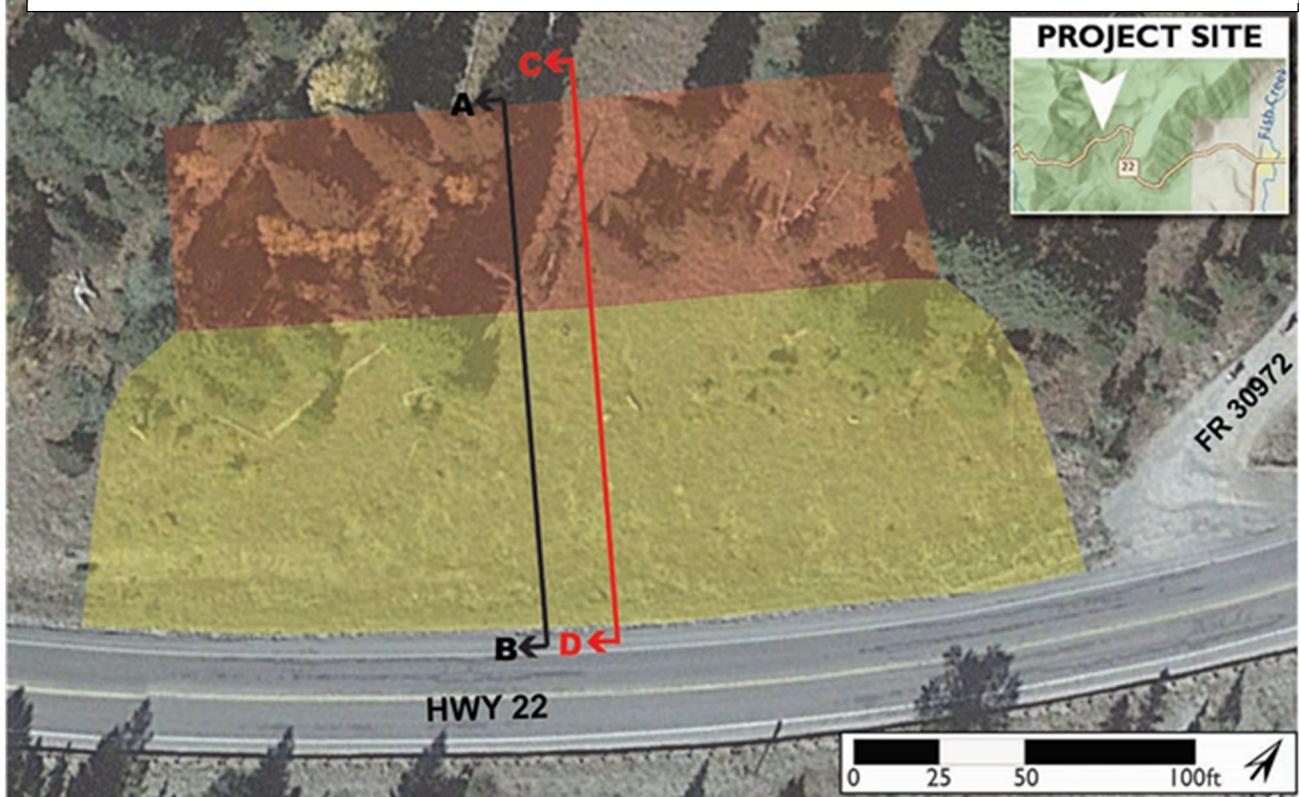
Some opportunities and constraints of this new considered access area include:

- The only legal snowmobile access along the study corridor exists at a small pullout a quarter mile east of this of this location on the south side of the highway. **This considered new location would provide for much safer snowmobile access and accommodation to what is present** (Right image).
- Would accommodate shuttle drop-off and pick-up safely and more efficient

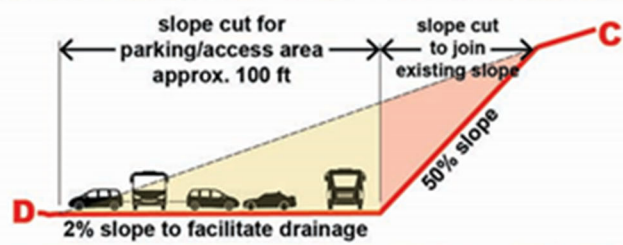


- Site has minimal site line distance and obstruction issues
- A formalized parking area that would accommodate approx. 74 spaces
- CONSTRAINT: Would require earthwork and removal of around 12 trees

Figure I: Phillips Bench Considered Access Area Improvements



SECTION A-B: EXISTING SLOPE PROFILE



SECTION C-D: CONSIDERED PARKING & ACCESS AREA

FHWA engineer's high level cost estimate for design, engineering and construction:

- all elements and improvements = **\$3 million**

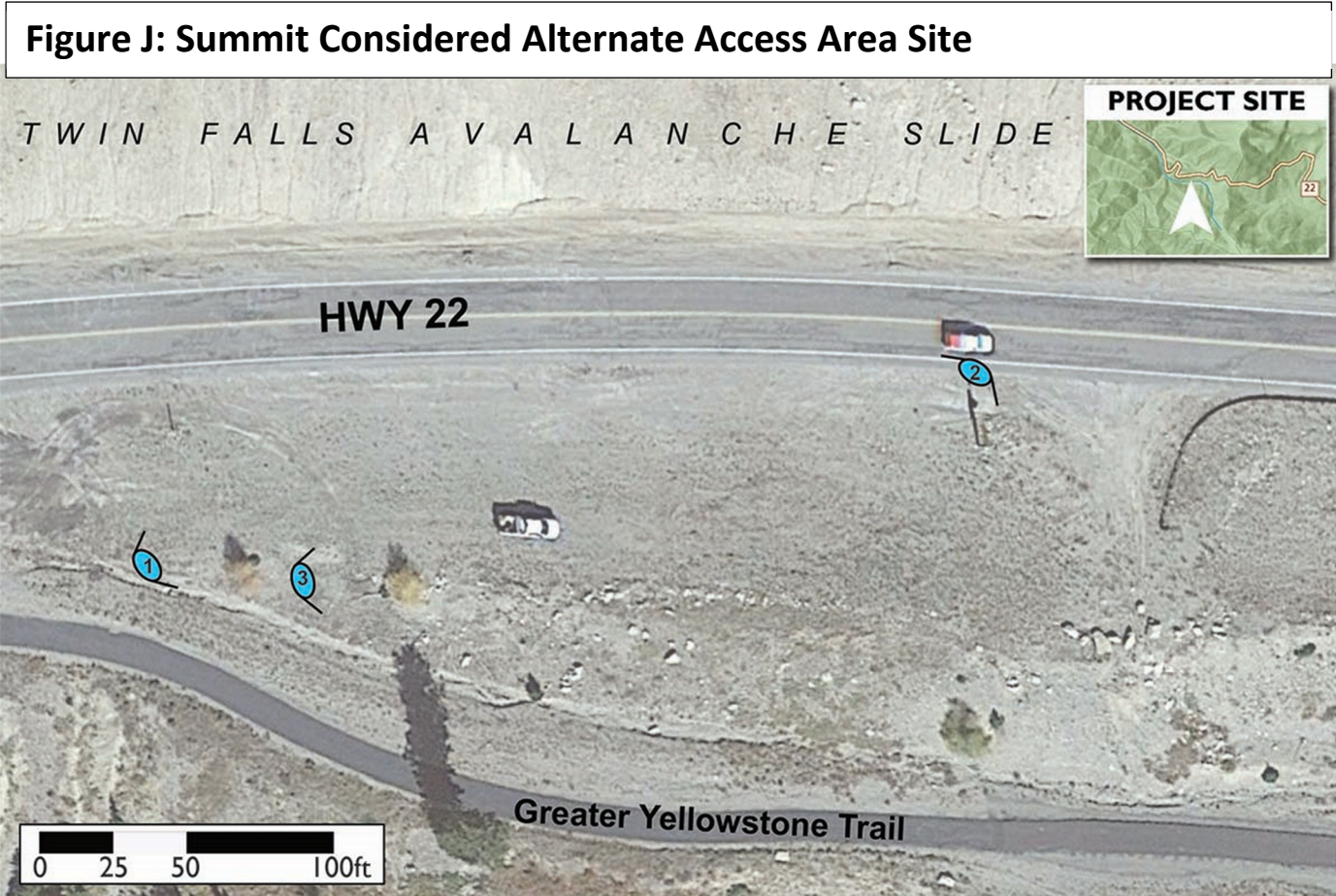
Project precedent: the aerial to the right is a parking and recreation access area at Berthoud Pass in the Arapaho National Forest in Colorado, and represents a considered example of what a new Phillips Bench access area could look like.



Considered Access Area: Teton Pass Summit Alternate Access Area

Current Condition: an approx. 24K non-developed area adjacent to WY-22 and approximately a quarter mile east of Teton Pass summit.

Existing aerial and site images:



Existing site images:



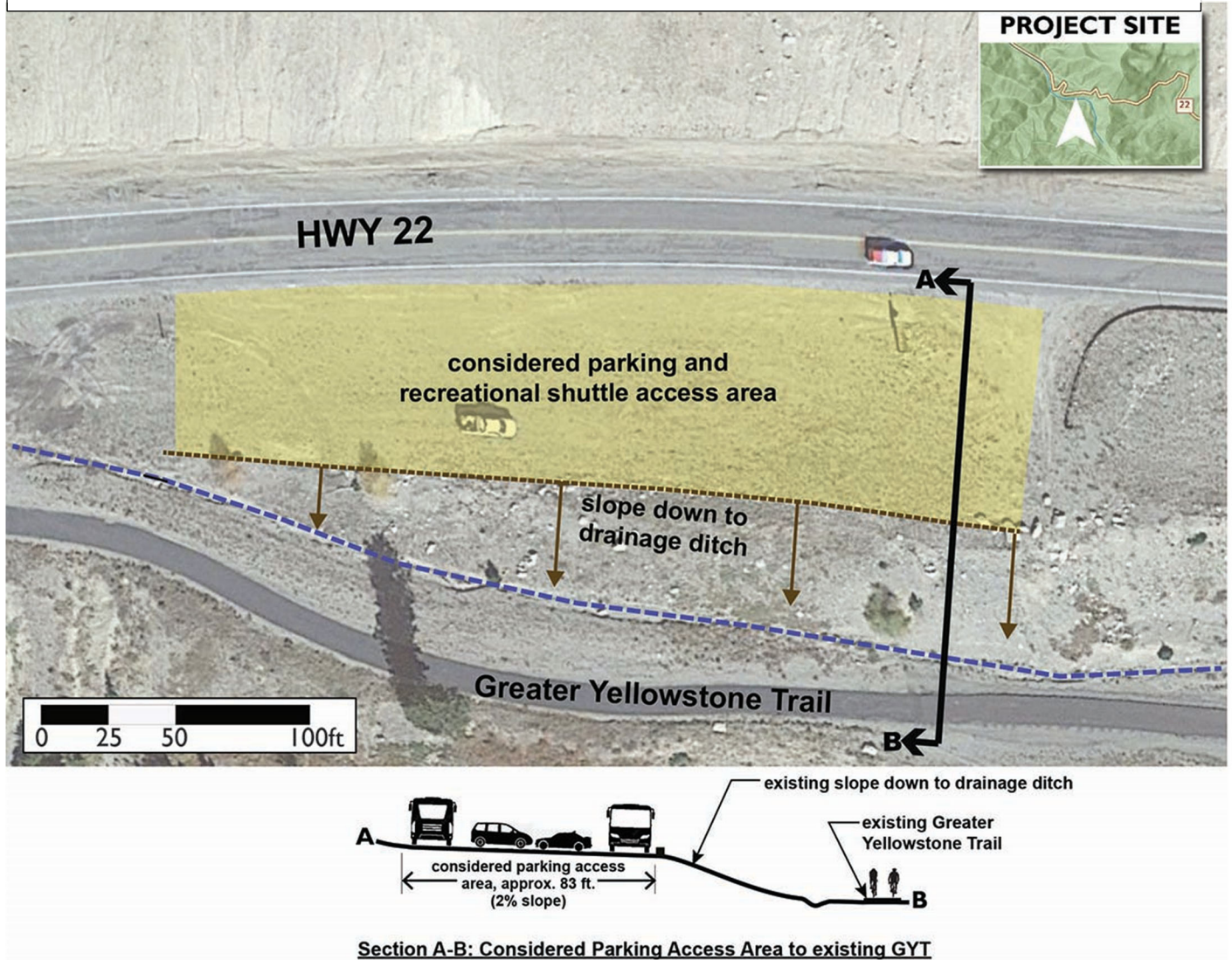
Considered Condition: An alternate public access and recreation shuttle drop-off and pick up area that would mitigate congestion at the present Summit access area.

Some opportunities and constraints of this new considered access area include:

- Minimal grading and earthwork required to develop this site
- Minimal existing slope across site
- No site line distance obstruction issues
- A formalized parking area would accommodate approx. 62 spaces

- Site is adjacent to existing Greater Yellowstone Trail which would provide safe access to Summit, a quarter mile to the west
- CONSTRAINT: Area is directly in line and below Twin Slides Avalanche path
 - Area could be developed into a dual avalanche shed and parking structure

Figure K: Summit Considered Alternate Access Area



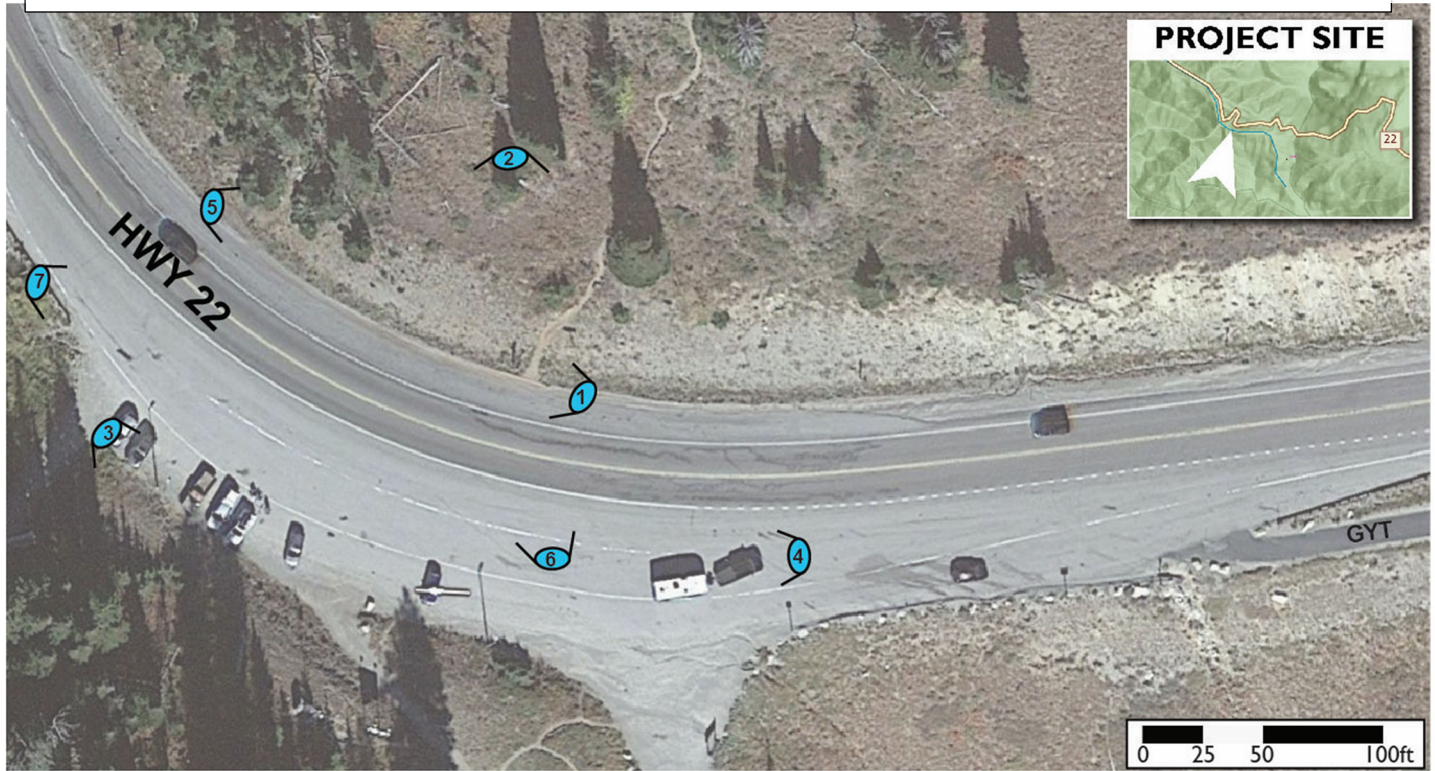
FHWA engineer's high level cost estimate for design, engineering and construction:

- all elements = **\$800K**

Improved Access Area: Teton Pass Summit

Current Condition: A year-round recreationalist access and tourist sightseeing area that can be congested with both pedestrian and vehicle traffic. Being at the top of the Summit and adjacent to a 90-degree curve adjacent to the west, the site has horizontal and vertical curve site line dangers especially for pedestrians crossing the Highway.

Figure L: Teton Pass Summit Access Area Existing Images



Existing site images:



Considered Condition: A recreational access area that provides safer pedestrian circulation with a separated **highway undercrossing** and provides room for potential recreational shuttle drop-off and pick-up zones.

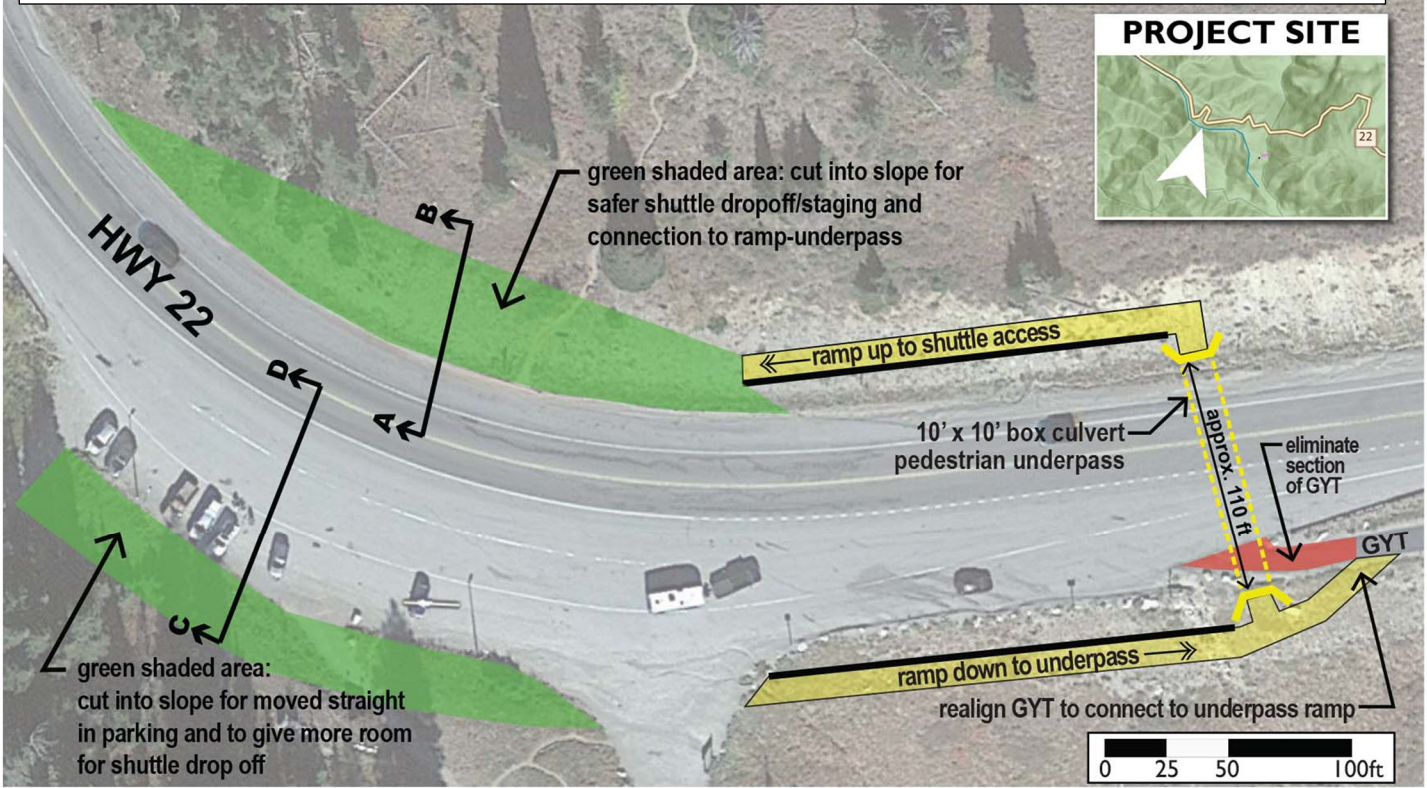
Some opportunities and constraints of this improved access area include:

- Provides safer areas and more room on both sides of the highway for recreational transit shuttle access
- With pedestrian undercrossing, provides safe crossing of highways
- The cut into the north slope to provide for safe recreational shuttle access could provide for better site line distances
- The realignment of the Greater Yellowstone Trail to provide for the pedestrian underpass places the exit/entry of the GYT at a safer location away from automobile traffic

CONSTRAINTS:

- Some environmental damage by cutting into the slopes especially on the north side
- The existing vertical alignment of the highway has site line distance issues

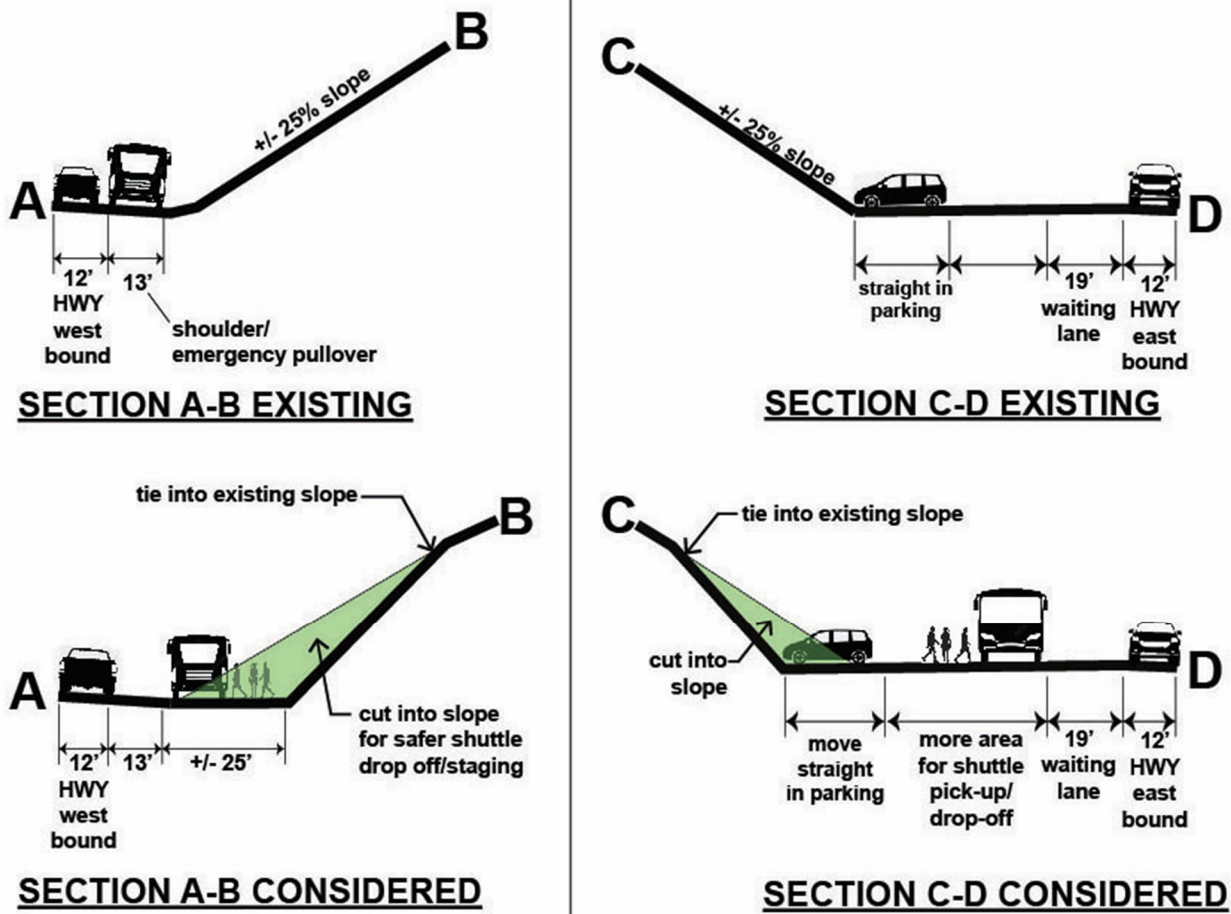
Figure M: Teton Pass Summit Considered Access Improvements



Pedestrian undercrossing project precedent- FHWA Western Federal Lands Greater Yellowstone Trail completed pedestrian crossing in Summer 2022 accessing Mike Harris Campground (right).



Figure N: Teton Pass Summit Considered Access Improvement Cross Sections



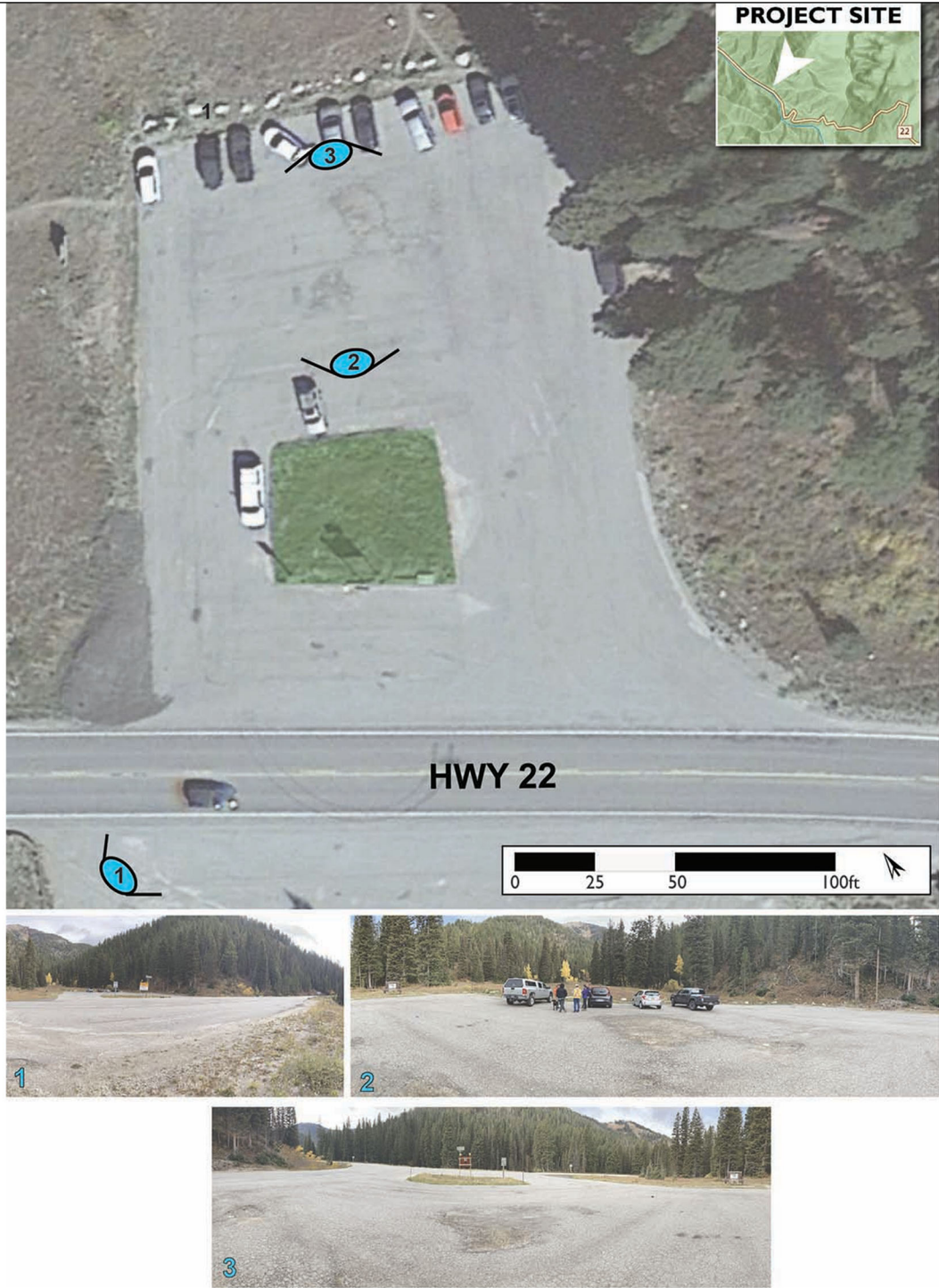
FHWA engineer's high level cost estimate for design, engineering and construction:

- all elements and improvements = **\$11.3 million**
- broken out pedestrian undercrossing associated cost estimate = **\$3 million**

Improved Access Area: Coal Creek

Current Condition: An approximate 31K SF USFS designated trailhead and parking area to access year-round recreation opportunities.

Figure O: Coal Creek Access Area Existing Images

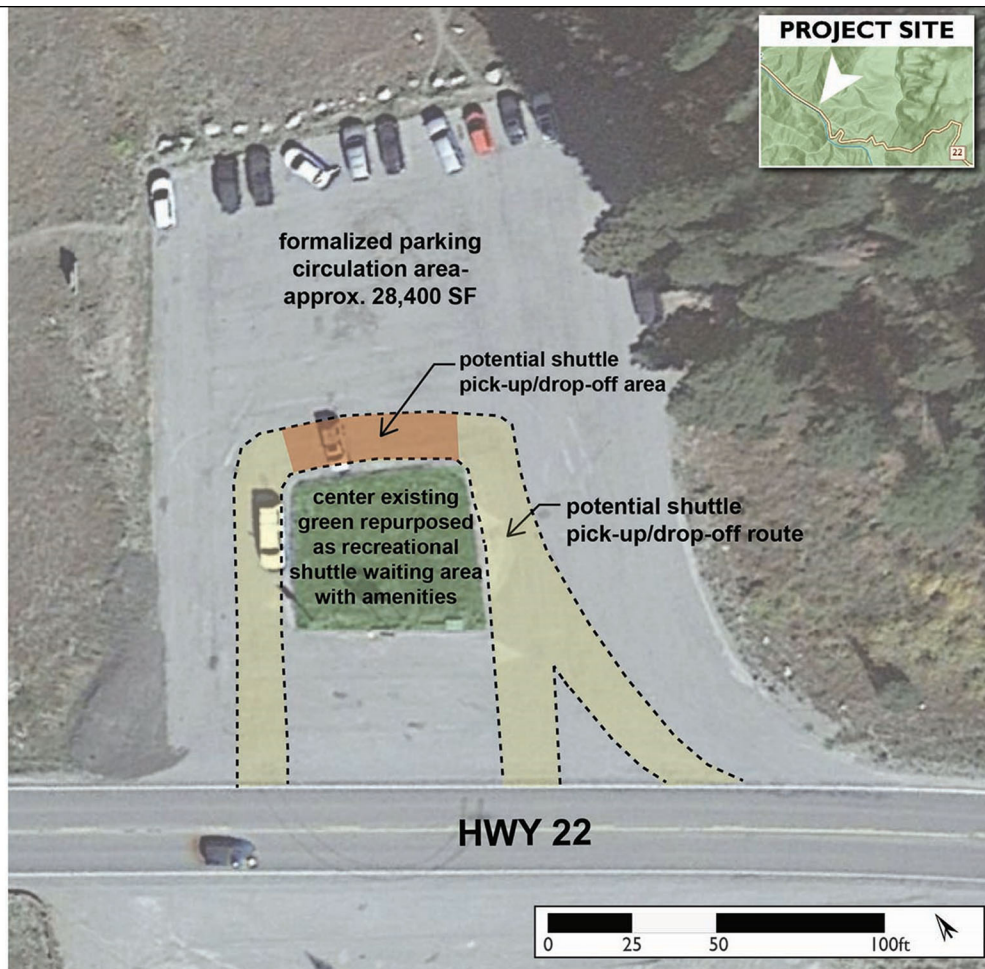


Considered Condition: A more formalized USFS trailhead and primary recreational shuttle pick-up and drop-off with amenities

Some opportunities and constraints of this improved access area include:

- would serve as the terminus for a potential East corridor recreational shuttle service, and accommodate shuttle drop-off and pick-up safely
 - more inviting trailhead with restored pavement conditions and a more formalized trailhead
 - center green area revitalized as a shuttle waiting area with amenities
- CONSTRAINTS:
- existing pavement surface is not ideal but would suffice, so the cost to repave may be better

Figure P: Coal Creek Access Area Considered Improvements



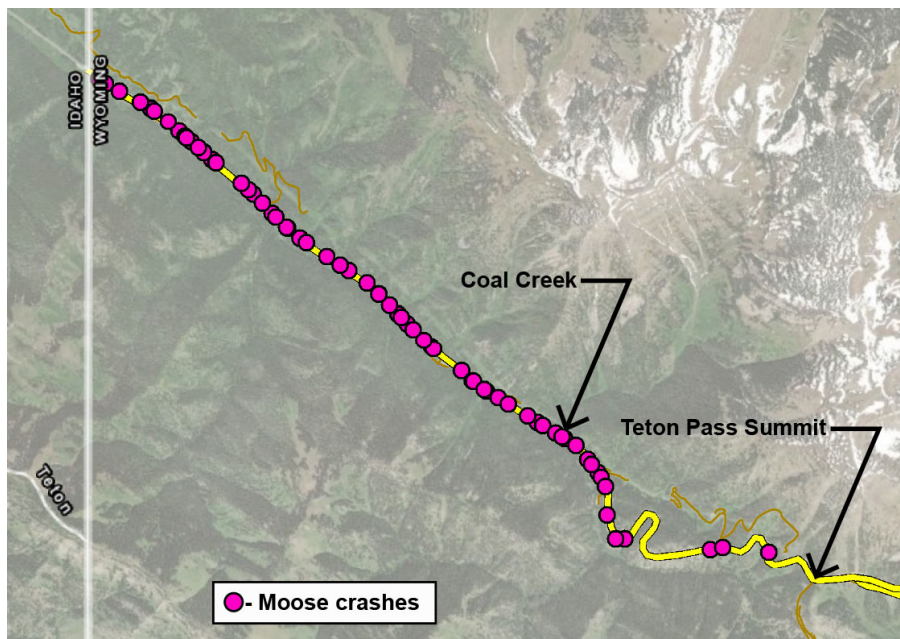
FHWA engineer's high level cost estimate for design, engineering and construction:

- all elements and improvements = **\$700 thousand**

Environmental Focused Capital Improvements- Wildlife Crossings

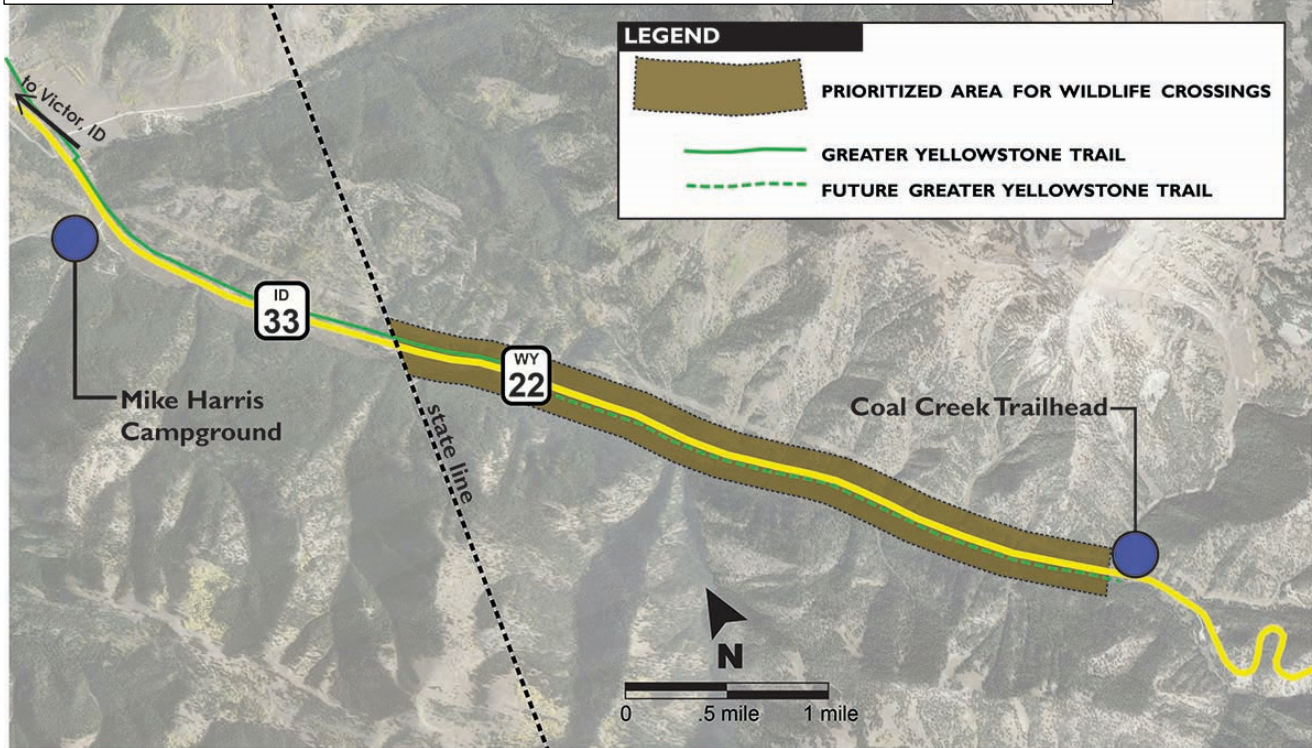
Current Condition: Wildlife crossing the highway are prevalent along the study corridor. This is especially true along the 3.75-mile stretch between the Coal Creek Trailhead along WY Highway 22 west to the Idaho state line. What was once a continuous habitat for many native animal species is now divided habitats, and wildlife vehicle collisions (WVC) are becoming more frequent. According to Jackson Hole Wildlife Foundation data, from 1991 to September of 2020, 439 wildlife vehicle collisions have been recorded along the Pass. These data are likely a significant underestimate of WVC occurrences in Teton County, WY.

Many WVC events go unreported, or animals are hit and die out of sight from roads. According to Jackson Hole Wildlife Foundation, dating back to 1991 through 2020, the top species that have been involved in WVC is Mule Deer with 243 incidents, followed by Moose with 157, Elk with 23, and other animals with 16. Collisions with large wildlife like moose are especially dangerous and costly, averaging over \$30,000 per collision, and are a threat to human safety. See diagram below of recorded WVC with Moose from 1991 to 2020 (source: Jackson Hole Wildlife Foundation)



Considered Condition: Wildlife crossing structures and fencing along the 3.75-mile stretch between Coal Creek and the Idaho state line (Figure Q). Wildlife crossing structures and fencing are known to be the most effective mitigation, resulting in reductions of collisions with wildlife by up to 90% or more while allowing wildlife to move safely under or over a roadway. However, crossing structures are not universally feasible due to their cost as well as other terrain or land use considerations, in which case other types of mitigation strategies may be warranted, alone or in combination with crossings. Recommended mitigation solutions will be integrated with community needs and values including highway mobility and safety, recreation, viewsheds and aesthetic concerns, and landowner and stakeholder interests.

Figure Q: Prioritized Area for Wildlife Crossings



Wildlife over and undercrossing and fencing example images:



High level cost estimates for wildlife crossing infrastructure include:

- arch overpass for 2-lane highway: **\$8 million**
- arch underpass for 2-lane highway: **\$2.5 million**
- box culvert underpass: **\$1.5 million**
- wildlife fencing (includes ramps and gates): **\$130 thousand a mile**

Environmental Focused Considered Capital Improvements- Avalanche Sheds

Current Condition: Avalanche hazard areas at the **Twin Falls Slides and Glory Slides** fall areas just east of Teton Pass Summit (Figure R) pose closure and roadway safety concerns during and after large snowfall events.

Avalanches are always a concern along Teton Pass during the Winter and Spring thaw months. According to WYDOT historical data, there have been a total of 690 avalanches along Teton Pass from 2008 to 2021 with the two most problematic and frequent paths being the Glory and Twin Slides. Since 2008, WY-22 has been closed a total of 582 hours from these avalanche occurrences, with 71 closure hours coming in 2020 and 2021.

Considered Improvement: Avalanche, or snow, sheds have been effectively utilized in similar alpine contexts. They are technically a “shed” built over transportation corridors to divert avalanches over the top which can make a transportation corridor safer for the traveling public and reduce highway closures.

Some opportunities and constraints of avalanche sheds include:

- One or two avalanche sheds could be constructed below the two slide hazard areas to maintain free flow of traffic, enhance safety, and mitigate delays caused by roadway obstruction
- Auxiliary parking and transit infrastructure could be incorporated into a shed near the pass summit
- The structures offer an opportunity for branding, placemaking, wayfinding, and/or public art

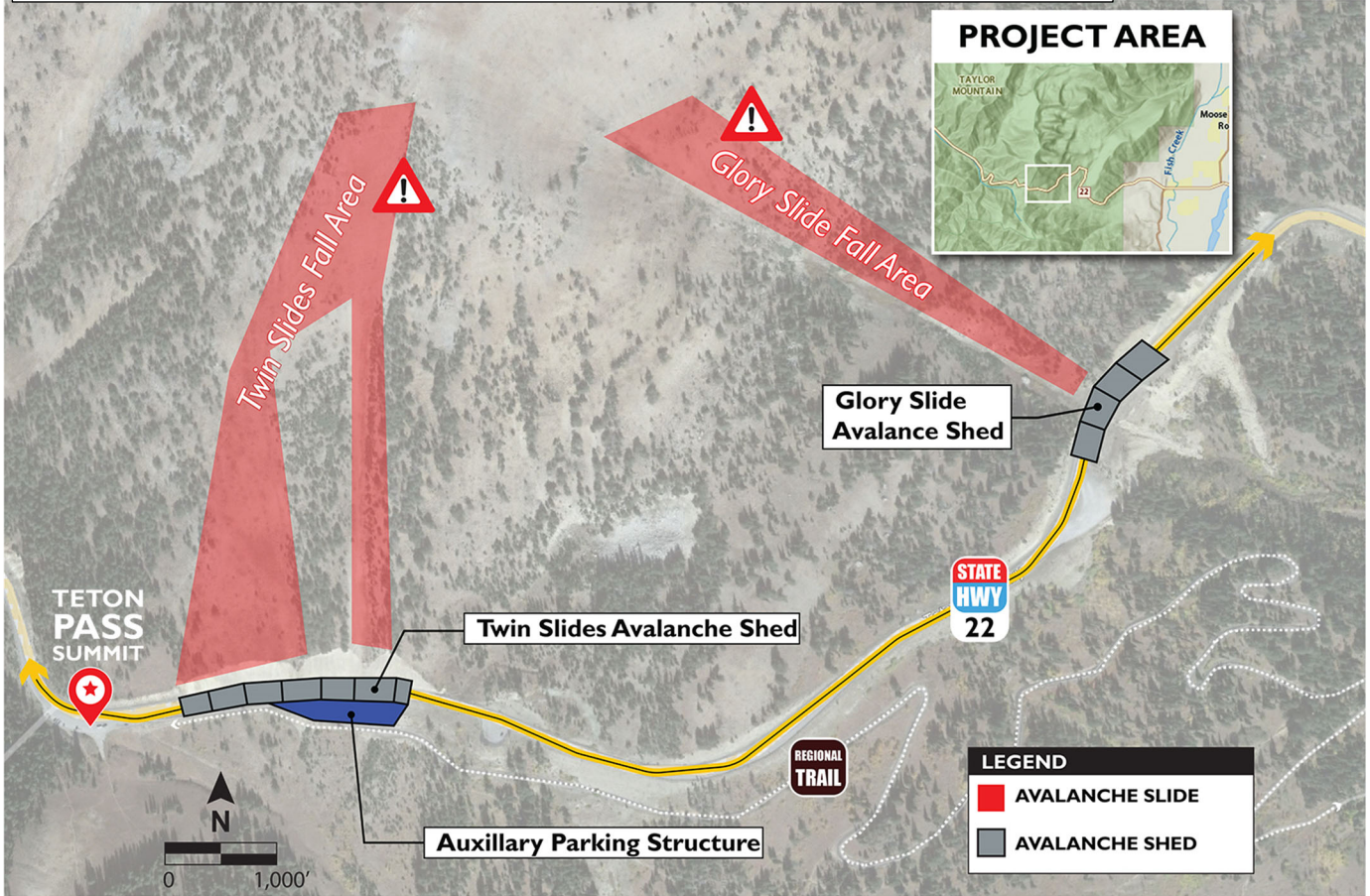
CONSTRAINTS:

- Costs of construction, operations, and maintenance of the structures can be significant
- **The sheds can act as a dam, impeding the function of natural drainages, this could impact vegetation and wildlife at lower elevations**

Example images of avalanche sheds:



Figure R: Considered Avalanche Shed Locations



High level cost estimate for design, engineering and construction:

- Twin Slides Avalanche Shed (with no auxiliary parking structure) = **\$23.5 Million**
- Glory Slide Shed = **\$20.7 Million**

Auxiliary Parking Structure adjacent to Twin Slides Avalanche Shed

An alternate access area for Teton Pass Summit is considered (Figure K) but the area is directly in the path of the Twin Slides avalanche path. To improve safety and access for this considered access area, an avalanche shed with a directly adjacent parking structure could be an option as displayed in the photo-simulation to the right.

High level cost estimate: **\$7 Million**

