

APPENDIX 2G

Preferred Alternative Selection Memorandum

Preferred Alternative Technical Memorandum for the Final EIS

**Little Cottonwood Canyon
Environmental Impact Statement
Wasatch Boulevard to Alta**

Lead agency:
Utah Department of Transportation

May 27, 2022

Contents

1.0	Introduction	1
2.0	Preferred Alternative Evaluation	1
2.1	Methodology	1
2.2	Primary Alternatives Evaluation	3
2.2.1	Purpose and Need Performance	3
2.2.2	Estimated Costs.....	8
2.2.3	Summary Comparison of Resource Impacts by Alternative	8
2.2.4	Preferred Alternative Selection	11
2.3	Sub-alternatives Evaluation.....	13
2.3.1	S.R. 210 – Wasatch Boulevard Alternatives.....	14
2.3.2	Mobility Hubs Alternative	19
2.3.3	Avalanche Mitigation Alternatives.....	19
2.3.4	Trailhead Parking Alternatives.....	22
2.3.5	No Winter Parking Alternative.....	27
3.0	UDOT's Preferred Alternative	28
4.0	References	28

Tables

Table 1.	Purpose and Need Performance for the No-Action and Primary Action Alternatives	3
Table 2.	Travel Time for the Primary Alternatives by Mode.....	5
Table 3.	Degree to Which the Primary Alternatives Would Meet the Project Objectives.....	5
Table 4.	Evaluation of Other Transportation Performance Considerations	7
Table 5.	Preliminary Cost Estimates for the Primary Alternatives	8
Table 6.	Environmental Impacts of the No-Action and Primary Action Alternatives including Supporting Elements	9
Table 7.	Wasatch Boulevard – Level of Service by Segment for the No-Action Alternative and Wasatch Boulevard Sub-alternatives (2050).....	15
Table 8.	Wasatch Boulevard – Level of Service by Intersection for the No-Action Alternative and Wasatch Boulevard Sub-alternatives (2050).....	15
Table 9.	Preliminary Construction Cost Estimates for the Wasatch Boulevard Sub-alternatives	16
Table 10.	Environmental Impacts of the No-Action Alternative and Wasatch Boulevard Sub-alternatives	17
Table 11.	S.R. 210 – Average Days and Hours of Road Closures with the No-Action Alternative and Avalanche Mitigation Sub-alternatives (2050).....	19
Table 12.	Preliminary Construction Cost Estimates for the Avalanche Mitigation Sub-alternatives	20
Table 13.	Environmental Impacts of the No-Action Alternative and Avalanche Mitigation Sub-alternatives	21
Table 14.	Total Parking Spaces from S.R. 209/S.R. 210 Intersection to Snowbird Entry 1 by Trailhead Parking Sub-alternative	23
Table 15.	Degree to Which the Trailhead Parking Sub-alternatives Would Meet the Project Objectives.....	23
Table 16.	Preliminary Construction Cost Estimates for the Trailhead Parking Sub-alternatives	24
Table 17.	Environmental Impacts of the No-Action Alternative and Trailhead Parking Sub-alternatives	25

Figures

Figure 1.	Vehicle Backup Distance from S.R. 209/S.R. 210 Intersection in 2050	4
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1.0 Introduction

This technical memorandum documents the Utah Department of Transportation's (UDOT) process to identify the preferred alternative for the Final Environmental Impact Statement (EIS) for the State Route (S.R.) 210 Project. UDOT's process included reviewing how the project alternatives would meet the purpose of and need for the project and how they would affect the human and natural environment, including Section 4(f) resources.

UDOT reviewed transportation and environmental information both at the regional scale (by the total alternative) and at the local level (by city or area). Local information was reviewed to ensure that UDOT considered how specific cities or neighborhoods would be affected by the alternatives.

What is Section 4(f)?

For a description of Section 4(f), see footnote e in Table 6.

Section 2.0, Preferred Alternative Evaluation, of this technical memorandum summarizes the transportation performance, costs, and impacts of the alternatives. Section 3.0, UDOT's Preferred Alternative, identifies the preferred alternative and the reasons for its identification.

The environmental review, consultation, and other actions required by applicable federal environmental laws for this action are being, or have been, carried out by UDOT pursuant to 23 United States Code (USC) Section 327 and a Memorandum of Understanding dated January 17, 2017, and executed by the Federal Highway Administration and UDOT.

2.0 Preferred Alternative Evaluation

2.1 Methodology

For the S.R. 210 Project, UDOT is evaluating five primary alternatives and nine sub-alternatives that support the primary alternatives. The primary alternatives provide the main transportation solution on S.R. 210 from Fort Union Boulevard to the town of Alta, and the sub-alternatives are supporting elements that help the primary alternatives achieve the project goals.

The five primary alternatives are as follows:

- Enhanced Bus Service Alternative
- Enhanced Bus Service in Peak-period Shoulder Lane Alternative
- Gondola Alternative A (Starting at Canyon Entrance)
- Gondola Alternative B (Starting at La Caille)
- Cog Rail Alternative (Starting at La Caille)

The sub-alternatives that help the primary alternatives achieve the project goals are:

- **S.R. 210 – Wasatch Boulevard Alternatives**
 - Imbalanced-lane Alternative
 - Five-lane Alternative
- **Mobility Hubs Alternative**
 - Gravel Pit
 - 9400 South and Highland Drive
- **Avalanche Mitigation Alternatives**
 - Snow Sheds with Berms Alternative
 - Snow Sheds with Realigned Road Alternative
- **Trailhead Parking Alternatives**
 - Trailhead Parking Improvements and No S.R. 210 Roadside Parking within ¼ Mile of Trailheads Alternative
 - Trailhead Parking Improvements and No Roadside Parking from S.R. 209/S.R. 210 Intersection to Snowbird Entry 1 Alternative
 - No Trailhead Parking Improvements and No Roadside Parking from S.R. 209/S.R. 210 Intersection to Snowbird Entry 1 Alternative
- **No Winter Parking Alternative**
 - From about Snowbird Entry 1 to the Bypass Road (west) and Bypass Road (east) to about the Alta Lodge

What is a mobility hub?

A mobility hub is a location where users can transfer from their personal vehicle to a bus.

In identifying a preferred alternative, UDOT first evaluated and identified its preferred primary alternative, then decided which of the sub-alternatives would best support the objectives of the identified primary alternative.

In its decision process, UDOT considered the following measures:

- **Purpose and Need Performance** – The degree to which an alternative would meet the project purpose to “substantially improve transportation-related safety, reliability, and mobility on S.R. 210 from Fort Union Boulevard through the town of Alta for all users on S.R. 210”
- **Resource Impacts** – The amount and type of impacts to the natural and human environment an alternative would have
- **Estimated Cost** – How much an alternative would cost

UDOT’s decision process did not weigh any of the above measures as being more important than the others; UDOT considered all three when making its decision. The evaluation below explains UDOT’s rationale for selecting the preferred alternative.

In reviewing the three measures, UDOT also looked at other factors as part of the evaluation. For example, with regard to purpose and need performance, some alternatives have a greater potential to cause travel delays on S.R. 210 on days when it snows. As another example, with regard to resource impacts, two alternatives could have similar impacts, but one would affect a resource of greater importance.

2.2 Primary Alternatives Evaluation

The five primary alternatives evaluated in the preferred alternative decision process are:

- Enhanced Bus Service Alternative
- Enhanced Bus Service in Peak-period Shoulder Lane Alternative
- Gondola Alternative A (Starting at Canyon Entrance)
- Gondola Alternative B (Starting at La Caille)
- Cog Rail Alternative (Starting at La Caille)

2.2.1 Purpose and Need Performance

Purpose and Need Screening Criteria Evaluation

UDOT analyzed the transportation performance of each alternative to determine how well the alternative would meet the purpose of and need for the project. The evaluation included the degree to which each alternative would meet the following objectives:

What is the 30th-busiest hour?

The 30th-busiest hour is the hour with the 30th-highest hourly traffic volumes during the year.

- Substantially improve peak-hour per-person (defined as the 30th-busiest hour) travel times in Little Cottonwood Canyon for uphill and downhill users in 2050 compared to travel times with the No-Action Alternative in 2050.
- Meet peak-hour average total person-demand on busy ski days in Little Cottonwood Canyon.
- Substantially reduce vehicle backups on S.R. 210 and S.R. 209 through residential areas on busy ski days (30th-busiest hour).

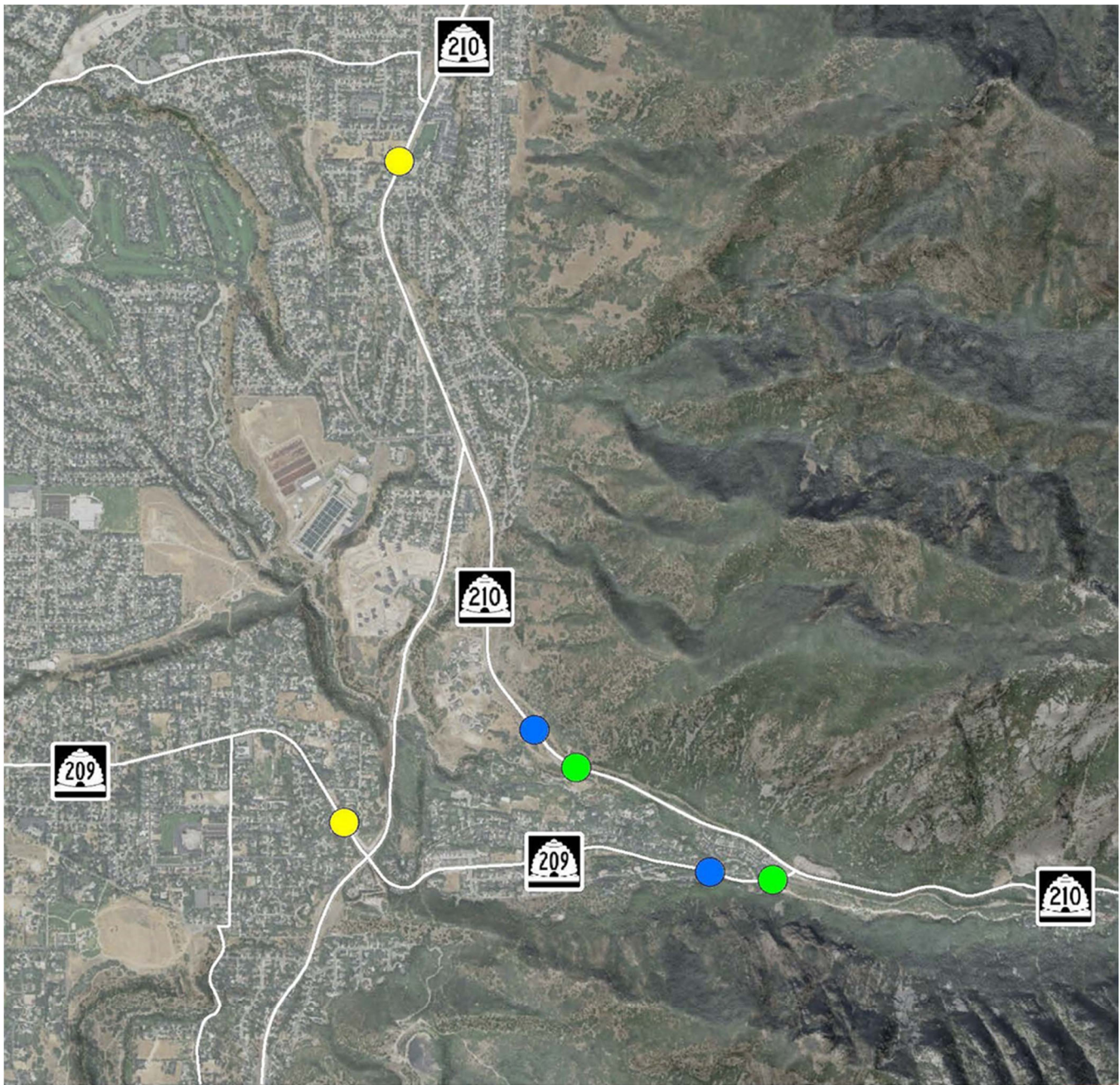
As shown in Table 1, all five primary alternatives would substantially reduce peak-hour per-person travel time, with the Enhanced Bus Service in Peak-Period Shoulder Lane Alternative providing the best overall travel time. All of the primary alternatives would provide nearly equal peak-hour capacity, but the Enhanced Bus Service Alternative would cause vehicles to back up for greater distances on S.R. 209 and S.R. 210 compared to the other primary alternatives (Figure 1).

Table 1. Purpose and Need Performance for the No-Action and Primary Action Alternatives

Alternative	30th highest-hour Per-person Travel Time ^a (minutes)	Alternative Transit Capacity in the Peak Hour (persons)	Vehicle Backup Distance from S.R. 209/S.R. 210 Intersection (feet)	
			On S.R. 209	On S.R. 210
No-Action Alternative	80–85	336	6,700	13,000
Enhanced Bus Service Alternative	45–50	1,008	1,275	4,300
Enhanced Bus Service in Peak-period Shoulder Lane Alternative	35–40	1,008	350	3,050
Gondola Alternative A	45–50	1,050	350	3,050
Gondola Alternative B	45–50	1,050	350	3,050
Cog Rail Alternative	45–50	1,012	350	3,050

^a Fort Union Boulevard to Alta ski resort

Figure 1. Vehicle Backup Distance from S.R. 209/S.R. 210 Intersection in 2050



Vehicle Backup Length

- Enhanced Bus Service in Peak-period Shoulder Lane, Gondola Alternatives A and B, and Cog Rail Alternative
- Enhanced Bus Service
- No Action

0 Feet 3,000



Table 2 shows the travel time for the primary alternatives for each mode of travel considered.

Table 2. Travel Time for the Primary Alternatives by Mode

In minutes

Alternative	Transit Mode Travel Time with Transfers ^a	Transit Mode Travel Time in Transit Vehicle ^b	Personal Vehicle Travel Time
Enhanced Bus Service Alternative	54	42	42
Enhanced Bus Service in Peak-period Shoulder Lane Alternative	36	24	38
Gondola Alternative A	63	34	38
Gondola Alternative B • From La Caille base station	55	37	38
Cog Rail Alternative • From La Caille base station	55	37	38

^a Travel times are from Fort Union Boulevard to Alta ski resort and include transfers from parking to the transit mode.

^b Travel times are times in the actual transit vehicle (bus, gondola, or cog rail) from the start location to Alta ski resort.

Table 3 evaluates the degree to which the primary alternatives would meet the project objectives.

Table 3. Degree to Which the Primary Alternatives Would Meet the Project Objectives

Alternative	Substantially Improve Peak-hour Per-person Travel Times	Meet Peak-hour Average Total Person-demand	Substantially Reduce Vehicle Backups on S.R. 210 and S.R. 209
Enhanced Bus Service Alternative	Travel times would be 45–50 minutes. The travel time would be similar to that with the gondola alternatives and Cog Rail Alternative.	Meets peak-hour demand.	This alternative would have the longest vehicle backups from the S.R. 209/ S.R. 210 intersection.
Enhanced Bus Service in Peak-period Shoulder Lane Alternative	This alternative would have the best overall per-person travel time.	Meets peak-hour demand.	This alternative, along with the gondola and cog rail alternatives, would have the shortest vehicle backups from the S.R. 209/S.R. 210 intersection.
Gondola Alternative A	Same as the Enhanced Bus Service Alternative.	Meets peak-hour demand.	Same as the Enhanced Bus Service Alternative in Peak-Period Shoulder Lane Alternative.
Gondola Alternative B	Same as the Enhanced Bus Service Alternative.	Meets peak-hour demand.	Same as the Enhanced Bus Service Alternative in Peak-Period Shoulder Lane Alternative.
Cog Rail Alternative	Same as the Enhanced Bus Service Alternative.	Meets peak-hour demand.	Same as the Enhanced Bus Service Alternative in Peak-Period Shoulder Lane Alternative.

Other Transportation Performance Considerations

In evaluating the primary alternatives, UDOT also considered other important factors such as how well each alternative would operate over the long term. The factors considered are as follows:

- **Scalable Service/Phased Implementation** – This measure was used to determine whether an alternative could be built in phases starting with improvements to address the initial transportation needs and build up to full build-out by 2050. For example, bus service could start with an initial smaller service and build on that service as demand increases. The advantage of scalable service is that it would allow UDOT to start with low initial upfront capital and operating costs and build the system over time while considering future changes in transportation demand and technology.
- **Travel Reliability** – This measure was used to determine how well an alternative would operate during snow events—for example, would vehicle slideoffs or accidents disrupt travel performance? A system that is less affected by snow would have an advantage.
- **Mechanical Complexity** – This measure was used to determine whether an alternative has a high degree of mechanical complexity compared to the other alternatives. Such complexity could result in more disruptions in service because of mechanical issues. A simple transportation system or redundant system would have an advantage.
- **Delay due to Snow-removal Operations** – This measure was used to determine whether personal vehicles and buses on S.R. 210 in Little Cottonwood Canyon would be delayed during snow-removal operations.
- **Avalanche Mitigation Risk** – This measure was used to determine whether an alternative could be delayed by avalanche mitigation operations.
- **Support of Active Transportation** – This measure was used to determine whether an alternative would provide greater benefits to active transportation (bicycle and pedestrian use).

Table 4 presents UDOT's evaluation of each consideration by alternative. As shown in the table, all alternatives have advantages and disadvantages depending on the considerations.

Table 4. Evaluation of Other Transportation Performance Considerations

Alternative	Scalable Service/ Phased Implementation	Travel Reliability	Mechanical Complexity	Delay due to Snow-removal Operations	Avalanche Mitigation Risk	Support of Active Transportation
Enhanced Bus Service Alternative	Scalable service capability. The alternative could initially start with a smaller bus fleet and fewer mobility hub parking spaces. This would allow UDOT to build on the service as demand grows and allow for future-year adjustments based on the operational characteristics of the bus service.	The buses would operate in the same travel lane as personal vehicles. Similar to existing conditions, vehicle slideoffs or accidents during snow events could block the travel lane and delay bus service.	Similar to the current bus system, which is easy to operate and maintain. Spare buses would be available if a bus breaks down during operation. Low likelihood of stranding users since one bus breaking down would not stop bus service.	Snow-removal operations could occur during operation of the bus service, similar to existing conditions.	With the addition of snow sheds, avalanche mitigation operations would have a low risk of delaying the bus service. Snow sheds improve roadway reliability and safety.	There would be no change to pedestrian and cyclist facilities on S.R. 210 in Little Cottonwood Canyon.
Enhanced Bus Service in Peak-period Shoulder Lane Alternative	Scalable service capability. Same as the Enhanced Bus Service Alternative except would require the capital investment for the peak-period shoulder lanes.	With the availability of a separate travel lane, buses could operate around vehicle slideoffs and accidents. However, snow and icy conditions would slow bus service.	Same as the Enhanced Bus Service Alternative.	Same as the Enhanced Bus Service Alternative.	Same as the Enhanced Bus Service Alternative.	The peak-period shoulder lanes would become pedestrian and cyclist lanes on S.R. 210 during the summer and when not in use during the winter.
Gondola Alternative A	No scalable service capability. UDOT would need to make the investment in the gondola infrastructure at project initiation. This would not allow UDOT to determine the operational success until after a major capital investment is made into the system.	The gondola system would not be affected by vehicle slideoffs or accidents. Vehicle users could decide to use the gondola system if travel lanes on S.R. 210 are closed or congested.	The system would have four stations, each necessary to operate the gondola system. If any part of the gondola system has a mechanical failure, the entire system would stop, stranding users at the base station or the ski resorts. Similar gondola systems are in operation around the world and have shown high overall reliability.	Same as the Enhanced Bus Service Alternative.	Current artillery use would require gondola cabins to be outside artillery fragmentation areas during avalanche mitigation operations. After use of artillery, the gondola cables would need to be inspected for damage before use. With snow sheds on S.R. 210, the use of artillery would be lower compared to current operations.	. Same as the Enhanced Bus Service Alternative.
Gondola Alternative B	No scalable service capability. Same as Gondola Alternative A.	Same as Gondola Alternative A.	Same as Gondola Alternative A but with an additional angle station (a station that adjusts the horizontal direction of the gondola cabin).	Same as the Enhanced Bus Service Alternative.	Same as Gondola Alternative A.	Same as the Enhanced Bus Service Alternative.
Cog Rail Alternative	No scalable service capability. UDOT would need to make the investment in the cog rail infrastructure at project initiation. This would not allow UDOT to determine the operational success until after a major capital investment is made into the system.	The cog rail system would not be affected by vehicle slideoffs or accidents. Vehicle users could decide to use the cog rail system if travel lanes on S.R. 210 are closed or congested.	The cog rail system would operate similar to other rail systems in the Salt Lake area except with cog wheels on the vehicles and a third, toothed rail. If a cog rail vehicle were to break down in a double-track segment of the alignment, other rail vehicles could still operate. However, a cog rail failure in the 2-mile single-track section would stop operation of the entire system. Low likelihood of stranding users.	Snow removed from the cog rail tracks would need to be blown onto S.R. 210, which would require UDOT to spend additional time for snow removal. In addition, when snow is blown off the tracks, this would temporarily close S.R. 210. The snow-blowing operation could occur during the early morning before peak travel periods.	Same as the Enhanced Bus Service Alternative.	A 6-to-8-foot-wide roadway shoulder would be built between the travel lane and the cog rail tracks. This shoulder could be used by pedestrians and cyclists.

2.2.2 Estimated Costs

Table 5 shows the estimated costs of the primary alternatives. The construction cost estimates include design, right-of-way, construction, utility relocations, and environmental mitigation. The construction cost estimates also include the sub-alternatives that would be necessary for the primary alternative to meet the project objectives. These construction cost estimates are based on unit prices for previously completed, similar projects that were escalated to 2020 dollars. The actual cost of construction would likely be higher because of inflation between 2020 and the year of construction, but the costs are expected to increase proportionally among the various alternatives.

The table also includes winter and summer operation and maintenance cost for each alternative. Only the gondola and cog rail alternatives may operate during the summer.

Table 5. Preliminary Cost Estimates for the Primary Alternatives
In millions of 2020 dollars

Alternative	Construction Cost Estimate ^{a,b}	Operation and Maintenance Cost Estimate ^c		
		Winter ^d	Summer	Total Annual Cost
Enhanced Bus Service Alternative	338–355	14.0	None	14.0
Enhanced Bus Service in Peak-period Shoulder Lane Alternative	493–510	11.0	None	11.0
Gondola Alternative A	554–561	9.5	5.0	14.5
Gondola Alternative B	533–550	4.0	3.0	7.0
Cog Rail Alternative	1,051–1,064	3.4	2.2	5.6

- ^a The construction costs of the primary alternatives are presented as a range since each cost varies depending on the sub alternative(s) selected. The construction cost estimates also include tolling infrastructure.
- ^b The construction costs for the Enhanced Bus Service Alternatives and Gondola Alternative A include new buses, signal priority at intersections, fare-collection systems, communication equipment, and a bus maintenance and storage facility.
- ^c The operation and maintenance costs include the total operations for the alternative, such as buses, personnel, and maintenance, plus snow removal for the Enhanced Bus Service in Peak-period Shoulder Lane Alternative and the Cog Rail Alternative.
- ^d The operation and maintenance costs for the enhanced bus service alternatives include the cost of retaining drivers year-round to avoid laying off and rehiring and retraining drivers at the start of each winter season.

2.2.3 Summary Comparison of Resource Impacts by Alternative

Table 6 compares the resource impacts after mitigation of the five primary alternatives. This table provides a comparison among the alternatives for the resources evaluated in the Final EIS. Although impacts are quantified, not all resources listed favored one alternative or another.

As shown in Table 6, some resources would experience a substantial difference in impacts from the alternatives, while other resources would experience no difference or a very small difference in impacts from the alternatives. Thus, some resource impacts were more helpful than others in distinguishing among the alternatives. Although Table 6 provides the quantitative information for each impact, it does not always provide the context and intensity of the impact. For some resources, the context and intensity of the impact provide relevant information for weighing alternatives. Impact context and intensity are included as appropriate in the following discussions of how UDOT’s preferred primary alternative was identified.

Table 6. Environmental Impacts of the No-Action and Primary Action Alternatives including Supporting Elements

Impact Category	Unit	No-Action Alternative	Enhanced Bus Service Alternative	Enhanced Bus Service in Peak-period Shoulder Lane Alternative	Gondola Alternative A	Gondola Alternative B	Cog Rail Alternative
Potential residential relocations	Number	0	1	1	1	1	1
Potential business relocations	Number	0	0	0	0	0	0
Recreation areas affected	Number	0	2	4	3	3	5
Community facilities affected	Number	0	1	1	1	1	1
Environmental justice impacts	Yes/No	No	No	No	No	No	No
Economic impacts	Yes/No	No	No	No	No	No	No
Existing Forest Service trails affected	Number	0	0	1	1	1	1
Climbing resources (existing boulders affected)	Number	0	0	41	5	2	116
Air quality impacts above regulations	Yes/No	No	No	No	No	No	No
Receptors with modeled noise levels above criteria	Number	173	213–230	216–233	213–230	213–230	214–231
Increase in impervious surface ^a	Acres	0	13.2–16.8	35.2–38.8	14.8–18.4	22.6–26.2	59.2–62.8
Water quality standards exceeded ^b	Yes/No	No	No	No	No	No	No
Wildlife habitat impacted	Acres	0	11–15	44–48	13–17	24–28	87–91
Threatened and endangered species	Yes/No	No	No	No	No	No	No
Impacts to waters of the United States ^c	Acres	0	0	0	0	0	0.01
Impacts to intermittent, perennial, and ephemeral streams	Acres	0	0.03–0.17	0.32–0.46	0.03–0.17	0.03–0.17	0.35–0.49
Impacts to Riparian Habitat Conservation Areas	Acres	0	0.14–0.83	1.58–2.18	0.14–0.83	0.14–0.83	0.75–1.44
Adverse impacts to cultural resources	Number	0	2	2	2	2	2
Hazardous waste sites affected	Number	0	1	2	1	2	2
Floodplain impacts	Acres	0	1.18–1.32	2.1–2.2	1.5–1.6	2.1–2.3	1.5–1.6

(continued on next page)

Table 6. Environmental Impacts of the No-Action and Primary Action Alternatives including Supporting Elements

Impact Category	Unit	No-Action Alternative	Enhanced Bus Service Alternative	Enhanced Bus Service in Peak-period Shoulder Lane Alternative	Gondola Alternative A	Gondola Alternative B	Cog Rail Alternative
Visual change ^d (Primary Alternative /Supporting Element)	Category	None	Negligible/High	High/High	High/High	High/High	High/High
Section 4(f) uses (with greater-than- <i>de minimis</i> impact) ^e	Number	0	1	1	1	1	2

- ^a The listed range captures the increase in impervious surface from the Wasatch Boulevard Imbalanced-lane Alternative or the Five-lane Alternative. The range does not include new impervious surface at the gravel pit or 9400 South and Highland mobility hubs; these locations were not included in the quantitative water quality analysis because they are outside the Little Cottonwood Creek watershed. The range includes the impervious surface at the gondola and cog rail base stations at La Caille.
- ^b Based on water quality modeling, numeric water quality standards in Little Cottonwood Creek would not be exceeded with any alternative for 80% of the storm events.
- ^c The impact would be to a seep from the upper-canyon snow sheds as part of the Cog Rail Alternative.
- ^d Visual change includes landscape character change at key observation points. The visual change is for the primary alternative and supporting elements such as snow sheds.

- ^e A greater-than-*de minimis* Section 4(f) use would occur with the avalanche mitigation sub-alternatives under all primary alternatives. Section 4(f) is an element of law and U.S. Department of Transportation regulation that requires a project to avoid the use of eligible or potentially eligible historic properties and significant publicly owned parks, recreation areas, and wildlife or waterfowl refuges unless there is no feasible and prudent alternative to such use or unless the use would have a *de minimis* impact. For historic properties, a *de minimis* impact means that UDOT has determined, in accordance with 36 Code of Federal Regulations Part 800, that the historic property in question would not be affected by the project or that the project would have “no adverse effect” on the historic property. For recreation areas, a *de minimis* impact is one that would not adversely affect the features, attributes, or activities that qualify the property for protection under Section 4(f). A temporary occupancy is an occupancy of land so minimal as to not constitute a use within the meaning of Section 4(f). For more information, see Chapter 26, Section 4(f) and Section 6(f) Evaluation.

2.2.4 Preferred Alternative Selection

The section identifies and provides UDOT's basis for identifying its preferred primary alternative in the Final EIS. The final selection of a primary alternative will be made by UDOT in the Record of Decision for the S.R. 210 Project. For the Final EIS, UDOT has narrowed down the five primary alternatives to one primary alternative that is being considered as its preference.

UDOT identified the preferred primary alternative based on its transportation performance, cost, and impacts to the natural and human environment. As part of identifying the preferred primary alternative, UDOT considered public and agency input during the scoping process, purpose and need development, the alternatives development, screening, and refinement process, and on the Draft EIS.

Note that there are strengths and weaknesses for each primary alternative. No primary alternative had the best transportation performance, the lowest cost, and the fewest impacts to all resources.

Based on the evaluation, UDOT identified **Gondola Alternative B** as its preferred primary alternative. UDOT primarily based the decision on Gondola Alternative B providing the best overall reliability. Other factors in making the decision are described below.

What are UDOT's preferred primary alternatives?

UDOT's preferred primary alternatives are the Enhanced Bus Service in Peak-period Shoulder Lane Alternative and Gondola Alternative B.

Gondola Alternative B – Preferred Primary Alternative

- **Travel Reliability.** The alternative would have a high travel reliability because it would be on a separate alignment from the road. Snow, vehicle slideoffs and crashes, and snow- and avalanche-removal operations would not affect the gondola service. If S.R. 210 were closed because of an avalanche debris or vehicle crash, the gondola could still operate and be used as alternate to personal vehicle use.
- **Transit Mode Travel Time.** The alternative would have a better transit mode travel time with transfers than Gondola Alternative A (4 to 8 minutes shorter) and the same travel time as the Cog Rail Alternative. The advantage of Gondola Alternative B over Gondola Alternative A is that the 2,500 parking spaces at the gondola base station. This would reduce one of the mode transfers and save time, and would lower the winter operational and maintenance cost of this alternative by \$3.6 million per year. With the exception of the Enhanced Bus Service in Peak-period Shoulder Lane Alternative, all travel times are very similar.
- **Delay Due to Snow Removal Operations.** The alternative would not delay or be delayed by UDOT's snow-removal operations. Both enhanced bus service alternatives could be delayed by snow-removal operations. For the Cog Rail Alternative, snow removed from the cog rail tracks would need to be blown onto S.R. 210, which would require UDOT to spend additional time for snow removal. In addition, when snow is blown off the tracks, this would temporarily close S.R. 210. The snow-blowing operation could occur during the early morning before peak travel periods. If an avalanche flow covers the rail tracks, cog rail operations would be delayed until the avalanche flow is cleared.
- **Environment.** Of the five primary alternatives, Gondola Alternative B would have lower impacts to wildlife habitat compared to the Enhanced Bus Service in Peak-period Shoulder Lane Alternative and the Cog Rail Alternative. The alternative would have the second-fewest impacts to climbing resources in Little Cottonwood Canyon and would have low impacts to the watershed because there would be no substantial increase in the amount of impervious surfaces in Little Cottonwood Canyon. The alternative along with the Enhanced Bus Service Alternative would also have the lowest impact to riparian habitat conservation areas.
- **Cost.** The alternative has the third-highest construction cost but the second-lowest winter operational cost. The overall life cycle cost to 2050 would be the lowest of any of the alternatives.

Overall, UDOT believes that Gondola Alternative B best meets the project purpose of improving reliability because it can operate independently of S.R. 210 and avoid delays related to snow removal, avalanche removal, and traffic. In addition, UDOT believes that having a 2,500-space parking structure at the gondola base station would make Gondola Alternative B an attractive option to using personal vehicles. During congested traffic times related to snow and avalanche removal, the considerably faster gondola service would likely provide an incentive for people to switch from personal vehicles to the gondola service. UDOT also recognized the concerns of the residents in Cottonwood Heights that the proposed 2,500-space parking structure at the gondola base station would reduce mobility on busy ski days on Wasatch Boulevard. However, based on the proposed improvements to both Wasatch Boulevard and North Little Cottonwood Road, a new access road from Wasatch Boulevard west of the base station, and the results of traffic modeling, UDOT determined that traffic going to the Gondola Alternative B base station would not cause congestion or traffic backups on Wasatch Boulevard.

In addition, UDOT considered the importance of the scenic value and watershed that Little Cottonwood Canyon provides. UDOT believes that Gondola Alternative B would have the highest visual impacts of the primary action alternatives; however, the alternative would have the second-lowest impacts to the watershed (after the Enhanced Bus Service Alternative) because there would be a negligible increase in the amount of impervious surfaces added in the watershed, thus reducing the potential for increasing stormwater runoff.

UDOT believes that Gondola Alternative B would not provide an additional barrier to wildlife movement since no additional travel lanes or rail alignment would be added to S.R. 210. The alternative may directly remove two climbing boulders in Little Cottonwood Canyon if they can't be avoided during final design or moved to a new location in Little Cottonwood Canyon. Gondola Alternative B would not reduce access to climbing or other recreation resources in Little Cottonwood Canyon. In identifying Gondola Alternative B, UDOT considered the public and agency comments on the Draft EIS that were in favor of a gondola alternative because of the reliability of the system as well as the comments that stated that a gondola system would substantially impair the scenic viewshed of Little Cottonwood Canyon and detract from the overall recreational experience outside of the ski resort.

2.3 Sub-alternatives Evaluation

The sub-alternatives that help the primary alternatives achieve the project goals are:

- **S.R. 210 – Wasatch Boulevard Alternatives**
 - Imbalanced-lane Alternative
 - Five-lane Alternative
- **Mobility Hubs Alternative**
 - Gravel Pit
 - 9400 South and Highland Drive
- **Avalanche Mitigation Alternatives**
 - Snow Sheds with Berms Alternative
 - Snow Sheds with Realigned Road Alternative
- **Trailhead Parking Alternatives**
 - Trailhead Parking Improvements and No S.R. 210 Roadside Parking within ¼ Mile of Trailheads Alternative
 - Trailhead Parking Improvements and No Roadside Parking from S.R. 209/S.R. 210 Intersection to Snowbird Entry 1 Alternative
 - No Trailhead Parking Improvements and No Roadside Parking from S.R. 209/S.R. 210 Intersection to Snowbird Entry 1 Alternative
- **No Winter Parking Alternative**

2.3.1 S.R. 210 – Wasatch Boulevard Alternatives

Purpose and Need Performance

UDOT analyzed the transportation performance of each Wasatch Boulevard sub-alternative to determine how well the alternative would meet the purpose of and need for the project. The evaluation included the degree to which each alternative would meet the following objective:

- By 2050, meet UDOT's goal of level of service (LOS) D in the weekday AM and PM peak periods on Wasatch Boulevard.

As shown in Table 7 and Table 8, the two Wasatch Boulevard sub-alternatives would meet UDOT's goal of level of service (LOS) D in the weekday AM and PM peak periods on both the segments and intersections on Wasatch Boulevard. Overall, with the additional travel lane, the Five-lane Alternative would meet the LOS D objective to a greater degree; two roadway segments and five intersections would operate at a higher level of service than with the Imbalanced-lane Alternative. Additionally, the Five-lane Alternative would meet a higher demand of traffic in the future if traffic growth is greater than predicted.

What is level of service?

Level of service is a measure of the operating conditions on a road or at an intersection. Level of service is represented by a letter "grade" ranging from A (free-flowing traffic and little delay) to F (extremely congested, stop-and-go traffic and excessive delay).

Table 7. Wasatch Boulevard – Level of Service by Segment for the No-Action Alternative and Wasatch Boulevard Sub-alternatives (2050)

Alternative	Travel Time from Fort Union Blvd. to North Little Cottonwood Road (minutes)		Level of Service by Segment (Passing Criteria Are LOS A–D)			
	Northbound in AM/PM Peak Hour	Southbound in AM/PM Peak Hour	Fort Union Blvd. to Bengal Blvd.	Bengal Blvd. to 3500 East	3500 East to Kings Hill Drive	Kings Hill Drive to North Little Cottonwood Road
No-Action Alternative	4:22 / 4:40	3:53 / 10:15	F	E	E	D
Imbalanced-lane Alternative	4:05 / 4:37	3:32 / 4:21	C	C	C	C
Five-lane Alternative	3:51 / 4:00	3:32 / 4:12	C	B	B	C

Source: Fehr & Peers 2019

Red shading = Does not meet level of service goal of LOS D.

Table 8. Wasatch Boulevard – Level of Service by Intersection for the No-Action Alternative and Wasatch Boulevard Sub-alternatives (2050)

Alternative	Level of Service by Intersection									
	Fort Union Blvd./Wasatch Blvd.		Bengal Blvd./Wasatch Blvd.		3500 East/Wasatch Blvd.		Kings Hill Drive/Wasatch Blvd.		North Little Cottonwood Road/Wasatch Blvd.	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
No-Action Alternative	B	F	C	F	B	E	B	F	D	C
Imbalanced-lane Alternative	C	D	C	C	A	B	C	D	C	D
Five-lane Alternative	C	C	B	B	A	B	B	C	C	D

Source: Fehr & Peers 2019

Red shading = Does not meet level of service goal of LOS D.

Estimated Costs

Table 9 shows the estimated construction costs of the Wasatch Boulevard sub-alternatives. The construction cost estimates include design, right-of-way, construction, utility relocations, and environmental mitigation. These construction cost estimates are based on unit prices for previously completed, similar projects that were escalated to 2020 dollars. The actual cost of construction would likely be higher because of inflation between 2020 and the year of construction, but the costs are expected to increase proportionally between the two alternatives.

Table 9. Preliminary Construction Cost Estimates for the Wasatch Boulevard Sub-alternatives

In millions of 2020 dollars

Alternative	Construction Cost Estimate
Imbalanced-lane Alternative	59
Five-lane Alternative	62

Summary Comparison of Resource Impacts by Alternative

Table 10 compares the resource impacts of the Wasatch Boulevard sub-alternatives. This table provides a quantitative comparison among the alternatives for the resources evaluated in the Final EIS. Although impacts are quantified for all of the impact categories below, not all resources listed favored one alternative or another.

As shown in Table 10, some resources would experience a substantial difference in impacts from the alternatives, while other resources would experience no difference or a very small difference in impacts from the alternatives. Thus, some resource impacts were more helpful than others in distinguishing among the alternatives.

Although Table 10 provides the quantitative information for each impact, it does not always provide the context and intensity of the impact. For some resources, the context and intensity of the impact provide relevant information for weighing alternatives. Impact context and intensity are included as appropriate in the following discussions of how UDOT's preferred Wasatch Boulevard alternative was identified.

Table 10. Environmental Impacts of the No-Action Alternative and Wasatch Boulevard Sub-alternatives

Impact Category	Unit	No-Action Alternative	Imbalanced-lane Alternative	Five-lane Alternative
Land converted to transportation use	Acres	0	53	54
Residential relocations	Number	0	1	1
Business relocations	Number	0	0	0
Recreation areas affected	Number	0	2	2
Community facilities affected	Number	0	1	1
Environmental justice impacts	Yes/No	No	No	No
Economic impacts	Yes/No	Yes	No	No
Existing trails affected	Number	0	0	0
Air quality impacts above regulations	Yes/No	No	No	No
Receptors with modeled noise levels above criteria	Number	99	135	152
Wildlife habitat impacted	Acres	0	1	1
Threatened and endangered species	Yes/No	No	No	No
Increase in impervious surface	Acres	0	13.2	14.4
Water quality standards exceed	Yes/No	No	No	No
Impacts to waters of the United States	Acres	0	0	0
Impacts to intermittent, perennial, and ephemeral streams	Acres	0	0.02	0.02
Adverse impacts to cultural resources	Number	0	0	0
Hazardous waste sites affected	Number	0	0	0
Floodplain impacts	Acres	0	1.17	1.17
Visual change	Category	None	Low	Low
Section 4(f) uses (with greater than <i>de minimis</i> impact) ^a	Number	0	0	0

^a All uses of Section 4(f) properties would have *de minimis* impacts. Section 4(f) is an element of law and U.S. Department of Transportation regulation that requires a project to avoid the use of eligible or potentially eligible historic properties and significant publicly owned parks, recreation areas, and wildlife or waterfowl refuges unless there is no feasible and prudent alternative to such use or unless the use would have a *de minimis* impact. For historic properties, a *de minimis* impact means that UDOT has determined, in accordance with 36 Code of Federal Regulations Part 800, that the historic property in question would not be affected by the project or that the project would have “no adverse effect” on the historic property. For recreation areas, a *de minimis* impact is one that would not adversely affect the features, attributes, or activities that qualify the property for protection under Section 4(f). A temporary occupancy is an occupancy of land so minimal as to not constitute a use within the meaning of Section 4(f). For more information, see Chapter 26, Section 4(f) and Section 6(f) Evaluation.

Preferred Alternative Selection

The section identifies and provides UDOT's basis for identifying its preferred Wasatch Boulevard alternative. The final selection of a Wasatch Boulevard alternative will be made by UDOT in the Record of Decision for the S.R. 210 Project. UDOT identified the preferred Wasatch Boulevard alternative based on its transportation performance, cost, and impacts to the natural and human environment. As part of identifying the preferred Wasatch Boulevard alternative, UDOT considered public and agency input during the scoping process, the alternatives development, screening, and refinement process, and on the Draft EIS. Note that there are strengths and weaknesses for each Wasatch Boulevard alternative. Neither of the Wasatch Boulevard alternatives had the best transportation performance, the lowest cost, and the fewest impacts to all resources.

What is UDOT's preferred Wasatch Boulevard alternative?

UDOT's preferred Wasatch Boulevard alternative is the Five-lane Alternative.

Based on the evaluation, UDOT has identified the **Five-lane Alternative** as its preferred Wasatch Boulevard alternative for the Final EIS. The Five-lane Alternative would provide better transportation performance, with all segments of Wasatch Boulevard operating at LOS B or better compared to the Imbalanced-lane Alternative providing LOS C or better. In addition, the Five-lane Alternative would have only one intersection operating at LOS D, whereas the Imbalanced-lane Alternative would have three. In addition, the travel times for the Five-lane Alternative in the northbound direction in the morning peak-period would be 13% shorter with the Five-lane Alternative. Therefore, the Five-lane Alternative would have a higher degree of meeting the project purpose of improving mobility on Wasatch Boulevard.

Although the cost would be slightly greater with the Five-lane Alternative compared to the Imbalanced-lane Alternative (\$62 million versus \$59 million), UDOT believes that the better transportation performance outweighs the higher cost. The environmental impacts of the alternatives would be similar, with the main difference being that about 17 more residential receptors would have noise impacts from the Five-lane Alternative compared to the Imbalanced-lane Alternative.

Some residents of Cottonwood Heights wanted UDOT to minimize the footprint of any Wasatch Boulevard alternative being considered. Residents felt that a wider road would harm the rural nature of the community, cause greater safety concerns with pedestrians wanting to cross the road, and further increase vehicle speeds. In making its decision, UDOT considered the concerns of the residents and therefore would implement a phased approach for the Five-lane Alternative.

With the phased approach, UDOT would first construct the Imbalanced-lane Alternative but would purchase the right-of-way to accommodate the Five-lane Alternative in the future. The extra right-of-way would be maintained as open space on the east side of the road between the travel lane and multi-use trail until the additional northbound lane is needed. UDOT would base the need for the additional northbound lane on when the level of service on the roadway and/or intersections reaches LOS E or greater. According to the current traffic analysis, this might not occur until after 2050.

2.3.2 Mobility Hubs Alternative

With identification of Gondola Alternative B, there would be a 2,500-space parking structure at La Caille, which would meet the parking demand for this alternative. For this reason, there is no need for mobility hubs for this alternative at the gravel pit or at 9400 South and Highland Drive.

What is the gravel pit?

The gravel pit is an existing aggregate (gravel) mine located on the east side of Wasatch Boulevard between 6200 South and Fort Union Boulevard.

2.3.3 Avalanche Mitigation Alternatives

Purpose and Need Performance

UDOT analyzed the transportation performance of each avalanche mitigation sub-alternative to determine how well the alternative would meet the purpose of and need for the project. The evaluation included the degree to which each alternative would meet the following objectives:

- Substantially reduce the number of hours and/or days during which avalanches delay users.
- Substantially reduce the avalanche hazard for roadway users.

As shown in Table 11, the two avalanche mitigation alternatives would equally meet UDOT’s objectives. However, the Snow Sheds with Realigned Road Alternative would straighten out the S.R. 210 roadway in the immediate area of the snow sheds (the Snow Sheds with Berms Alternative would leave the road in its current configuration), thereby improving vehicle safety by providing better driver sight distance in the sheds.

Table 11. S.R. 210 – Average Days and Hours of Road Closures with the No-Action Alternative and Avalanche Mitigation Sub-alternatives (2050)

Alternative	Average Days of Closures ^a	Average Hours of Closures ^a	Avalanche Hazard Index ^a
No-Action	10.5 to 21	56 to 108+	96
Snow Sheds with Berms	4 to 6	2 to 11	59
Snow Sheds with Realigned Road	4 to 6	2 to 11	59

^a Avalanche hazard index. <1 = very low; 1 to 10 = low; 10 to 40 = moderate; 40 to 150 = high; >150 = very high.

Estimated Costs

Table 12 shows the estimated construction costs of the avalanche mitigation sub-alternatives. The cost estimates include design, right-of-way, construction, utility relocations, and environmental mitigation. These cost estimates are based on unit prices for previously completed, similar projects that were escalated to 2020 dollars. The actual cost of construction would likely be higher because of inflation between 2020 and the year of construction, but the costs are expected to increase proportionally between the two alternatives.

Table 12. Preliminary Construction Cost Estimates for the Avalanche Mitigation Sub-alternatives

In millions of 2020 dollars

Alternative	Construction Cost Estimate
Snow Sheds with Berms	72
Snow Sheds with Realigned Road	86

Summary Comparison of Resource Impacts by Alternative

Table 13 compares the resource impacts of the avalanche mitigation sub-alternatives. This table provides a quantitative comparison among the alternatives for the resources evaluated in the Final EIS. Although impacts are quantified for all of the impact categories below, not all resources listed favored one alternative or another.

As shown in Table 13, some resources would experience a difference in impacts from the alternatives, while other resources would experience no difference or a very small difference in impacts from the alternatives. Thus, some resource impacts were more helpful than others in distinguishing among the alternatives.

Although Table 13 provides the quantitative information for each impact, it does not always provide the context and intensity of the impact. For some resources, the context and intensity of the impact provide relevant information for weighing alternatives. Impact context and intensity are included as appropriate in the following discussions of how UDOT's preferred avalanche mitigation alternative was identified.

Table 13. Environmental Impacts of the No-Action Alternative and Avalanche Mitigation Sub-alternatives

Impact Category	Unit	No-Action Alternative	Snow Sheds with Berms	Snow Sheds with Realigned Road
Land converted to transportation use	Acres	0	15	19
Residential relocations	Number	0	0	0
Business relocations	Number	0	0	0
Recreation areas affected	Number	0	0	0
Community facilities affected	Number	0	0	0
Environmental justice impacts	Yes/No	No	No	No
Economic impacts	Yes/No	Yes	No	No
Existing trails affected	Number	0	0	0
Climber boulders and trails affected	Number	0	0	0
Air quality impacts above regulations	Yes/No	No	No	No
Receptors with modeled noise levels above criteria ^a	Number	0	0	0
Wildlife habitat impacted	Acres	0	6	10
Threatened and endangered species	Yes/No	No	No	No
Increase in impervious surface	Number	0	0	0
Water quality standards exceeded	Yes/No	No	No	No
Impacts to waters of the United States ^b	Acres	0	0	0
Impacts to intermittent, perennial, and ephemeral streams	Acres	0	0.01	0.01
Impact to Riparian Habitat Conservation Areas	Acres	0	0.23	0.14
Adverse impacts to cultural resources	Number	0	1	1
Hazardous waste sites affected	Number	0	0	0
Floodplain impacts	Acres	0	0.01	0.14
Visual change	Category	None	High	High
Section 4(f) uses (with greater than <i>de minimis</i> impact) ^a	Number	0	1	1

^a Section 4(f) is an element of law and U.S. Department of Transportation regulation that requires a project to avoid the use of eligible or potentially eligible historic properties and significant publicly owned parks, recreation areas, and wildlife or waterfowl refuges unless there is no feasible and prudent alternative to such use or unless the use would have a *de minimis* impact. For historic properties, a *de minimis* impact means that UDOT has determined, in accordance with 36 Code of Federal Regulations Part 800, that the historic property in question would not be affected by the project or that the project would have “no adverse effect” on the historic property. For recreation areas, a *de minimis* impact is one that would not adversely affect the features, attributes, or activities that qualify the property for protection under Section 4(f). A temporary occupancy is an occupancy of land so minimal as to not constitute a use within the meaning of Section 4(f). For more information, see Chapter 26, Section 4(f) and Section 6(f) Evaluation.

Preferred Alternative Selection

The section identifies and provides UDOT's basis for identifying its preferred avalanche mitigation alternative. The final selection of an avalanche mitigation alternative will be made by UDOT in the Record of Decision for the S.R. 210 Project. UDOT identified the preferred avalanche mitigation alternative based on its transportation performance, cost, and impacts to the natural and human environment. As part of identifying the preferred avalanche mitigation alternative, UDOT considered public and agency input during the scoping process, the alternatives development, screening, and refinement process, and on the Draft EIS. Note that there are strengths and weaknesses for each avalanche mitigation alternative.

What is UDOT's preferred avalanche mitigation alternative?

UDOT's preferred avalanche mitigation alternative is the Snow Sheds with Realigned Road Alternative.

Based on the evaluation, UDOT has identified the **Snow Sheds with Realigned Road Alternative** as its preferred avalanche mitigation alternative. The decision was based primarily on visual impacts. Both avalanche mitigation alternatives would equally meet the project purpose of improving safety and reliability by substantially decreasing the amount of time when S.R. 210 is closed for avalanche mitigation and by reducing the avalanche risk to roadway users. The environmental impacts of the two avalanche mitigation alternatives would be similar, with the main difference being that the Snow Sheds with Berms Alternative would have a greater visual impact because the berms that would extend 300 feet up the mountainside at a height of up to 20 feet. In addition, the impacts to Riparian Habitat Conservation Areas would be 0.14 acre with the Snow Sheds with Realigned Road Alternative compared to 0.23 acre with the Snow Sheds with Berms Alternative.

Both alternatives would have the same greater-than-*de minimis* impact to a Section 4(f) resource (archaeological site 42SL419). However, as part of the least overall harm analysis, it was determined that the Snow Sheds with Realigned Road Alternative would have the least harm because the alternative would have less visual impact and impacts to Riparian Habitat Conservation Areas.

In its evaluation, UDOT did consider that the Snow Sheds with Realigned Road Alternative would cost about \$14 million more than the Snow Sheds with Berms Alternative (\$86 million versus \$72 million); however, UDOT believes that the lesser visual and riparian impacts outweigh the greater cost.

2.3.4 Trailhead Parking Alternatives

Purpose and Need Performance

UDOT analyzed the transportation performance of each trailhead parking sub-alternative to determine how well the alternative would meet the purpose of and need for the project. The evaluation included the degree to which each alternative would meet the following objectives:

- Improve roadway safety at existing trailhead locations.
- Reduce or eliminate traffic conflicts between motorized and nonmotorized transportation modes at key trailhead locations.
- Reduce or eliminate roadside parking to improve the safety and operational characteristics of S.R. 210.

Table 14 shows the number of parking spaces that would be associated with each trailhead parking sub-alternative. Table 15 provides a summary evaluation of how well each alternative would meet the project objectives.

Table 14. Total Parking Spaces from S.R. 209/S.R. 210 Intersection to Snowbird Entry 1 by Trailhead Parking Sub-alternative

Parking Area	Number of Parking Spaces ^a			
	Existing Parking/ No-Action Alternative	Trailhead Improvement Alternatives		No Trailhead Improvement Alternative
		No Roadside Parking ¼ Mile from Trailhead	No Roadside Parking to Snowbird Entry 1	No Roadside Parking to Snowbird Entry 1
Roadside parking	429	290	0	0
Gate Butress Trailhead	30 (in formal dirt lot)	21	21	30 (in formal dirt lot)
Bridge Trailhead	Not applicable (roadside parking only)	15	15	0
Lisa Falls Trailhead	17 (north and south dirt pullouts)	41	41	17 (north and south dirt pullouts)
White Pine Trailhead	52	144	144	52
Total parking spaces^a	528	511	221	99

^a The total number of parking spaces does not capture all of the smaller available pullouts along S.R. 210, so the total number of existing parking spaces would be higher.

Table 15. Degree to Which the Trailhead Parking Sub-alternatives Would Meet the Project Objectives

Alternative	Improve Roadway Safety at Trailheads	Reduce or Eliminate Traffic Conflicts	Improve Safety and Operations
Trailhead Improvements and No Roadside Parking within ¼ Mile	Existing and new trailheads would be designed to meet UDOT safety standards for vehicle ingress and egress.	Roadside parking would be eliminated only within ¼ mile of the trailheads. Outside this area, some roadside parking could be allowed, which might cause conflicts with pedestrians and cyclists.	Some roadside parking would still be allowed, which could reduce the safety and operation of all transportation modes.
Trailhead Improvements and No Roadside Parking in Little Cottonwood Canyon	Same as Trailhead Improvements and No Roadside Parking within ¼ Mile Alternative.	Eliminating roadside parking on S.R. 210 in Little Cottonwood Canyon would eliminate roadside parked vehicles and pedestrian/cyclist conflicts.	Eliminating roadside parking on S.R. 210 in Little Cottonwood Canyon would improve safety and operations for all transportation modes.
No Trailhead Improvements and No Roadside Parking	Gate Butress, Lisa Falls, and White Pine Trailheads would continue to have substandard vehicle sight distances at entrances and no left or right turn lanes from S.R. 210.	Same as Trailhead Improvements and No Roadside Parking in Little Cottonwood Canyon Alternative.	Same as Trailhead Improvements and No Roadside Parking in Little Cottonwood Canyon Alternative.

Estimated Costs

Table 16 shows the estimated costs of the trailhead parking sub-alternatives. The cost estimates include design, right-of-way, construction, utility relocations, and environmental mitigation. These cost estimates are based on unit prices for previously completed, similar projects that were escalated to 2020 dollars. The actual cost of construction would likely be higher because of inflation between 2020 and the year of construction, but the costs are expected to increase proportionally between the three alternatives.

Table 16. Preliminary Construction Cost Estimates for the Trailhead Parking Sub-alternatives

In millions of 2020 dollars

Alternative	Construction Cost Estimate
Trailhead Improvements and No Roadside Parking within ¼ Mile	5.8
Trailhead Improvements and No Roadside Parking in Little Cottonwood Canyon	5.8
No Trailhead Improvements and No Roadside Parking	0.0

Summary Comparison of Resource Impacts by Alternative

Table 17 compares the resource impacts of the trailhead parking sub-alternatives. This table provides a quantitative comparison among the alternatives for the resources evaluated in the Final EIS. Although impacts are quantified for all of the impact categories below, not all resources listed favored one alternative or another.

As shown in Table 17, some resources would experience a substantial difference in impacts from the alternatives, while other resources would experience no difference or a very small difference in impacts from the alternatives. Thus, some resource impacts were more helpful than others in distinguishing among the alternatives.

Although Table 17 provides the quantitative information for each impact, it does not always provide the context and intensity of the impact. For some resources, the context and intensity of the impact provide relevant information for weighing alternatives. Impact context and intensity are included as appropriate in the following discussions of how UDOT’s preferred trailhead parking alternative was identified.

Table 17. Environmental Impacts of the No-Action Alternative and Trailhead Parking Sub-alternatives

Impact Category	Unit	No-Action Alternative	Trailhead Improvements and No Roadside Parking within ¼ Mile	Trailhead Improvements and No Roadside Parking	No Trailhead Improvements and No Roadside Parking
Land converted to transportation use	Acres	0	7	7	0
Residential relocations	Number	0	0	0	0
Business relocations	Number	0	0	0	0
Recreation areas affected	Number	0	0	0	0
Community facilities affected	Number	0	0	0	0
Environmental justice impacts	Yes/No	No	No	No	No
Economic impacts	Yes/No	Yes	No	No	No
Existing trails affected	Number	0	0	0	0
Climber boulders and trails affected	Number	0	0	0	0
Air quality impacts above regulations	Yes/No	No	No	No	No
Receptors with modeled noise levels above criteria	Number	0	0	0	0
Wildlife habitat impacted	Acres	0	7	7	0
Threatened and endangered species	Yes/No	No	No	No	No
Increase in impervious surface	Acres	0	2.4	2.4	0
Water quality standards exceeded	Yes/No	No	No	No	No
Impacts to intermittent, perennial, and ephemeral streams	Acres	0	0.14	0.14	0
Impact to Riparian Habitat Conservation Areas	Acres	0	0.6	0.6	0
Impacts to waters of the United States	Acres	0	0	0	0
Adverse impacts to cultural resources	Number	0	0	0	0
Hazardous waste sites affected	Number	0	0	0	0
Floodplain impacts	Acres	0	0.01	0.01	0
Visual change	Category	None	Moderate	Moderate	None
Section 4(f) uses (with greater than <i>de minimis</i> impact) ^a	Number	0	0	0	0

(continued on next page)

Table 17. Environmental Impacts of the No-Action Alternative and Trailhead Parking Sub-alternatives

Impact Category	Unit	No-Action Alternative	Trailhead Improvements and No Roadside Parking within ¼ Mile	Trailhead Improvements and No Roadside Parking	No Trailhead Improvements and No Roadside Parking
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^a All uses of Section 4(f) properties would have *de minimis* impacts. Section 4(f) is an element of law and U.S. Department of Transportation regulation that requires a project to avoid the use of eligible or potentially eligible historic properties and significant publicly owned parks, recreation areas, and wildlife or waterfowl refuges unless there is no feasible and prudent alternative to such use or unless the use would have a *de minimis* impact. For historic properties, a *de minimis* impact means that UDOT has determined, in accordance with 36 Code of Federal Regulations Part 800, that the historic property in question would not be affected by the project or that the project would have “no adverse effect” on the historic property. For recreation areas, a *de minimis* impact is one that would not adversely affect the features, attributes, or activities that qualify the property for protection under Section 4(f). A temporary occupancy is an occupancy of land so minimal as to not constitute a use within the meaning of Section 4(f). For more information, see Chapter 26, Section 4(f) and Section 6(f) Evaluation.

Preferred Alternative Selection

The section identifies and provides UDOT’s basis for identifying its preferred trailhead parking alternative. The final selection of a trailhead parking alternative will be made by UDOT in the Record of Decision for the S.R. 210 Project. UDOT identified the preferred trailhead parking alternative based on its transportation performance, cost, and impacts to the natural and human environment. As part of identifying the preferred trailhead parking alternative, UDOT considered public and agency input during the scoping process, the alternatives development, screening, and refinement process, and on the Draft EIS. Note that there are strengths and weaknesses for each trailhead parking alternative.

What is UDOT’s preferred trailhead parking alternative?

UDOT’s preferred trailhead parking alternative is the Trailhead Improvements and No Roadside Parking within ¼ Mile Alternative.

Based on the evaluation, UDOT has identified the **Trailhead Improvements and No Roadside Parking within ¼ Mile Alternative** as its preferred trailhead parking alternative. UDOT made this decision primarily because UDOT did not want to substantially reduce recreation access in areas that are currently used by recreationists and do not have designated parking areas. With the trailhead improvements, UDOT would add parking at the Bridge, Lisa Falls, and White Pine Trailheads equivalent to the number of spaces eliminated in the proposed no-parking areas ¼ mile on either side of the trailheads and would maintain the existing roadside parking outside the ¼ mile. Overall, this alternative would reduce parking in Little Cottonwood Canyon by 17 spaces, from 528 to 511.

All three trailhead alternatives would address the project need to reduce or eliminate traffic conflicts among roadside parked vehicles, cyclists and pedestrians, and vehicles moving in the S.R. 210 travel lanes. The Trailhead Improvements and No Roadside Parking in Little Cottonwood Canyon Alternative and the No Trailhead Improvements and No Roadside Parking Alternative would reduce these conflicts to a greater degree, but they would also eliminate roadside recreational access except at designated trailheads from the intersection of S.R. 209/S.R. 210 to Snowbird Entry 1. UDOT decided that maintaining some roadside recreation access outside the main trailheads was important to many recreational users in Little Cottonwood Canyon. UDOT also decided that it was important to improve the access to the existing trailheads at the Lisa

Falls and White Pine Trailheads since they do not meet safety standards for sight distance. The No Trailhead Improvements and No Roadside Parking Alternative would not improve these safety deficiencies.

Of the three trailhead parking alternatives evaluated, the No Trailhead Improvements and No Roadside Parking Alternative would not cause any additional environmental impacts since there would be no improvements to trailhead parking. The Trailhead Improvements and No Roadside Parking within ¼ Mile Alternative would result in 7 acres of impacts to wildlife habitat; 0.14 acre of impacts to intermittent, perennial, or ephemeral streams; and 0.6 acre of impact to Riparian Habitat Conservation Areas. However, in discussions with the USDA Forest Service, UDOT decided that reducing roadside vehicle parking conflicts within ¼ mile of either side of the trailheads, improving safety for vehicles accessing the trailheads, and providing trailheads that would allow the USDA Forest Service to better manage access (appropriate restrooms, reduction in “spider web” trailheads, and water treatment measures) at the existing trailheads outweighed the environmental impacts.

Cost was not a factor in UDOT’s decision process regarding improving trailheads.

2.3.5 No Winter Parking Alternative

The No Winter Parking Alternative would eliminate some winter roadside parking (about 230 spaces) adjacent to the ski resorts. The objective of this alternative is to reduce or eliminate roadside parking to improve the safety and operational characteristics of S.R. 210. No construction is required to implement this alternative, so it would have no construction-related environmental impacts or cost.

Based on the evaluation, UDOT has identified the **No Winter Parking Alternative** as part of the preferred alternative. UDOT based its decision on the fact that removing winter roadside parking would reduce friction between parked vehicles and vehicles in the travel lanes and therefore improve overall mobility. In addition, removing roadside parked vehicles would allow UDOT to improve winter snow removal operations since snow plows would not need to navigate around parked vehicles and would provide more areas for storing snow.

What is UDOT’s decision regarding the No Winter Parking Alternative?

UDOT decided to select the No Winter Parking Alternative as part of its preferred alternative.

3.0 UDOT's Preferred Alternative

Based on the analysis presented in this technical memorandum, UDOT has identified **Gondola Alternative B (Starting at La Caille)** as the preferred primary alternative in the Final EIS. UDOT has identified the following sub-alternatives as the supporting elements of the preferred primary alternative in the Final EIS:

- **Five-lane Alternative** (Wasatch Boulevard alternative)
- **Snow Sheds with Realigned Road Alternative** (avalanche mitigation alternative)
- **Trailhead Improvements and No Roadside Parking within ¼ Mile Alternative** (trailhead parking alternative)
- **No Winter Parking Alternative**

4.0 References

[USDA Forest Service] U.S. Department of Agriculture Forest Service

- 2003 Revised Forest Plan: Wasatch-Cache National Forest. South Jordan, Utah: U.S. Department of Agriculture, Forest Service, Intermountain Region, Uinta-Wasatch-Cache National Forest. <https://www.fs.usda.gov/detailfull/uwcnf/landmanagement/planning/?cid=stelprdb5076923&width=full>.