COG RAIL ALTERNATIVE LCC UTAH
CWC BOARD MEETING

Salt Lake City, 2/1/2021

STADLER

AGENDA

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1. Envision
2. Wasatch Front Situation and Issues
3. Rail Options
4. Costs & Financing
5. Summary


VISION
By 2030: 50% Transit Mode Split
By 2040: 90% Transit Mode Split

SITUATION WASATCH FRONT TODAY

Congestion

- Traffic congestion in the **canyons** and in **the valley**
- Overloaded Parking Situation at the Resorts
- Unstable Situation during Avalanche Situations

Policy

- Multimodal solution needed (Road, Transit, Bike, Pedestrians)
- Year-round System
- Supporting all purposes
- 40+ year horizon
- Supporting Land Use
- Managing usage (Zions NP)

Impact

- Ski Bus service started in 1976 to Alta, Brighton, Snowbird and Solitude
- Transit decisions are long-term and influence communities for 50 to 100 years

EXISTING ISSUES

Existing Transportation Conditions

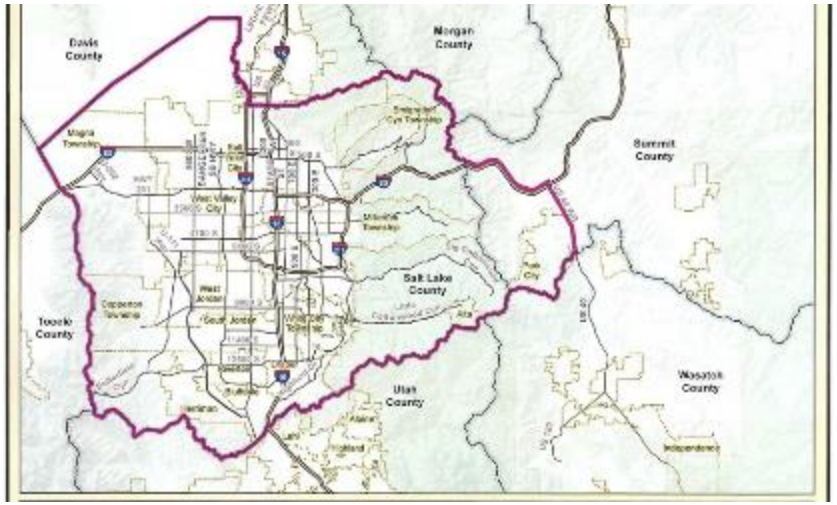
- 3.7 Million Visitors per Year
  - Comparable to Zions & LDS Temple
- Growth
  - Winter 5-10%
  - Summer 10-20%
- Traffic
  - Road is closed or restricted 25-35% of the time in winter
  - Level of service F peak hour
- Parking
  - No additional parking allowed in canyon
  - Parking in canyons 6-9,000 (LCC=5,000)

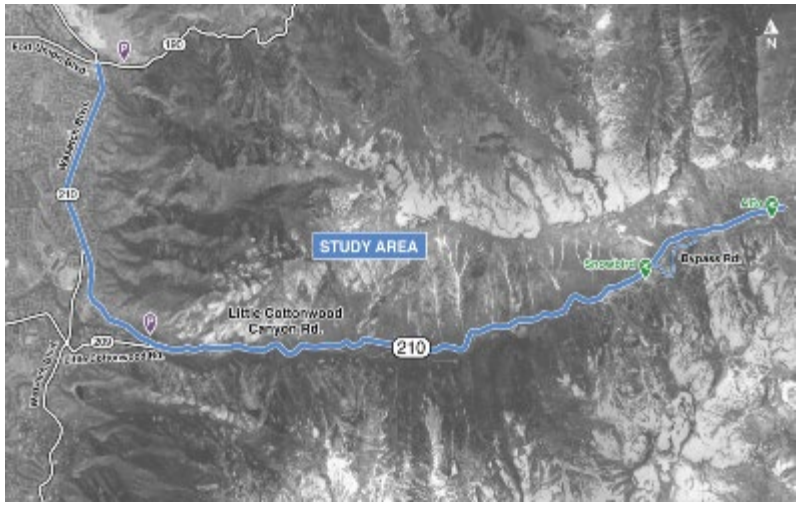
Conclusions of requirements

- System, which is able to expand
- Seamless integration with other transit modes
- Year-round service solution
- Extended daily service hours
- Easy adjustment to changing demands
- Service reliability
- Mass Transit solution
- Expanded system into the valley helps disperse parking

COMPARISON OF SCOPE

CWC scope vs UDOT scope





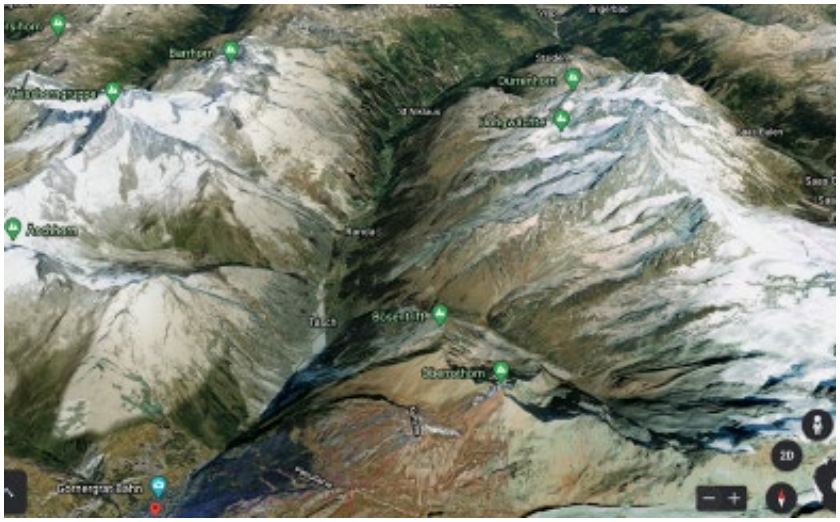
Considering a regional system

- National and Regional Market considered
- Wasatch Front as the economic development area and commuter housing market

Focuses on one link and missing out the integration into the region

TWO COMPARABLE EXAMPLES OF RAIL

Zermatt and Pikes Peak



- Cog Rail line in the canyon & car free
- Seamlessly integrated into Swiss National Rail Network
- Sensitive to environmental issues (Snow, Avalanches, Water Quality, visual)
- One of the premier all year-round recreation destination
- **World wide Recognition**

- Privately owned Cog Rail in Colorado
- About 10 Miles long, mostly single track
- Completely upgraded 125 years old system for $10.7 M / Mile
- Challenging construction and minimal impact to environment and stream
- Operating state of the art snow blower
- Local contractors: Stacy Witbeck, Stadler

Approximately 100 COG rail lines around the World
Snowbird is Sister City and Resort with Zermatt

RAIL SOLUTION FOR LCC

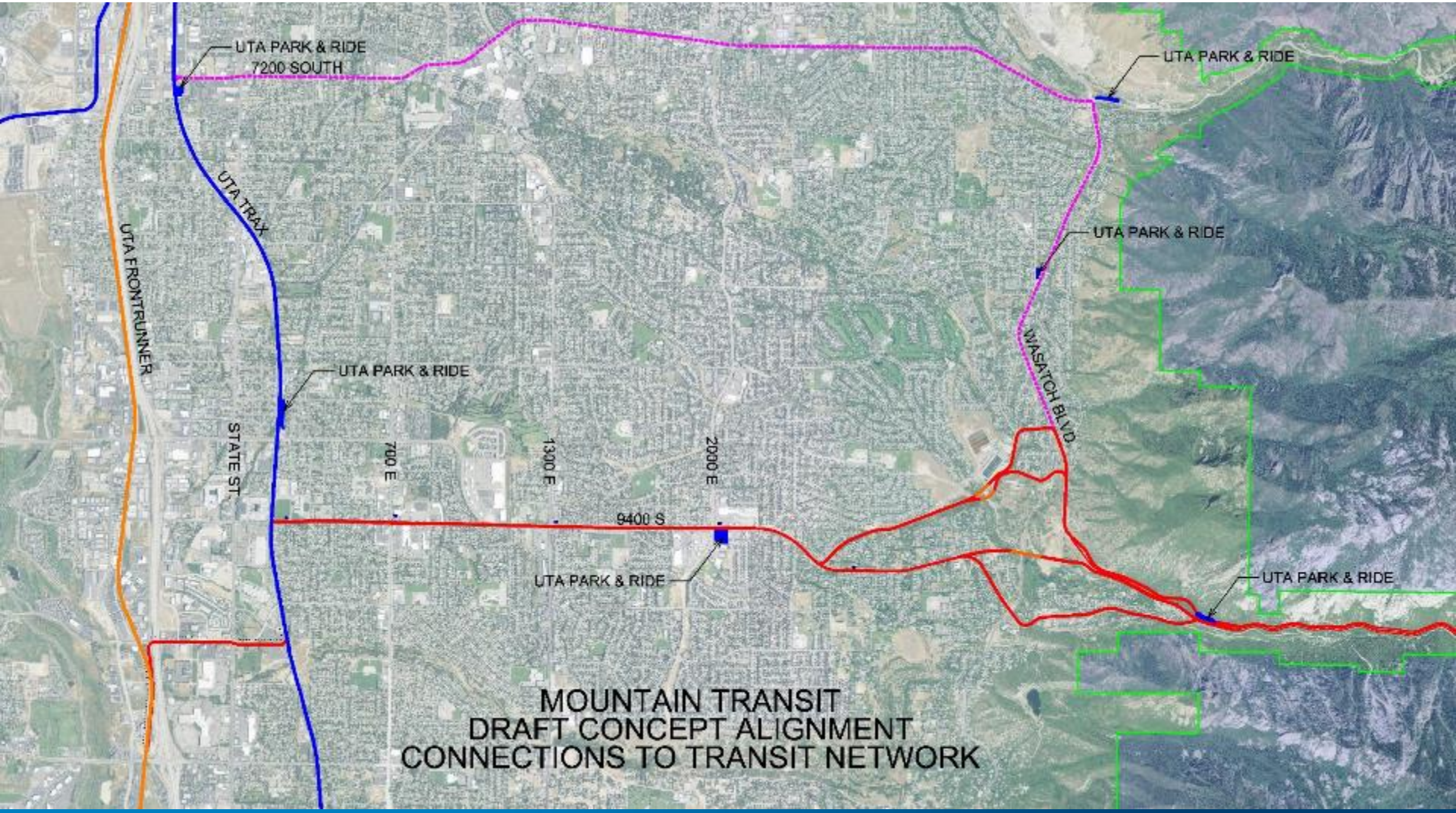
- COG Rail Team responded to UDOT's criteria and single line in order to be comparable
- Additionally, a full build out system that is better suited for growth and expansion with phasing has been evaluated

RAIL IN THE CANYON IS ADDRESSING:

- Reliability and Flexibility in capacity
- Transportation Management
- Environment such as air, noise, water and energy
- Water Quality Issues can be solved and improved
- Improving visual impact
- Year round and multi use purposes (whistle stops, bikes, skis, ADA, luggage)
- Extended operating hours
- Fast, safe and comfortable travel
- Cost effectiveness

ALTERNATE VALLEY ALIGNMENTS

STADLER



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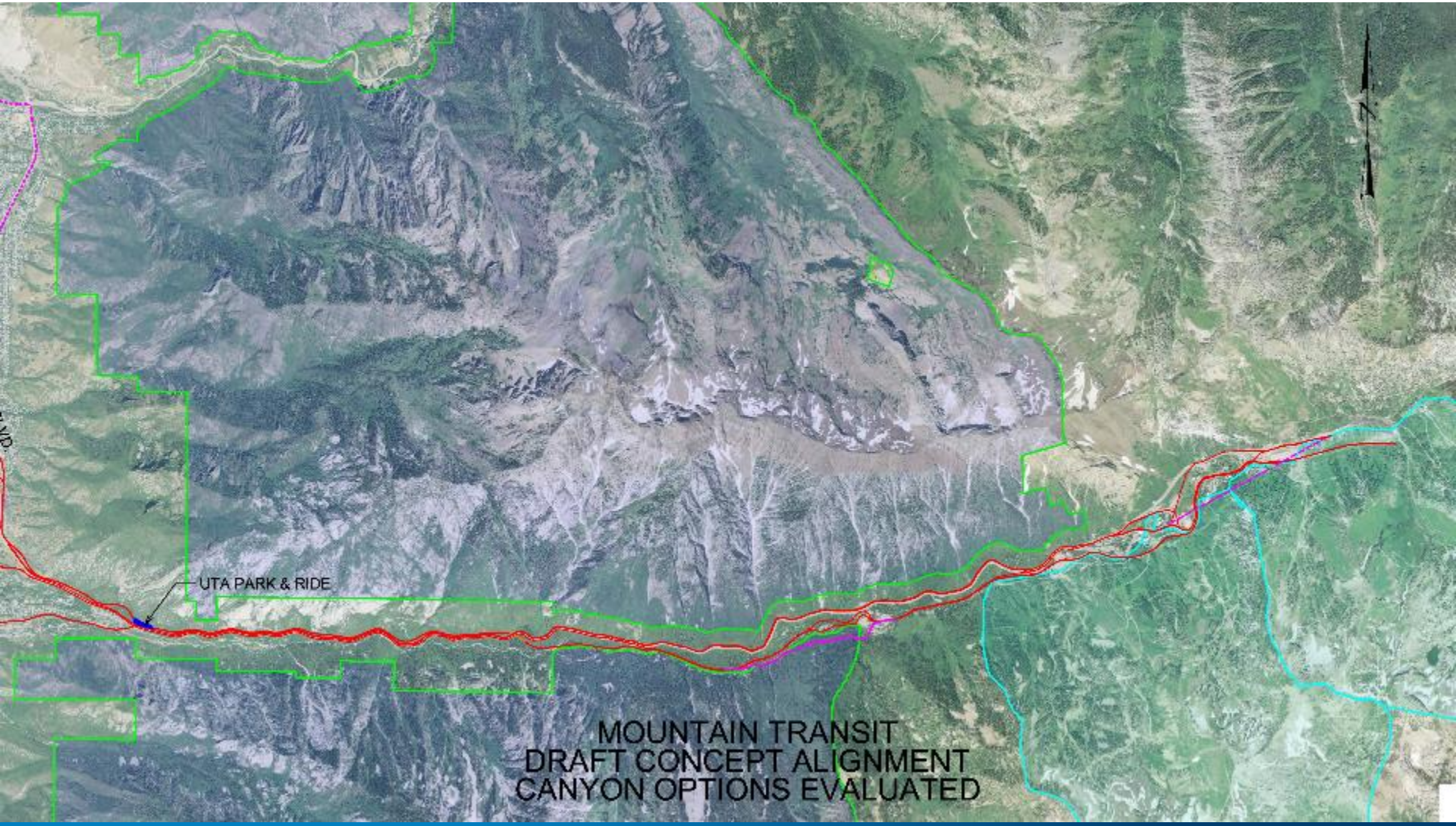
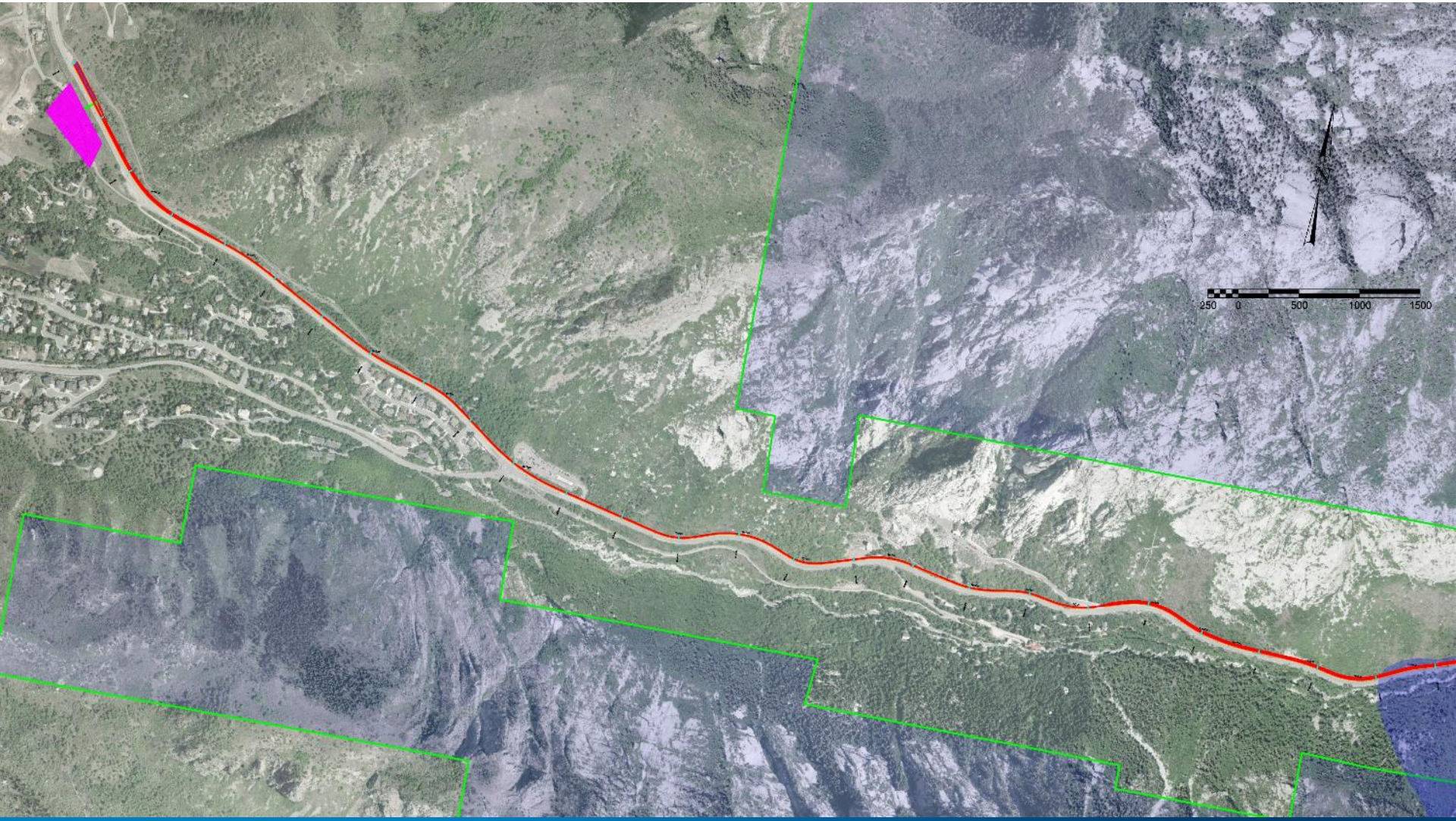


NORTH SIDE ALIGNMENT



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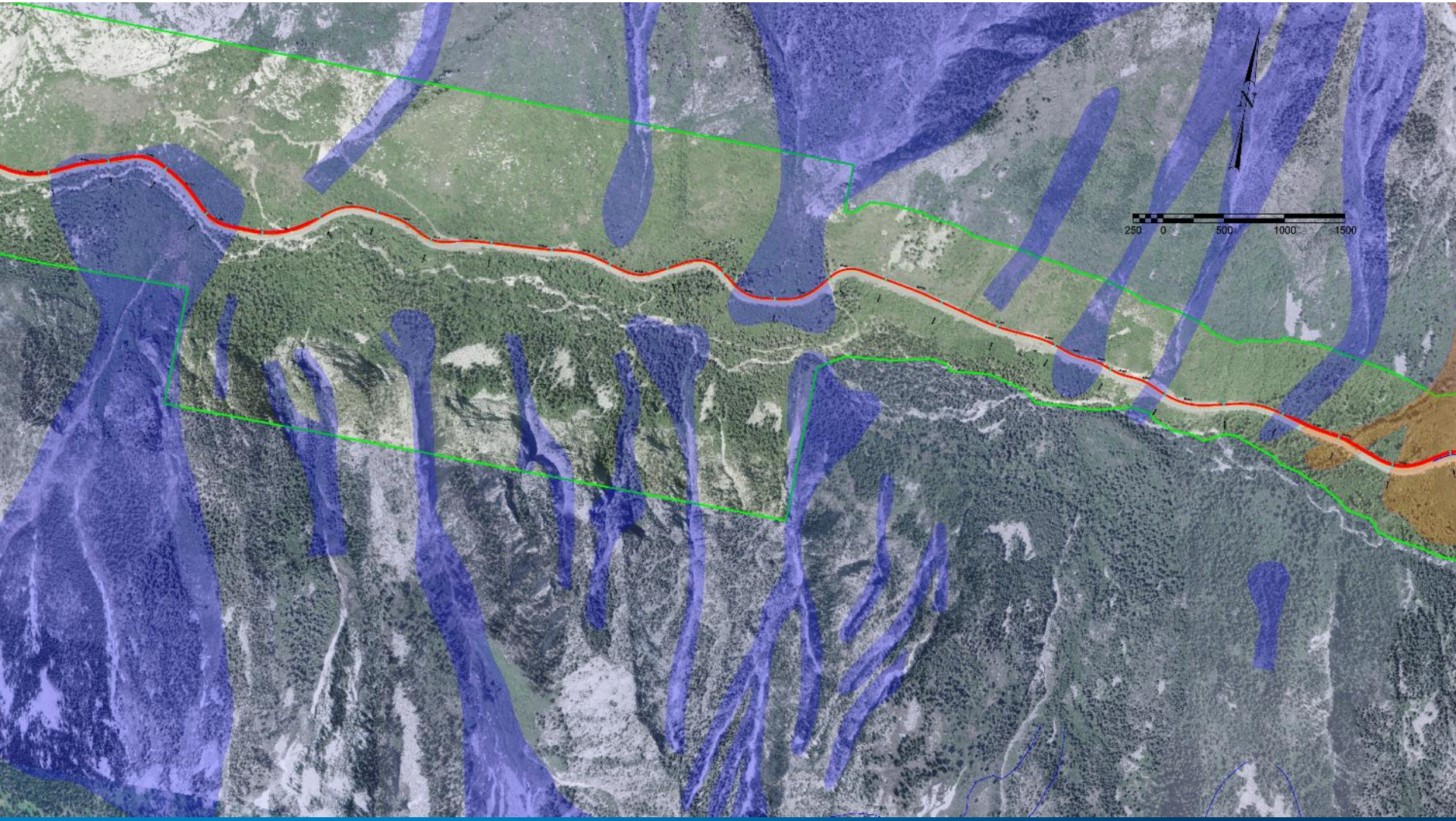

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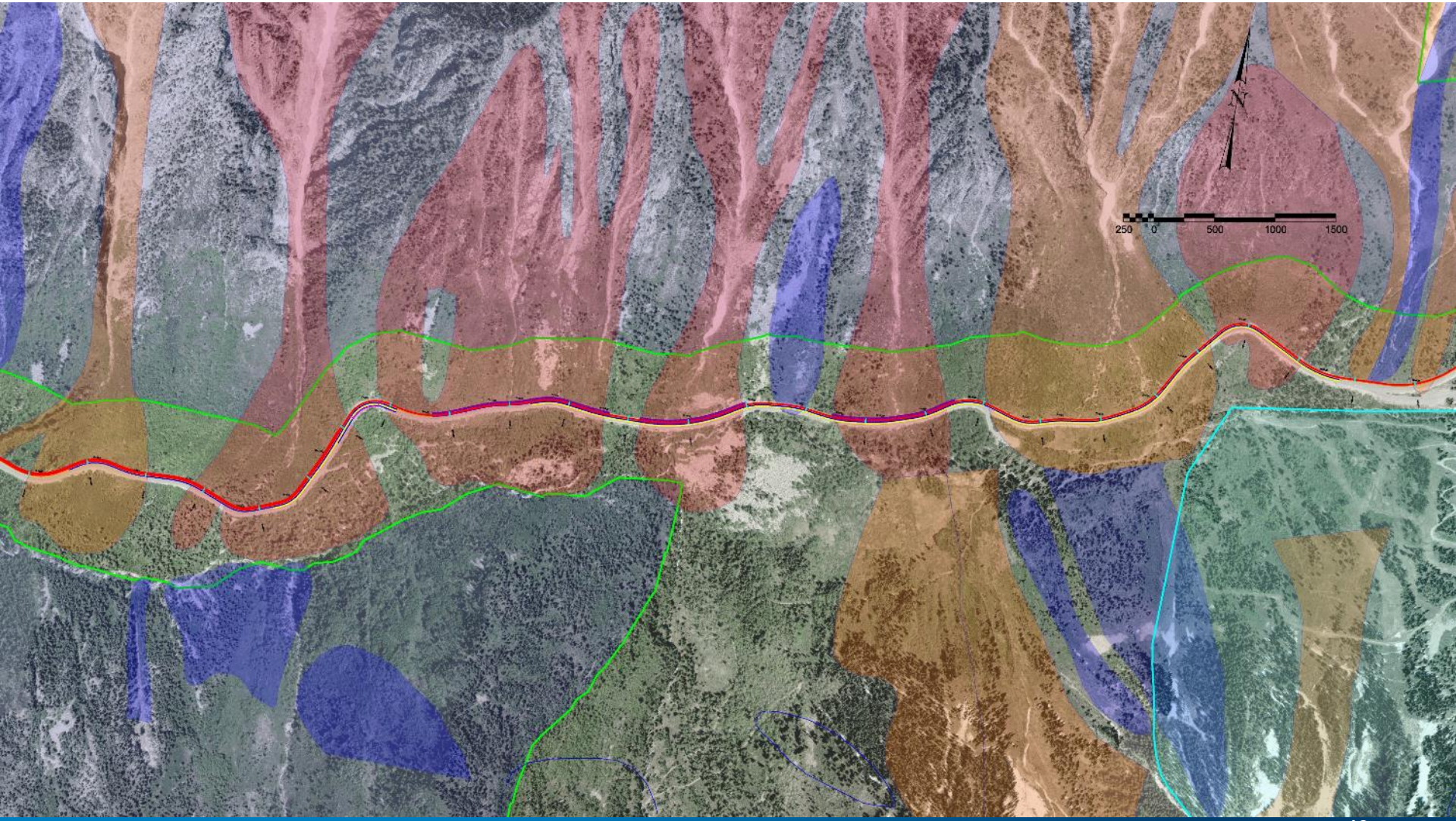

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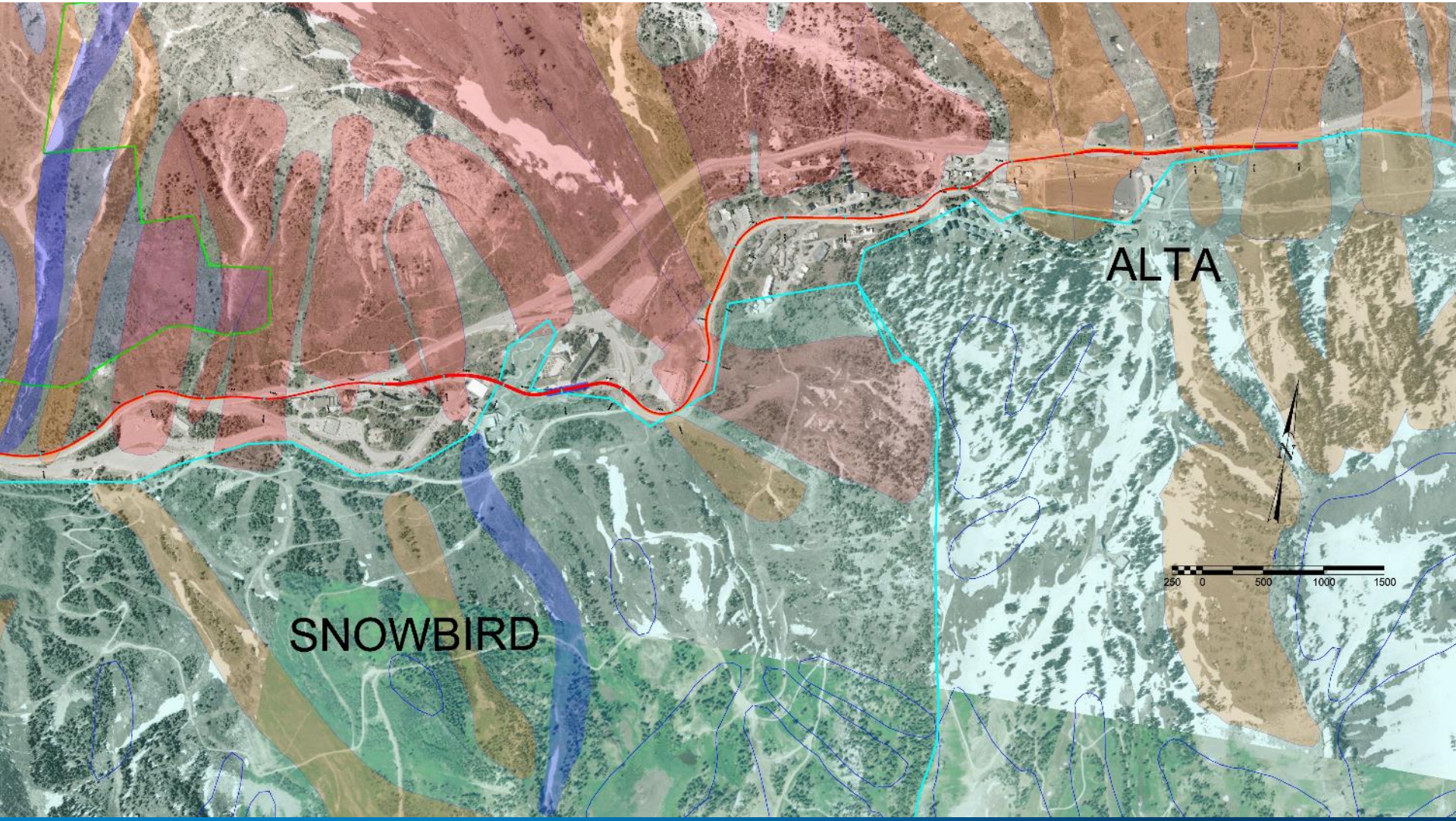
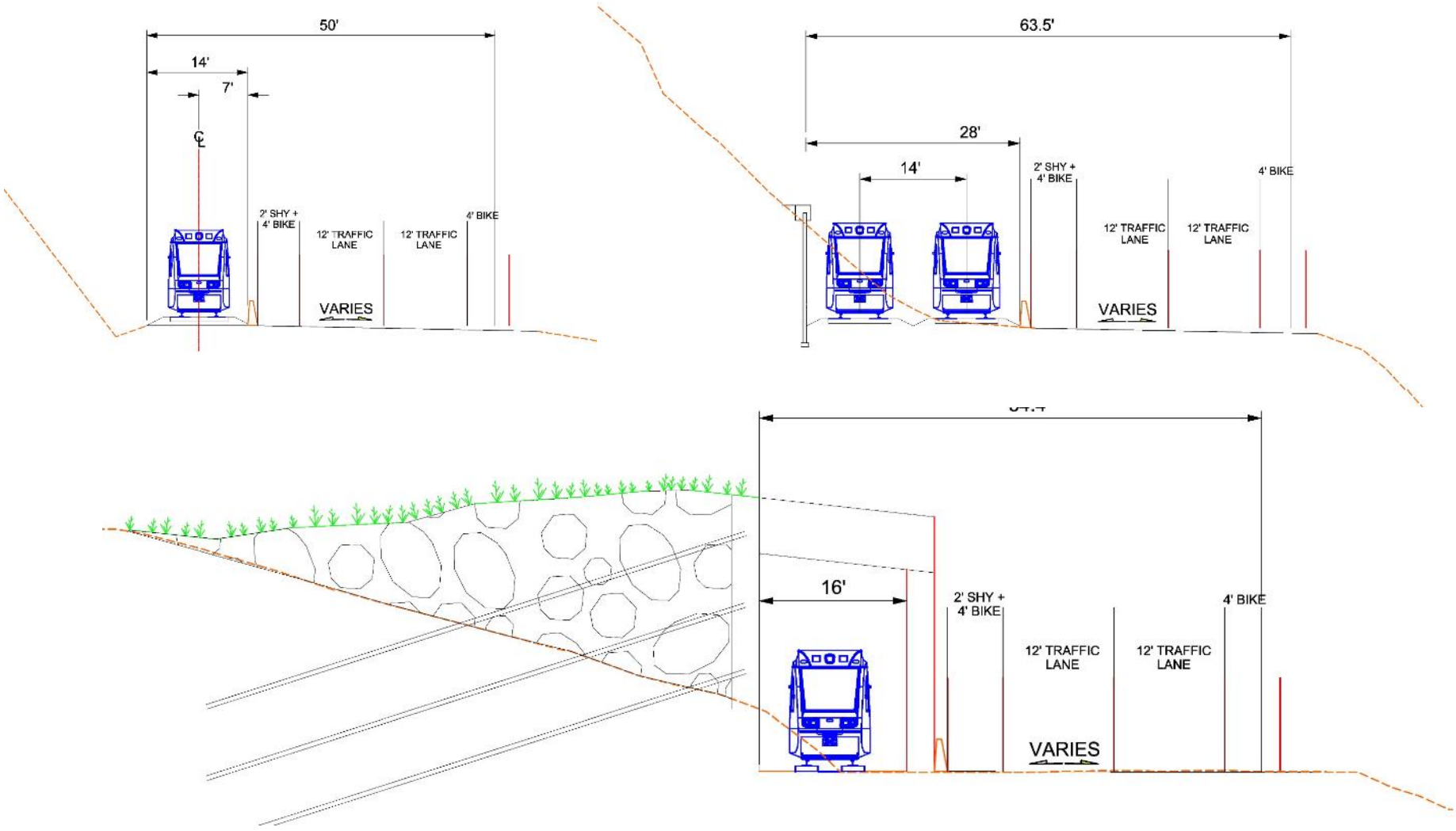


CROSS SECTIONS NORTH SIDE



SOUTH SIDE ALIGNMENT

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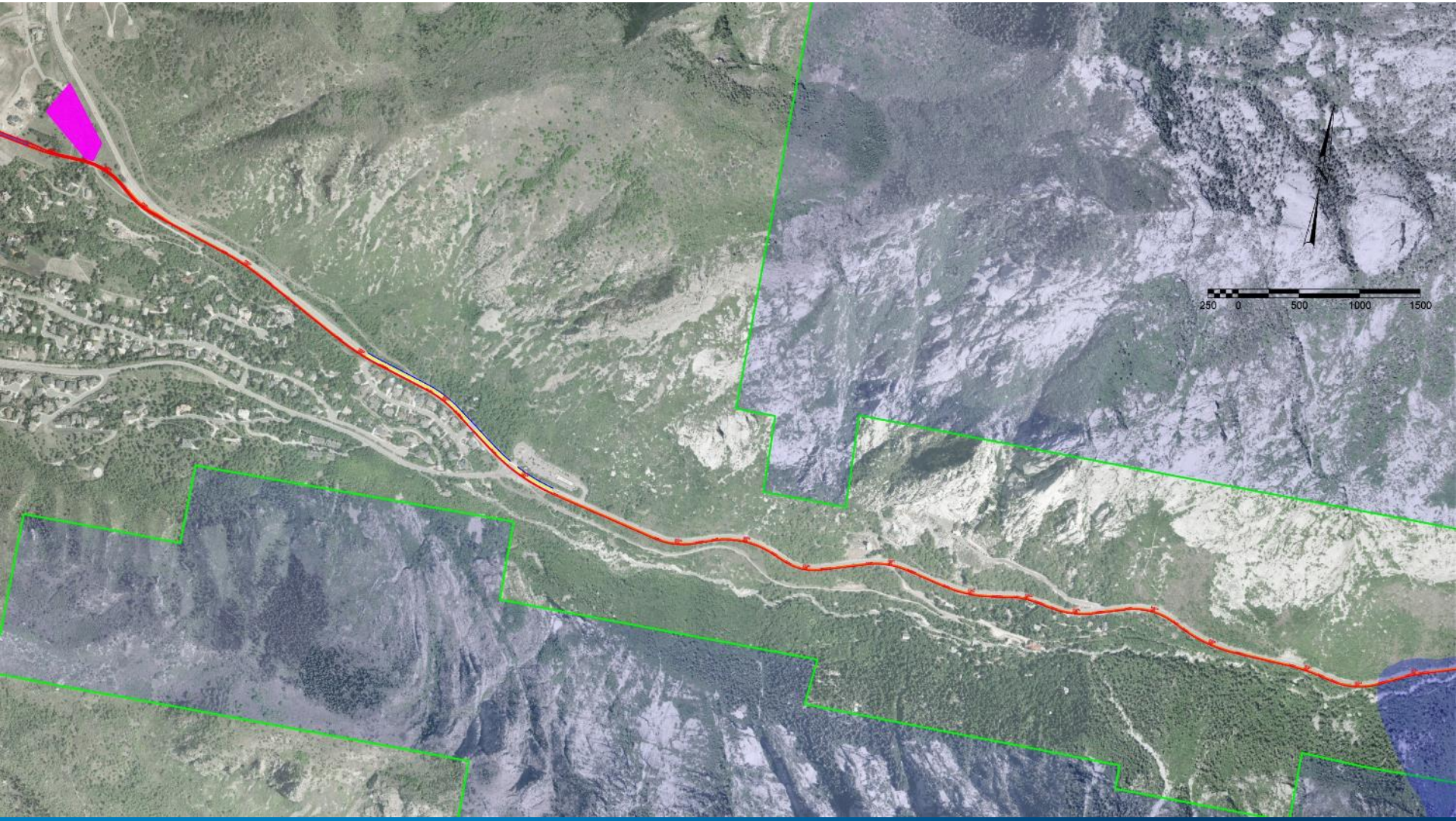

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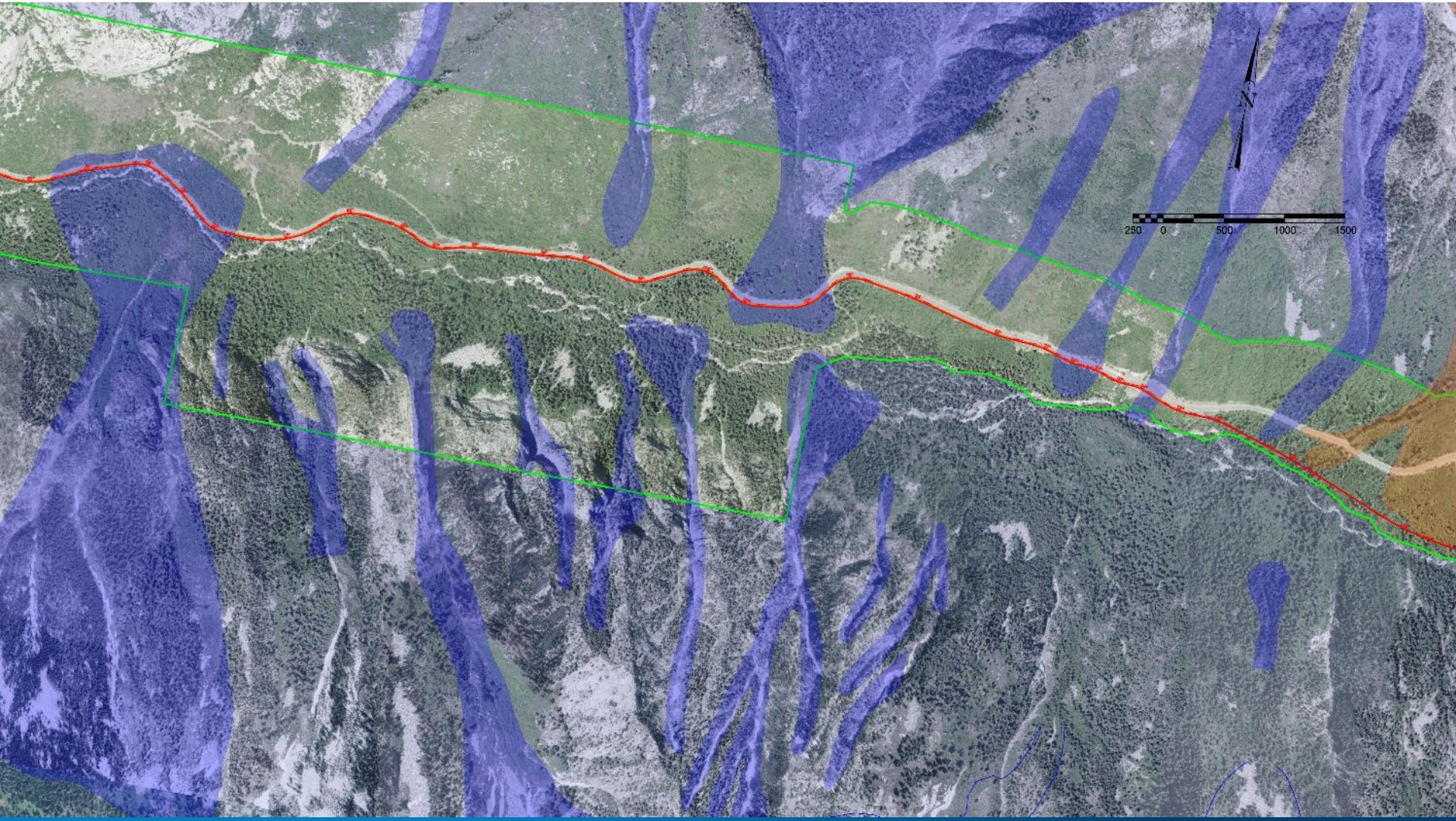

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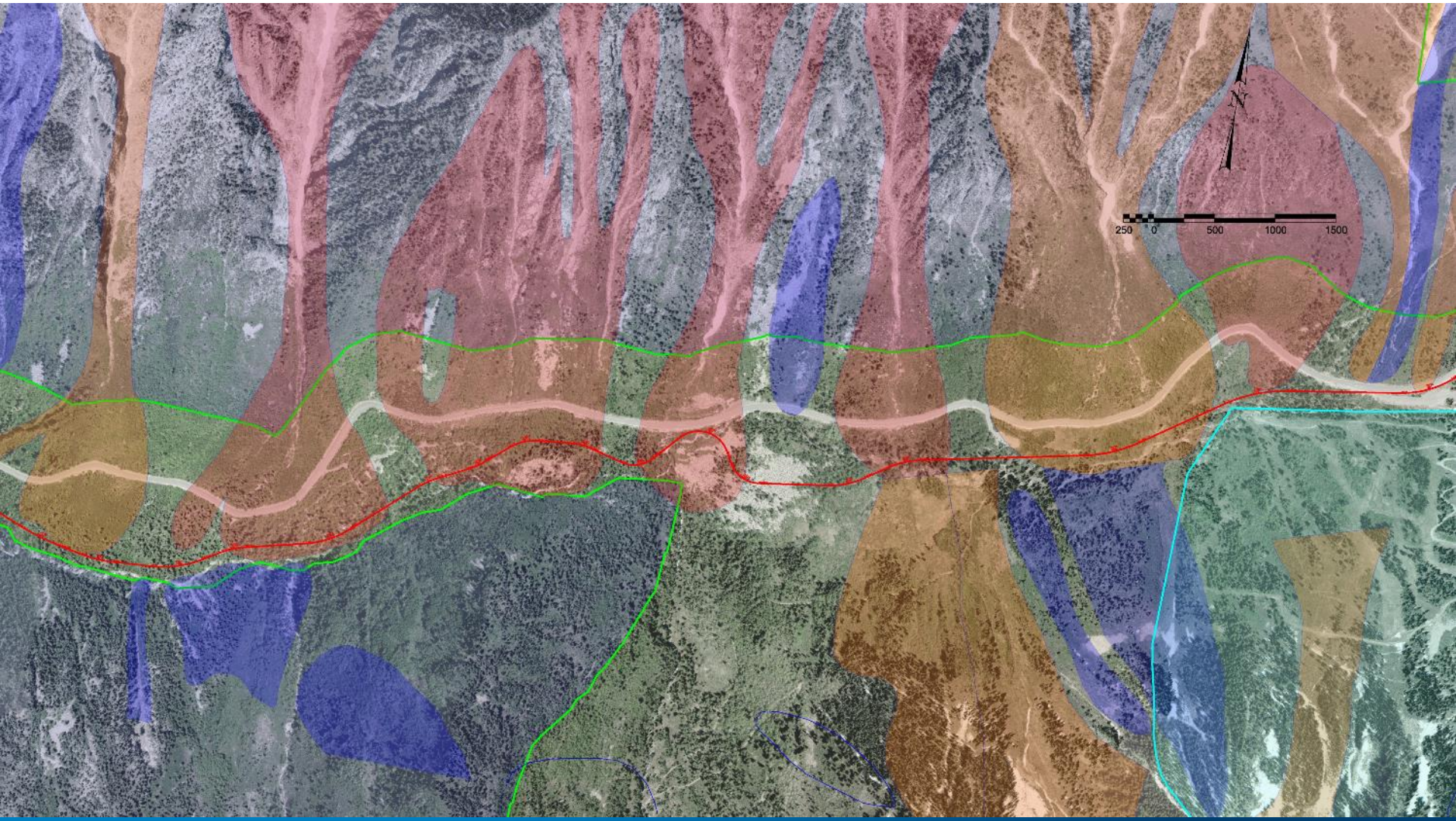

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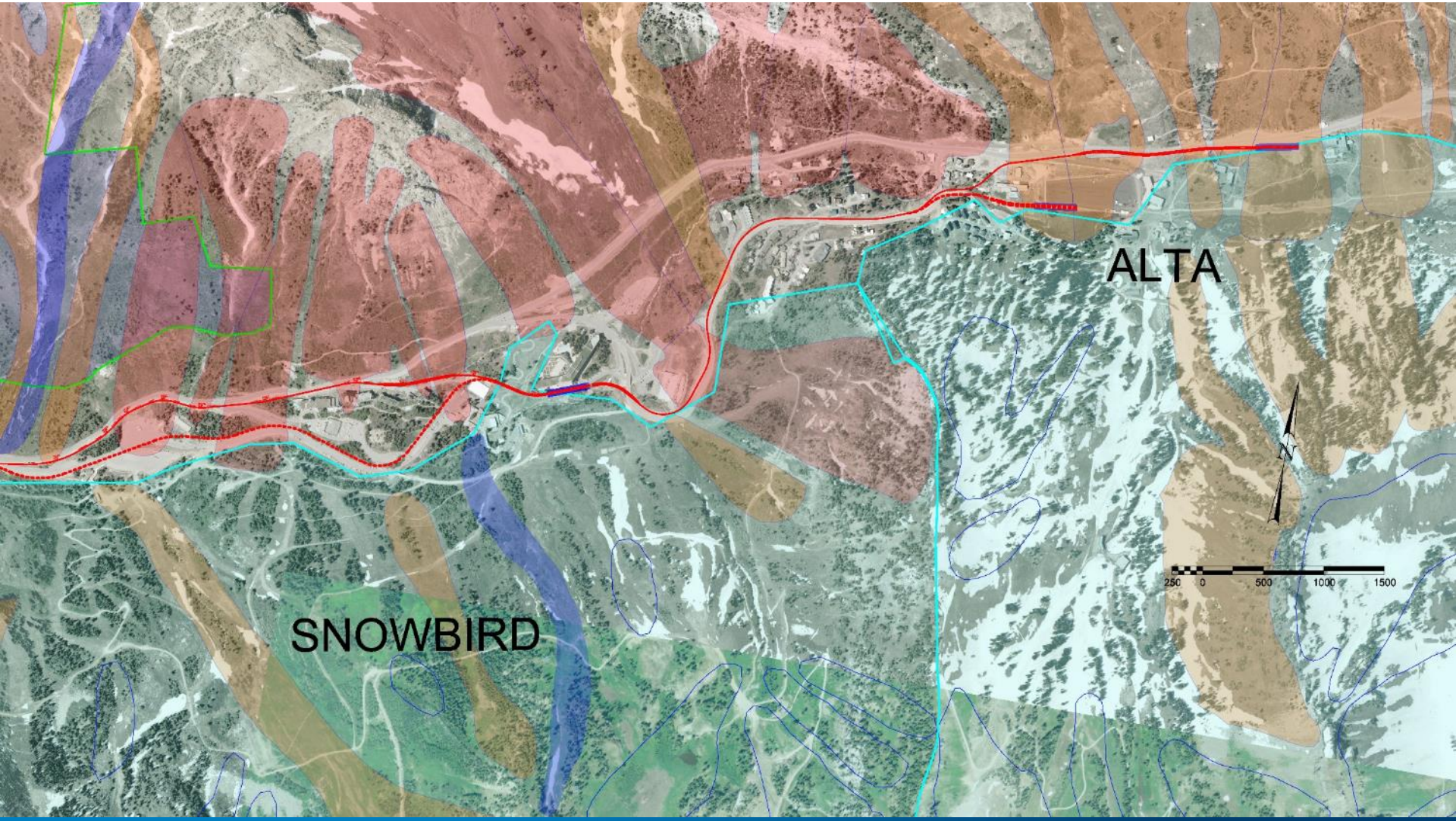

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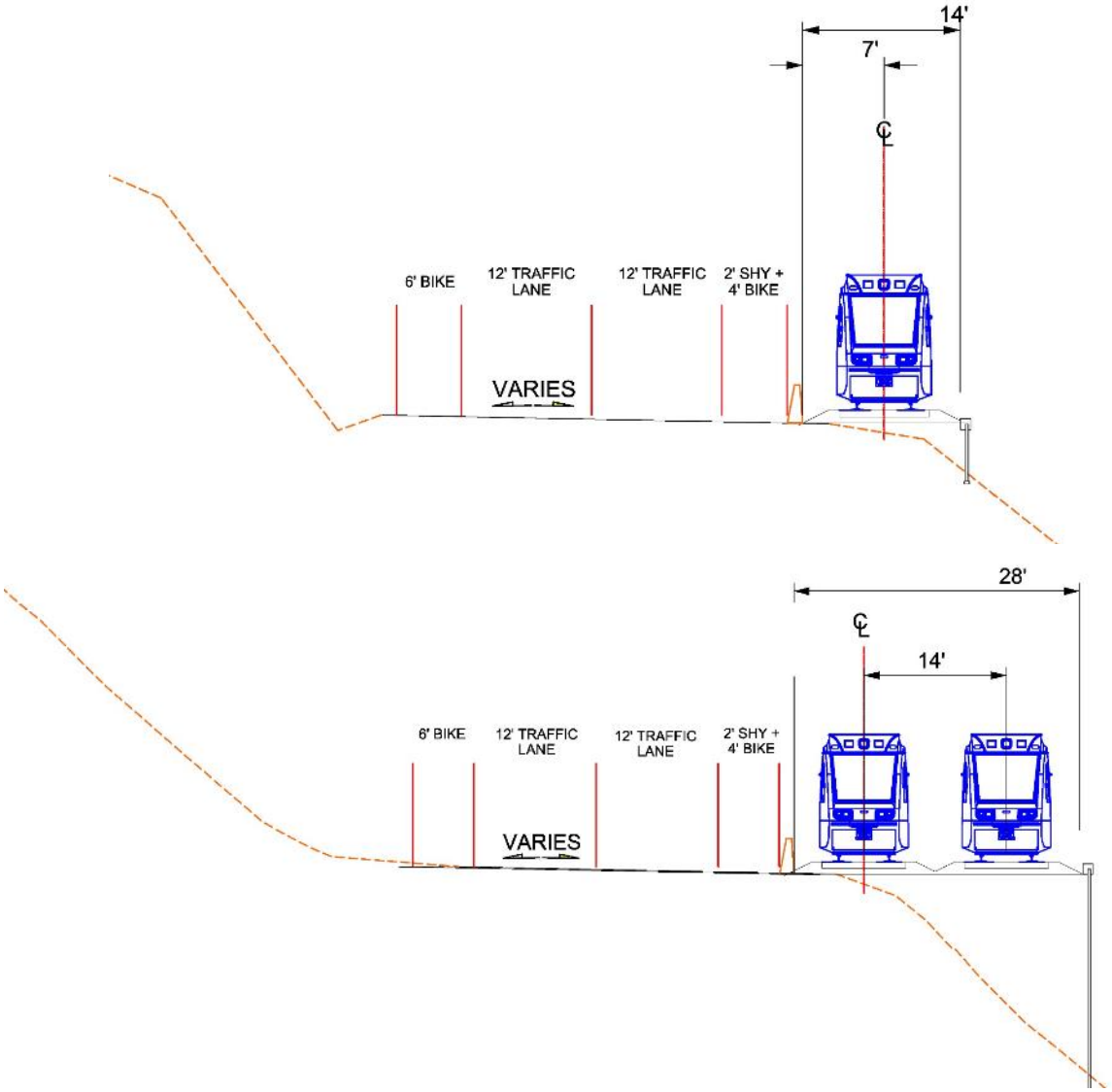


CAPITAL COSTS COMPARISON

Mountain Transit Rail Capital Costs (ROM)

Mouth of Little Cottonwood Canyon (La Caille Base) to Alta (Goldminer's Daughter)

North Side Alignment

Item	Description	Length (mi)	Cost/mile	ROM Cost
Rail Infrastructure Cost - Single Track North Side of Road	Side-running Cog DMU, single track w/passing sidings	9.02	$ 38,329,909	$ 345,500,000
Contingency (20%)				$ 69,100,000
PM/Design (10%)				$ 34,600,000
Park & Ride Garage	1500 Stalls @ $20,000 per Stall			$ 30,000,000
Vehicles	5 Train Sets @ $12.5M per Train Set			$ 62,500,000
Total Cost				**$ 541,700,000**

Mountain Transit Rail Capital Costs (ROM)

Mouth of Little Cottonwood Canyon (La Caille Base) to Alta (Goldminer's Daughter)

South Side Alignment

Item	Description	Length (mi)	Cost/mile	ROM Cost
Rail Infrastructure Cost - Single Track South Side of Road, Av	Side-running Cog DMU, single track w/passing sidings	9.02	$ 29,371,878	$ 264,800,000
Contingency (20%)				$ 53,000,000
PM/Design (10%)				$ 26,500,000
Park & Ride Garage	1500 Stalls @ $20,000 per Stall			$ 30,000,000
Vehicles	5 Train Sets @ $12.5M per Train Set			$ 62,500,000
Total Cost				**$ 436,800,000**

Other Potential Additions	**Electrification**			**$ 81,000,000**

CAPITAL COSTS OF VALLEY ALIGNMENTS

Valley Connection Capital Costs (ROM)

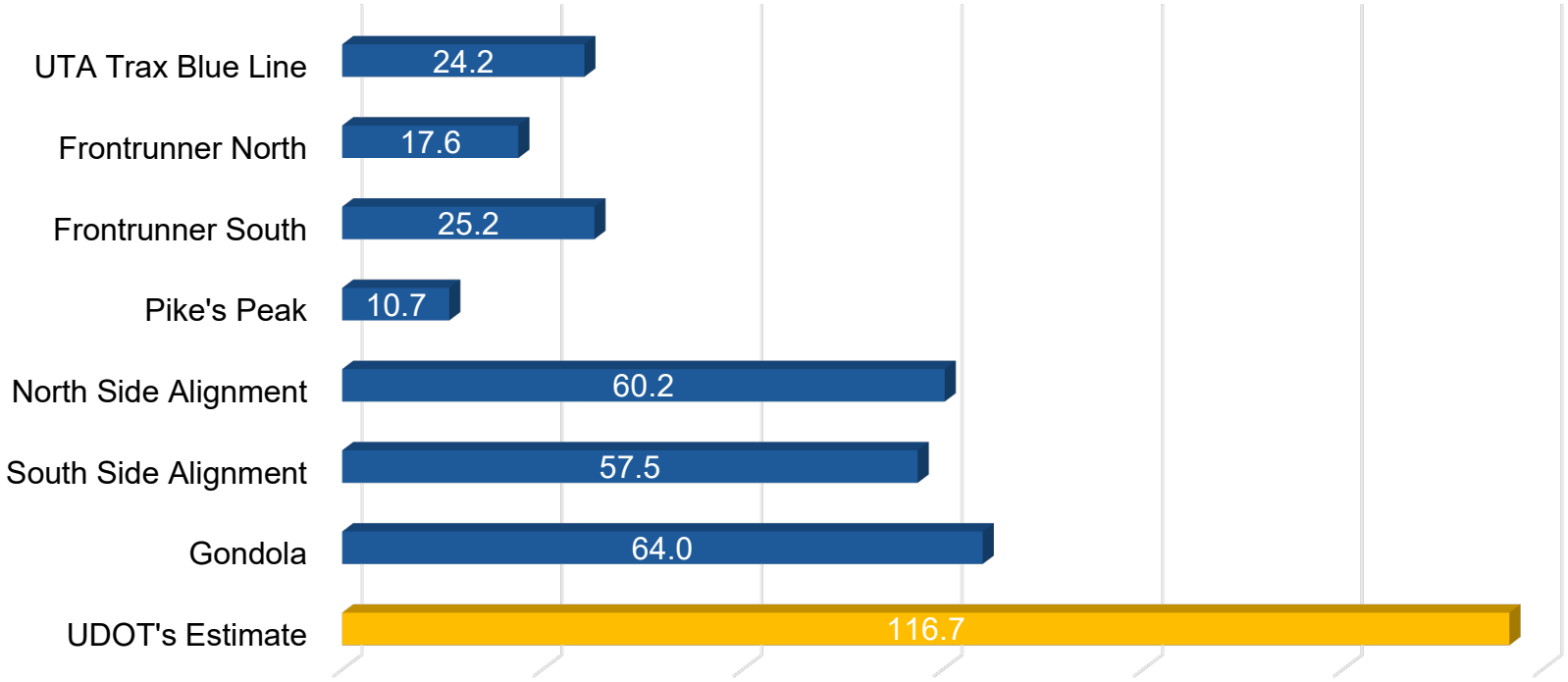
9400 South Alignment Segments

Segment Name	From	To	Route Description	Length (mi)	Segment Cost - Low	Segment Cost - High
9400 South - East	2000 East	Mouth of LCC	Double Track, electrified - 9400 South	2.44	$ 141,000,000	$ 177,000,000
9400 South - Mid	9400 Trax	2000 East	Double Track, electrified - 9400 South	2.84	$ 163,000,000	$ 204,000,000
9400 South - FR Connection	South Jordan Frontrunner	9400 S Trax	Double Track, electrified - 9400 South	1.61	$ 84,000,000	$ 106,000,000
Total				**6.89**	**$ 388,000,000**	**$ 487,000,000**

***With Valley Connection, could eliminate P&R Garage from other options**

COMPARABLE COSTS PER MILE

IN 2019 $M



- Differences from UDOT's Estimate:
  - Snow Sheds
  - Soft Costs (PM, Design, Contigency)
  - Roadway

RAIL CAR ALTERNATIVES

Proven Design available

- Diesel Electrical Multiple Unit
- Capacity 250 people per train
- 3 car trainsets
- Not compatible with TRAX or FR

- Hybrid Electrical Unit potentially with battery technology
- Capacity 250 people per train
- 2 x 3 – car consists
- Compatible with TRAX

INTERIOR DESIGN

LITTLE COTTONWOOD CANYON

PROPOSED TRANSPORT OPTIONS

3000 TRAVELERS PER HOUR

GONDOLA	**90 CARS** (22 PYLONS)
BUS	**75 BUSSES** (ON CANYON ROAD)
TRAIN	**6 TRAINS** (6 CARS PER TRAIN)

COMPARISON NORTH AND SOUTH SIDE

Operations Characteristics

North Side

- Cog Rail Technology 50% of the line
- Sizing to accommodate 1000 passengers per hour.
- 3 car trains at 15 minute headways
- Capacity can be increased by more double track or/and more frequency or running 2 trainset consists
- Double track can be added later when demand warrants
- Speeds. 55-20 mph. Speeds can be increased through more detailed engineering of horizontal and vertical curves. Assumed average speed of 30 mph.
- Travel time LaCaille to Snowbird (19min.) to Alta (25min.)

South Side

- Capacity for 3,000- 5,000 passengers per hour
- 2-3 car trains at 10 minute headways
- Hybrid diesel-electric convertible to battery
- Ability to extend into valley and run on TRAX lines
- Could end at Snowbird (with Gondola to Alta)
- Similar travel time and quicker if electrified
- Without impacting wilderness area
- Avoids most avalanche paths
- Whistle Stops are safer

LIFE CYCLE COSTS OVER 40 YEARS

Auto	most expensive
Gondola	medium
Bus	medium
Rail	least expensive

Financial cost analysis only. It does not including environmental and social costs

CURRENT FINANCING AND FUNDING TRANSIT

PUBLIC TRANSIT FUNDING

- Federal
- State
- Local
- Fares
- Private

PRIVATE-PUBLIC PARTNERSHIPS IN THE US

Dallas-Houston HSR – Financing

Miami-Orlando Brightlines – Funding with Station Development

Las Vegas-Los Angeles – PAB's, RRIF

PRIVATE OPERATION

Pike's Peak, CO

Jungfraubahn, Top of Europe

Gornergratbahn, Zermatt

PROS AND CONS

	Pros	Cons / Issues
Rail Overall	▪ Highest Ride Quality & Safety ▪ Year Round Public Use/ ADA Accessible ▪ Quickest travel time ▪ Best schedule reliability ▪ Trains can be adjusted for demand (scalable) ▪ On Demand (Whistle) stops ▪ Accommodates skis, bikes, luggage, etc ▪ Best Life Cycle Costs ▪ Lowest Operating Costs ▪ Highest Ridership volume & capacity ▪ High 3P (local,state,federal,private) $$ potential ▪ People Centric Solution/Management Tool ▪ Air Quality, Water, Energy, Noise, Congestion Relief	▪ Capital Investment ▪ At grade crossings
North Side	▪ Within existing transportation footprint ▪ No catenary required	▪ Snow sheds ▪ Next to Autos ▪ Snow removal ▪ Limit ability to expand road ▪ Small shop required
South Side Hybrid/ Electric	▪ Potential to convert to battery ▪ Separate from auto corridor (Emergency Exit) ▪ Connectivity to Valley Transit (TRAX & Frontrunner) ▪ Minimal Visual Impact	▪ New Alignment ▪ 2 Stream crossings ▪ Forest Service Coordination required ▪ Wetlands

SUMMARY

- Vision for the Future
- Rail is best suited to accommodate community, environmental, economic and safety goals
- Year Round, public use, intermediate stops
- Ability to easily expand with ridership
- Modern Construction Solutions to minimize impacts
- Life Cycle Costs are best with Rail
- Potential for P3 is high
- Build to the future (50-100 years) and connect with UTA Network

DISCUSSION

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WHISTLE STOP EXAMPLES