About the Tunnel with At-Grade Freight

For the tunnel alternative, the railroad tracks will be lowered in a trench south of Oregon Expressway to approximately Loma Verde Avenue. The twin bore tunnel will begin near Loma Verde Avenue and extend to just south of Charleston Road. The railroad tracks will then be raised in trench to approximately Ferne Avenue. The new electrified southbound railroad tracks will be built at the same horizontal location as the existing railroad track, however, the northbound track will be moved to the east within the limits of the tunnel to accommodate the spacing required between the twin bores. The railroad tracks in the trench and tunnel will carry only passenger trains. The freight trains will remain at-grade. The roadways at Meadow Drive and Charleston Road remain at their existing grade and will have a similar configuration that exists today with the addition of Class II buffered bike lanes on Charleston Road. This will require expanding the width of the road to maintain bike lanes through the overpass of the railroad.

By the numbers

- Diameter of twin bores is 30 feet.
- Railroad track is designed for 110 mph.
- Meadow Drive and Charleston Road are designed for 25 mph.
- Maximum grade on railroad is 2%.
- Travel lane widths are 10-12 feet.
- Bike lane widths are 5-6 feet.
- Construction period is approximately 6 years.

Engineering Challenges

- A non-standard grade of 2% will be required on tracks. Caltrain’s preferred maximum grade is 1%.
- Lowering of the tracks will require diversion of Adobe and Matadero creeks, resulting in the need for lift stations/siphons and numerous regulatory agency permits/approvals. Negotiations with the regulatory agencies will be lengthy and difficult since there are other “least impacting” alternatives that could be considered.
- Pump stations will also be needed for dewatering since the tunnel will be below the ground water level.
- Increased long term maintenance costs and risk of flooding due to pump stations.
- Major utility relocations are required for the lowered railroad.

Neighborhood Considerations

- Alma Street will permanently be reduced to one lane in each direction from south of Oregon Expressway to Ventura Avenue and from Charleston Road to Ferne Avenue.
- The train tracks will be approximately 70 feet below the existing grade in the tunnel section. A high fence will be required along trench walls.
- With grade separations at Meadow Drive and Charleston Road the traffic at nearby intersections is expected to improve.

Cost Breakdown

- Roadway & Railroad Items: $735M to $1,102M
- Right-of-way & Utilities: $7M to $10M
- Support Costs: $227M to $340M
- Escalation to 2025 dollars: $204M to $307M
- TOTAL PROJECT COSTS: $1,173M to $1,759M

Preliminary and subject to change. Maintenance costs and relocation of fiber optic lines not included.

For more Rail Fact Sheets visit: https://connectingpaloalto.com/fact sheets/
Evaluation with City Council-Adopted Criteria

- Facilitate movement across the corridor for all modes of transportation
- Provide clear, safe routes for pedestrians and cyclists crossing the rail corridor, separate from vehicles
- Reduce delay and congestion for vehicular traffic at rail crossings
- Reduce rail noise and vibration
- Support continued rail operations and Caltrain service improvements
- Minimize visual changes along the corridor
- Minimize disruption and duration of construction
- Support movement of freight: Caltrain Right-of-Way Station Platform

Train horn noise and warning bells will remain for the at-grade crossings to accommodate a limited number of freight trains. Utilizing EMU trains instead of diesel engines will also reduce noise. In the trench section, train noise would be partially reduced with acoustically absorptive materials. In the tunnel section, train noise will be contained. Reduced traffic lanes on Alma would also reduce noise levels in the community. There would be slight reduction to vibration levels at nearby receptors.

Minimize visual changes along the corridor
Passenger tracks will be below grade and freight tracks will be at-grade with high fencing. Landscaping options will be limited to plants with shallow roots in areas where ground anchors are required for the trench section.

Minimize disruption and duration of construction
Extended lane reductions on Alma Street are required. Construction would last for approximately 6 years.

Finance with feasible funding sources (Order of magnitude cost)
The tunnel will require the greatest levels of local funding in the form of fees, taxes or special assessments, the feasibility of which are still being studied along with potential alternative funding sources. The feasibility of which are still being studied along with potential alternative funding sources.

Minimize right-of-way acquisition (Private property only)
Subsurface acquisition will be required for the ground anchors for the trench retaining walls and private properties will be required for creek diversion pump station.

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