CALIFORNIA
High-Speed Rail Authority

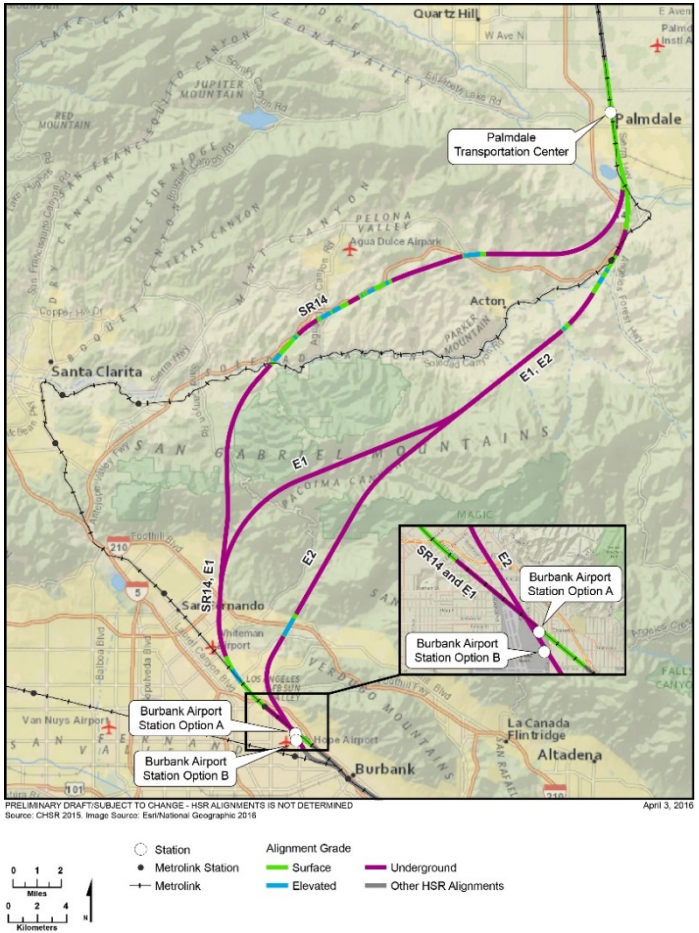
Engineering Elements

Palmdale to Burbank Project Section
September 2016

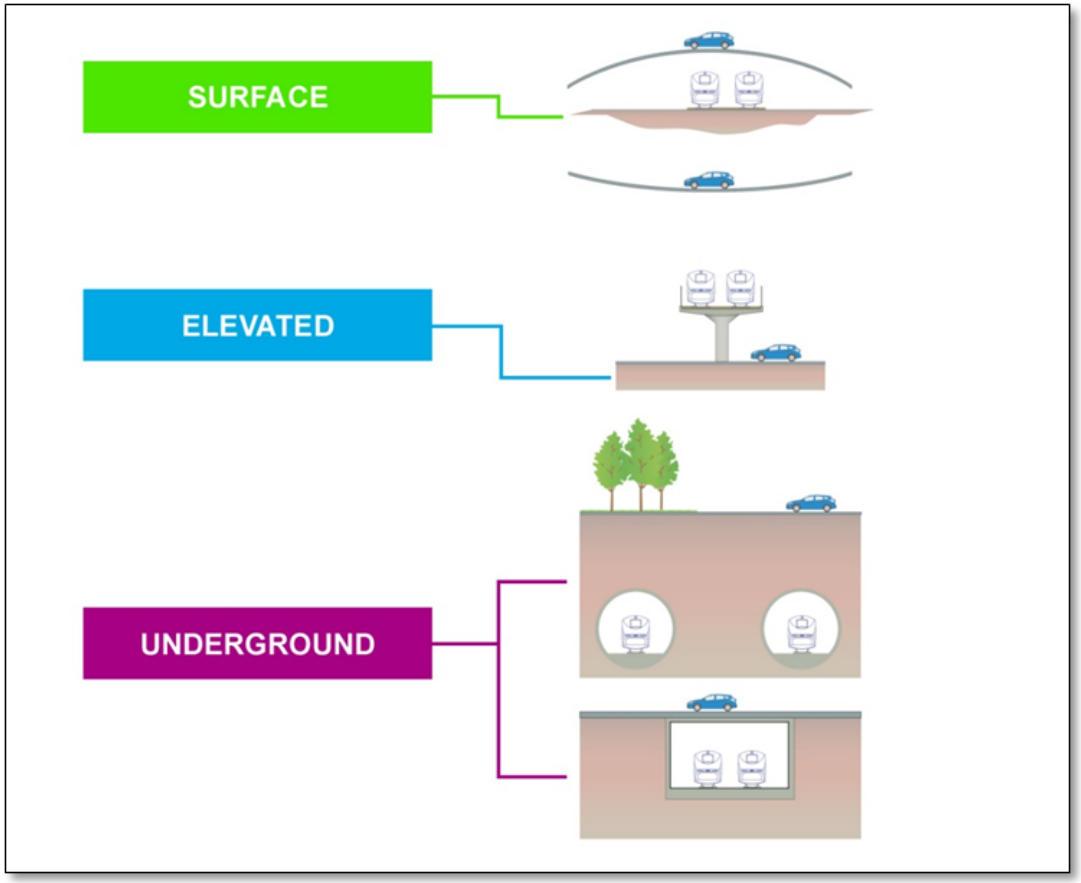
2016 Palmdale to Burbank Project Section Alignment Details

Design Feature	SR14	E1	E2
Total length (miles*)	38.4	36.3	32.8
Surface (miles*)	9.7	9.7	7.3
Elevated (miles*)	3.4	1.3	1.4
Underground - Bored Tunnel (miles*)	24.3	23.3	22.2
Underground - Other (miles*)	1.0	2.0	1.9

*Approximate length

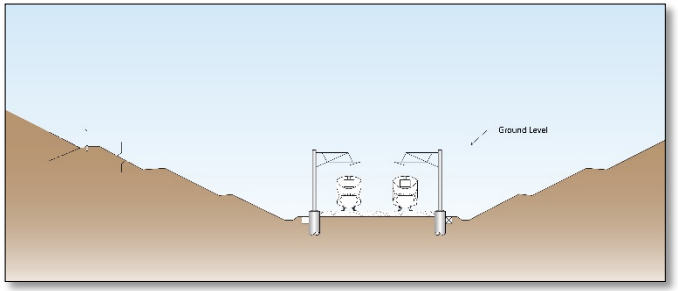


2016 Alignment Details

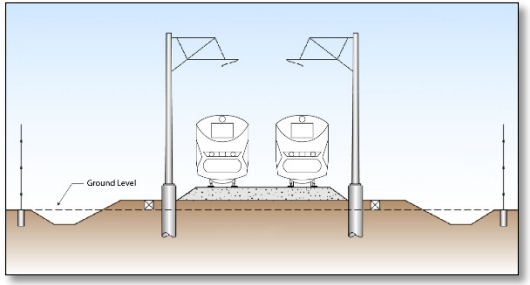


Surface

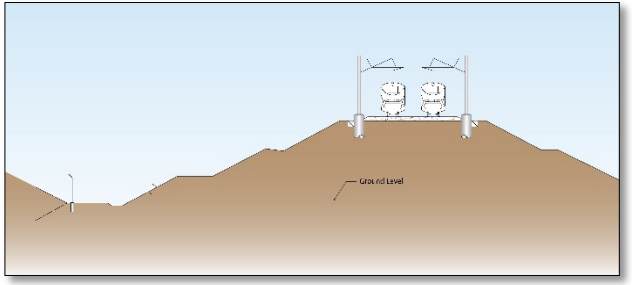
Cut

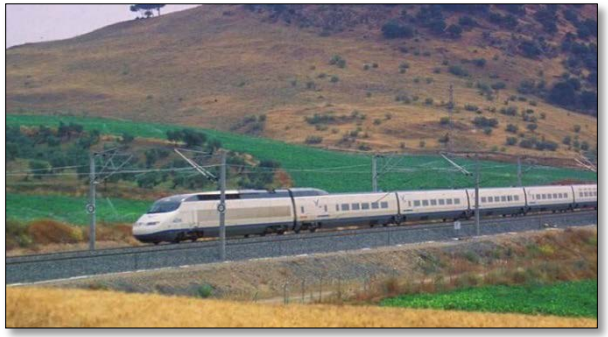


At grade



Fill





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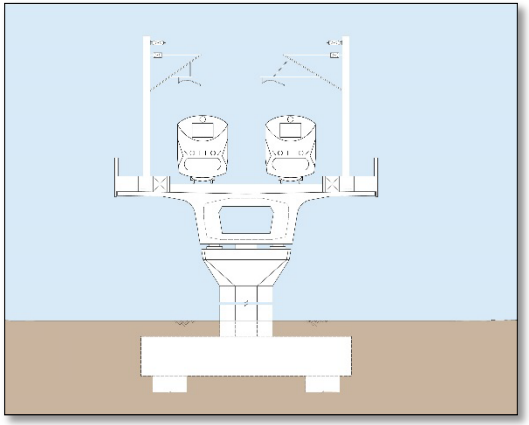
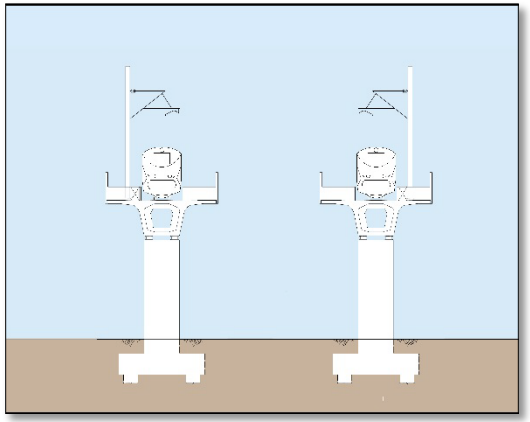
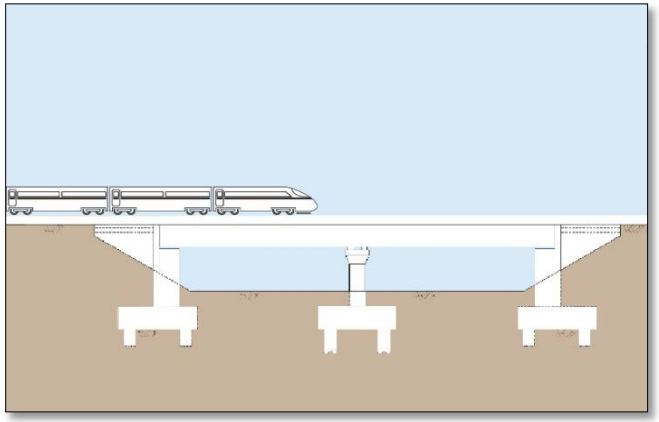
Elevated Structures





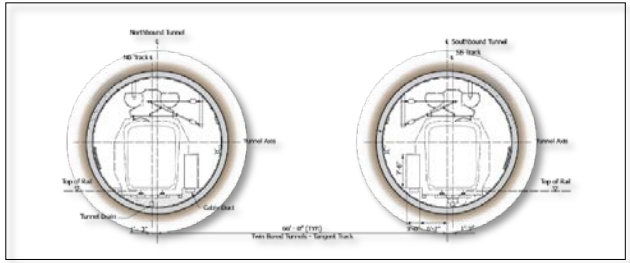


Underground

- **Tunnel** - Underground trainway, dug through the surrounding soil or rock without disturbing the ground above
- **Cut-And-Cover** - Underground trainway built by excavating a trench, constructing the concrete structure in the trench, and covering it with soil
- **Artificial Tunnel** - False shallow tunnel constructed inside a wide trench, and later covered by soil to minimize environmental/visual impact
- **Trench** - An open-air shallow excavation for a trainway, without ground cover

Underground

Tunnel

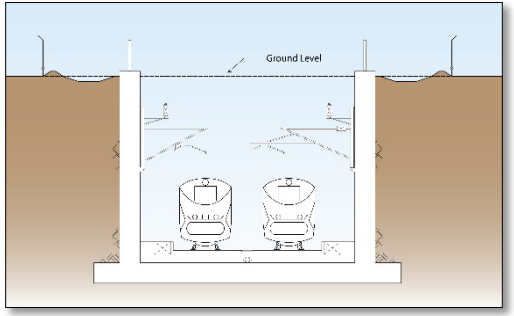


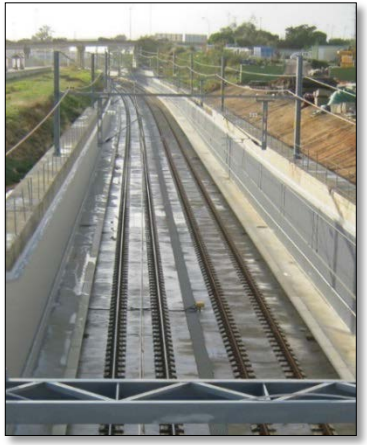
TBM

Mined

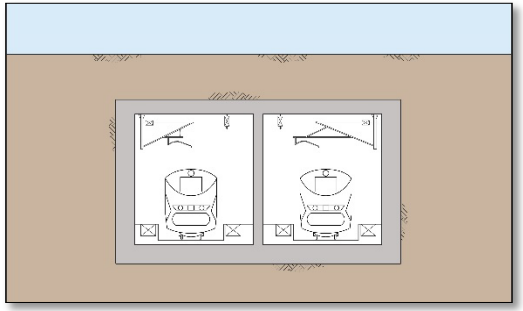
Underground

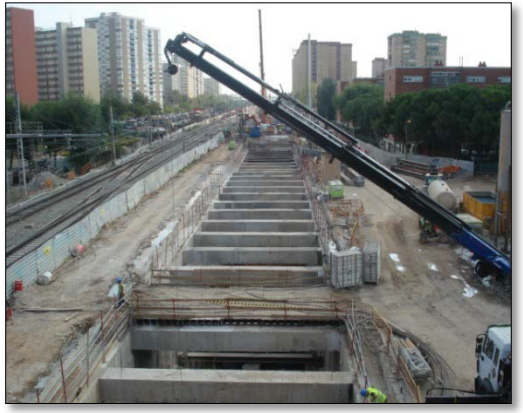
Trench



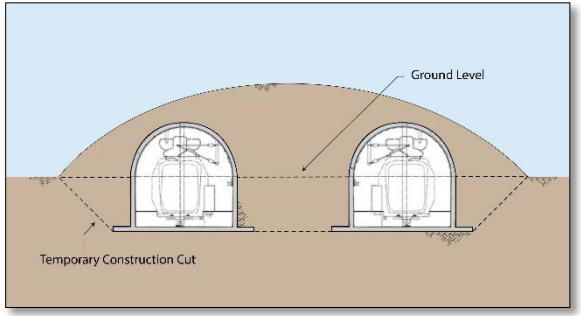


Cut-And-Cover



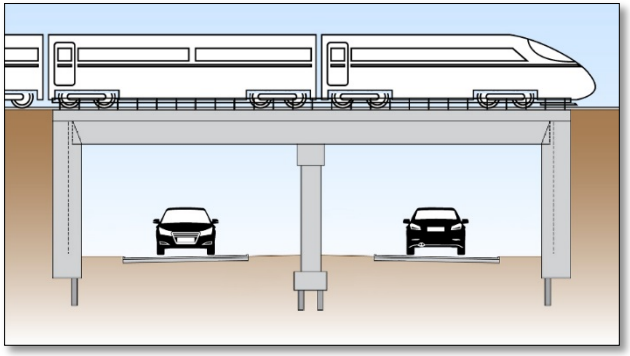


Artificial Tunnel

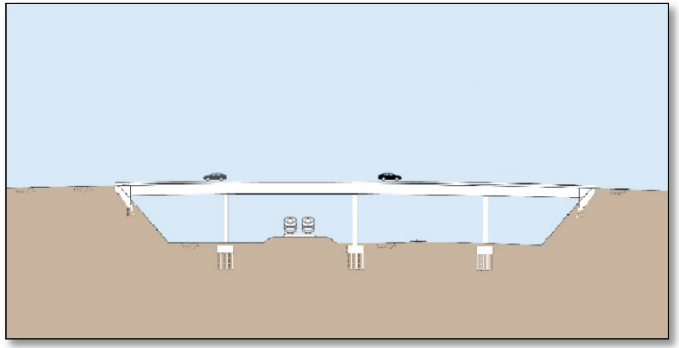


Grade Separations

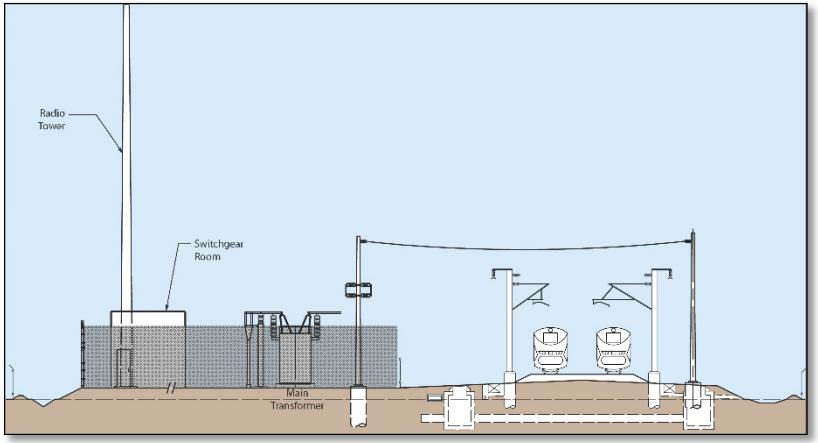
Roadway Undercrossing



Roadway Overcrossing



Communication Towers & Traction Power Substations



Communication Tower

Traction Power Supply Substation (TPSS)

Noise Abatement

**Above images serve as examples and are not an indication of a preferred design or mitigation for use on the California High-Speed Rail project*

More on Tunnels…

Tunnels can be built using different methods of construction. The methodology is determined based on several factors including:

- Length of the tunnel
- Geology of the material through which the tunnel will pass.

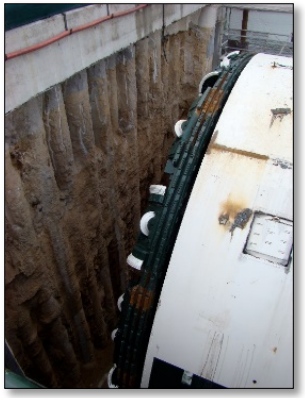
Generally, longer tunnels are constructed using tunnel boring machines (TBMs), while shorter tunnels are often mined using conventional excavation equipment.”

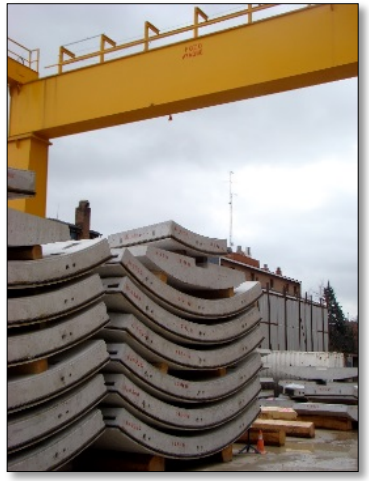
TBM

Mined

Tunnel Boring Machine (TBM)

Offers maximum efficiency and performance for relatively long tunnels.





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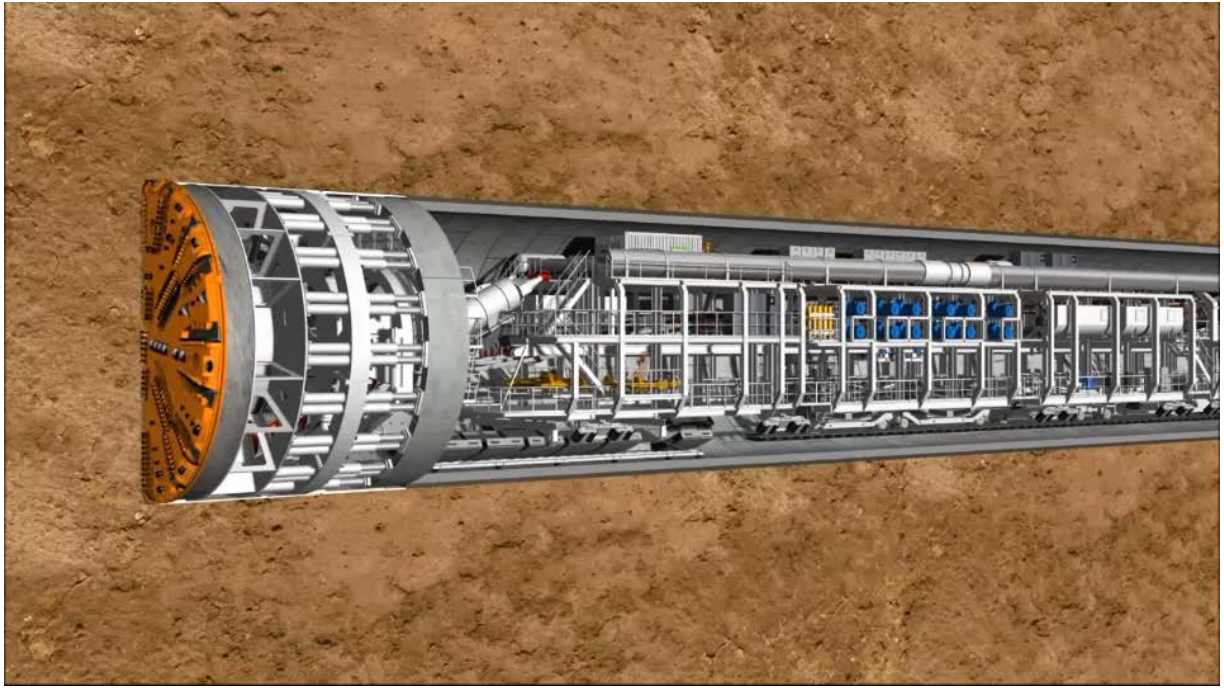
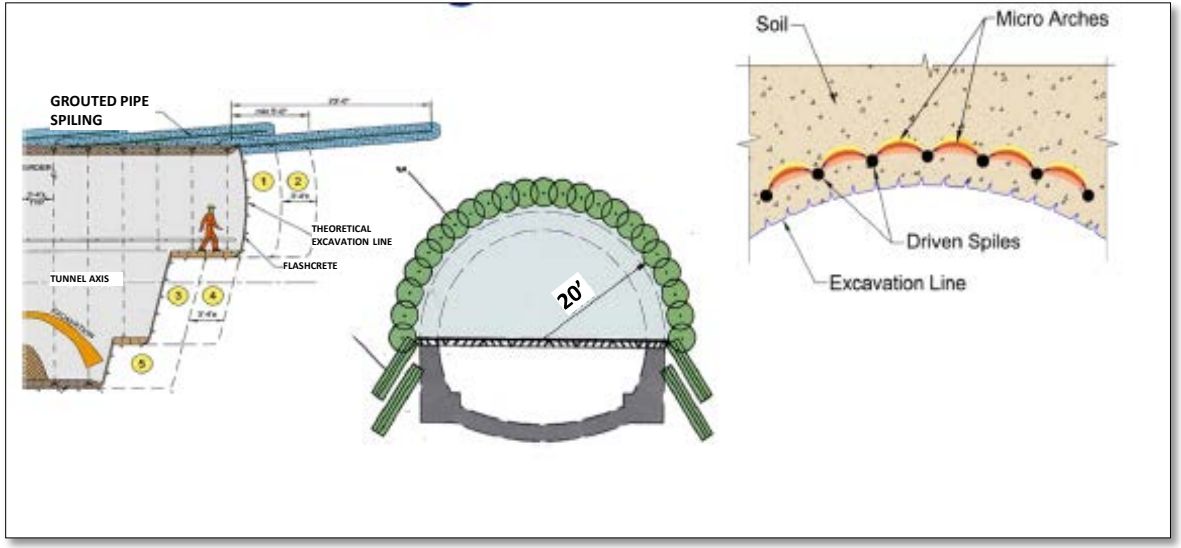
Tunnel Boring Machine (TBM)



Mined Tunnel



A tunnel constructed with no surface impacts using conventional construction equipment.

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Portals

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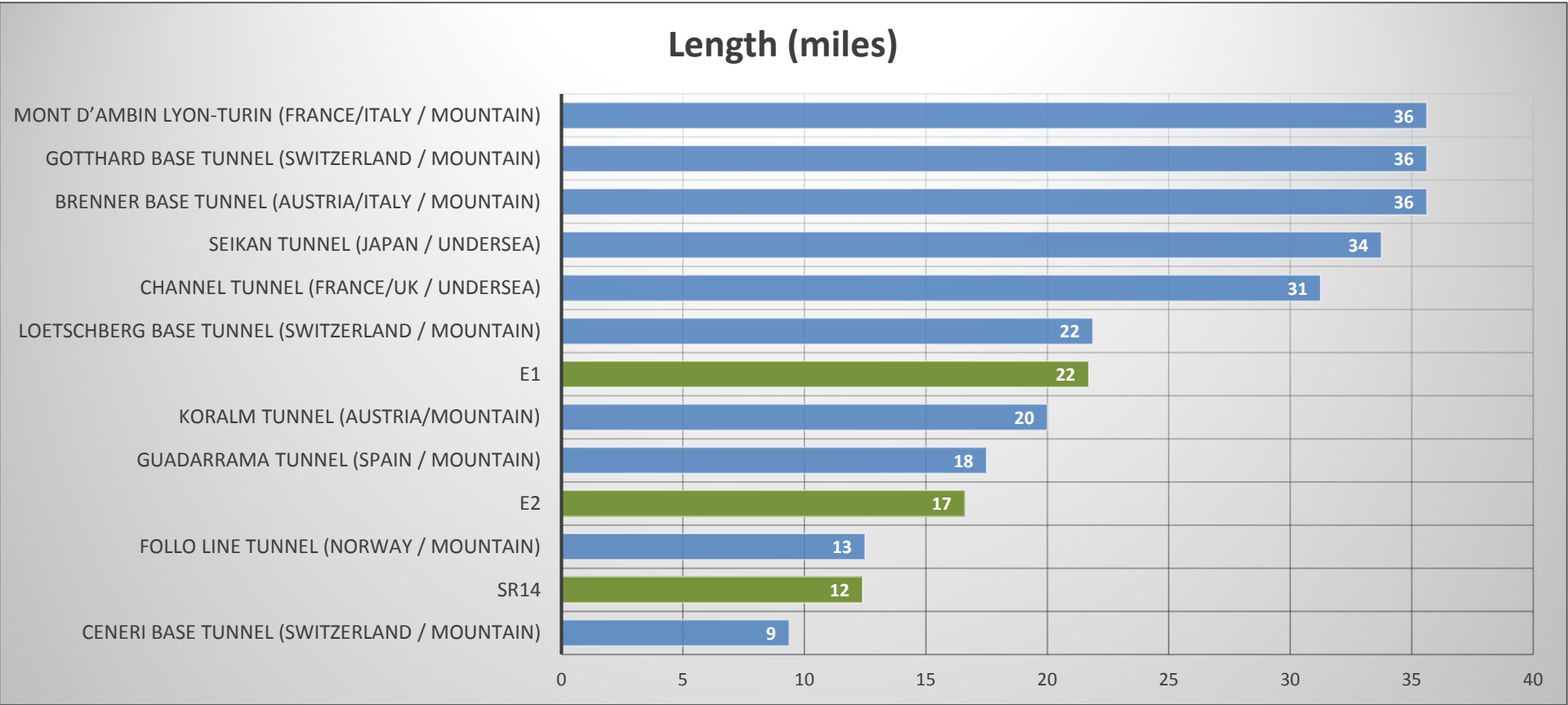
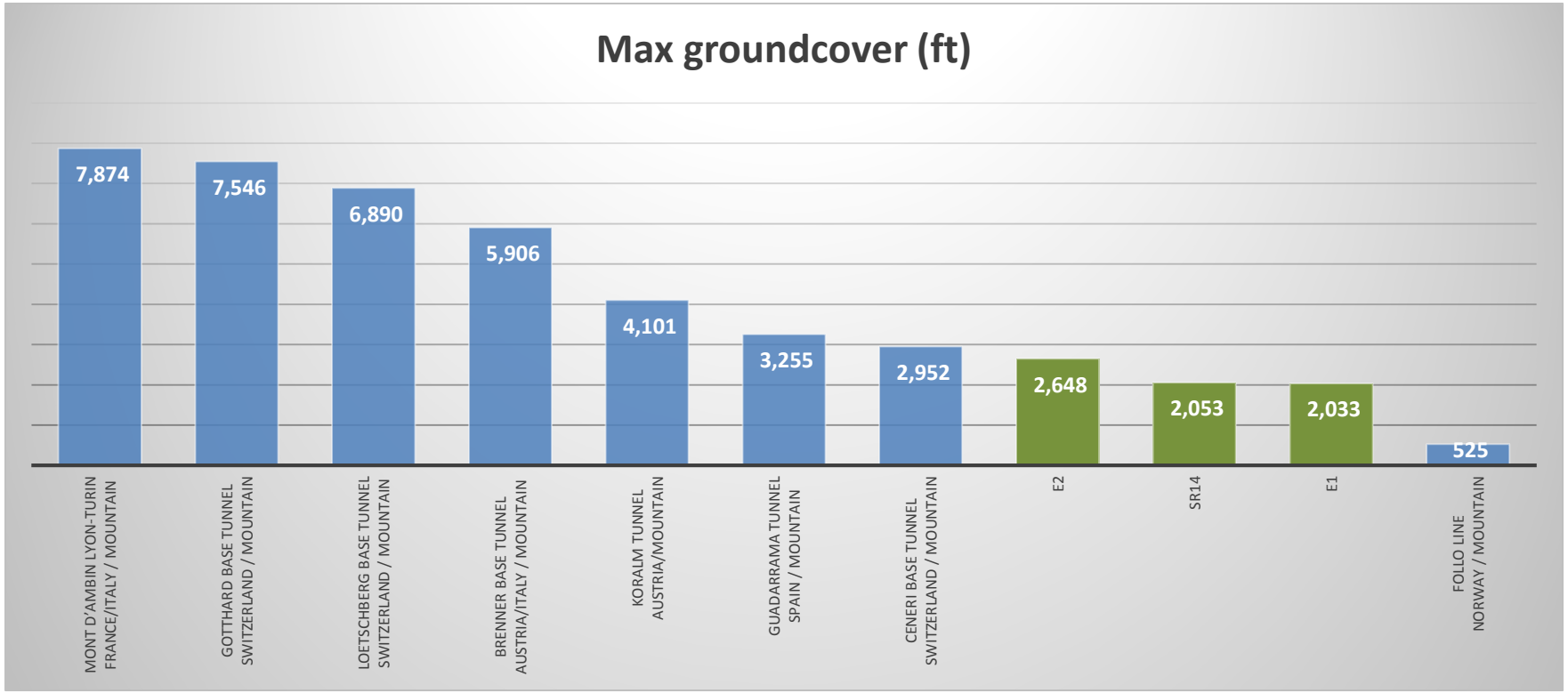
Tunnels

Longest single tunnel lengths compared with other rail tunnels.

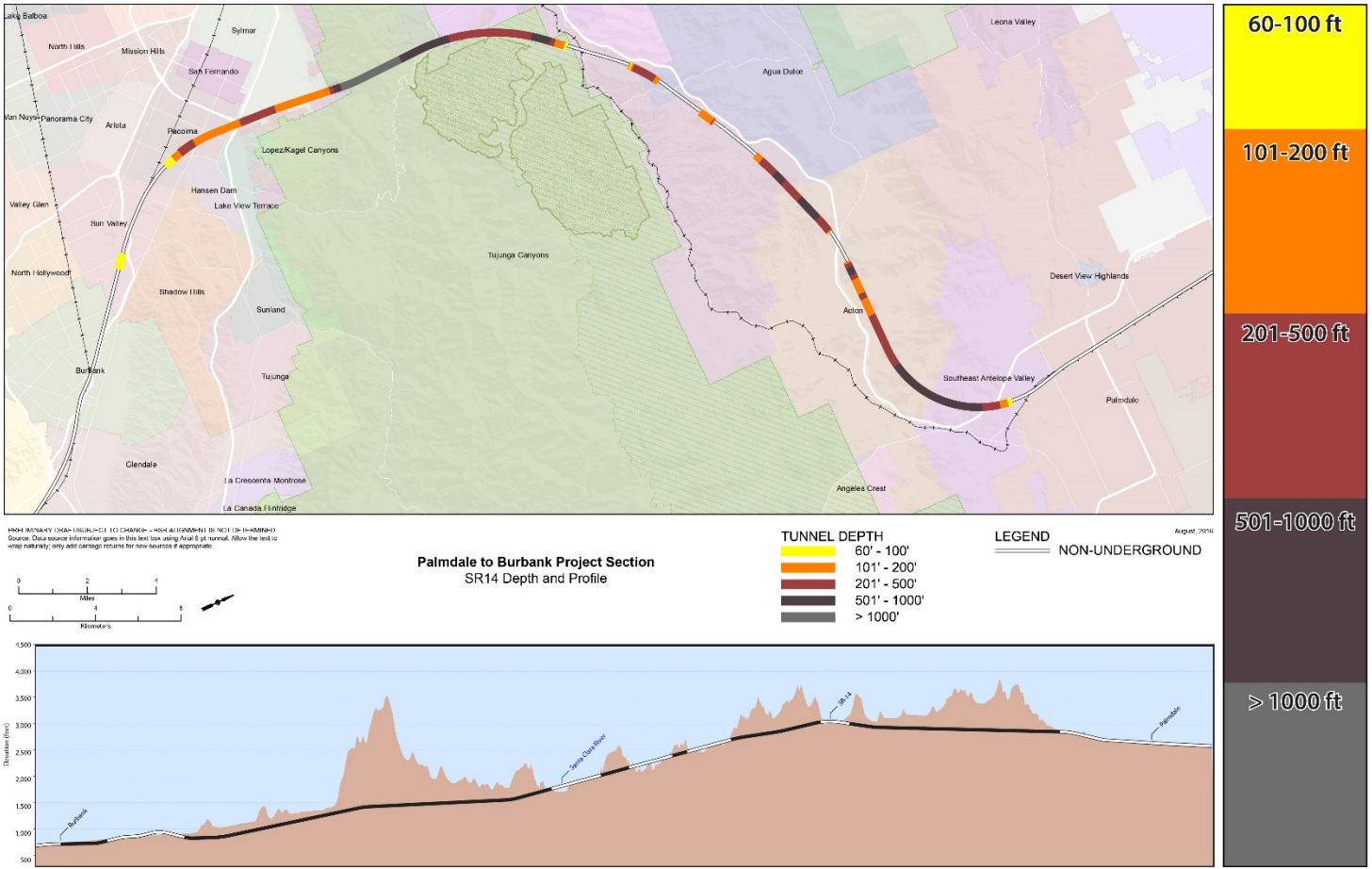


Tunnels

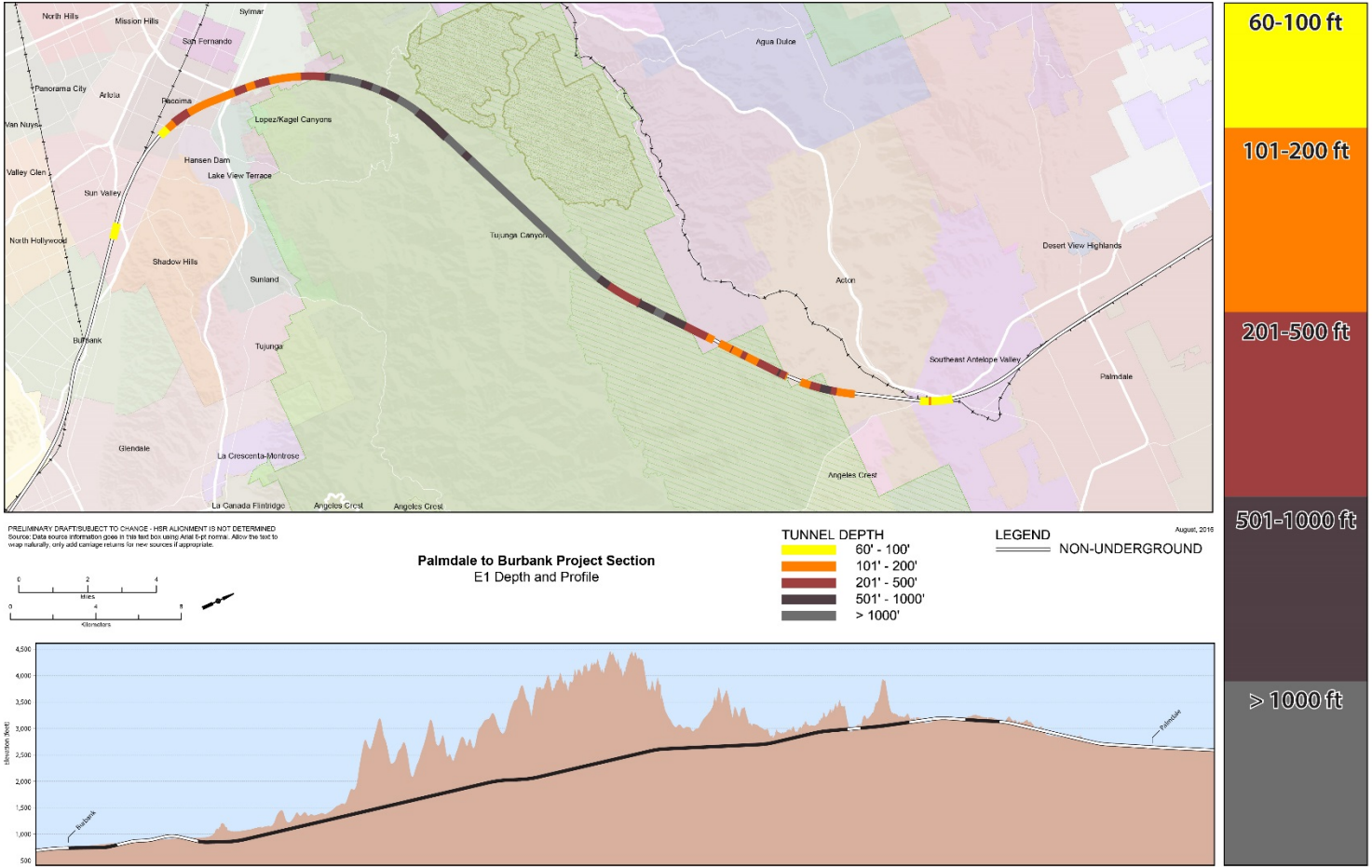
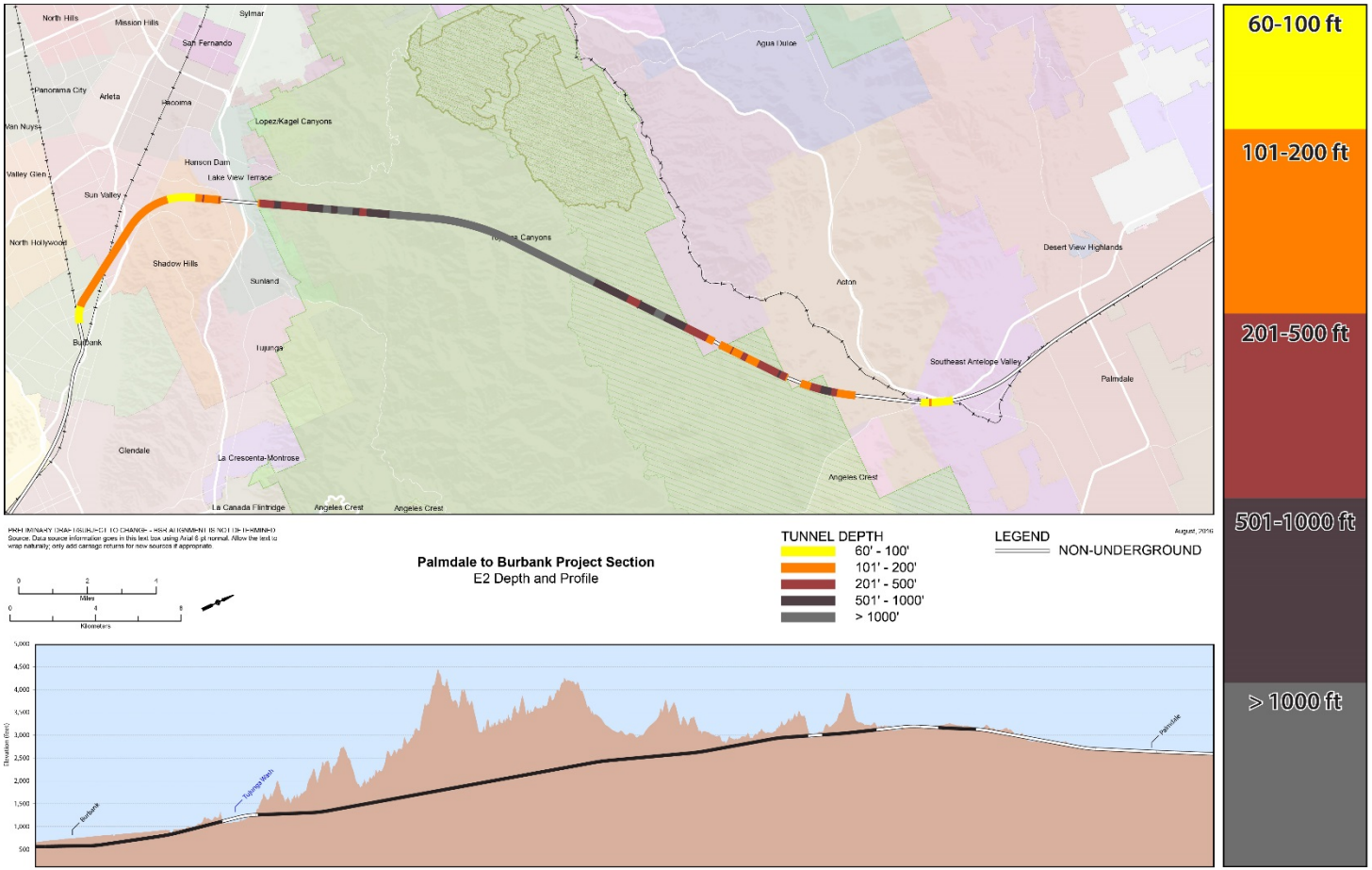
Maximum groundcover compared with other rail tunnels.



Tunnel Depth Map SR14



Tunnel Depth Map E1



Tunnel Depth Map E2