SASE's Endeavors
towards
All Weather Connectivity
and
Infrastructure Development
in
Avalanche Prone Areas

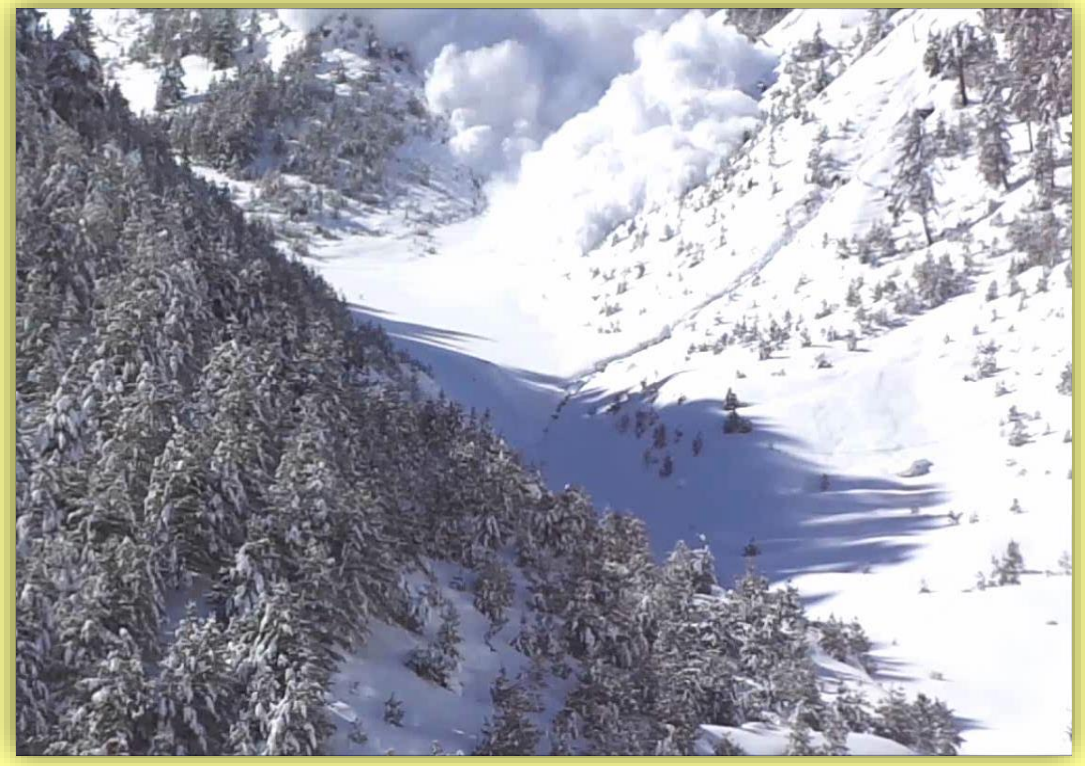
Naresh Kumar
Director
Snow and Avalanche Study Establishment

Snow and Avalanche Study Establishment (SASE)

- A constituent lab of DRDO established in 1969 at Manali

- The primary objective to develop technologies to mitigate avalanche hazard to men and its facilities in snow bound areas.

- SASE's focus areas-
  - Issue of avalanche and weather forecast for mountain regions.
  - Development of technologies for hazard mitigation by artificial triggering, avalanche mapping and structural control of avalanches
  - Providing consultancy for avalanche protection to highways and other infrastructure in mountain regions.



Snow and Avalanche Study Establishment (SASE)

Our Users-

- Indian Army
- Border Roads Organisation
- NHIDCL
- Indian Tibet Border Police
- Power Grid Corporation of India Limited
- Northern Railways
- Tourism Departments of J&K, HP and UK
- Electricity Department of J&K and HP
- National Disaster Mitigation Authority
- Rural Energy Commission
- Private Consultancy Firms

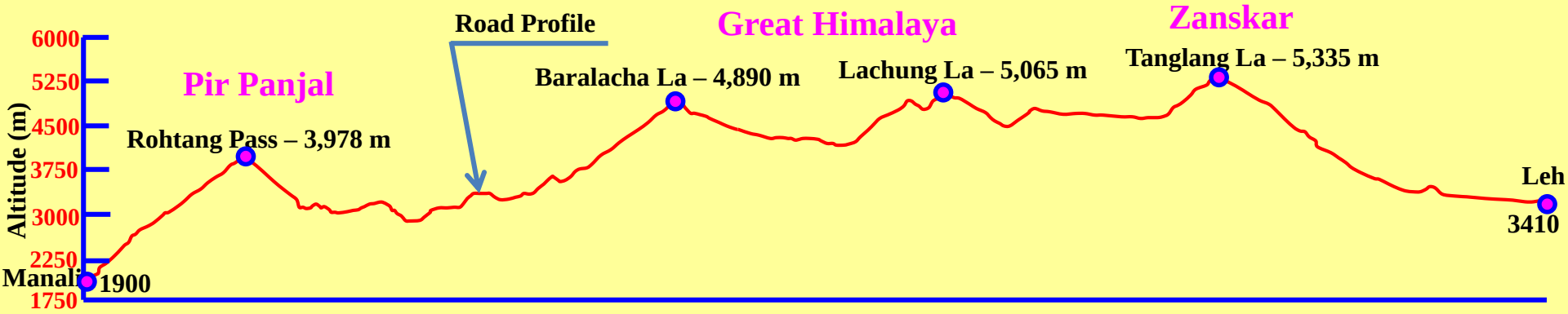
Snow and Avalanche Study Establishment (SASE)

Strategically Important Roads in the AOR of NC

View of Existing Manali – Leh Road

- Shortest route (474 km) which connects Ladakh with rest of the country
- Closed for min 05 months every winter due to heavy snowfall in the vicinity of four Passes and 190 avalanches along the highway

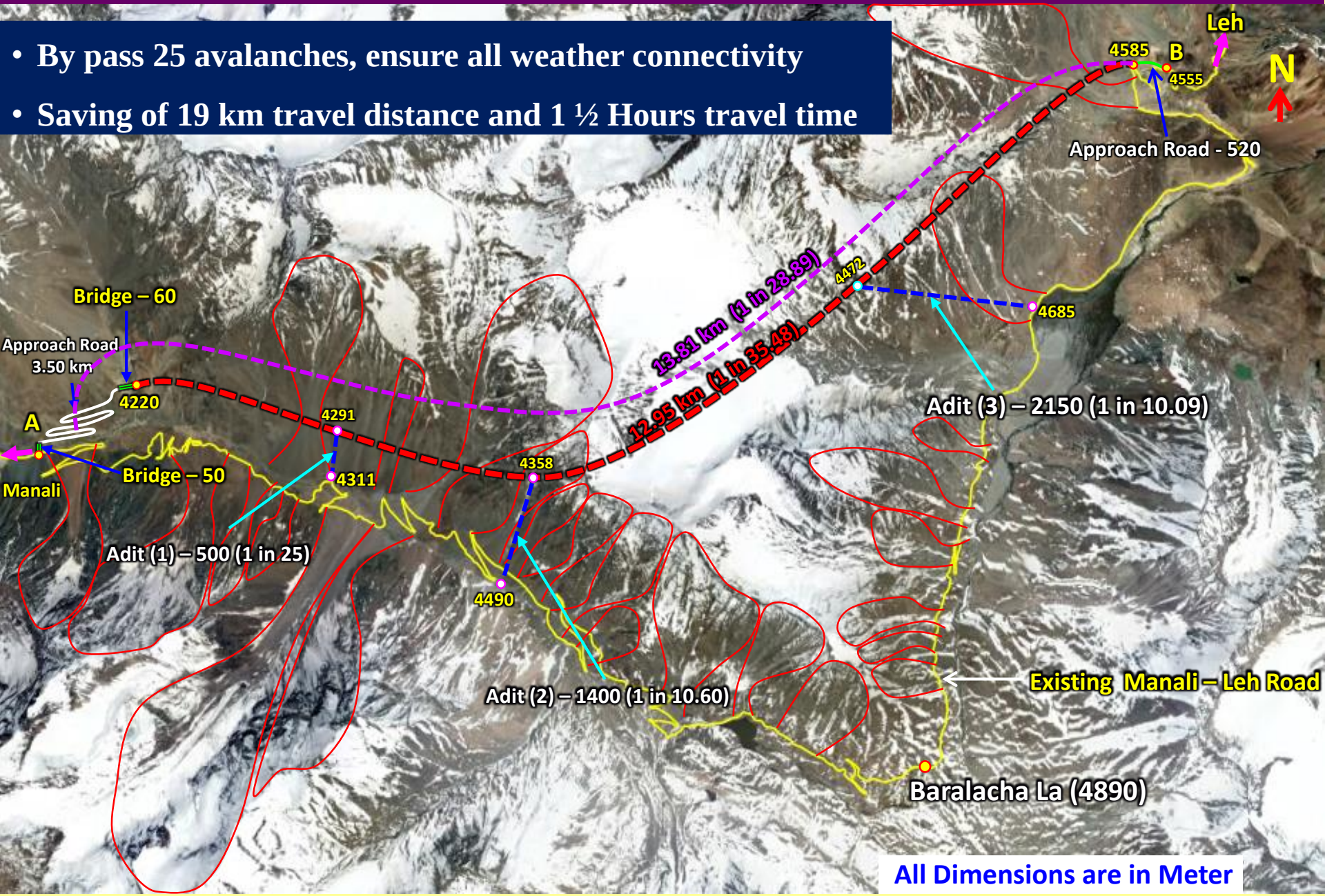
Plan View



Longitudinal Profile

Alignment of Baralacha La Tunnel worked out by SASE

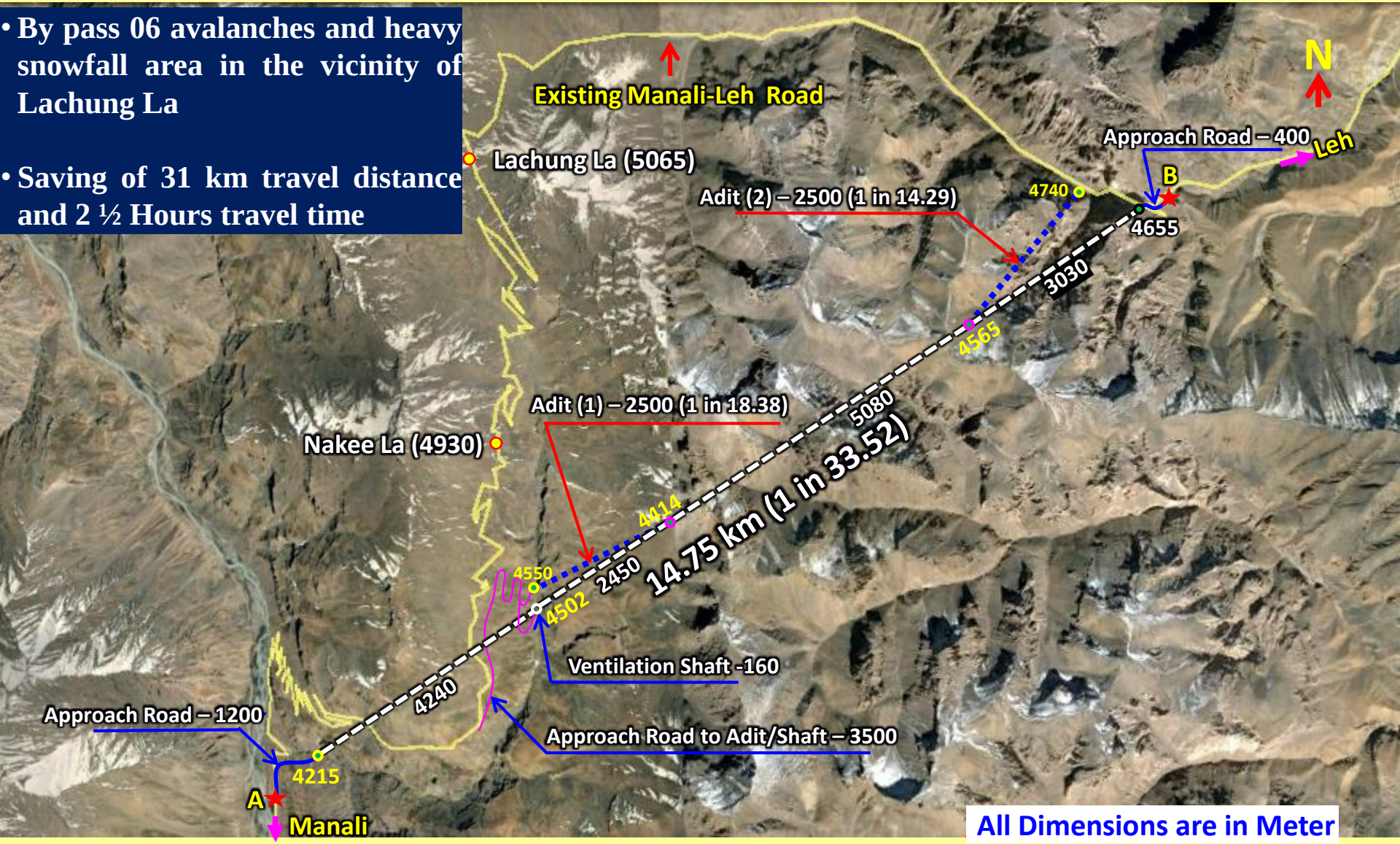
- By pass 25 avalanches, ensure all weather connectivity
- Saving of 19 km travel distance and 1 ½ Hours travel time



All Dimensions are in Meter

Alignment of Lachung La Tunnel worked out by SASE

- By pass 06 avalanches and heavy snowfall area in the vicinity of Lachung La
- Saving of 31 km travel distance and 2 ½ Hours travel time



Alignment of Tanglang La Tunnel worked out by SASE

- By pass 06 avalanches and heavy snowfall area in the vicinity of Tanglang La
- Saving of 24 km travel distance and 2 Hours travel time

All Dimensions are in Meter

List of Tunnels for which Pre-feasibility Studies carried out by SASE

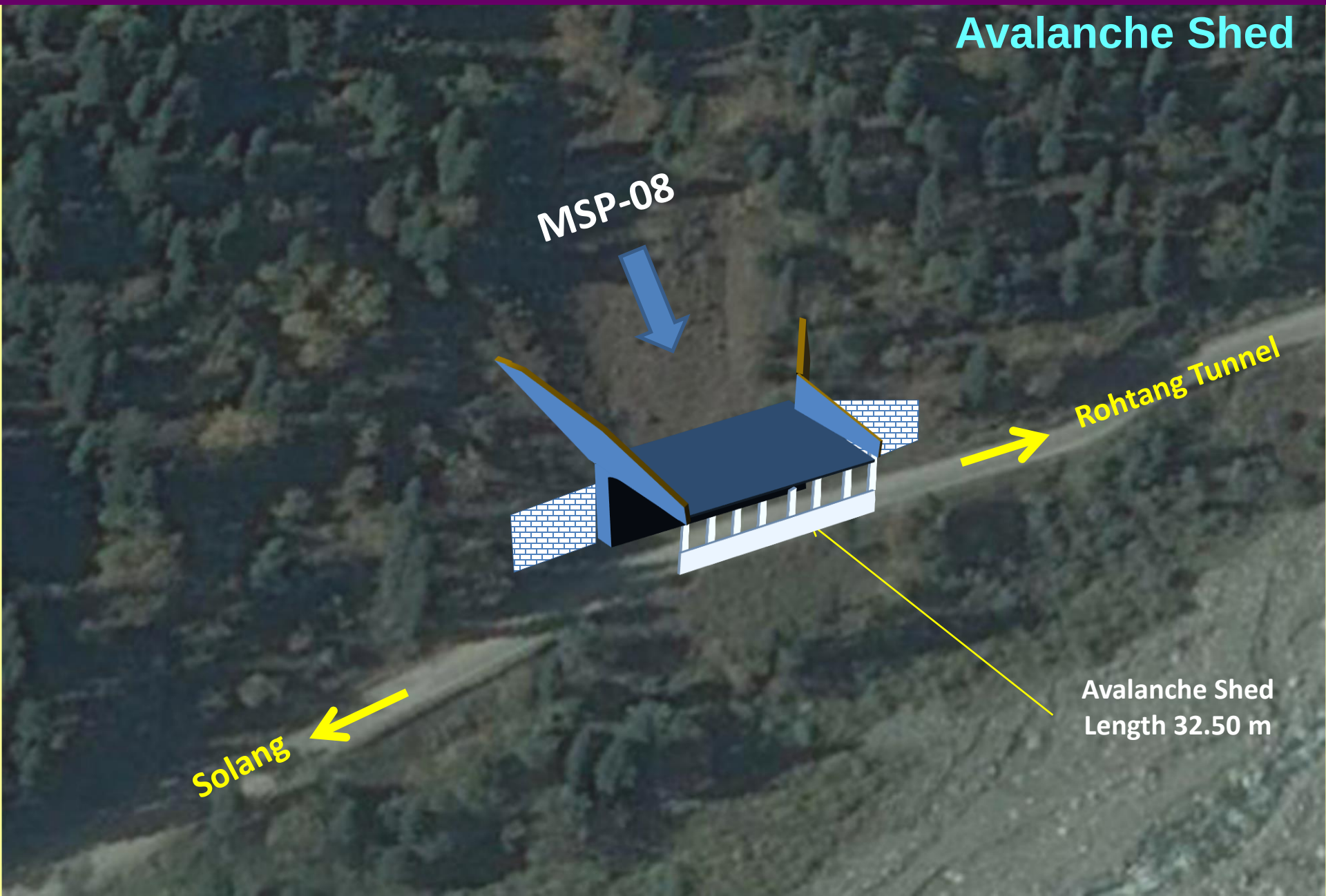
Sr. No.	Name of Tunnel	Length of Tunnel (km)	Name of the Road Axis
1	Lachung La	14.75	Manali - Leh
2	Tanglang La	9.00	Manali - Leh
3	Baralacha La	12.95	Manali - Leh
4	Shinku La	7.0/12.66	Darcha – Padam
5	Sinthan	10	Kishtwar – Anantnag
6	Sudhmahadev Goha	5.40/8.12	Chenani – Doad
7	Sadhana	6.12	Chowkiwal – Tangdhar
8	Zamidar Khan (Z) Gali	6.57	Kupwara – Machhal
9	Pharkiyan (P) Gali	3.10	Karalpura – Pathra
10	Razdhan	16.40	Bandipur – Dawar
11	Chatterga La	5.0 /7.42	Basholi – Bani – Bhaderwah
12	Chang La	5.48/9.0	Karu – Tangste
13	Pir Ki Gali	9.55	Bafliaz – Shopian (Mughal)
14	Khardung La	5.40	Leh – Khalasr
15	Saser La	7.10	Sasoma – DBO
16	Lasar La	7.77	Dras – Padam
17	Amarnath	19.10	Pahalgam – Baltal

Significantly contributed in alignment selection of

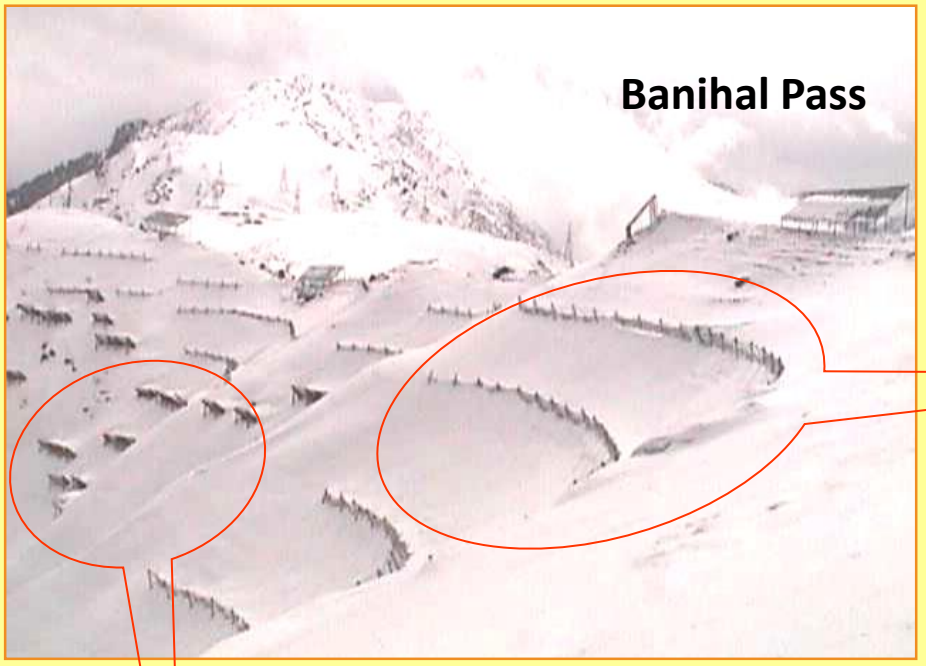
Z Morh Tunnel (6.50 km) – Gangangir – Sonamarg along Srinagar Leh road

Zoji La Tunnel (13.90 km) – Baltal - Minamarg along Srinagar Leh road

Planned and designed Avalanche Shed at MSP-08 along approach road to South Portal of Rohtang Tunnel

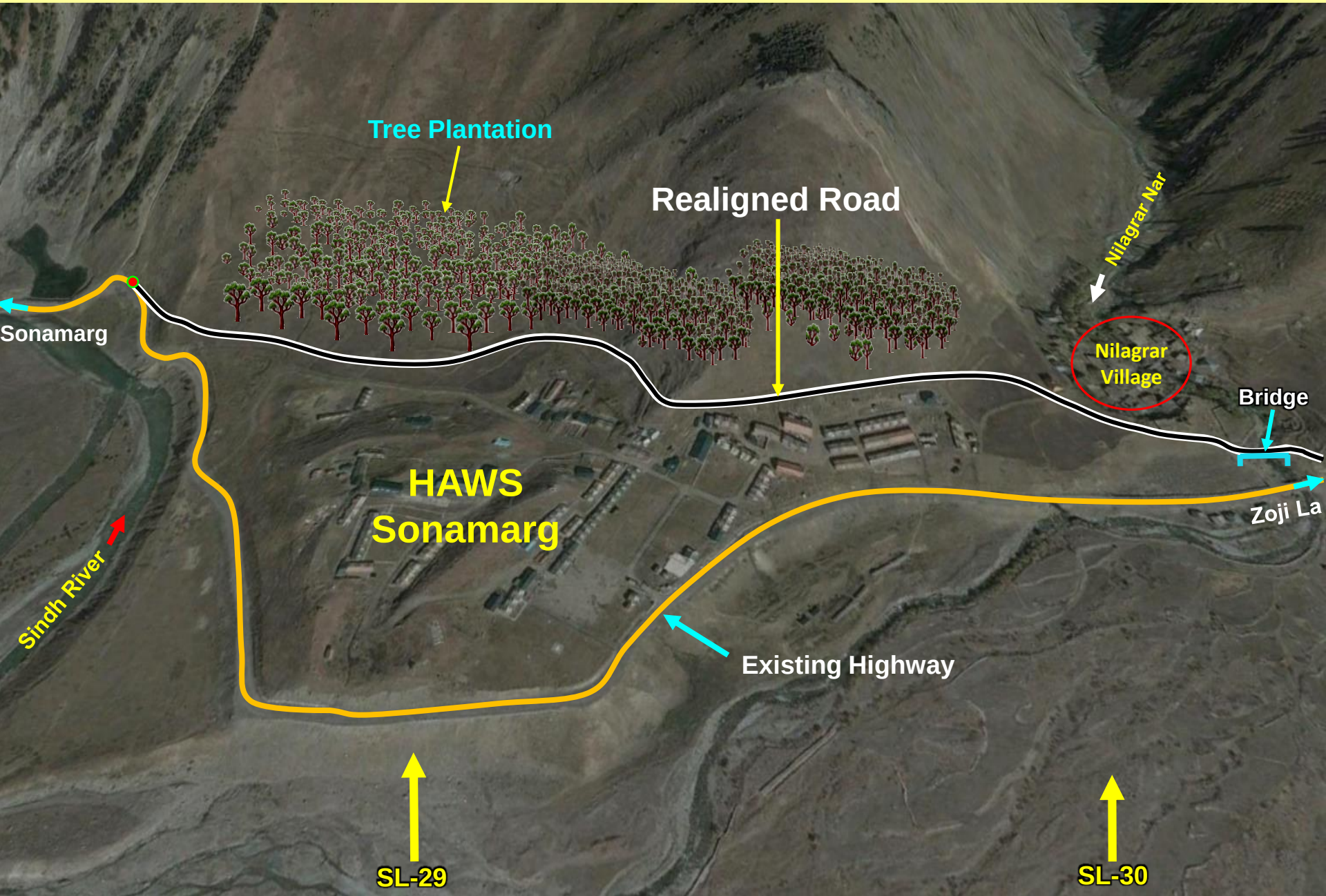


Snow Retaining Structures Constructed at Banihal Pass to avoid the threat of avalanche on North Portal of Jawahar Tunnel along Jammu – Srinagar Highway



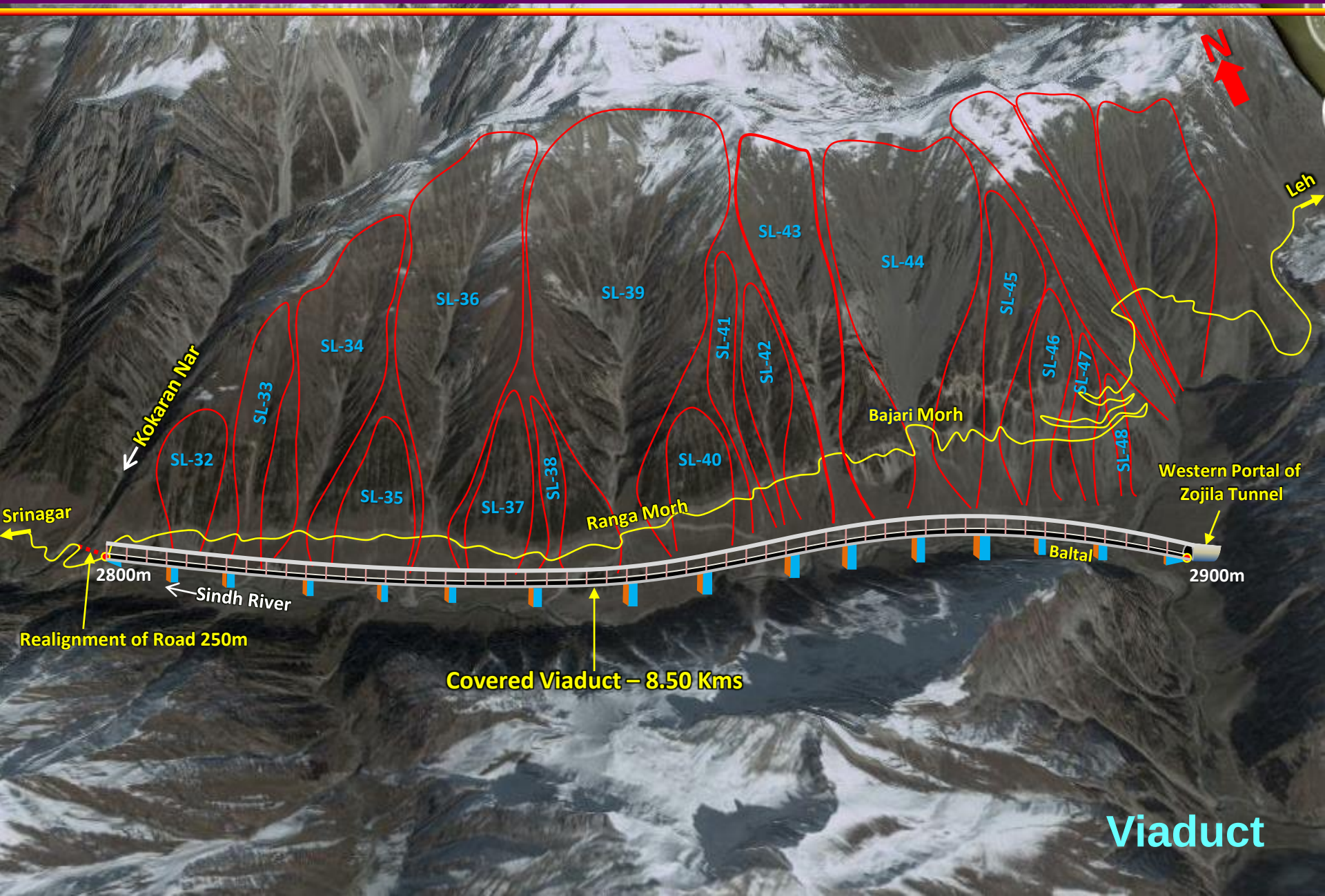
Avalanche Catch Dam designed to protect 250 m Manali-Sarchu Road opposite to North Portal of Rohtang Tunnel

Realignment suggested to avoid the threat of SL-29 and SL-30 avalanches along Srinagar – Leh Highway



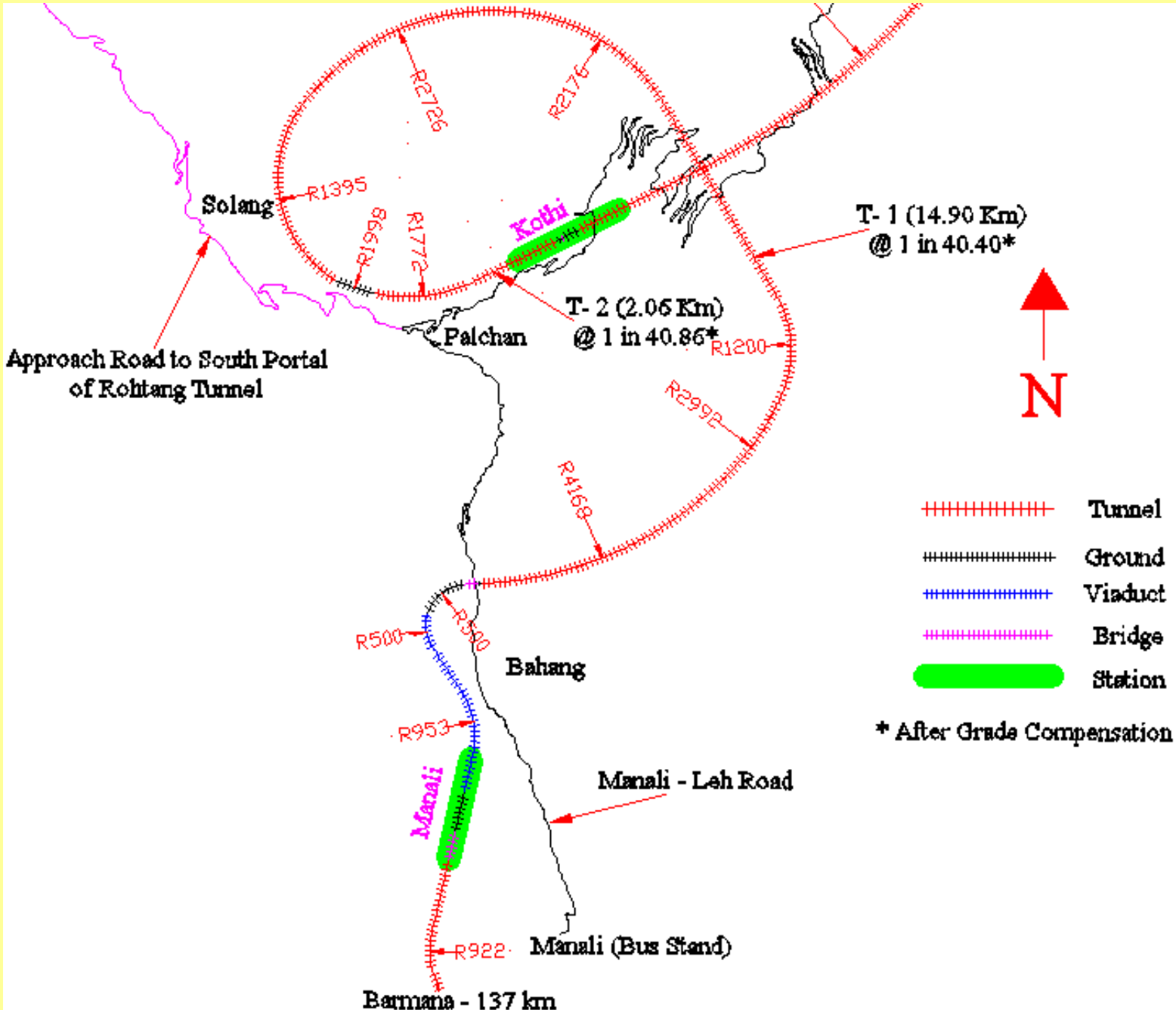
A bridge proposed at Shong Dong Nalla along Manali-Leh road to bypass avalanche mass underneath

A Viaduct proposed between Kokaran Nar and Western Portal of Zoji La Tunnel to mitigate threat of 17 avalanches



Tower locations and protection measures suggested for Transmission line between Sonamarg and Dras in J&K (PGCIL)

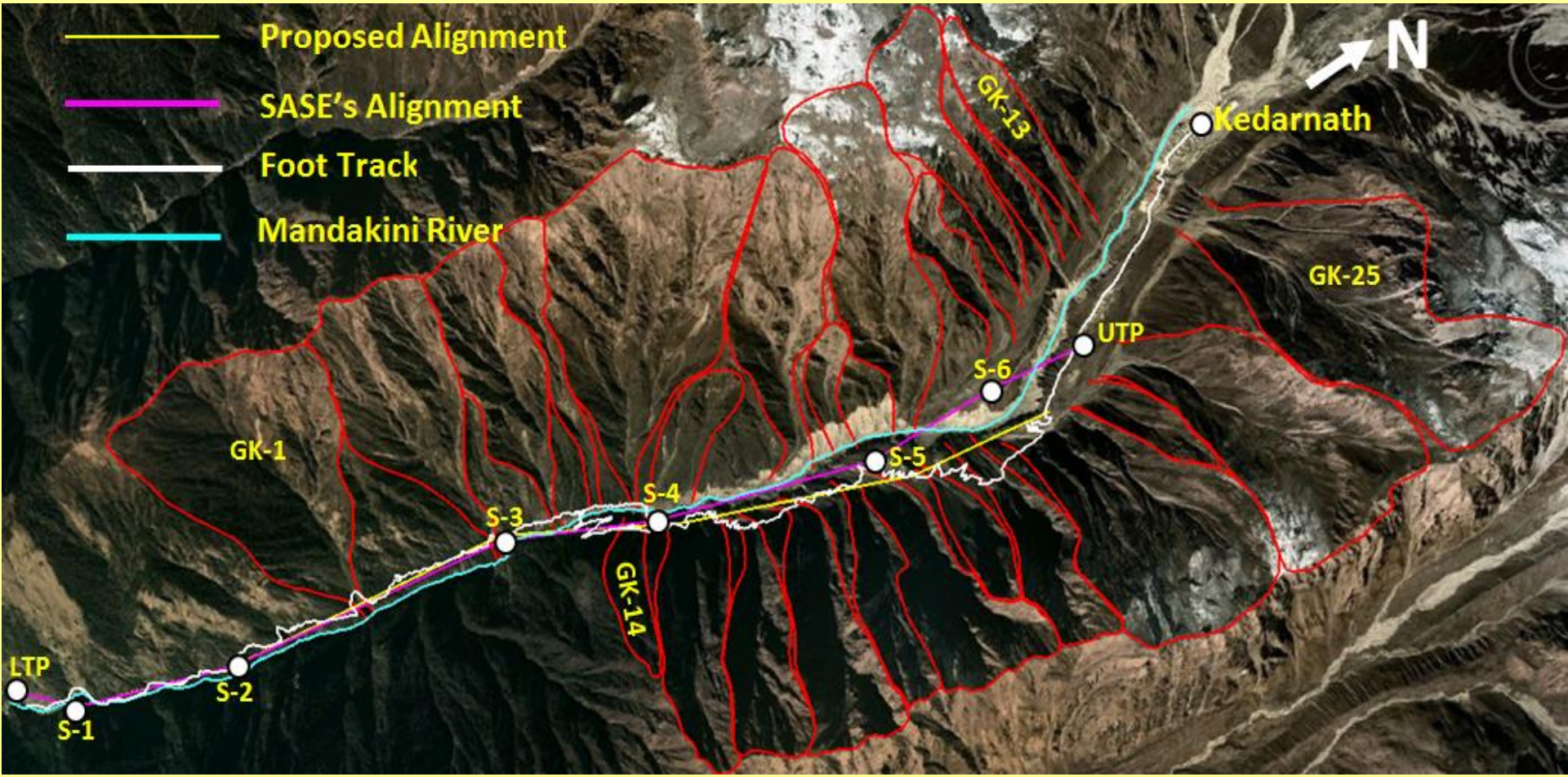
Providing services to NR in selection of all weather railway line to Leh via Manali



Designed and Constructed Earthen Mounds for Safety of Badrinath Temple from threat of Avalanche

Middle Zone – Deflecting/ Retarding Structures

Assessment of Avalanche Hazards along Proposed Ropeway between Gourikund and Kedarnath




Thanking You