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Geological Assessment of 2.150 Km long Parkhal-Sankot Motor Road to Simli-Nakho Motor Road between Chainage 0.0 to 2.150 Km, Narayanbagar Block, District Chamoli (Garhwal)

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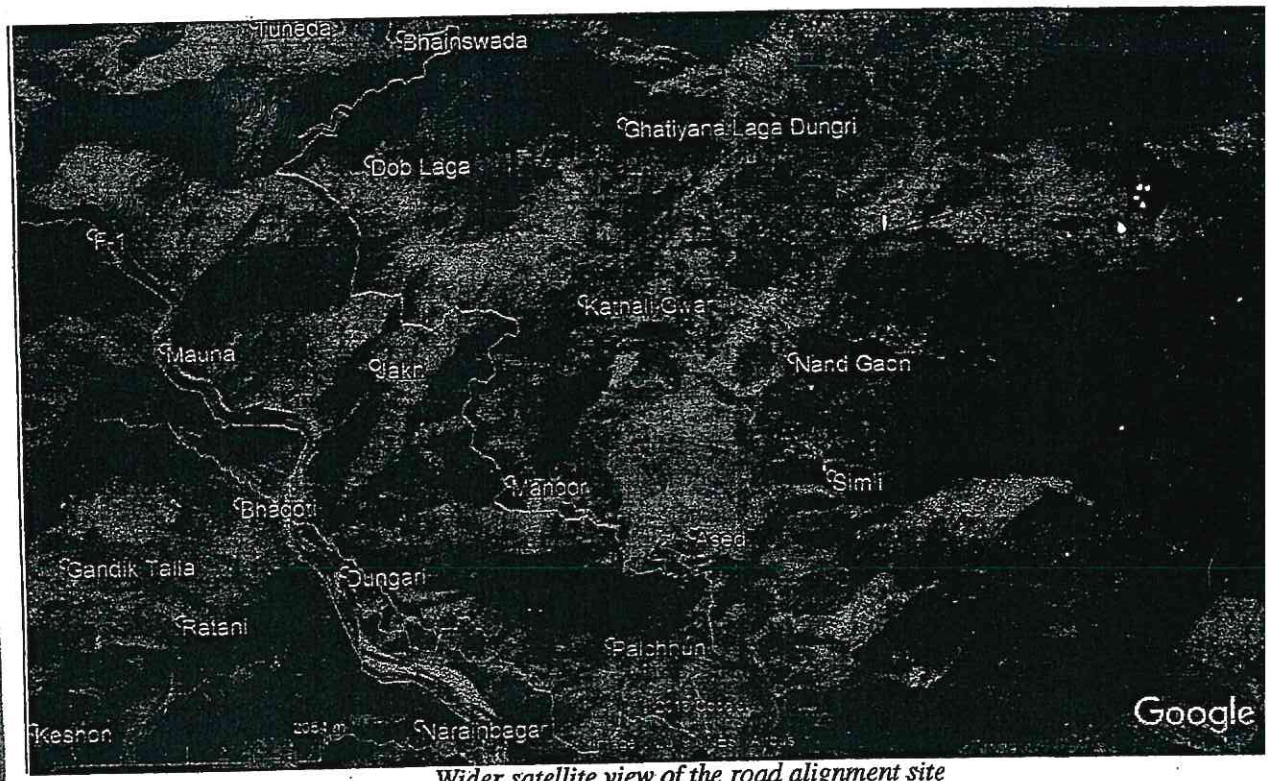
11/03/2019

1- **Introduction:** The Construction Division, Tharali, has been entrusted for the construction of 2.150 Km long Parkhal-Sankot motor road to Simli-Nakholi motor road between CH 0.0 to 2.150 Km. In order to assess the geological conditions of the site of road construction for its feasibility, Er. Vijay Kumar (Executive Engineer) Construction Division, PWD, Tharali asked for a geologist to make a site visit. Consequent to his request a visit to the proposed site was made on 01/11/2018; Er. Jeetendra Kumar (Assistant Engineer) and Er. Ashish Chauhan (Junior Engineer), CD PWD, Tharali was present during the site visit.

2- **Topographical Information/Location:** The above mentioned road alignment site diverts from CH 5.0 Km of Parkhal-Sankot motor road and will connect Nakholi, Kanyee and Paint villages in Narayanbagar Block, district Chamoli (Garhwal). The co-ordinates along with elevation, masl of the site at CH 0.0 Km are as follows-

Latitude	:	30°09'43.80"
Longitude	:	79°24'59.15"
Approximate Elevation	:	



Wider satellite view of the road alignment site

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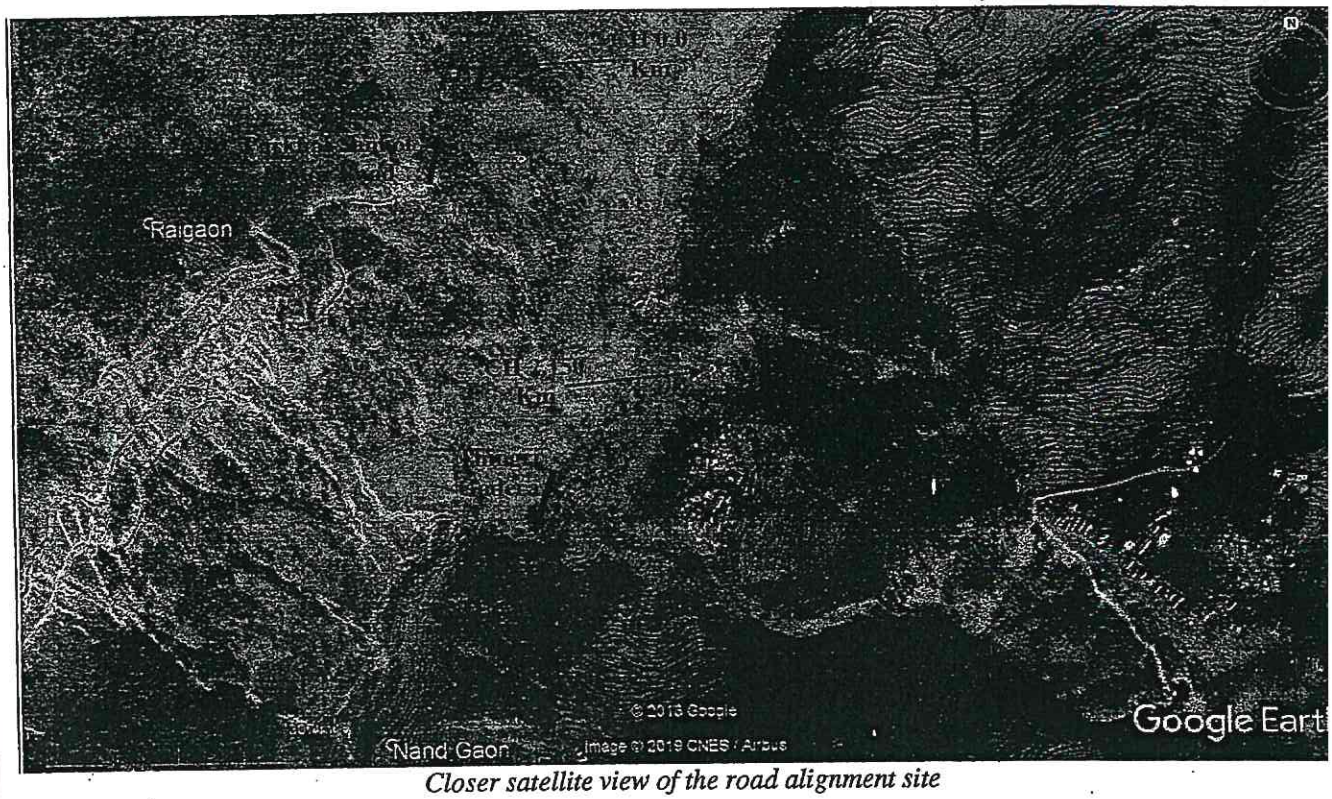

Closer satellite view of the road alignment site

3- **Geological Assessment:** Geologically, the road alignment corridor around the site falls under the crystallines of Baijnath-Gwaldam Nappe which consist of banded Quartz Biotite gneiss, augen gneiss, Mica schist and amphibolite. However, the road alignment passes through Overburden and slope wash material over which there is cultivation land (Naap/Civil land) along with a few patches of Mica Schist and Gneissic bed rock. The approximate strength of exposed rock mass is around ~100 MPa and has undergone $W_0$to W_3 weathering grade. The road alignment passes through a perennial stream/Nalla at CH ~2.0 Km which may damage the road especially during rainy season.

The hill slope around the road alignment is gentle to moderately steep (20-30°). There are four hairpin bends on the road alignment which are at CH 0.650, 1.150, 1.350 and 1.600 Km respectively. The hairpin bends are very close to eachother but considering the gentle nature of the hill slope and very less traffic the hairpin bends can be constructed provided that thorough protection is provided along the hairpin bends and very gentle gradient is to be maintained. The road alignment has level to 1:20 of rising gradient and 1:24 of falling gradient with 1:40 gradient at the hairpin bends.

4- **Seismicity of the area:** According to Indian Standard code the site falls in seismic zone V of seismic zoning Map of India (IS 1893, part 1, 2002) which corresponds to intensity IX or above on MM scale.

On the basis of the geological inspection of the site studies carried and the facts given above, the following recommendations are being made for the construction of the proposed road failing to these recommendations this report will be automatically treated as cancelled.

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5- Recommendations:

1. Blasting by explosives for the road construction is to be avoided as far as it is possible. Use of explosives will render the slope highly unstable as the slope consists of both rock and slope wash material. Rock excavation must be carried out by the skilled manual workers.

2. Rock excavation must be carried out by the skilled manual workers as at a few places slopes are prone to slide down in case of rapid disturbance.

3. The slopes on either sides of entire road must be protected by the construction of suitably designed retaining wall/ breast wall with proper weep holes, this work shall be carried out simultaneously with the advancement of the road cutting. This is very important for the stability of the hill side slopes.

4. Construction of large U-shaped longitudinal lined drain all along the hill side of the road with adequate provision of cross drains is necessary.

5. Construct the road by half cut and half fill techniques and compact the fill material properly by dynamic compaction.

6. Construct a bridge/puliya over the seasonal stream/nalla at CH 2.0 Km of the motor road alignment as it may damage the motor road especially during rainiy season.

7. Disposal of muck and excavated waste on the lower slopes of this road is to be strictly avoided; failing to which will increase the weight of the lower slope resulting in the increase in driving forces. It is advised to dispose the muck on the identified site for muck disposal.

8. All the construction activities ought to be carried out as per the standard codes of practice laid by BIS and MORTH.

6- Conclusion: On the basis of the geological studies carried at the site and with the above recommendations, the site proposed 2.150 Km long Parkhal-Sankot motor road to Simli-Nakhol motor road between CH 0.0 to 2.150 Km was found geologically suitable for road construction.

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