# Geological Assessment of 3.40 Km long Taintuda to Naini Motor Road between CH 0.00 to 3.40 Km, Gairsain Block, District Pauri (Garhwal)

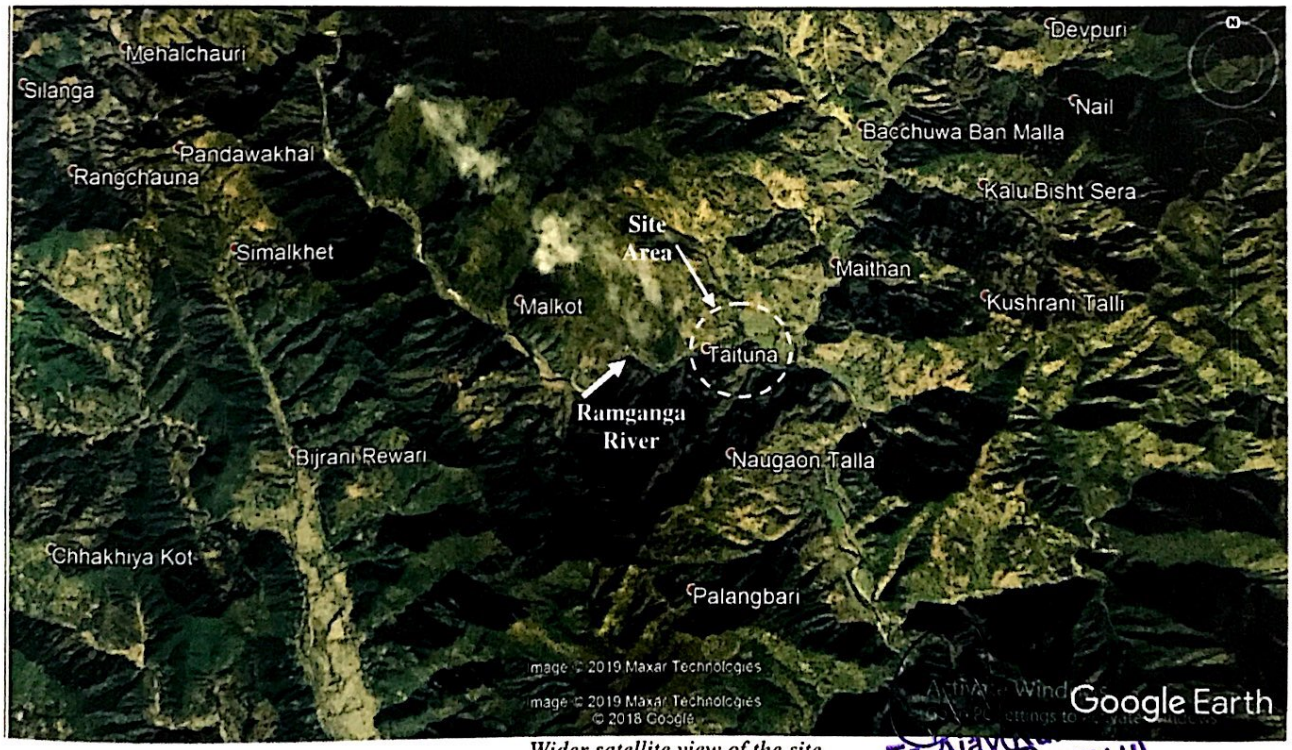
Tushar Sharma

14/08/2019

1- **Introduction:** PMGSY (BRIDCUL), Gairsain, has been entrusted for the construction of 3.40 Km long Taintuda to Naini motor road between CH 0.00 to 3.40 Km. In order to assess the geological conditions of the road alignment site for its feasibility, Er. Sanjay Kumar Jain (Project Manager) PMGSY (BRIDCUL), Headquarter and Er. Amit Negi (Residential Engineer) PMGSY (BRIDCUL), Gairsain asked for a geologist to make a site visit. Consequent to his request a visit to the proposed road alignment site was made on 08/08/2019; Er. Deepak Singh Aswal (Junior Engineer) PMGSY (BRIDCUL), Gairsain was present during the site visit.

2- **Topographical Information/Location:** The above mentioned road alignment site diverts from the CH 33.0 Km of Bungidhar-Mehelchauri-Bachuaban motor road terminates at village Naini. The co-ordinates along with elevation, masl of the site at CH 0.0 Km are as follows:-

| | |
|---|---|
| Latitude | : 29°57'04.83" |
| Longitude | : 79°23'34.75" |
| Approximate Elevation | : 1210 m |




*Wider satellite view of the site*

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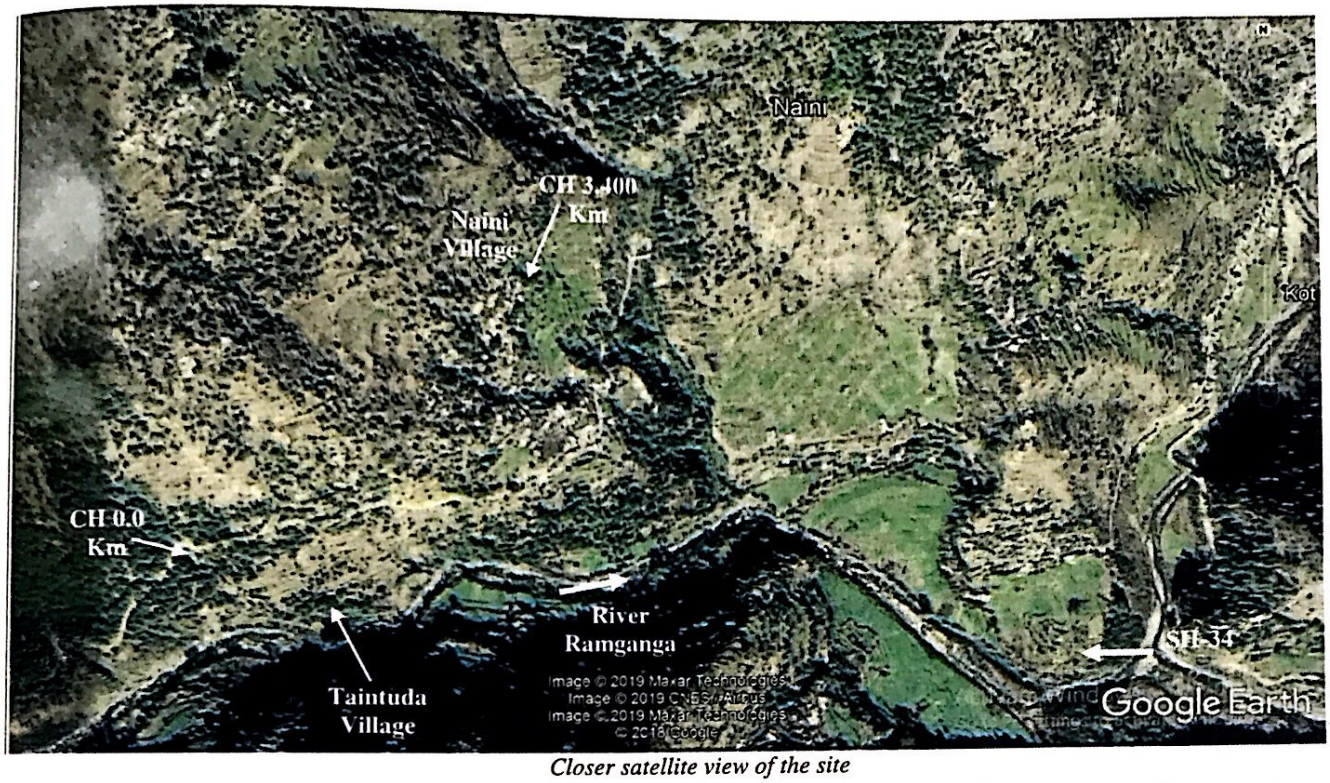
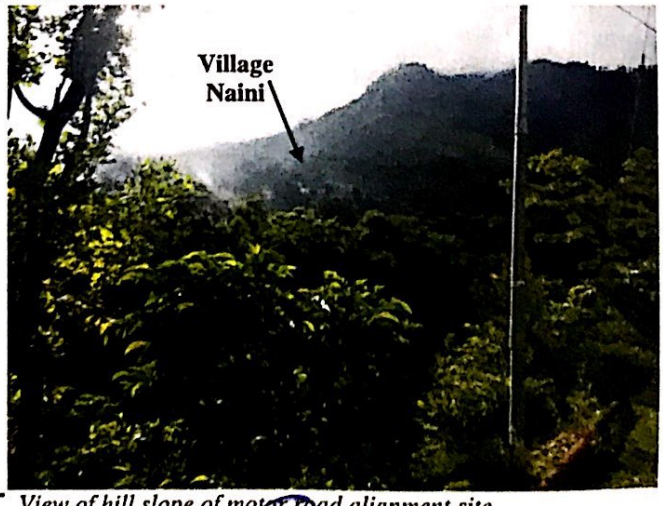



*Closer satellite view of the site*

3- **Geological Assessment:** Geologically, the road alignment site area falls under lesser Himalayan sequences of Garhwal Himalaya in the vicinity of normal contact between Deoban and Rautgara formations of Tejam and Damtha groups respectively. The rocks exposed in the area consist of Dolomitic Limestone belonging to Deoban formation of Tejam group. However, road alignment site the passes through overburden/slope wash material over which there is cultivation land (Naap & Banjar Khet) initially followed by reserve forest with patches of limestone bed rock. The hill slope of the road alignment site is gentle to moderately steep which declines at ~20-30°. The approximate strength of exposed rock mass is around ~50-100 MPa and has undergone $W_0$ to $W_3$ weathering grade. At places the bed rock is highly weathered and jointed and is susceptible to creep and subsidence therefore, utmost care is to be taken during the excavation work and proper measures of slope stabilization are to be taken.


*View of motor road alignment site at CH 0.0 Km*




*View of hill slope of motor road alignment site*



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There are six hairpin bends on the motor road alignment which are at CH 0.300, 0.600, 0.825, 1.225, 1600 and 2.275 Km respectively. The road alignment has level to 1:20 of rising gradient and no 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 and 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.

## 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 jointed/ fractured rock mass and overburden/slope wash material.

2. Excavation work must be carried out by skilled manual workers as the rock slopes might slide down in case of rapid disturbance.

3. The slopes on either sides of the 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.

4. Construction of longitudinal concrete 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. 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.

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

**Note:** On the basis of the geological studies carried at the site with limited accessibility to the hill slopes due to heavy rains this is a generalized report. The conditions of the site are subject to change after the construction or protection work, in case if opinion is required during or post construction then the geologist should be separately communicated. If the problem of slide/subsidence/erosion persists after the protection work then the motor road alignment should be changed after doing proper survey.

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6- **Conclusion:** On the basis of the geological/geotechnical studies carried at the site and with the above recommendations, the site proposed for 3.400 Km long Taintuda to Naini motor road between CH 0.00 to 3.400 Km was found geologically suitable for construction.

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