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**Geological Assessment of 1.30 Km long Gwaldam to Kendra Vidyalaya Motor Road**  
**Alignment corridor between Chainage 0.0 to 1.30 Km, Tharali Block**  
**District Chamoli (Garhwal)**

**Tushar Sharma**

**21/07/2018**

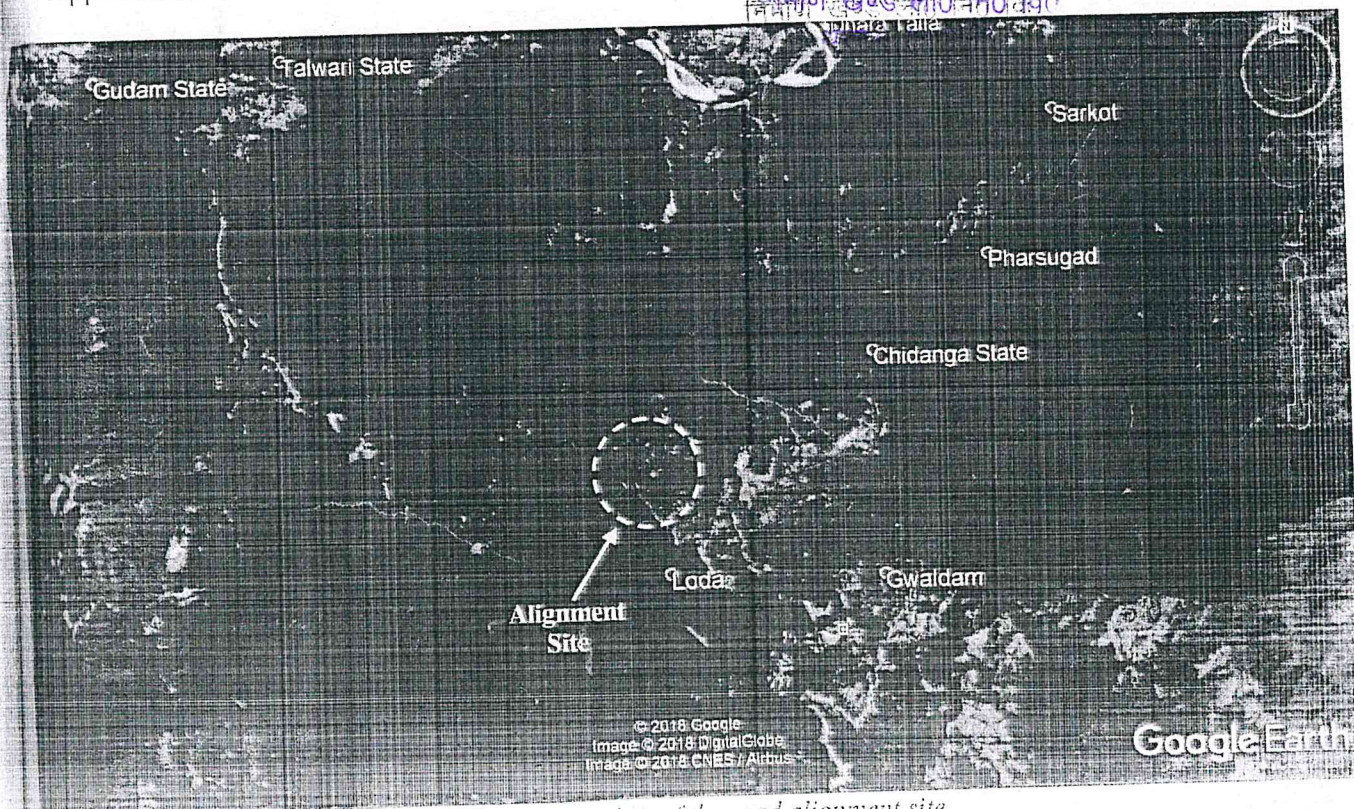
1. **Introduction:** The Construction Division, Tharali, has been entrusted for the construction of 1.30 Km long Gwaldam-Kendra Vidyalaya motor road. In order to assess the geological conditions of the site of road construction for its feasibility, Er. Vijay Kumar (Executive Engineer) Construction Division, PWD, Tharali asked for a geologist to make a site visit. Consequent to his request a visit to the proposed site was made on 11/07/2018; Er. Jeetendra Kumar (Assistant Engineer) and Er. Amardeep (Junior Engineer), CD PWD, Tharali were present during the site visit.

2. **Topographical Information/Location:** The above mentioned road alignment site diverts from CH 93.0 Km of SH-23 (Almora-Baijnath-Gwaldam-Karanprayag motor road) and will connect Government Intermediate College in Gwaldam Tea Estate (Malla Tok) of Tharali Block, district Chamoli (Garhwal). The co-ordinates along with elevation, masl of the site at CH 0.0 Km are as follows-

Latitude : 30°00'36.52"  
Longitude : 79°33'17.58"  
Approximate Elevation : 1928 M

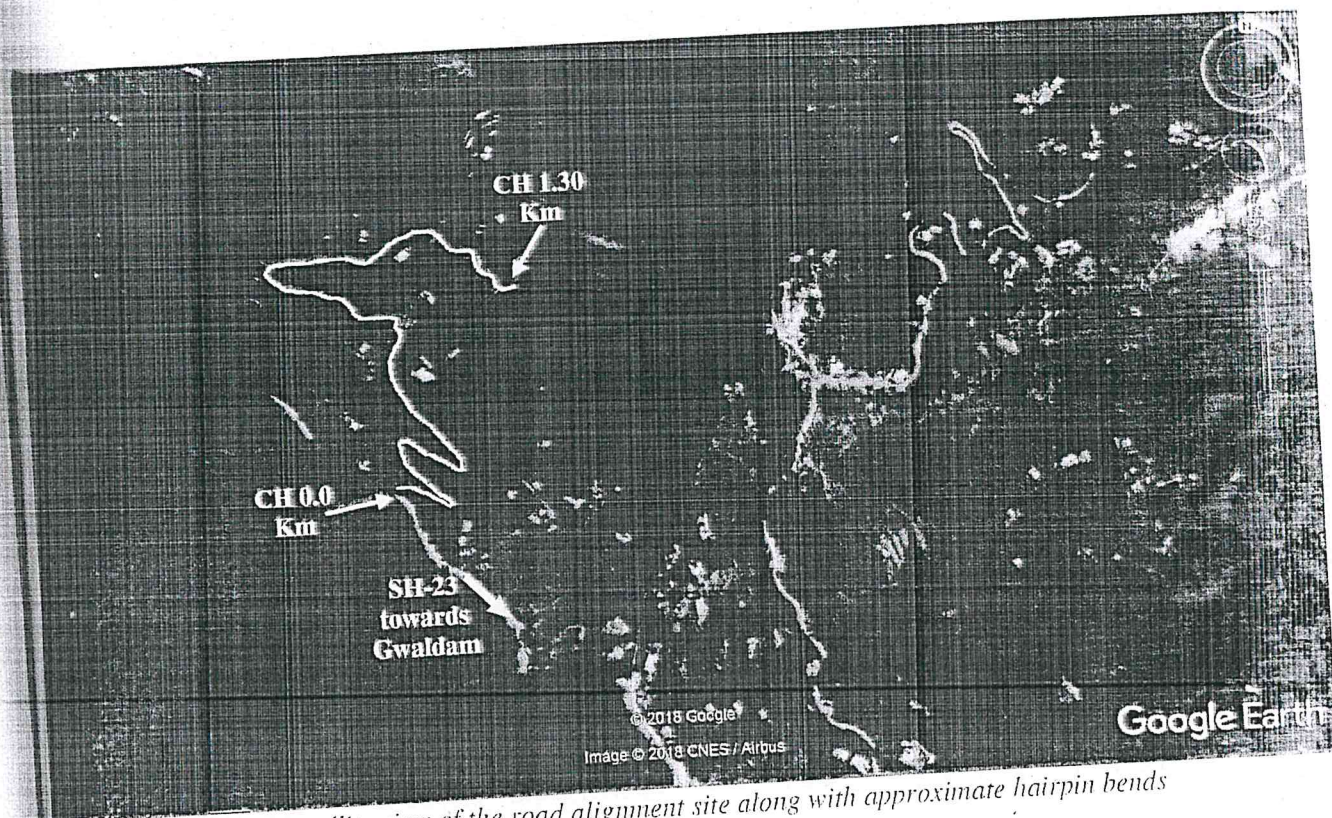
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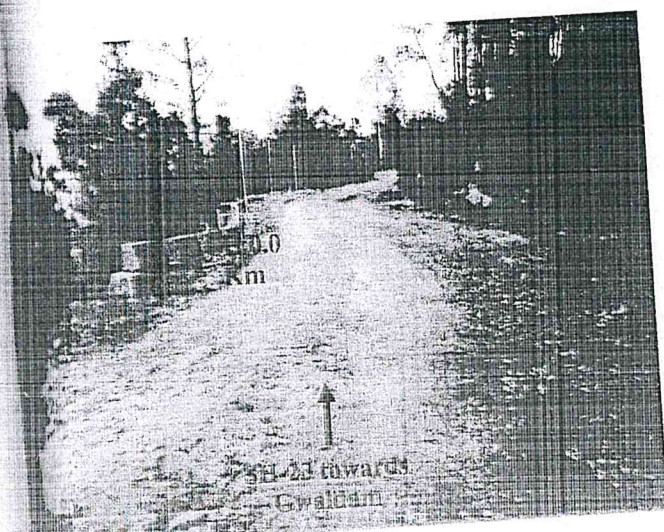
Wider satellite view of the road alignment site



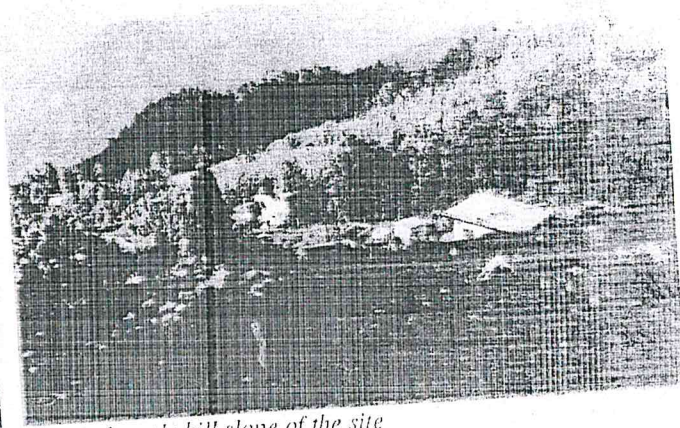


Closer satellite view of the road alignment site along with approximate hairpin bends

**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) and forest land (Oak and Devdar trees) along with a few patches of Mica Schist and Gneiss bed rock. The approximate strength of exposed rock mass is around ~100 MPa and has undergone  $W_0$  to  $W_3$  weathering grade.



View of site at CH 0.0 Km of the site



View of gentle hill slope of the site

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The hill slope around the road alignment is gentle ( $\sim 20^\circ$ ). There are four hairpin bends on the road alignment which are at CH 0.075, 0.225, 0.325 and 0.825 Km respectively. The hairpin bends number 1 & 2 and 2 & 3 are very close to each other 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 1:20 of falling gradient and no rising 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.

#### 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. Utmost care with protection is to be taken while constructing the hairpin bends number 1 & 2 and 2 & 3 and very gentle gradient is to be maintained along them.
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.

PC Attached  
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थराली (चिमाली)  
निर्माण कार्य बोर्ड निदेश  
थराली (चिमाली)

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

**Conclusion:** On the basis of the geological studies carried at the site and with the above recommendations, the site proposed 1.30 Km long Gwaldam-Kendra Vidyalaya motor road alignment between CH 0.0 to 1.30 Km was found geologically suitable for road construction.

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Date: 21/07/2018

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