

Geological Assessment of 4.50 Km long Chiledi-Manjuli Motor Road to Chaurikhal-Sirwadi-Kaanda Motor Road Alignment corridor between CH 0.0 & 4.50 Km, Kirtinagar Block, District Tehri (Garhwal)

Tushar Sharma

17/07/2020

- 1- **Introduction:** The Temporary Division, Kirtinagar, has been entrusted for the construction of 4.50 Km long Chiledi-Manjuli motor road to Chaurikhal-Sirwadi-Kaanda motor road between CH 0.0 & 4.50 Km. In order to assess the geological conditions of the road alignment site for its feasibility, Er. S.C. Bhatt (Executive Engineer) Temporary Division, PWD, Kirtinagar asked for a geologist to make a site visit. Consequent to his request a visit to the proposed road alignment site was made on 08/07/2020; Er. Razzak Ahmed (Junior Engineer) TD, PWD, Kirtinagar was present during the site visit.
- 2- **Topographical Information/Location:** The above mentioned motor road alignment site extends from CH 6.0 Km (Hectometer 2-4) of Chiledi-Manjuli motor road and ends at CH 38.0 Km of Kirtinagar-Badiyargarh-Dhaurangi-Saurakhal motor road connecting village Manjuli, Chaurikhal, Sirwadi, Gwaad and Kaanda, in Keertinagar Block, district Tehri (Garhwal). The co-ordinates along with elevation, masl of the site at CH 0.0 Km are as follows:-

Latitude : $30^{\circ}18'20.00''$
 Longitude : $78^{\circ}50'32.00''$
 Approximate Elevation : 1675 M



Broader Satellite View of the Site

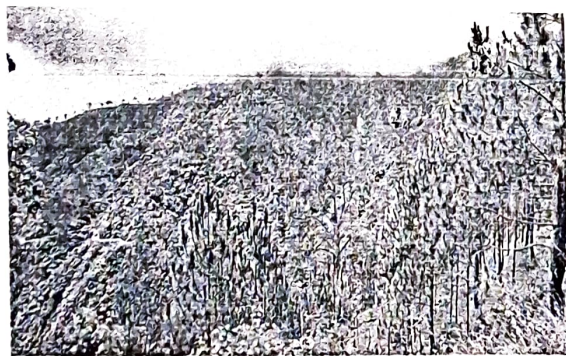
Photo by A. J. J. J.

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Closer Satellite View of the Motor Road Alignment Site with Approximate Hairpin Bends

- 3- **Geological Assessment:** Geologically, the site falls under the Meta-sedimentaries of Garhwal Himalayas (Lesser Himalaya) sandwiched between two regional thrusts known as Ramgarh Thrust in the North and North Almora Thrust (NAT) in the South which separate Ramgarh group with Jaunsar group (Berinag Formation) and Jaunsar Group (Chandpur formation) from Damtha Group (Raugara Formation) of and respectively. The rocks exposed in the area consist of white Quartzite, Pink Quartzite with Shale and Dolomitic limestone belonging to Nagthat, Rautgara and Deoban Formations of Jaunsar, Damtha and Tejam Groups respectively. However, the slope around the site is covered with overburden/slope wash material (SWM) along with patches of Quartzite bed rock over which there is cultivation land (Naap/Banjar Khet & Civil land). The approximate strength of exposed rock mass in the vicinity of the site is around ~80-100 MPa and has undergone W_0 to W_2 weathering grade. The motor road alignment passes through a few small streams/nallas which may damage the motor road especially during rainy season.



View of the hill slope of the site near CH 0.0 Km



View of the hill slope of the site near CH 4.0 Km

Not to be used
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The hill slope of the site is gentle to moderate ($\sim 20^\circ$ - 40°) which declines roughly towards South-West direction. There are four hairpin bends on the road alignment which are at CH 0.925, 1.500, 2.875 and 3.625 Km respectively. The road alignment has 1:20 of falling gradient and 1:40 of 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 IV of seismic zoning Map of India (IS 1893, part 1, 2002) which corresponds to intensity VIII 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 motor 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 generally slope consists of overburden and slope wash material.
2. Excavation work must be carried out by skilled manual workers as the rock 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.
4. Construction of large U-shaped longitudinal concrete lined drain all along the hill side of the road with adequate provision of cross drains is necessary. Doing so will help in decreasing the chances of subsidence/slide during rainy season.
5. Construct the road by half cut and half fill techniques and compact the fill material properly by dynamic compaction.
6. Construct causeway/culvert/scupper at places where the motor road alignment passes through small streams/nallas as these nallas may damage the motor road especially during rainy 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 the BIS and MORTH.

- 6- **Conclusion:** On the basis of the geological studies/observations carried at the site and with the above recommendations, the site proposed for 4.50 Km long Chiledi-Manjuli motor road to Chaurikhal-Sirwadi-Kaanda motor road between CH 0.0 and 4.50 Km was found geologically suitable for construction.

Note: On the basis of the geological studies carried at the site with limited accessibility to the hill slopes this is a generalized report. The conditions of the site are liable to change during/after the construction work, in case any opinion is required during or post construction then the geologist should be separately communicated.

Place: Temporary Division PWD Kirtinagar

Date: 17/07/2020

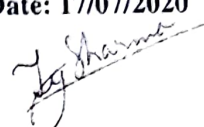


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