प्रारुप–33

# भू–वैज्ञानिक की आख्या

कार्यालय प्रमुख अभियन्ता एवं विभागाध्यक्ष
उत्तराखण्ड लोक निर्माण विभाग,
देहरादून

भू–गर्भीय निरीक्षण आख्या ए0जी0– 271/सड़क/पुल/सम्रेखण/उत्तराखण्ड/गढ़वाल–2019

**Geological assessment of the alignment corridor proposed for the construction of 4.750 km(sanctioned length= 5.00 km) long Sansmar-Kaudiyala motor road which ultimately joining to NH 58/07, in Narendranagar block, distt. Tehri Garhwal**

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# Geological assessment of the alignment corridor proposed for the construction of 4.750 km(sanctioned length= 5.00 km) long Sansmar-Kaudiyala motor road which ultimately joining to NH 58/07, in Narendranagar block, distt. Tehri Garhwal

Shiv Kumar Rai
23.10.2019

**1-*Introduction*:-** The Construction Division, PWD, Narendranagar vide G.O. No. 90/III(2)/19-11(एम0एल0ए0)/2017 टी0सी0 *dated 09.01.2019* has been instructed for the construction of 5.00 km long Sansmar-Kaudiyala motor road which ultimately joins to NH 58/07 near Kaudiyala bridge, in Narendranagar Block, distt. Tehri Garhwal. The work of survey has been carried out for the above mentioned alignment where the actual length across the slope comes to be 4.750 km comprising 5 HP bend. Therefore, on the request made by Er. M.A Khan, Executive Engineer I carried out the geological assessment of the proposed motor road on 01.10.2019 in the presence of Er. Anup Saklani, Junior Engineer. Construction Division, PWD, Naredranagar, distt. Tehri Garhwal.

**2-Location:-** The alignment corridor for the above mentioned motor road originates from km 256 of NH *58/07* motor road near the bridge at Kaudiyala, in the upslope direction with length passes dominantly through the naap land and scantly through reserve forest comprising 5 HP bends in whole along its length of 4.750 km joining village Sansmar, in Narendranagar block, distt. Tehri Garhwal.

**3-Geological Assessment:-** Geologically, the alignment corridor proposed for the above mentioned motor road lies in a inner part of Garhwal Lesser Himalayan Belt bounded by North Almora Thrust (NAT) in the north and Main Boundary Thrust (MBT) in the South. The area as a whole occupied by the rock mass phyllite with intercalated slate and lenticular quartz vein. The entire area and its environs is exposed by outcrops with moderately steep to gentle slope. Sometimes, there is a thin cover of overburden material intermittently along the alignment with terrace like cultivated land is been exposed along the slope. There is a seasonal local river at the toe of the slope with huge discharge during monsoon.

According to the estimation made at the site, "Undrained Shear Strength" of the overburden was found ranging between 300 K Pa to 400 K Pa and this can be referred as "Stiff soil" for road cutting. The phyllites exposed along the alignment corridor exhibits a wide range of physical competency values which proportionately resembles to their mineral content and nature of stratigraphic desposition. The thickly foliated phyllitic quartzites massive (PQM) are more arenaceous in nature were found most competent rocks (UCS values ranging between 100 M Pa to 150 M Pa) while the Quartzitic Phyllites (QP) and the sheared/ shattered phyllites (SP), rich in argillaceous content, exhibits very low of values of compressive strength ranging between 1 M Pa to 5 M Pa. Another moderately hard rock mass named as phyllitic quartzites thinly bedded (PQT) exhibits the moderate (Fair) values of physical competency estimated at the site ranging between 20 M Pa to 100 M Pa.The QP/SP rocks are prone to weathering and contains large volume of argillaceous material while the PQM are rich in deterital quartz which resists exogenic alteration. The weathering grade of these rock masses have been assessed ranging between $W_2$ to $W_3$ grade. The hill wash/slope wash material deposited across the alignment slopes is naturally compacted and dense in nature and it comes under the heavy soils (soil mixed with boulders) category. The HP bends are situated on the gentle terrace like cultivated land having no slided portion/slope. The rock masses exposed along the alignment corridor are dissected by four prominent linear discontinuities. In the initial chainage nearly between 1-2 km of the alignment there is

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stretch of 100-150 m of slided/unstable portion near the crown of the slide which generated before generated due to toe cutting due to the river below.

By and large the alignment slopes are stable and presently free from any landslides/mass wasting activities.

On the basis of the geological/geotechnical studies carried at the site and the facts mentioned above the following suggestions are being made for the construction of the proposed road failing to which, these report will be automatically treated as cancelled.

## 4-Recommendations:-

1. Construct the 100-150 m by half cut and half fill method near the slided portion whereas remaining portion can be construct by box like full excavation of the hill slope, wide benches will be feasible as these will reduce the steepness of the slope angle and increase the stability of the hill slope.

2. Both sides of the road must be protected by the construction of wire crates wherever required having competent basement only.
3. Do not dispose the excavated waste on the lower slopes, otherwise it may threat the overall stability of the hill slopes. Therefore, choose a suitable stable dumping zone for muck disposal.
4. It is strongly recommended to construct large size lined hill side drain all along the road and make adequate cross drainage arrangements. The drained water should be disposes over a stable ground/perennial water channel below.
5. The drainage work must be taken up immediately after the excavation of the hill slopes.

All the construction activities should be carried out as per the guidelines and Standard of codes laid by the MORTH/IRC for the construction of the similar structures.

**5-Conclusion:-** On the basis of the geological / geotechnical studies carried at the site and with the above recommendations, the alignment corridor was found geologically suitable for the construction of 4.750 km(sanctioned length=5.00 km) long Sansmar-Kaudiyala motor road to the NH below comprising 5 HP bends , in Narendranagar block, distt. Tehri Garhwal.

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