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परियोजना का नाम:- प्रधानमंत्री ग्रामीण सड़क योजना के अर्न्तगत बादसी गौलोकधाम खाण्ड मोटर मार्ग से कटखन मोटर मार्ग के नव निर्माण हेतु वन भूमि हस्तान्तरण प्रस्ताव।

भू-वैज्ञानिक की आख्या

संलग्न है।

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कनिष्ठ अभियन्ता,
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सिंचाईखण्ड, उत्तरकाशी

सहायक अभियन्ता
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Office of Empanelled Geologist
पत्रांक 622/148व्यक-सा0/13 दिनांक 15/05/2013
P.W.D. Uttarakhand

Geological Investigation Report
E.G. – Road / Bridge / Alignment
Uttarkashi – 01 / 2015

Geological Assessment of the Alignment Corridor Proposed For –Badasi
Gaulok Dham – Khand motor road to Katkhan motor road, Distt.
Uttarkashi

01 Oct. 2015

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Geological Assessment of the Alignment Corridor
Proposed For – Badasi Gaulok Dham – Khand motor road to
Katkhan, Distt. Uttarkashi


J.P. Madhwal
01/10/2015

Introduction :- The Irrigation Division, PMGSY, Uttarkashi has proposed the construction of ~~2.20~~ Km. long motor road named Badasi Gaulok Dham – Khand motor road to Katkhan motor road under PMGSY Project on the request of the Executive Engineer, Irrigation Division, PMGSY, Uttarkashi I carried out the geological assessment of the proposed alignment of the road in presence of the person of MAGOT Engineering Consultants Pvt.Ltd., D.Dun on Dated 16/08/2015.

1. **Location:-** The proposed alignment originates from Km. 15 of Chinyalisaur Motor Road. 6.850 Km. is already existing motor road. ~~2.20~~ is a fresh alignment starting from end of the existing road. Two H.P. Bends are Provided.
2. **Geological Assessment:-** Geologically the area of the proposed road is located in the inner lands of Lesser Himalaya Belt which is mostly occupied by the rocks of Garhwal Group. The thinly foliated quartzite, grey phyllite and limestone are exposed along the alignment. These rocks are massive to thinly bedded, soft to very hard, compact and partially weathered in nature.

Four prominent and one random joints set in addition to minor shear zone traverse these rocks and control the stability of the various slope facets of the alignment passes are inclined at moderate to steep angle and these are partially covered with the overburden material of varying thickness ranging from 0.5 m to 1.5 m thick. The rock mass exposed along the alignment corridor is mostly hard and its "Uniaxial Compressive Strength" has been estimated ranging between 50 M Pa to 100 M Pa (ISRM Manual Index). By and large the joints traversing the rock masses are widely spaced through except at places where the rocks is sheared and shattered. The values of the Rock Quality Designation (RQD) calculated at the site ranging between 81 percent to 100 percent suggests that the slope forming rock masses are less distressed in nature and decrease the risks of instability. All the joints planes of the rocks are rough to moderately smooth, tight and sometimes sealed with the secondary inclusion.

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The details of the joints recorded at the site are given in the following table:-

Table

S. No.	Feature	Dip angle	Azimuth
1	2	3	4
J ₁	(S ₀ Bedding Joint)	20 ⁰	N155
J ₂	(S ₁ Foliation Joint)	35 ⁰	N175
J ₃	(Random Joint Set)	30 ⁰	N160
J ₄	(Sealed with Quartzite's)	45 ⁰	N180
J ₅	Joint	32 ⁰	N310

The overburden material exposed along the alignment corridor is comprised of the scanty rock fragments of various shapes and sizes embedded in the clay- silt matrix. This overburden material is naturally well compacted and dense in nature.

The slope forming overburden materials do not contain any soft/dispersive soils.

By and large the alignment slopes are stable and do not bear any signature of mass wasting/land sliding.

On the basis of the geological / geotechnical studies carried at the site and the facts mentioned above the following recommendations are being made for the construction of the proposed road.

3. Recommendation:-

- The alignment some time traverses along/across minor fault zone which is geologically fragile and special attention needs to be given for stability of road where alignment crossing the Nalas or Gads or Local streams.
- The hill slope is another factor responsible for geological hazards; the road basically traverses the slope class 34⁰ to 48⁰ special attention needs to be given for stability where it is 45⁰ to 50⁰ in some parts.
- Form the road by half cut – half fill techniques and ensure the proper compaction of the fill material.
- Do not dispose the debris in hill side, dispose it in a safe zone.

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- (v) Do not blast heavily on the rocks and blasting is restricted near the human settlement / public property.
- (vi) The road must have extra wide lined long drain with adequate cross drainage arrangement.
- (vii) The road must be formed shoulder to shoulder paved, this is so to check the water ingress into the sub surface material.
- (viii) Construct suitably designed retaining walls / Brest wall all along the road, it is essential for the overall stability of the hill slope.
- (ix) All the construction activity must be carried out as per the standards and norms following the IS codes prescribed for the similar civil construction in Himalayan Zone.
- (x) This report is prefeasibility report. At the time of construction it need separate geological concern.

4. Conclusion:- On the basis of the geological / geotechnical studies carried at the site and with the above recommendations, the site was found geologically suitable for the construction of ~~2.20~~ 2.20 Km. long motor road named Badasi Gaulok Dham – Khand motor road to Katkhan motor road, Distt. Uttarkashi, Uttarakhand.

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