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**P.W.D. Uttarakhand**

**Geological Investigation Report**  
**E.G. – Road / Bridge / Alignment**  
**PMGSY, R.W.D., Didihat (Pithoragarh) – 10 / 2016**

**Geological Assessment of the Alignment Corridor Proposed For –**  
**Adichaura to Hunera Motor Road,**  
**Distt. Pithoragarh**

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**Introduction:** - The PMGSY, R.W.D., Didihat, Pithoragarh has proposed the construction of 9.00 Km. long motor road named **Adichaura to Hunera Motor Road** under PMGSY, Project on the request of the Executive Engineer, PMGSY, R.W.D., Didihat, Pithoragarh I carried out the geological assessment of the proposed alignment of the road in presence of the person of MAGOT Engineering Consultancy Pvt. Ltd, D.Dun on Dated 30/04/2016.

1. **Location:** - The proposed alignment originates From End point of didihat – adichaura motor road at the place of Patwari Chowki Adichaura.
2. **Geological Assessment:** - Geologically the area of the proposed road is located in the inner lands of Kumaon Lesser Himalaya Belt which is mostly occupied by the rocks of Granite, Granodiorite and quartzite are exposed along the alignment. These rocks are massive to thinly bedded, soft to very hard, compact and partially weathered in nature.

Three prominent and one random joints set in addition to minor shear zone traverse these rocks and control the stability of the various slope facets. The alignment passes inclined, moderate to steep angle slope 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 70 M Pa to 90 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 60 percent to 80 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 <sub>1</sub>	(S <sub>0</sub> Bedding Joint)	35 <sup>0</sup>	N175
J <sub>2</sub>	(S <sub>1</sub> Foliation Joint)	20 <sup>0</sup>	N165
J <sub>3</sub>	(Random Joint Set)	22 <sup>0</sup>	N190
J <sub>4</sub>	Joint	40 <sup>0</sup>	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:-**

- (i) 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.
- (ii) The hill slope is another factor responsible for geological hazards; the road basically traverses the slope class 33<sup>0</sup> to 47<sup>0</sup> special attention needs to be given for stability where it is 45<sup>0</sup> to 50<sup>0</sup> in some parts.
- (iii) Special attention must be give at the point of H.P. Bend at the time of construction of road.
- (iv) Do not dispose the debris in hill side, dispose it in a safe zone.
- (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) Construct Culvert Span 6.00 mtr. at Km. 3.775
- (x) Construct R.C.C. Bridge Span 10 mtr., 12 Mtr., 15 Mtr. and 10 Mtr. at Km. 4.575, Km. 4.725, Km. 7.000 and Km. 8.050.
- (xi) Construct Causeway at Km. 6.00.
- (xii) 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.
- (xiii) 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 9.00 Km. long motor road named **Adichaura to Hunera Motor Road**, Distt. Pithoragarh, Uttarakhand.



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