

GEOLOGICAL REPORT ON PROPOSED
LINK ROAD FROM DADRIARA TO
CHAKKI, DISTRICT CHAMBA HIMACHAL
PRADESH

SUBMITTED TO

PUBLIC WORKS DEPARTMENT
HIMACHAL PRADESH

SUBMITTED BY

DEPARTMENT OF CIVIL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY
HAMIRPUR (H.P)

Geological Report

SCOPE OF WORK:

Letter was received from office of Assistant Engineer, Sihunta Sub-Division, Public Works Department, Sihunta, (H.P) vide letter no. PWD-SSD-R-28/2021-22-1616-17 Dated 29.11.2021 and letter from Executive Engineer, Dalhousie Division, Public Works Department, Dalhousie, (H.P) vide letter no. PWD-WA-Forest Case- 2021-22-10449 Dated 30.11.2021 for possibility of erosion and feasibility of the road in respect of construction of Link Road from Dadriara to Chakki Km. 0/000 to 13/500.

PREVIOUS STUDY:

The report submitted by Geological Wing of Industries Department, Himachal Pradesh, describes in detail the topography and the local geology of the area along proposed road alignment from Dadriara to Chakki. After going through the report, it was found that apart from detailed study of the local geology it has suggested some pre and post construction measures for stability of the road. Though these measures are to be taken for sustainability of the local environment but also to prevent any accident and natural disaster triggered by destabilization of the natural slopes.

GENERAL OBSERVATIONS:

After the field visit to the area it was observed that there could not be a better alignment of the road to connect the far lung area of the region. The proposed alignment runs along the zone which have minimum possible forest density and considering the adverse winter conditions the east facing slope has been selected to avoid the accumulation of snow during winter. The grade/slope of the proposed road is such that it covers maximum number of Hamlets with minimum disturbance to the local flora and fauna.

GEOLOGICAL CONSIDERATIONS:

After inspection of the proposed alignment it is suggested that the proposed alignment may be followed avoiding the steep slopes as well as overhangs which may pose danger to the workers involved in road construction. The rocks in the surveyed area are mostly of metamorphic origin which are considered favourable for road construction. Since the rocks are not highly jointed or sheared (as appeared on the surface) there is minimum possibility of slope failure and soil erosion. The topography of the valley comprises of moderate to highly steep slopes and narrow gorges. The slopes at places are steep escarpments formed on the crystalline rocks. The vegetation along the proposed alignment is not very dense, comprises mostly of

pine trees and bushes. The reason of scanty vegetation is thin soil cover due to presence of steep slopes.

Dip and Strike:

Foliation plane in case of metamorphic rocks at most of the outcrops is dipping into the hill and striking NW-SE direction parallel to the proposed road cutting which is considered safe against slope failure. The rocks at exposed outcrops show a trend of E-W with varying amount dipping into the hill.

Joints

Though two sets of joints are prominently exposed along the proposed alignment with vertical to moderate dip, trending NE-SW and NW-SE direction posing no threat to the proposed road. But if encountered in great abundance during construction, jointed rocks must be provided artificial support by breast walls and retaining walls along with efficient drainage network for ensuring stability of the road.

Faults

Faulting generally leads to the crushing of the rock along the fault planes and shear zones. Such a condition is, of course, very unfavourable for a cut when it happens to form upper or lower slope or even base of the cut. It should not be left untreated in any case otherwise they are the worst type of planes of potential failure. Though no prominent fault was observed along the proposed road alignment, but advice of the person having expertise in this field may be sought during the construction work.

Folding

Folds signify bends and curvatures and a lot of strain energy stored in the rocks. Firstly, folding of rocks introduces considerable variation and uncertainty in a sequence of rocks so that entirely unexpected rocks might be encountered along any given direction. No prominent folding is exposed along the proposed road alignment.

RECOMMENDATIONS:

- i) If the outcrops exposed during construction are contrary to the above and there is no alternative to cuts either parallel to or inclined to strike (other than at right angles), special measure might become necessary to ensure stability of slopes.
- ii) Such measures would include enlarging of the section of the cutting, particularly on the hillside face, to stable provision of strong, adequately high retaining walls; very efficient drainage system to remove water from the affected slopes.

- iii) Cutting of slopes must be done from top to bottom with cutting face dipping not more than joint/bedding dip.



Fig. 1 Outcrop of a mildly jointed rock mass.



Fig. 2 Weathered gauge material in the joints.



Fig. 3 Crystalline rocks exposed along the road alignment.

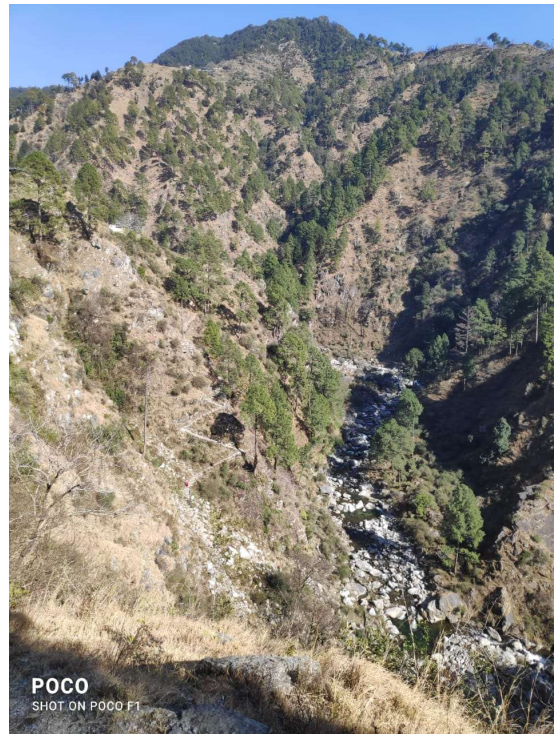


Fig. 4 Deep gorge encountered enroute to Chakki.

- iv) The muck generated during the road construction must be dumped in the designated dumping sites. In any case it should not be spilled on the slopes otherwise it is going to destroy the vegetation and pose threat for land slides.
- v) The stability of the road is dependent upon the underlying strata and design of drainage system to avoid subsidence/landslide and soil erosion along critical points identified during construction on the proposed road.



Fig. 5 Panoramic view of the right bank of the valley along which the proposed road alignment has been done.

Since the slope along the alignment is covered with vegetation, hence very few outcrops are exposed which are likely to be exposed during road construction. Therefore, the recommendation made here in this report may be adhered to strictly to avoid any untoward incident/accident and general stability of the road and sustainability to the environment.



Fig. 6 Inspection team following the path of road alignment.

Dated: 4.3.2022

A handwritten signature in blue ink, appearing to read 'R.S.', with a horizontal line underneath.

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