

**RECONNAISSANCE GEOLOGICAL REPORT OF PROPOSED SITE OF
SHRI GULVIYA LAL S/O SHRI MOOSA LAL FOR THE CONSTRUCTION OF
OWNER DRIVEN CONSTRUCTION HOUSING (ODCH)
VILLAGE- GONA, TEHSIL- BARKOT, DISTT.- UTTARKASHI
KHASARA NO – 2633, 2635, 2636, 2637 & 2638; AREA – 0.021 ha**

Date of Inspection: 20-12-2013

1. INTRODUCTION:

In a 'World Bank' funded programme, Government of Uttarakhand has provided teams of Consultant Geologists and Consultant Associate Geologists to Director, Geology and Mining Unit, Uttarakhand for geological studies in proposed sites for Owner Driven Construction House (ODCH) in disaster affected districts of Uttarakhand. Director, Geology and Mining Unit, Directorate of Industries, Uttarakhand has issued an Office Order No.1612 Aa. Pra./Bhu.Ni./Bhu.Khani.E./2013-14 dated 10th December 2013 regarding geological studies in disaster affected five districts of Uttarakhand. Uttarkashi is one of them. Thus undersigned traversed and collected field geological observations under the management of cosignatory departmental 'Assistant Geologist'.

In the above mentioned questioned area, the reconnaissance geological investigation was carried out in the presence and co-operation of Shri Bhupendra Singh Rana, Revenue Sub-Inspector, Nagangaon, for proposed site of Shri Gulviya Lal S/o Shri Moosa Lal, Village Gona, Tehsil- Barkot, Khasara No- 2633, 2635, 2636, 2637 & 2638, Area- 0.021 ha. The site is 8km approximately from Tehsil Barkot, District Uttarkashi, Uttarakhand from NH-123 (Delhi-Yamunotri National Highway) via Naugaon-Pounti-Rajgarhi Motor road and is 80m approximately from the Naugaon-Pounti-Rajgarhi Motor road by bridle path. It falls on coordinates – N 30°50.215' E 78°12.858' and elevation 1274m. The site is less populated.

2. GEOMORPHOLOGY OF THE PROPOSED AREA:

The proposed site is situated on a hill terrace and the general slope of the area is 50° towards ENE direction from the site. The overburden thickness in the proposed site is about 1-5m approximately and overburden is more in downhill side as compared to uphill side from the site. The overburden is composed of sub-angular to angular fragments of phyllite varying in size from 2-10cm. The boulders of quartzite and phyllite approximately 20cm-1m size are also found around the site. The site is consolidated and on a manmade terrace. The site is on the right bank of Banal Khad River which is about 100-150m approximately in East direction from the site and is flowing from north to south direction. There is a seasonal Nala at a distance of about 40-50m in Northwest direction and another Nala at 4-5m in Southeast direction from the site. Seepage is present in the soil around the site and the vegetation is less.

3. REGIONAL GEOLOGY AND GEOLOGICAL OBSERVATION AROUND THE CONSTRUCTION SITE:

Uttarkashi valley exhibits characteristic rugged topography of the Lesser Himalayan terrain. The ground elevations generally vary between 1150m to 2000m above msl. The hill slopes in the area are generally observed to comprise of rocky outcrops, rocky cliffs and mantle of colluviums. The hill slopes in the area is generally moderately steep (25° - 35°) to steep (36° - 45°) while few escarpments or cliffs ($> 50^{\circ}$) are also present. Uttarkashi town is located in the Lesser Himalayan geotectonic block and it is bound by two major Thrust fault i.e. Main Central Thrust (MCT) and Srinagar Thrust (ST). The MCT can be traced to the northeast of Uttarkashi while the Srinagar Thrust lies in the southwest. Phyllite, metabasic and quartzite of Garhwal Group are exposed around the area.

Geologically, the area falls in the region of rocks of Bhatwari-Barkot Formation (= Chail) of Ramgarh Group of Lesser Himalayan terrain, the rocks are mainly phyllites, quartzites with intrusion. It should be emphasized that the quartzites, phyllites and metabasics (= Chail) directly underlying the crystalline are a typical phenomenon for all the Himalayas.

An outcrop about 5m x 5m size of quartzitic phyllite is found in Southwest direction uphill from the site. These rocks are grey in color, fine grained, and thinly foliated with minor folding. The foliation plane is dipping 55° towards N 250° with a strike of N 340° . The foliation spacing is 2-5cm, continuity is 5m and openings are 2-3mm with a hillside dip. The most prominent joint plane is 65° towards N 160° with strike N 240° and the joint spacing is approximately 5-20cm and continuity is 5m with 5-20mm openings. Along the foliation plane of the phyllite two to three quartz veins of about 2-5cm wide are seen. The rocks are moderately strong to moderately weathered.



Phyllite outcrop in the uphill of the proposed site.

4. GEOTECHNICAL OBSERVATION OF THE PROPOSED CONSTRUCTION SITE:

There is a small slide at the backside of the site towards Northeast direction which has caused the damage to the house. The slope is stable and the in-situ rocks are dipping towards the hillside. In the downhill side of the site there are possibilities of minor slides. The soil type here is colluvial, yellow in color of clay material and is about 50cm-1m thick.



A far view of the proposed site from SE direction.



A close view of the proposed site from Northeast direction.

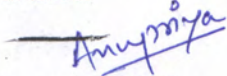
5. RECOMMENDATIONS:

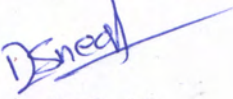
Based on above surface geological observations of the proposed area the following remedial measures for construction of a geologically suitable house are recommended:

1. A retaining wall with proper weep holes must be constructed in two levels of 4m each in Southwest direction of the proposed site to retain the small slide. Another retaining wall in Northeast direction of about 15m must be constructed in three levels of 5m each to protect the house.
2. The foundation depth of the houses must be kept on the in-situ rocks or as per the compactness of the overburden material in the proposed site.
3. A minimum distance of about 2ft must be kept between the backside retaining wall and the proposed house to prevent seepage into the house.
4. The back, sides and premises of the houses must be made cemented to prevent subsurface seepage and a drainage channel must be constructed at the back of the house with a slope towards Southeast direction for discharge of rain water and surface water.
5. Light roof and deep column must be constructed for the proposed houses.
6. The area falls in Lesser Himalayan earthquake zone IV so the houses must be erected with latest earthquakes resistive techniques, and scientific and technically sound craftsmanship.

6. CONCLUSION:

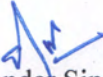
Prima-facie, the proposed site of Shri Gulviya Lal S/o Shri Moosa Lal is geologically feasible for the proposed construction, only if, the above mentioned recommendations will be followed strictly, otherwise, in their contravention; geological suitability will be deemed annulled.


(Anupriya Shah)
Consultant Associate Geologist


(Deepak Singh)
Consultant Geologist

Date: 25th Dec 2013

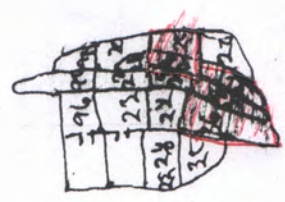
Place: Camp Uttarkashi


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नाम मीजा नमः॥ राम गो-पती कवल लखलखकाल किलो उलकिली

R.S. No - 57

सेनाग-२४११ = १२/११



पनाकिली किलो OCH

२५/११/१३
 २५/११/१३
 २५/११/१३

संकेत (शालामार्ग)

- 1) नापकेस
- 2) वंजकेश
- 3) गकामनिर्माण द्विक
- 4) नस्तविले शक्ति

कवल मीजा नमः लखलखकाल किलो

२५/११/१३
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