

**RECONNAISSANCE GEOLOGICAL REPORT OF PROPOSED SITE OF SHRI
BACCHU LAL S/O SHRI KALU FOR THE CONSTRUCTION OF OWNER
DRIVEN CONSTRUCTION HOUSING (ODCH)
VILLAGE BHELURA, TEHSIL- BHATWARI, DISTT.- UTTARKASHI
KHASRA NO.-884 & AREA-0.028 ha.**

Date of Inspection: 14-12-2013

INTRDUCTION:

In a 'World Bank' funded programme, Government of Uttarakhand has consummate teams of undersigned for geological studies in proposed site 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 10thDecember 2013 regarding geological studies in disaster affected five districts of Uttarakhand.

In the above mentioned questioned area, the reconnaissance geological investigation was carried out in the presence and co-operation of Shri Jagwant Sing Mehar, Revenue Sub-Inspector, Kotiyal the land of Shri Bacchu lal khasra no. 884 and the area of the land are 0.028 ha.

The proposed site for house construction falls in flat colluvial terrace on left bank about 700m hillsides from river bed of Bhagirathi. The site is located 3km from District headquarter Uttarkashi, in light motor road nearby Vikash Bhawan, 100m valley side from Joshiyara-Ladadi motor way. The boundary of proposed area in North side Khasara No.-88, East side Khasara No.-78, South side 78 and West side Khasara No.-882 around the proposed site. The proposed site surrounding area is dense populated. That proposed site falls on coordinate N 30° 43' 35.1" E 78° 25' 54" and El. 1093m from msl.

GEOMORPHOLOGY OF THE PROPOSE AREA:

The proposed site is situated on old coluvial terrace, cultivated land about 650-700m hillside from river bed of Bhagirathi. About 2-5m thickness of overburden, quartzite fragment varying 1-5cm with fine to coarse grain blackish brown soil matrix. The boulders of varying size are also found around the site. The site is in between two seasonal water bodies at about 150-200m approx distance.

General slope of the proposed site is 10°-10°, uphill slope is of the 25°-30° and downhill slope is 10°-15° towards North direction. No bed rock found about 200m surrounding proposed area. On the hills around the proposed site mix vegetation is found. No bed rock and natural drainage is found around proposed area.

REGIONAL GEOLOGY OF THE AREA:

Uttarkashi valley exhibits characteristic rugged topography of the Lesser Himalayan terrain. The ground elevations generally vary between 1150 to 2000 meters 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 Netala Formation of Lesser Himalayan terrain. Quartzite with bands of limestone, phyllite and slate is fine grained, compact, massive in general, but jointed and fractured at places. The slope of the hill ranges between 25° - 30° towards eastern direction. At few places insitu rocks are exposed in the plot whereas maximum plot area is covered with overburden. This overburden material comprising soil, hillwash and debris of varying size consisting of brown colored, fine to medium grained silty to gravely matrix with angular fragments of dolomitic limestone and a few brown fine grained shale etc., in which percentage of the angular fragments is more than the matrix. The major joint trends $240^{\circ}/30^{\circ}$ NW (Oblique to foliation plane) whereas minor joint trends $265^{\circ}/40^{\circ}$ NW.

GEOTECHNICAL OBSERVATION OF THE AREA:

The proposed area is on old colluvial deposit man made terrace. The angular and sub-angular fragment of Quartzite varying 1-3cm with blackish brown soil matrix made up of colluvial terrace and also boulders of 1.5-2m size are embedded in the soil at the back side of the proposed site. The proposed land situated in toe of the hill. General slope 15° - 20° of the proposed site is favourable for the construction of house. No natural/seasonal drainage is found in proposed site, but is at about 150-200m distance Southward direction. At the proposed site 1.5m height and 10-12m length retaining wall is already constructed. The proposed site is depending on geological observation is stable for the house construction. At the backside of the proposed site poor sewage is developed.



A upstream side view of propose area

RECOMMENDATIONS:


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


1. The surface drainage should be properly planned through lined drain/pipe, both rain water flows from higher elevation as well as waste water from existing building and release safe place at down-hill along a sewage channel.
2. Framed structure of building must be designed as per seismic coefficient in earthquake zone 4 of this region.
3. Light weight and slanting roof, framed structure, deep column, tabular structure and single storied house for construction is immensely recommended.
4. As the area falls in Lesser Himalayan earthquake zone IV so the houses must be erected with latest earthquake resistive techniques, and scientific and technically sound craftsmanship with logical and favourable principles of soil mechanics or the foundation of the houses must be kept in the fresh in-situ outcrops.
5. Massive plantation of trees, bushes and grasses which can hold the soil mass and retained the debris with dense and long roots and floral species of wide/broad leave must be done to protect the soil erosion and minimize the weathering of subsurface rocks.

CONCLUSION:

Prima-facie, the proposed site of Shri. Bacchu Lal S/O Shri Kalu is geological feasible for construction work, only if, the above mentioned recommendations will be followed strictly, otherwise, in its contravention, geological suitability will be deemed voided.


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