

प्रारूप-33

परियोजना का नाम :- माननीय मुख्यमंत्री जी की घोषणा संख्या 281/2017 के अन्तर्गत जनपद चमोली के गैरसैण शहर एवं एडजवाइनिंग आबादी में पेयजल आपूर्ति हेतु रामगंगा नदी पर बाँध निर्माण कार्य के लिए 4.95 हे० वन भूमि का सिंचाई विभाग को हस्तान्तरण प्रस्ताव।

भू-वैज्ञानिक की आख्या

(प्रस्तावित स्थल की भू-वैज्ञानिक द्वारा निर्गत अद्यतन निरीक्षण आख्या प्राप्त कर संलग्न की जाय।)

(संलग्न है।)

GEOLOGICAL INVESTIGATION REPORT OF RAMGANGA WEIR SITE AT GAIRSAIN, CHAMOLI

This report is prepared on the request from Mr. V. K Maurya, Executive Engineer, Irrigation Division, Tharali (Vide letter No. 544/ री०ख०य०/P-3/Bairage/Tharali/ dated; 03/06/2018).

A Preliminary Reconnaissance Survey was carried out on 23th June, 2018 in the tributary of Upper Ramganga catchment falls in Gairsain block of Chamoli Garhwal along with Assistant Engineer Dhanvantri Tripathi and Junior Engineer Monu Kumar, Irrigation Department, Tharali Division, Chamoli Garhwal, to find out the site suitability of the proposed weir site for multipurpose water pool near Nail lagga Farkande village. The present weir site is located geographically at Latitude $30^{\circ} 03' 48''$ N and Longitude $79^{\circ} 17' 04''$ E, at an elevation of 1614 m amsl, under the administrative control of District Chamoli Garhwal (Fig.1 & 2). The site is well connected by 1.5 km metalled motor road from Gairsain Township to near Polytechnic and further approximately 01 km upstream with a bridle path. Rikholi, Sadingwad, Farkande Malli, Tal Gaon, Kuneli and Marora are some of the villages falls in the catchment area.

GEOMORPHOLOGY AND WATER REGIME:

The overall synoptic view as it looks on high resolution satellite data indicate that the Ramganga river, originate from Dudhatoli range (3082 m amsl) and showing typical dendritic pattern of the stream. The catchment area is densely vegetated. The regional flow direction of the stream is initially NW-SE direction from its source while it starts flowing N-S direction from the present site. As it is evidenced from the field photograph (Fig.1) such orientation of the stream is controlled by subsurface geology. The Channel flow direction is parallel to the strike direction of the bed i.e. 256° due North. On the basis of field investigations it was observed that the catchment area forms typically a 'V' shaped valley. The right valley side slope is steeper than the left valley side slope. Therefore, the dip slope i.e. 28° due SW is equivalent to the hill slope in the left valley wall while it is apposite to hill slope in the right valley wall. The south western facing slopes are mostly occupied by villagers for their settlement and later on modified for agricultural practices while the north or north eastern slopes are full of vegetational cover. At places these agricultural fields are incised by number of unnamed channels with little water; later

on contribute to the main river. The presence of surface water is clearly evidenced from the well irrigated agricultural practices in the catchment and the volume of water just below the Polytechnic as measured by the Irrigation department is 0.3 qmt./sec. in the month of June i.e. on lean period while it reaches 250 qmt./sec. and even more depend upon the monsoonal rains. Finally as it is evidenced from the high resolution satellite data as well as after ground verification the geomorphological signatures viz. the high hill range of the catchment is covered with full of vegetation capped with Pine and Oak, Deodar and Raga. The shape of the valley head is typically armed chair or amphitheater like feature, divert all the rain water in to a common floor and ultimately feed to Ramganga River throughout the year (Fig. 3). The mean monthly hydrological data as measured by irrigation department indicate that there is a sufficient volume of water discharge through these channels which finally runoff into the Ramganga River. It is evidenced by field observations that by a large most of the springs are supported by bedding joints cut across to the valley side slopes and dipping towards SW direction while the river is flowing towards SE direction.

GEOLOGY OF THE AREA:

The Geological knowledge of area is best on the pioneer work of Middlemiss (1887) who classified the rocks around Dudatoli Mountain into the Schistose Series and the Gneissose-granites. Auden (1937) grouped the phyllite around Pauri and Chandpur. He believed the Dudatoli Crystalline (Dudatoli Thurst Sheet) to be the metamorphosed Chandpur Formation equivalent to the Jutogh series of the Simala Hills, and tentatively correlated this thrust with that of Garhwal Nappe. Stratigraphically the rocks of the present area fall under Dudatoli Group of Kumaun Super Group of Precambrian age, and Tectonically within Dudatoli-Almora Unit (Mehdi et. al.1972).

In the present area of investigation, it was observed that the Dudatoli Granite-Gneiss is the heterogeneous association of the metamorphose migmatite and granite-gneiss (Fig. 4). The foliated gneiss is generally developed contact with schist and grades into sub-augen gneiss or augan gneiss. At places it is inter banded with schistose streaks and bands of Flaggy quartzite. The mineral shows lamellar structure, but often clustered into augen to rectangular shaped nodules measuring 20 x 1 cm. The granite-gneiss is generally leucocratic, massive, rarely foliated coarse to medium-grained, porphyritic, and rich in biotite and tourmarline.

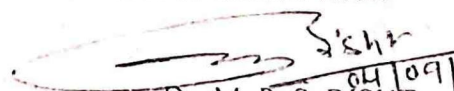
Table: 1. Lithostratigraphic Variations in the Dudatoli Group in Deferent Sections

Formation	Marchula - Masi section		Satpuli - Dudatoli section	
			Dudatoli Granite-gneiss	Heterogenous section sequence of granite migmatite and schist
Dudatoli-Almora Crystalline	Dodatoli Schist	Garnite mica schist with bands of flaggy quartzite, granite and augal niess Flaggy quratirti	Dudatoli Schist	Kyanite schist
				Garnet-mica schist with bands of flaggy quartzite, Granite and augan- gneiss Garnet-biotite-chlorite - schistose phyllite Flaggy quatizite

RECCOMONDATIONS:

On the basis of the geomorphologic features, geological characters and the disposition of rocks in the valley along with other mass movement phenomenon, it seems that the present proposed weir site for the construction of multi-purpose water pool is suitable. Some of the recommendations suggested to further stability of the structure are to be essentially taken under consideration before the final construction of the barrier is as:

1. Although the bed rocks are exposed all along the sides as well as floor of the channel even then right valley side slope must be of the water pool must be protected or guided by sufficient engineering structures to protect the movement of debris or rock mass into the submergence area.
2. Construction of check dams, gully plugging, and various gabion structures are essential to control the high sediment load carried by all the deeply cut by tributary channels located in upstream (particularly streams coming from Marora, Sare Gwar and Tal Gaoun side). The size and dimensions of these structures are designed as per site specific and the requirement.
3. Catchment Area Treatment (CAT) Plan must be prepared and implemented accordingly to increase life of reservoir and valley ecosystem.
4. Finally to maintain the aquatic ecosystem particularly for the migration of various species of fishes a Fish Ladder must be designed at one end of the barrier in the downstream side and make the surface uneven by pitching boulders or rock fragments gives a natural feel of channel floor.
5. Provision of de-siltation must be taken under consideration.


Dr. M. P. S. BISHT
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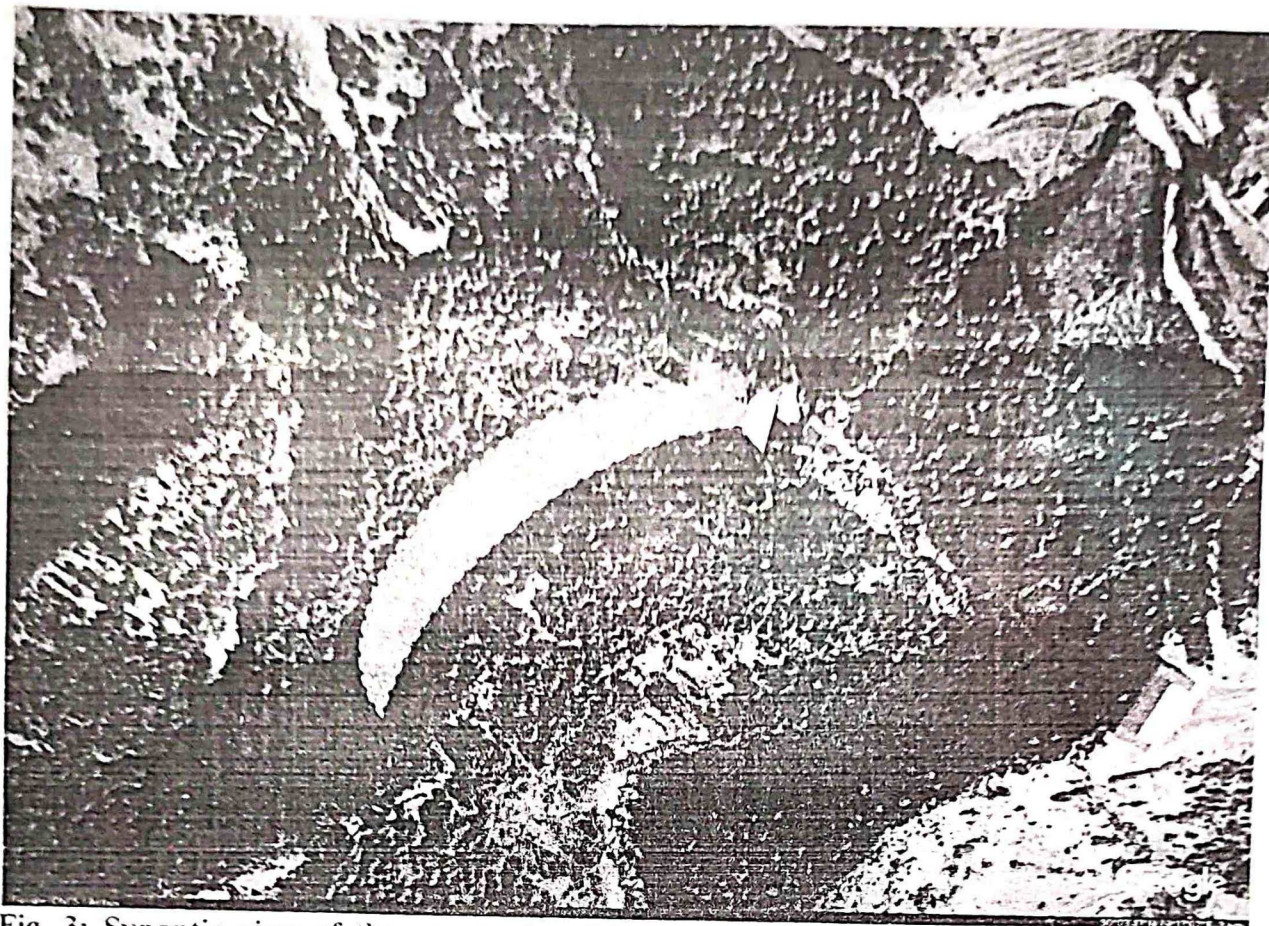


Fig. 3: Synoptic view of the proposed multipurpose water pool and Weir site on Ramganga River near Gairsain (Chamoli).

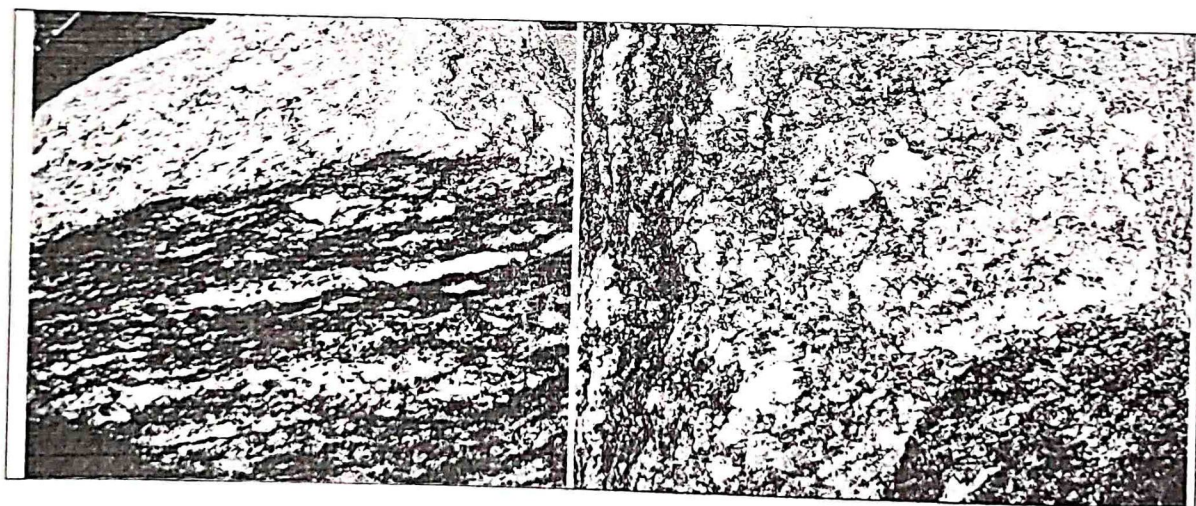
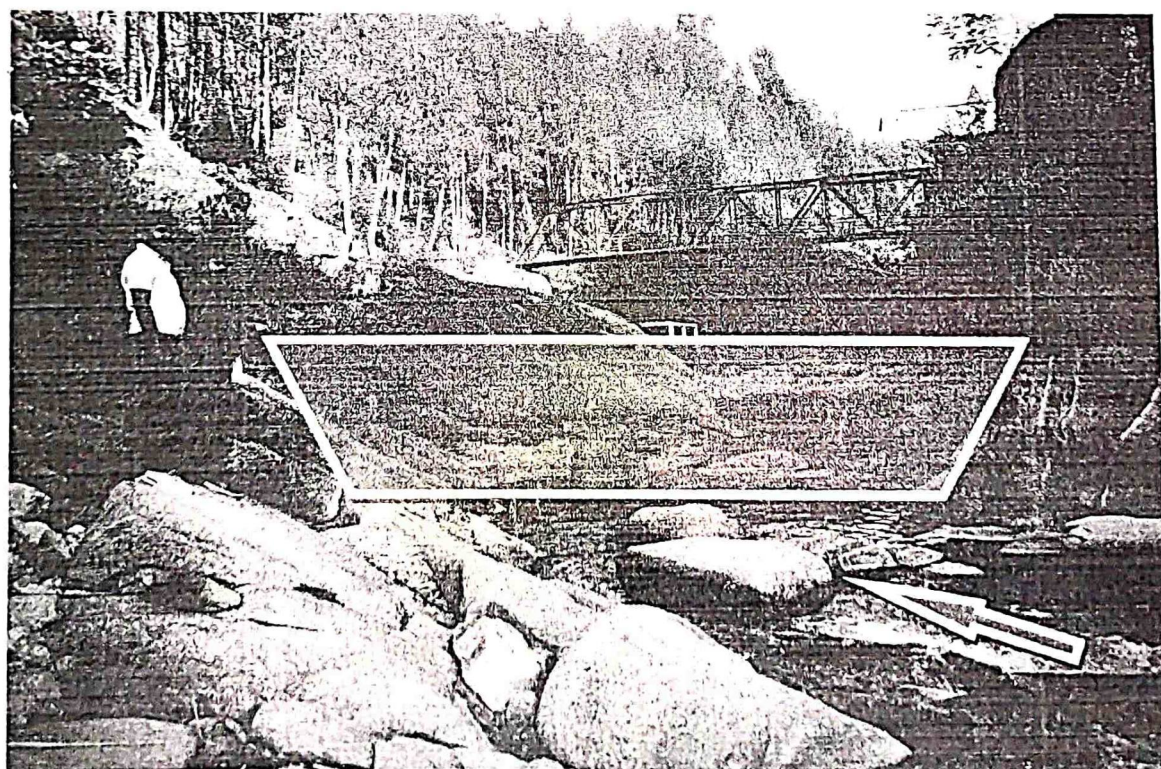


Fig. 4: A) Rock sample collected from the proposed weir site is evidence that the bed rock exposed all along the channel as well as axis line is mainly granitic gneiss. B) Surface texture of the rock indicates that there is a predominance of silica (white colour) while biotite and other dark coloured minerals are in lesser amount.



Fig, 1: Upstream view of Ramganga showing bed rock exposed all along the channel course near Gairsain



Fig, 2: Downstream view of Ramganga River near Gairsain and proposed Weir Site