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परियोजना का नाम:- जनपद देहरादून के ग्राम अजबपुर कलां अन्तर्गत देवांचल विहार में नलकूप निर्माण हेतु अपेक्षित  $(6.00 \times 5.00 = 30.00)$  वर्ग मी० अर्थात् 0.0030 है० (ग्राम समाजों में निहित, जंगल वन विभाग) भूमि का वन (संरक्षण) अधिनियम, 1980 के तहत गैर वानिकी कार्यों हेतु उत्तराखण्ड पेयजल निगम, देहरादून को प्रत्यावर्तन का प्रस्ताव।

भू-वैज्ञानिक की आख्या

संलग्न है।

(प्रयोक्ता एजेन्सी)

अधिशाली अभियन्ता

यांत्रिक शाखा

उत्तराखण्ड पेयजल निगम

देहरादून

  
**SUBMITTED TO**

**UTTARAKHAND PEYJAL SANSADHAN VIKAS  
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MECHANICAL DIVISION, DEHRADUN**

**REPORT ON THE FEASIBILITY FOR CONSTRUCTING  
A TUBEWELL AT DEVANCHAL VIHAR,  
DEHRADUN DISTRICT, UTTARAKHAND**

**PREPARED BY**

**BHARTI CONSULTANCY SERVICES**

**# 131, PHASE - I, ENGINEERS ENCLAVE**

**G. M. S. ROAD, DEHRADUN**

**NOVEMBER - 2016**

## ACKNOWLEDGEMENT

The author expresses his deep sense of gratitude to **Sri Jitendra Singh Deo**, Executive Engineer, Uttarakhand Jal Sansadhan Vikas Evam Nirman Nigam, Dehradun for endowing upon him an opportunity to carry out hydrogeological investigations, in order to facilitate the construction of ground water abstraction structures in Dehradun district, Uttarakhand.

The author also takes the opportunity to thanks **Sri Sunil Kumar**, Assistant Engineer, Mechanical Division, Uttarakhand Jal Sansadhan Vikas Evam Nirman Nigam, Dehradun for providing the author, the basic infrastructure and willful cooperation to carry out the field work and accompanying the author during the course of field investigations

***REPORT ON THE FEASIBILITY FOR CONSTRUCTING A TUBEWELL  
AT DEVANCHAL VIHAR, DEHRADUN DISTRICT, UTTARAKHAND***

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# ***REPORT ON THE FEASIBILITY FOR CONSTRUCTING A TUBEWELL AT DEVANCHAL VIHAR, DEHRADUN DISTRICT, UTTARAKHAND***

## ***I. INTRODUCTION***

A request was received from the Executive Engineer, Mechanical Division, Uttarakhand Jal Sansadhan Vikas Evam Nirman Nigam Dehradun for taking up hydrogeological investigation for constructing a tubewell at Devanchal Vihar, Dehradun district, Uttarakhand. M/s Bharti Consultancy Services, Dehradun deputed the author to take up the said investigation and submit a feasibility report.

Accordingly the author visited the office of the Executive Engineer, Mechanical Division, Uttarakhand Jal Sansadhan Vikas Evam Nirman Nigam, Dehradun. Sri Sunil Kumar, Assistant Engineer accompanied the author during the course of field investigation carried out on 21<sup>st</sup> November 2016. The report embodies summarized findings of investigations and has been prepared under the guidance of M/s Bharti Consultancy Services, Dehradun. The study area falls in survey of India toposheet No. 53 J/3.

## ***II. PURPOSE AND SCOPE***

The present hydrogeological investigation was aimed at finding out the feasibility of constructing a tubewell at Devanchal Vihar, Dehradun district, Uttarakhand. The water is mainly required for drinking purposes for augmenting the water supply to the local urban populace. The scope of the investigation includes:

- i Hydrogeological survey of the area.
- ii Assessing the suitability of ground water in the area for drinking purposes.
- iii Study and interpretation of existing hydrogeological data in and around the study area.

## ***III. GEOLOGY***

The area falls in the intermontane Doon Valley and is underlain by Recent to Sub Recent Doon Gravels, which lie over the Upper Siwalik Sediments. The Doon Gravel has been broadly divided in Older Doon Gravel and Younger Doon Gravel. The Older Doon

Gravel consists partly of crushed Upper Siwalik cobbles, angular pebbles of quartzites, slates and shales from the Nagthat, Chandpur and Tal formations and limestone pebbles from Krol limestone alternating with clay beds. The younger Doon Gravels rest unconformably over the Older Doon Gravels in the northern part. The disconformable relationship gradually disappears in the southern part. The Younger Doon Gravels are characterized by very large boulders in the alluvial fans and debris flow deposits and consists of moderately sorted mixture of clay, sand, gravels and boulders. The sandy and gravelly units are separated from each other by clay beds. The thickness of these units varies from place to place and also when traced laterally. The major part of Doon Valley and the area under study is occupied by the Younger Doon Gravel except isolated occurrences of Siwaliks and older sediments.

#### ***IV. HYDROGEOLOGY***

The Doon Valley being intermontane in nature receives heavy rainfall (2000 mm) during the monsoon. The area is characterized by high rate of infiltration because of being underlain by unconsolidated and unsorted material of Doon Gravels, having a high degree of porosity and permeability. Groundwater occurs under unconfined condition. Water levels are generally in the range of 45 to 50 m (Pre monsoon) below ground level in the area. Groundwater development in and around the study area is moderately low. The aquifers are composed mainly of sand, gravel and boulder.

#### ***V. CHEMICAL QUALITY***

In Dehradun area, the quality of ground water is reported to be fresh. In view of the requirement for drinking purposes, water samples must be analyzed to study its suitability for drinking purposes. For the said purpose BIS, IS: 10500 (1991) standards given in Annexure – I may strictly be followed.

#### ***VI. CONCLUSIONS***

Based on the field investigations and the available data, the following conclusions are drawn.



- i. Water is required mainly for drinking/domestic purposes.
- ii. Ground water quality in the area is reported chemically suitable for drinking purposes.
- iii. Fine to Coarse-grained sand, gravel and boulders form potential aquifers.
- iv. The depth to water level in the area is expected to be between 45 to 50 m below ground level.

## **VII. RECOMMENDATIONS**

Based on the field investigations and available data, following recommendations are made for constructing a tubewell at Devanchal Vihar, Dehradun district, Uttarakhand.

**Site Selection:** *A tubewell may be constructed in the Premises of Nagar Nigam land and near Bhairav Nath Shaktipeeth & Sanskaar School.*

The proposed site has been shown to Sri Sunil Kumar, Assistant Engineer, Mechanical Division, Uttarakhand Jal Sansadhan Vikas Evam Nirman Nigam, Dehradun who accompanied the author during the course of field investigation carried out on 21/11/2016.

- The drilling may be carried out by deploying a DR/Percussion/Dual Rotary Rig, down to a depth of 140 to 150 m below ground level.
- Electrical/Natural gamma ray logging must be conducted to decipher the exact depth of aquifer (water bearing layers).
- The borehole may be converted into a production well by tapping all the saturated granular zones below the depth of 70 m.
- A 305 mm (12" diameter) pipe assembly may be lowered down to the drilled depth. In view of long term water level decline, drawdown and seasonal fluctuation, a single line well assembly may be lowered.
- Any saturated granular zones encountered below the depth of 70 m bgl (excluding bail plug of 3 m) may be tapped through slotted pipe (the slot size shall depend on the nature of strata and grain size encountered in the borehole).
- The tubewell should be developed with air compressor followed by pump till the water becomes sand / silt free.
- The tubewell constructed to the recommended depth may give a sustainable discharge of about 1500 (lpm) liters per minutes for a moderate drawdown.

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**ANNEXURE – I****DRINKING WATER STANDARDS (IS: 10500:1991)**

<i>Sl. No.</i>	<i>Parameters</i>	<i>Desirable Limit</i>	<i>Permissible limit</i>
1.	Colour (Hazen Unit max)	5	25
2.	Odour	Un objectionable	--
3.	Taste	Agreeable	--
4.	p <sup>H</sup>	6.5 – 8.5	No relaxation
5.	Total Hardness as CaCO <sub>3</sub> (mg/l)	300	600
6.	Iron (Fe) mg/l	0.3	1.0
7.	Chloride (Cl) mg/l	250	1000
8.	Fluoride (F) mg/l	1.0	1.5
9.	Dissolved solids mg/l	500	2000
10.	Sulphate (SO <sub>4</sub> ) mg/l	200	400
11.	Nitrate (NO <sub>3</sub> ) mg/l	45	100
12.	Calcium (Ca) mg/l	75	200
13.	Magnesium (Mg) mg/l	30	100
14.	Copper (Cu) mg/l	0.05	1.5
15.	Cadmium (Cd) mg/l	0.01	No relaxation
16.	Chromium (Cr) mg/l	0.05	No relaxation
17.	Lead (Pb) mg/l	0.05	No relaxation
18.	Zinc (Zn) mg/l	5	15
19.	Manganese (Mn) mg/l	0.1	0.3