



# DETAILED PROJECT REPORT

*of*

## **RAIN WATER HARVESTING SYSTEM IN GANGTOK**



**Project Development & Management**

**Consultants**

Grant Thornton India LLP

**Gangtok Smart City Development Limited  
(GSCDL)**

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## ABBREVIATIONS

<b>ABD</b>	: Area Based development
<b>AMRUT</b>	: Atal Mission for Rejuvenation for Urban Transformation
<b>CBUD</b>	: Capacity Building for Urban Development
<b>CPWD</b>	: Central Public Works Department
<b>DPR</b>	: Detailed Project Report
<b>GoI</b>	: Government of India
<b>GSB</b>	: Granular Sub-base
<b>GSCDL</b>	: Gangtok Smart City Development Ltd
<b>GT</b>	: Grant Thornton
<b>HDPE</b>	: High Density Polyethylene
<b>HP</b>	: Horse Power
<b>lpcd</b>	: Litres Per Capita Per Day
<b>NGO</b>	: Non-Government Organization
<b>O&amp;M</b>	: Operation and Maintenance
<b>MCA</b>	: Multi Criteria Analysis
<b>PHED</b>	: Public Health Engineering Department
<b>PNUEA</b>	: National Programme for the Efficient Use of Water
<b>PVC</b>	: Polyvinyl Chloride
<b>RCC</b>	: Reinforced Cement Concrete
<b>RFP</b>	: Request for Proposal
<b>RSPM</b>	: Respirable Suspended Particulate Matter
<b>RWH</b>	: Rainwater Harvesting
<b>RWHS</b>	: Rainwater Harvesting System
<b>SCM</b>	: Smart City Mission
<b>SCP</b>	: Smart City Project
<b>SOR</b>	: Schedule of Rates
<b>SPV</b>	: Special Purpose Vehicle

# 1 INTRODUCTION

Sikkim is a prominent environmental conscious state in India. It has been pioneering in many environmental and social development schemes and policies to make sure that this small hilly state is able to protect its natural resources and environment. The economy of Sikkim is highly dependent upon tourism industry and thus the environment becomes such a paramount for the state. The tourist visiting the state of Gangtok are attracted due to its unique climate and thus the residents of state understand that how important it is for them to protect their livelihood.

The Smart City Proposal (SCP) of Gangtok city which mandates the implementation of projects for Rain Water Harvesting (RWH) which has been drafted keeping the aspirations of citizens on priority. RWH is itself a very effective environmentally friendly approach which is globally also dubbed as a green practice in terms of design of buildings and spaces by architects and planners to solve the issues of urbanizations which are keeping the groundwater table undisturbed and charging the aquifer.

## 1.1 Why do we need rain water harvesting?

Due to the increased urbanization level of existing cities in India, the modern cities are transforming into den of concentrated population with densely populated areas. The population residing in such area, generally results into uneven drawing of ground water due to water scarcity. Such unaccounted usage of ground water results into depletion of underground aquifers and river beds at places where there is high demand of domestic and industrial use of water. The extensive and unplanned usage of groundwater not only disturbed the natural water table but also results into contamination of ground water at many places thus making such water unfit for any use. If we are able to meet this demand of water from stored rain water, the dependence on underground water could be substantially reduced and there may be gradual repletion of ground water to its normal level.

In context of Gangtok, some of the issues that RWH sort out are not applicable for hilly region. Instead, it is very difficult for populous to extract water from underground source due to its topography and due to steep slope, most of the rain water easily run-off from the cities thus not creating the issue of water logging etc. The source of water supply for the city of Gangtok is the rain water which is stored in natural occurring catchment area and thus the city is already using the rain water for its existing need. Gangtok is witnessing a growth in population and number of tourists arriving in Gangtok and thus there is a pressure on existing water supply system prevalent in Gangtok. The city is witnessing a huge demand of potable water which

existing system is unable to suffice, especially during the tourist season and summer time. To meet the demand of potable water, it is envisaged by SCP Gangtok that decentralized system of storing rain water at its source can reduce the demand for piped water supply. Such stored water can be used for non-potable usage of water such as for toilets flush, washing & cleaning etc. Therefore, the Smart City SPV aims to develop a rain water harvesting system for existing institutions, schools or government building which will result in most sustainable usage of rain water for existing demand and thus reducing the pressure from piped water supply system of city.

## 1.2 Project Background

Due to increasing cost of treatment of raw water, along with the topographical conditions, deteriorating water quality from the source it is mandatory to search for another natural source of water which also minimizes the carbon emission. There is a renewed interest in decentralized water supply infrastructures. Rain water harvesting is becoming a good, sustainable unconventional water source which is attracting the attention of technology developers as well as users.

Several factors must be considered to develop general or national guidance for RWH. Although potable use is possible for harvested rainwater, necessary on-site treatment and perceived public health concerns are likely to limit the quantity of rainwater used for potable uses. Irrigation and the non-potable demands of water closets, urinals and heating, ventilation, and air conditioning make-up are the preferable end uses of harvested rainwater.

Utilizing harvested rainwater towards irrigation and certain non-potable indoor uses can considerably lower water demand while creating a balance and public comfort level between municipal potable water and reused rainwater.

The Rainwater harvesting resource guideline by the Central Public Works Department (CPWD) is a manual that provides guidance in the field of the design, installation, and management of domestic rainwater harvesting systems.

Engineers and planners, at some point of situation overlook the uses of Rain water harvesting systems, for these systems often require extra effort in the planning and development stages due to the diverse nature of these projects. Many smaller projects often combine to form a large rainwater harvesting project, such as collection tanks at individual homes, requiring inputs from a broad range of stakeholders. This often emerges as a drawback to a project and may require a more traditional system to be selected to avoid perceived issues, the need for community participation and consensus building.

With a view towards the improvement of urban centers of India and making them citizen-friendly and sustainable, the Union Ministry of Urban Development (MoUD), Government of India, has initiated the Smart Cities Mission. The program is concerned with urban renewal and retrofitting of 100 cities in India in collaboration with the State Governments and the respective City Authorities.

Setting up Rain water harvesting systems at hilly terrain such as the case in Gangtok is a challenge in the terms of topography where RWHS infrastructures becomes challenging to set up in such areas.

Gangtok Smart City Development Ltd (GSCDL) is interested in taking up the construction of Rainwater Harvesting System project on priority basis. As per the Smart City Proposal, the funding for this project is being sourced from Smart City Mission of Government of India. Although GSCDL is envisaging constructing Rainwater Harvesting System at many places within ABD, it is interested in taking up works at selected locations on priority.

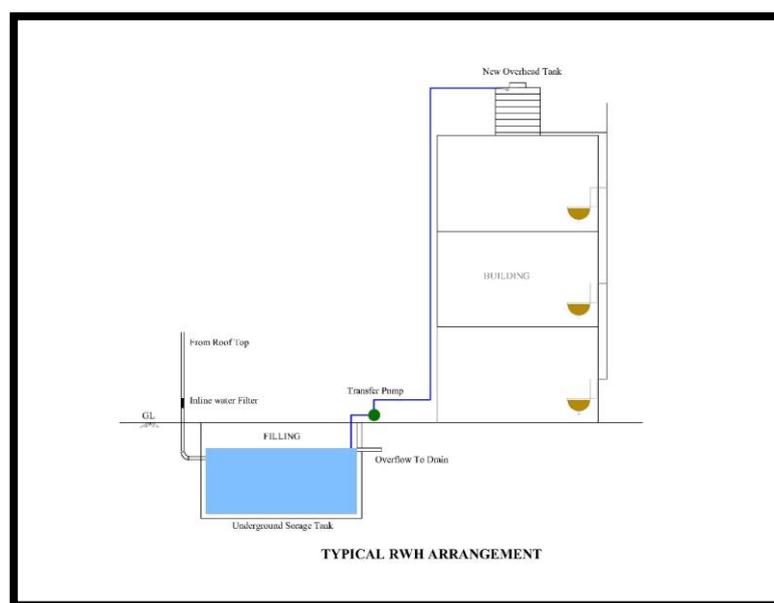
## 2 PROJECT DEFINITION AND CONCEPT

Rainwater harvesting (RWH) is a simple method by which rainfall is collected for future usage. The collected rainwater may be stored, utilized in different ways or directly used for recharge purposes. With depleting groundwater levels and fluctuating climate conditions, RWH can go a long way to help mitigate these effects. Capturing the rainwater can help store locally, recharge local aquifers, reduce urban flooding and most importantly ensure water availability in water-scarce zones. Though the term seems to have picked up greater visibility in the last few years, it was, and is even today, a traditional practice followed in rural India.

This water conservation method can be easily practiced in individual homes, apartments, parks, offices and temples too, across the world. Farmers have recharged their dry bore wells, created water banks in drought areas, greened their farms, increased sustainability of their water resources and even created a river. Technical knowhow for the rooftop RWH with direct storage can be availed for better implementation. RWH is an effective method in water scarce times, it is also an easily doable practice. Secondly with ample water source by adopting RWH we can reduce the burden on existing water supply schemes, so substantial water cost can be reduced upto some extent.

### 2.1 Methods of Rain Water Harvesting

Rainwater harvesting is the collection and storage of rainwater for reuse on-site, rather than allowing it to run off. These stored waters are used for various purposes such as gardening, flushing, irrigation etc. Various methods of rainwater harvesting are described in this section.



**Figure 1: Typical Arrangement of RWHS**

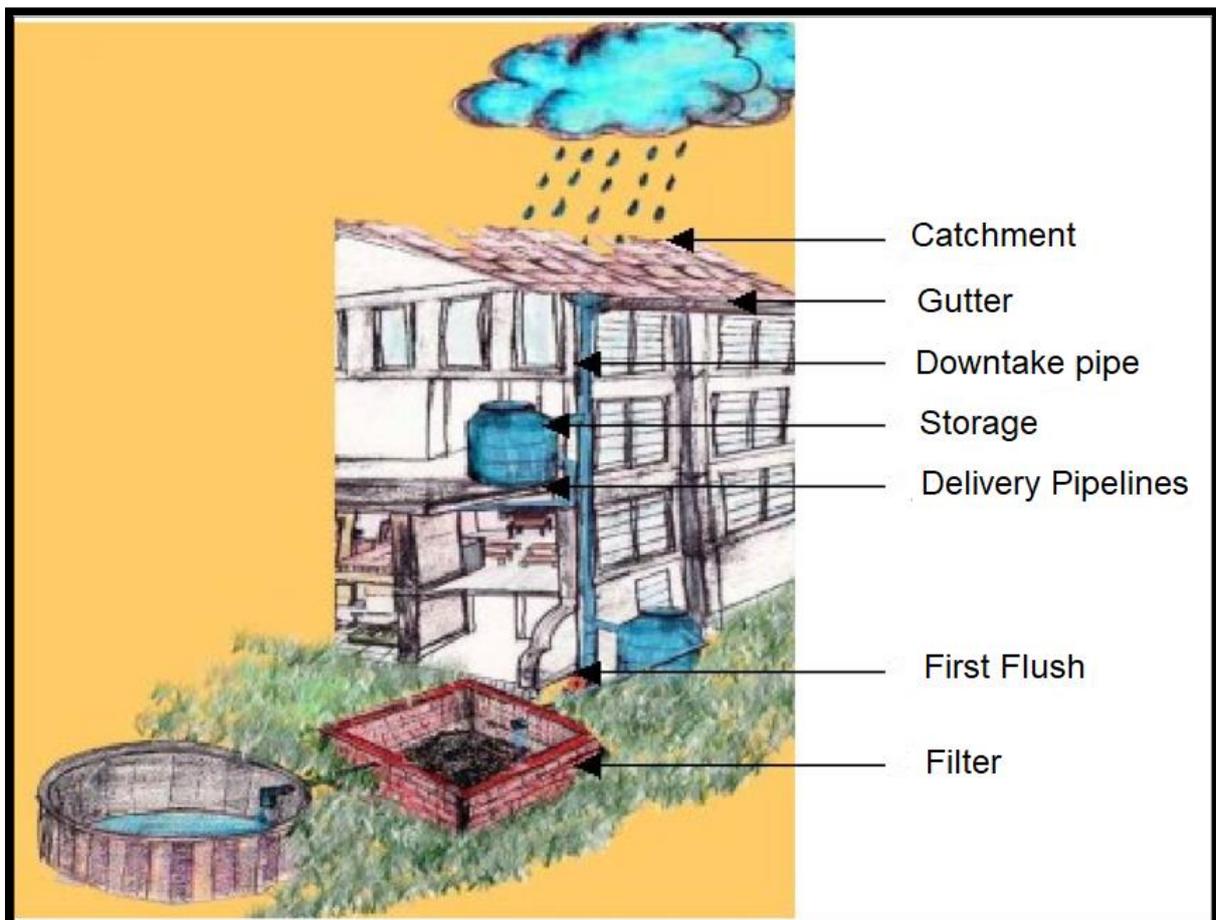
### 2.1.1 *Surface runoff harvesting*

In urban area rainwater flows away as surface runoff. This runoff could be caught and stored in the underground tanks for future use or simultaneously during rainy season.

### 2.1.2 *Rooftop rainwater harvesting*

It is a system of catching rainwater where it falls. In rooftop harvesting, the roof becomes the catchments, and the rainwater is collected from the roof of the house/building. It can either be stored in a tank or diverted to artificial recharge system. This method is less expensive and very effective and if implemented properly helps in augmenting the groundwater level of the area.

The illustrative design of the basic components of roof top rainwater harvesting system is given in the typical schematic diagram shown in Fig 2.



**Figure 2: Components of RWHS**

(Source: [https://www.researchgate.net/figure/The-basic-components-of-a-rainwater-harvesting-system-Source\\_fig1\\_281148459](https://www.researchgate.net/figure/The-basic-components-of-a-rainwater-harvesting-system-Source_fig1_281148459))

### 2.1.3 **Components of the Rooftop Rainwater Harvesting**

The system mainly constitutes of following sub components:

#### **a. Catchments**

The surface that receives rainfall directly is the catchment of rainwater harvesting system. It may be terrace, courtyard, or paved or unpaved open ground. The terrace may be flat RCC/stone roof or sloping roof. Therefore, the catchment is the area, which actually contributes rainwater to the harvesting system.

#### **b. Transportation**

Rainwater from rooftop should be carried through down take water pipes or drains to storage/harvesting system. Water pipes should be UV resistant (ISI HDPE/PVC pipes) of required capacity. Water from sloping roofs could be caught through gutters and down take pipe. At terraces, mouth of each drain should have wire mesh to restrict floating material.

#### **c. First Flush**

First flush is a device used to flush off the water received in first rainfall. The first shower of rains needs to be flushed-off to avoid clogging of filters, contaminating storable/rechargeable water by the probable contaminants of the atmosphere, birds shit and the catchment roof. It will also help in cleaning of silt and other material deposited on roof during dry seasons Provisions of first rain separator should be made at outlet of each drainpipe.

#### **d. Filter**

There is always some skepticism regarding Roof Top Rainwater Harvesting since doubts are raised that rainwater may contaminate groundwater. There is remote possibility of this fear coming true if proper filter mechanism is not adopted.

Secondly all care must be taken to see that underground sewer drains are not punctured, and no leakage is taking place in close vicinity.

Filters are used for treatment of water to effectively remove turbidity, suspended matters, leaves of tress and other organic matter. After first flushing of rainfall, water should pass through filters. A layer of gravel, sand is designed and placed on top of the storage tank. This filter is very important in keeping the rainwater in the storage tank clean. It removes silt, dust, leaves and other organic matter from entering the storage tank.

The filter media should be cleaned periodically after every rainfall event. Clogged filters prevent rainwater from easily entering the storage tank and the filter may overflow. The sand or gravel media should be taken out and washed before it is replaced in the filter

### 2.1.4 **Methods of Rooftop Rainwater Harvesting**

Various methods of using roof top rainwater harvesting are illustrated in this section.

#### **a. Storage for Direct Use**

In this method rainwater collected from the roof of the building is transported to a storage tank. The storage tank has to be designed according to the material availability, water requirements, rainfall and catchment availability.

Each drainpipe should have mesh filter at mouth and first flush device followed by filtration system before connecting to the storage tank. It is advisable that each tank should have excess water over flow system.

Excess water could be diverted to storm water drainage system. Water from storage tank can be used for secondary purposes such as washing and gardening etc. This is the most cost-effective way of rainwater harvesting, to reduce the treated water consumption.

The main advantage of collecting and using the rainwater during rainy season is not only to save water from conventional sources, but also to save energy incurred on transportation and distribution of water at the doorstep. This also conserves groundwater, if it is being extracted to meet the demand when rains are on.

#### **b. Recharging groundwater aquifers**

Groundwater aquifers can be recharged by various kinds of structures to ensure percolation of rainwater in the ground instead of draining away from the surface. Commonly used recharging methods are: -

- a. Recharging of bore wells
- b. Recharging of dug wells.
- c. Recharge pits
- d. Recharge Trenches
- e. Soak ways or Recharge Shafts
- f. Percolation Tanks
- g. Recharging of bore wells

Rainwater collected from rooftop of the building is diverted through drainpipes to settlement or filtration tank. After settlement filtered water is diverted to bore wells to recharge deep aquifers. Abandoned bore wells can also be used for recharge.

The mountains and the hills are the natural catchments for rain water. Gangtok has an average annual rainfall of 3736.8 mm and more than 80percent of this is received in monsoon. The excess water during monsoon goes as unused runoff and in dry season people face water

crisis. The best effective solution to deal with water crisis is “Rain water Harvesting”. The Smart City Mission (under Ministry of Urban Development, Government of India) programme is introduced at Gangtok with the main objective to harvest rain water.

## 2.2 System Plan

After examining of Geology and hydrogeology, we do recommend and proceed with the following steps:

### 2.2.1 *Collect the rain water*

The run-off from a structure or other impervious surface in order to store it for later use. Traditionally, this involves harvesting the rain from a roof. The rain will collect in gutters that channel the water into downspouts.

### 2.2.2 *Filtration of collected water*

Water that passes through the mesh (along with dust particles of less than 200 micron) enters the storage tank. About 10-20% of water, depending on the intensity of rainfall, gets rejected by the filter. Passing of 80-90% of roof water through the filter indicates very good and satisfactory performance.

### 2.2.3 *Store the filtered water*

We are storing the filtered water to the underground Modular Tank. This is a System subsurface water infiltration storage tank for storm water control and management system, and thus, it is also known as the Modular Rainwater Storage / Harvesting System, Underground Tank System.

## 2.3 Scope and Limitation

This report aims to understand the need of Rain water harvesting in hilly area and its benefits. There is no scarcity of water in Gangtok region, but it is necessary to search for the natural untreated source of water. To lower the burden of exiting Water supply system and distribution network. This is the very first case in Gangtok, Sikkim where systematic rain harvesting project at Pan-city level is initiated for implementation, under Smart City Mission using the modular technology. Hence, looking at the sustainability aspects of this system, it is a big stepping stone for city. It is also obvious that there remain some limitations in the study as briefly mentioned below:

1. In this region annual rain fall is about 3736.8 mm, which is such a huge quantity in terms of rain water availability from available catchment area. But due to hilly terrain

and less availability of open spaces there is limitations for developing required size of underground storage tanks.

2. In terms of cost recovery, the study focused mainly on the financial costs (operation and maintenance and the upgrading of services) but not on the economic cost recovery in detail through cost benefit analysis.
3. Quantity of water i.e. liters per capita per day (lpcd) is considered to analyze water supply service level of the households is based on National standard.

This study covers the design of RWH system for 15 administrative and educational blocks, conclusions and recommendations based on the findings.

The stored rain water is proposed to be used for gardening, flushing of toilets and other non-potable use and thus treatment of such water is not considered during the design of such systems.

Rainwater harvesting was an old practice that was gradually abandoned with the advent of modern technology in many regions around the globe as public water supply systems was being developed around the world. With the propulsion of expanding cities, the water supply system of cities was unable to cope up with rising demand and thus to meet the requirement the more sustainable approaches to urban water management, through re-naturalization of the urban water cycle or implementation of water conservation practices, advantages of techniques for using rainwater captured locally are being increasingly adopted. In regions where water resources are not abundant, or where demand put significant stress on available water resources, the alternative water sources are being explored. Also, the increasing requirements and costs of potable water are forcing cities to identify sources of water for non-potable uses. Uses compatible with non-potable water include car washing, cleaning of pavements, toilet flushing, irrigation of plants and gardens, street cleaning, sewer flushing and cooling processes. The potential for rainwater harvesting depends on volume of rainfall received, on storage capacity and catchment area of available roofs & other surfaces. The additional benefits of rainwater harvesting include reduction of runoff which results into reduction of floods frequency & magnitude, reduction of sewer/drainage overflows to sanitary systems such as wastewater treatment plant, thus increasing the system efficiency of such sanitary systems. However, in countries like India, only a few cases can be found even if significant potential exists. In this context, the capture and storage of rainwater could contribute to reduce water scarcity, pressure on water resources and reducing runoff and associated potential negative impacts. Currently, there is no policy document in state of Sikkim which regulates the utilization of rainwater harvesting systems in non-potable uses. However, the concept of smart cities in India talks about using the effective system to improve the living

index of concerned population and RWH is one of such initiative that cities at pan India levels are implementing within their cities. To implement such a system requires appropriate technical study in terms of use of technology to avoid potential dangers to public health, diffusion of inefficient technology and use locally available equipment's for constructing such a system.

In terms of availability of equipment for the capture and storage of rainwater, there are already some products in the Indian market. Also, the procurement can be done through companies that can buy the individual components from the manufacturers and provide the service of installing the systems in desired location. Also, the option of concrete tanks which can be built by any civil construction company is also a very feasible option both financially and technically. In practice the rainwater harvesting systems should suffice to following basic universal functions such as capture, transport, filtration, storage, distribution and treatment of rain water. The capture includes identifying the area of surface on which the rain falls called catchment surface/area. The transportation of such captured rain water is composed of components that allow water to travel from the catchment surface to the storage tank, including gutters and downspouts. The filtration involves removal of debris and dust from rainwater captured before storing in the tank. The first flush diverters and the roof washers are most feasible and economic measure to achieve the objective of filtration. The storage can be done in one or more tanks such as the underground water storage tank can be used for storage for long term storage and further for the distribution, the stored water can be pumped to overhead small tanks as per the requirements of service area for supply to requisite non-potable end usages using gravity. The treatment is applied only to potable systems, where filters and other methods are used in order to have the suitable water for human consumption which is not applicable at Gangtok and as the proposal is only for non-potable usage and hence it is not covered in reported general objective of this report is evaluation of viability of rainwater harvesting in non-potable urban uses for Gangtok city which is a substantiate requirement of this city at present. Hence, through this report we are trying to provide localized solution to one of the most prominent issue of the city as the pan-city proposal of SCP has large component of upgrading the existing water supply system of city which shows that it must be one of the most prominent issue that came out during citizens' participation exercise.

## 2.4 SWOT Analysis for implementing RWH system

Table 1: SWOT Analysis

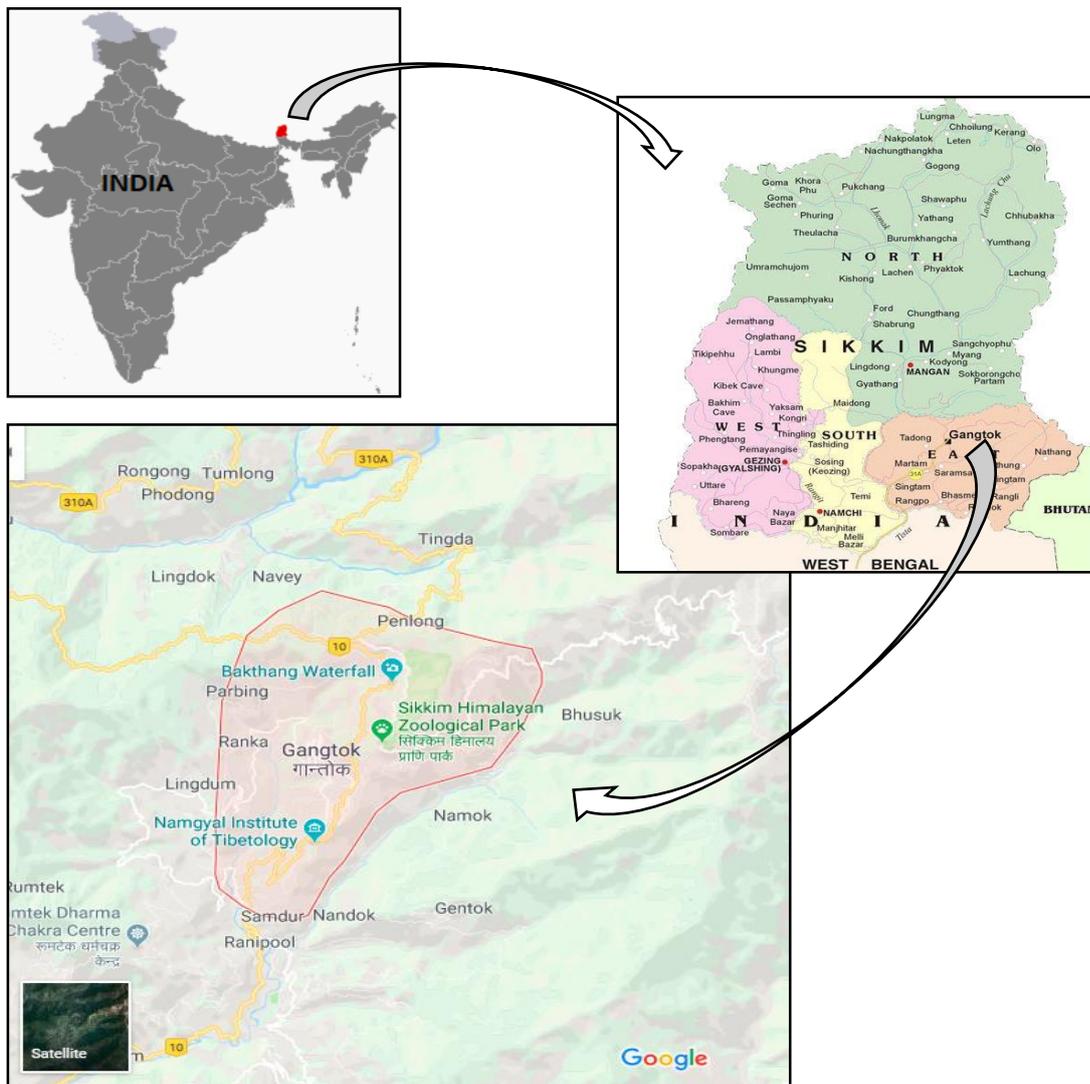
Strengths	Opportunities
<ul style="list-style-type: none"> <li>✓ Will reduce the consumption of supply water and associated cost.</li> <li>✓ Will reduce the exploitation costs of water supply systems</li> <li>✓ Will reduces the rainwater volume participation in wastewater and drainage network, contributing to control floods, efficient WTP and environment protection.</li> <li>✓ Will reduce the exploitation of ground water, if any, thus resulting into conservation of such water resources.</li> <li>✓ Technology used are easily comprehensible to understand, install, handle and maintain thus reducing the installation and maintenance costs.</li> <li>✓ The components and materials are easily available in the market.</li> <li>✓ The usage of untreated non-chlorinated water for non-potable uses is very beneficial to the plants, environment and people due to lack of any chemical content such as chlorine.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Technological innovations and bulk development of RWH system can reduce the initial investment cost.</li> <li>✓ The market of rainwater harvesting installation is being on rise and a greater number of solutions are available to choose.</li> <li>✓ In the context of climate change and environment this system is most viable option to choose to have direct positive impacts.</li> </ul>
Weakness	Threats
<ul style="list-style-type: none"> <li>❖ Limitation of harvested rainwater quantity in the tank due to the temporal variability of the precipitation.</li> <li>❖ The system requires a significant initial capital investment;</li> </ul>	<ul style="list-style-type: none"> <li>❖ Topographical constraints resulting into higher cost of development.</li> <li>❖ Without proper standards &amp; legislative push, the quality control and certification requirement of devices, systems and</li> </ul>

<b>Strengths</b>	<b>Opportunities</b>
<ul style="list-style-type: none"> <li>❖ Absence of development control norms and policies for regulating the rainwater harvesting.</li> <li>❖ Limitation and space constraint particularly in hilly areas like Gangtok.</li> <li>❖ Topographical limitation for installing the system.</li> </ul>	<p>equipment's could be absent which could result into sub-standard development.</p> <ul style="list-style-type: none"> <li>❖ Lack of proper information, citizen participation and awareness can result into non-acceptance of this technique.</li> <li>❖ The concentration and the intensification of precipitation phenomena requires a greater transport capacity from catchment surface to the tank and a larger tank volume to face the dry periods which tend to be drier.</li> </ul>

## 3 RAIN WATER HARVESTING IN GANGTOK CITY

### 3.1 City Profile

Sikkim (27° 05' to 28° 07' N latitudes and 87° 59' to 88° 56'E longitudes) lies between Nepal and Bhutan and is a small and beautiful state of India renowned for its natural beauty, rich biological diversity manifested by diverse eco-climatic conditions and wide altitudinal variation from 300 m to 8,598 m. Mount Kanchenjunga (8,598 m), the third highest peak in the world, strongly governs the relief features of the state which has a total geographical area of 7,096 Sq. Km. It is not only the highest but also the steepest landscape in the country, as the width of the Himalaya across its entire length is narrowest here. The annual mean rainfall and elevation show high variation over short physical distances.



Map 1: Location of Gangtok (Source: Google maps)

Gangtok is administered by the Gangtok Municipal Corporation along with the various departments of the Government of Sikkim, particularly the Urban Development and Housing Department (UDHD) and the Public Health Engineering Department (PHED). As the headquarters of East Sikkim district, Gangtok houses the offices of the district collector, an administrator appointed by the Union Government of India.

ABD area of Gangtok city is centrally located with an area of 366 acres with a population of about 30,000 and includes 6 municipal wards. Based on the baseline information available, discussions with citizens, public representatives, government officials and other eminent personalities, issues/concerns and development potentials were identified.

### 3.2 Rainfall

The mean monthly rainfall details for Gangtok city are shown below.

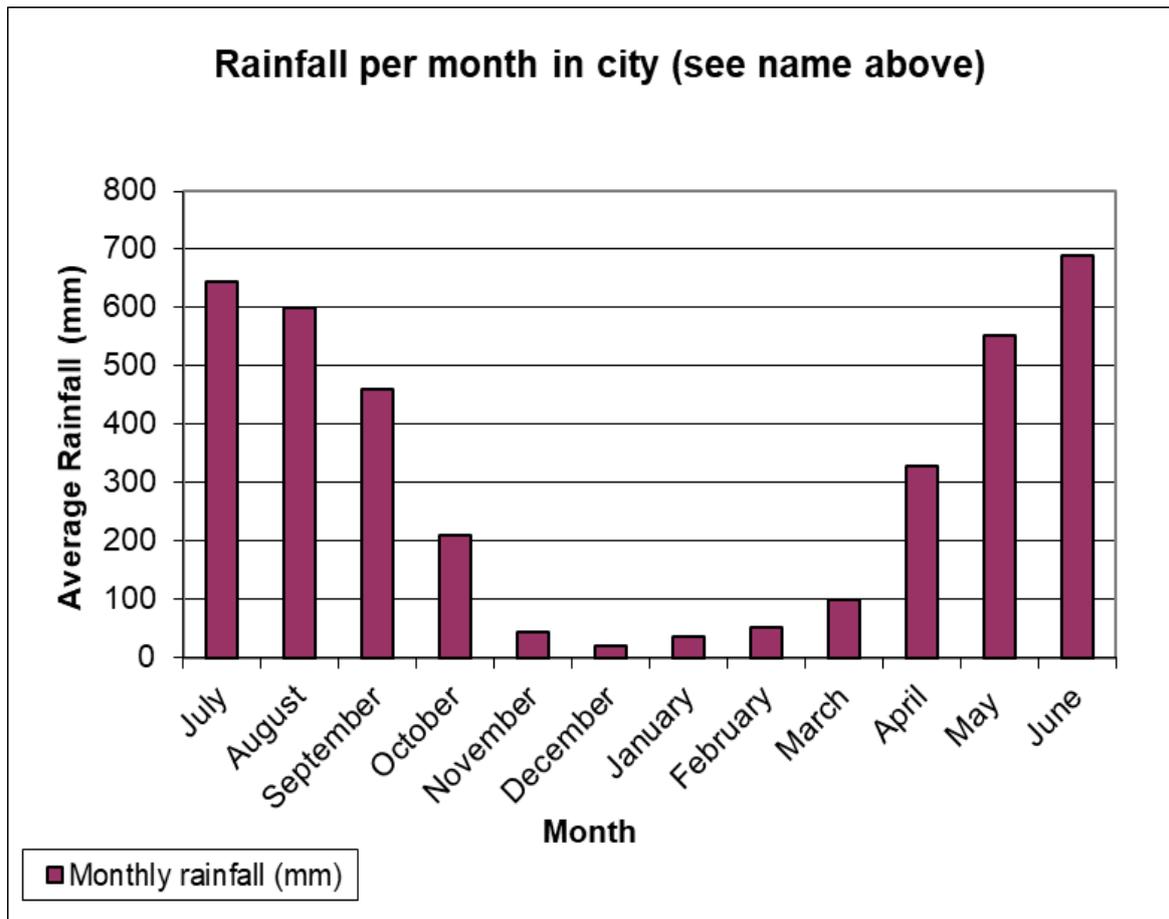
*Table 2: Mean monthly rainfall data for Gangtok city (PERIOD: 1971-2000)*

Month	Mean Temperature (°C)		Mean Total Rainfall (mm)	Mean Number of Rainy Days	Average Rainfall in mm
	Daily Minimum	Daily Maximum			
	Jan	4.2			
Feb	5.4	13.8	51.4	5.1	10.1
Mar	8.7	18.1	100.7	8	12.6
Apr	11.4	20.8	329.8	15.6	21.1
May	13.6	21.5	552	21.5	25.7
Jun	16	22.1	688.2	24	28.7
Jul	16.6	21.7	643.3	27.9	23.1
Aug	16.5	22.2	600.5	25.9	23.2
Sep	15.4	21.5	461.4	22.2	20.8
Oct	12.5	20.6	209.6	9.2	22.8
Nov	8.7	17.6	43.5	2.6	16.7
Dec	5.6	13.1	19.6	2	9.8
<b>Annual</b>	<b>11.2</b>	<b>18.9</b>	<b>3736.8</b>	<b>167.6</b>	

(Source: India Meteorological Department, Sikkim) <sup>1</sup>

The data is graphically represented as below:

<sup>1</sup> Website: <http://imdsikkim.gov.in/monthlymetparam.html>



*Figure 3: Mean monthly rainfall data for Gangtok City*

### 3.3 Project Scope and Study Area

Scope of rainwater harvesting manifests the possibilities of rainwater storage in an area or location. Though rain falls infrequently over space and time in the study area yet harvesting this available rainwater can provide water for regions where other sources are too distant, costly and limited. Once the rain water has been harvested, it can be used for crop production and lifesaving irrigation during the drought like conditions but here our intent to use harvested/ stored rainwater for toilet flushing, gardening, vehicle washing i.e. only limited to non-potable use. Consequently, the present section assesses the possibilities to capture the available rain water in the existing and proposed storages with the help of suitable strategies. Below explained that there are certain points which form the procedural steps while critically assessing the potential and scope for rainwater harvesting in an area. The points are as follows:

The starting point is the identification and quantification of naturally occurring runoff and its current use, through processing and interpretation of hydrological data.

Even when there is potential of harvesting runoff in the local areas, the runoff may already be committed to other uses in the downstream areas.

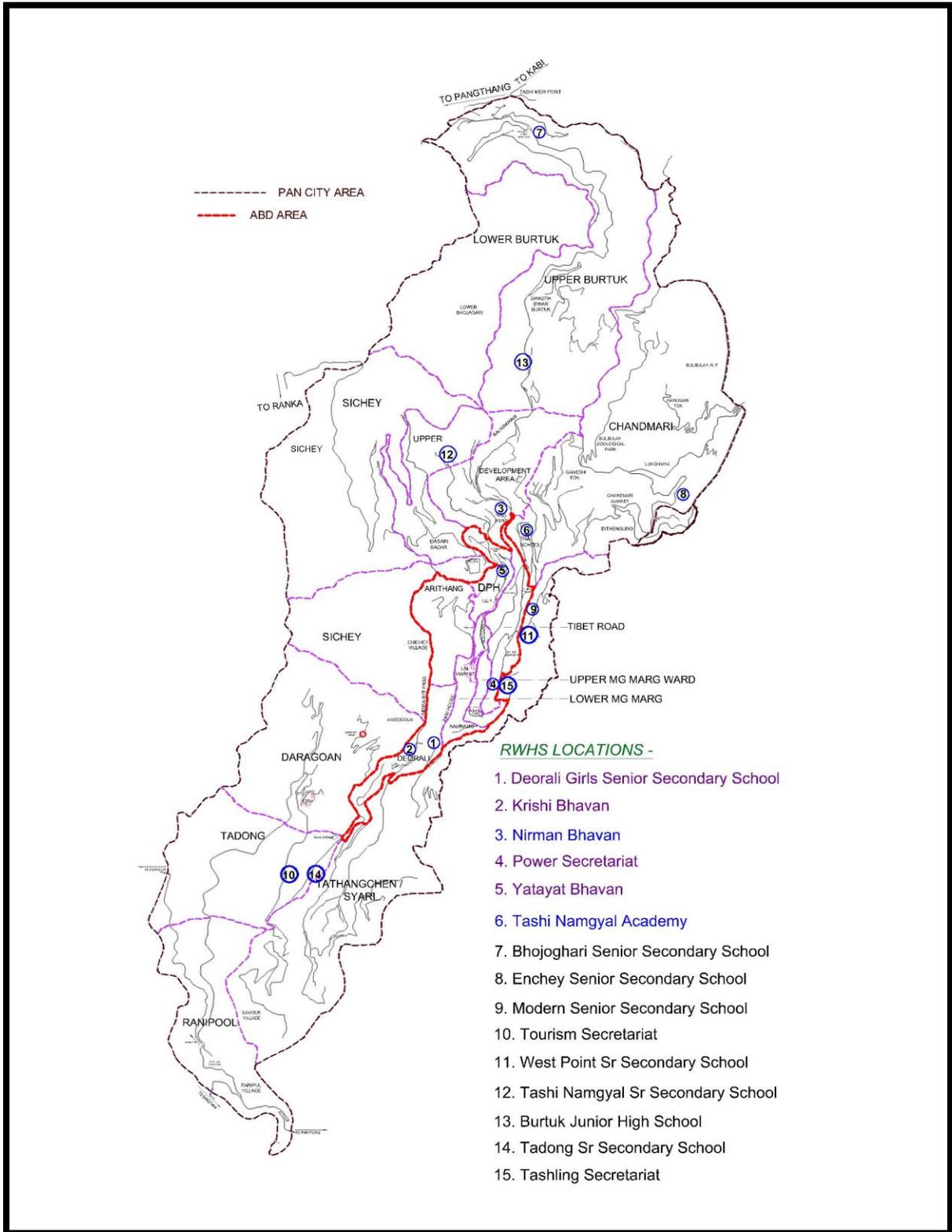
Harvesting in the local areas should therefore, be assessed in relation to other water uses in the catchment/ basin or other study units.

Taking into consideration all the foregoing points, scope of rainwater harvesting in the area has been evaluated. The following paragraphs consider those aspects which are thought to be significant in the study area while assessing the scope/potentials of rainwater harvesting.

Rainwater harvesting in the study area based on different characteristic. The criterion adopted gives a best suitable representation of areas in terms of scope and potential of rainwater harvesting. Eight variables have been taken into' considerations which are thought to be more significant for rainwater harvesting. Hence, combination of physical and topographical factors relevant for the present study. It is found that in different parts of the study area different factors are responsible for rainwater harvesting. Due to hilly terrain there is less availability of plain areas to construct underground storage tanks. As Gangtok area receiving huge rain fall about 3376.8 mm per year, it is not possible to store whole water due to various constraints. So, the maximum possibilities have been explored.

The locations selected are being suggested by the Special Purpose Vehicle (SPV) to implement RWH project. There are six locations considered in ABD area, out of which only three locations are situated within the boundary of ABD area and remaining three locations are situated at fringe area which are also considered within the influence of ABD area. Also, nine locations are being taken up at PAN City level. Selected locations are Government/ Private schools as well as Government institutions, i.e., Krishi Bhawan, Power Secretariat, etc. Prior approval is required regarding the site selected before floating Request for Proposal (RFP). As per SCP-Gangtok, Rain Water Harvesting proposal is only for ABD area.

Map 2 shows identified locations in Gangtok City for RWH System.



Map 2: Map showing locations identified for RWHS

### 3.4 Location Details

Following is the list of selected locations (ABD and PAN City Areas) for Rain Water Harvesting System in Gangtok.

#### ABD Areas

1. Deorali Girls Senior Secondary School
2. Krishi Bhawan
3. Nirman Bhawan
4. Power Secretariat
5. Yatayat Bhawan
6. Tashi Namgyal Academy

#### PAN CITY Areas

7. Bojoghari Senior Secondary School
8. Enchey Senior Secondary School
9. Modern Senior Secondary School
10. Tourism Secretariat
11. Tashi Namgyal Secondary School
12. West Point Senior Secondary School
13. Burtuk Junior High School
14. Tadong Senior Secondary School
15. Tashling Secretariat

### 3.5 Site Investigations Images

#### 3.5.1 ABD Areas



**Picture 1: Deorali Girls Senior Secondary School (Photo: GT, July 2018)**



**Picture 2: Krishi Bhawan (Photo: GT, July 2018)**



**Picture 3: Nirman Bhawan (Photo: GT, July 2018)**



**Picture 4: Power Secretariat (Left), Proposed location of RWH pit (Right) (Photo: GT, July 2018)**



**Picture 5: Yatayat Bhavan (Left), Proposed location of RWH pit (Right) (Photo: GT, July 2018)**



Picture 6: Tashi Namgyal Academy (Left); Proposed location of RWH pit (Right) (Photo: GT, July 2018)

### 3.5.2 PAN City Areas



Picture 7: Government Senior Secondary School, Bojoghari (Left), Proposed location of RWH pit (Right) (Photo: GT, July 2018)



Picture 8: Enchey Senior Sec. School (Left), Proposed location of RWH pit (Right) ; Photo: GT, July 2018



Picture 9: : Modern Senior Sec. School (Left); Identified location for RWH Pit (Right) (Photo: GT, July 2018)



Picture 10: Tourism Secretariat (Left); Identified RWH Pit location (Right); (Photo: GT, July 2018)



Picture 11: West Point Senior Sec. School (Left); Identified RWH Pit location (Right); (Photo: GT, July 2018)



*Picture 12: Sir Tashi Namgyal Sr. Sec. School (Left); Identified location for RWH Pit (Right) (Photo: GT, July 2018)*



*Picture 13: Burtuk Junior High School (Photo: GT, July 2018)*



**Picture 14: Tadong Sr. Sec. School (Left); Identified RWH Pit location (Right) (Photo: GT, July 2018)**



**Picture 15: Tashiling Secretariat (Photo: GT, July 2018)**

The Layout Plans of the above identified sites are annexed in Annexure 10.1

## 4 SITUATIONAL ASSESSMENT – GANGTOK

Site Visit Records for Rainwater Harvesting system in Gangtok are annexed in Annexure 10.2

### 4.1 Technical Dimensions

Under the “Technical” dimension, five core factors of Quantity, Accessibility, Reliability, Quality (QARQ) and the physical status of the system have been considered. Users were asked about access to the water supply services in terms of quantity, accessibility, reliability and quality (QARQ). Regarding quantity, 30 % of the total interviewed users responded to have water sufficiency for all year round whereas 40% of the users mentioned availability of water ranging from 5 to 10 months a year based on the storage capacity and the number of users. As we are developing the project only for educational institutions and administrative institutions there is no issue of accessibility of water. It is also observed that there is insufficient water supply from; local PHE department throughout the year, maximum in summer portion of the year.

**Table 3: Technical Analysis for all locations**

Sl. No.	Location	Building's Roof under Rain water catchment (In Sqm)	Possible collection of Rainwater /Day considering Intensity of rainfall 75 MM/Hour or Day (In Litres)	Possible water collected in Litres per Annum 3736.8 mm (In Litres)
<b>ABD Areas</b>				
1	Deorali Girls Senior Sec School	1557.38	89355	44,51,993
2	Krishi Bhavan	753.18	43214	21,53,079
3	Nirman Bhavan	898.68	51562	25,68,999
4	Power Secretariat	1271.12	72931	36,33,693
5	Yatayat Bhavan	419.85	24089	12,00,207
6	Tashi Namgyal Academy	4585	169314	84,35,882
<b>PAN City Areas</b>				
7	Bojoghari Senior Sec School	582.5	33421	16,65,165

Sl. No.	Location	Building's Roof under Rain water catchment (In Sqm)	Possible collection of Rainwater /Day considering Intensity of rainfall 75 MM/Hour or Day (In Litres)	Possible water collected in Litres per Annum 3736.8 mm (In Litres)
8	Enchey Senior Sec. School	579	33220	16,55,160
9	Modern Senior Sec School	1217	69825	34,78,979
10	Tourism Secretariat	455	26106	13,00,687
11	West Point Senior Sec School	1006.40	57742	28,76,960
12	Tashi Namgyal Senior Sec School	817.55	46907	23,37,091
13	Burtuk Junior High School	227.9	13076	6,51,487
14	Tadong Senior Sec School	360	20655	10,29,115
15	Tashiling Secretariat	2475	142003	70,75,164
	<b>TOTAL</b>	<b>17206</b>	<b>893418</b>	<b>4,45,13,661</b>

**Considerations:**

*Runoff Co-efficient of the roof (standard) = 85%*

*Filter Efficiency (standard)= 90%*

### 4.1.1 Basic Calculation

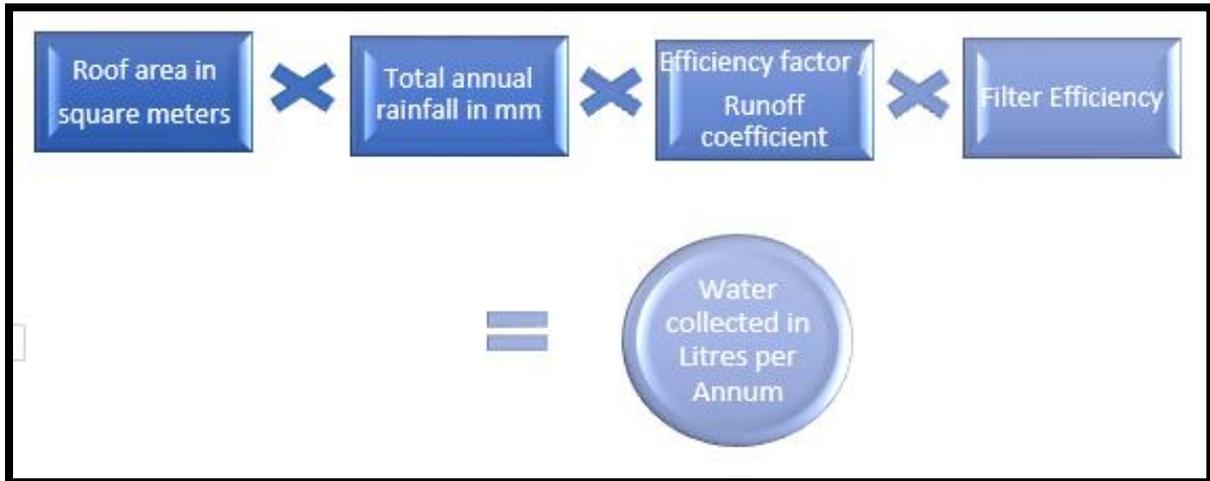


Figure 4: Basic Calculation for possible rain water collection

## 4.2 Environmental Sustainability

Now on this stage of urbanization Sikkim it is necessary to understand the methods of harvesting the water to make the future generation to mitigate the issues regarding. Under “Socio-Environmental” dimension of rainwater sustainability, the core factors were identified as improved sanitary practices, health status and hygiene behaviors, water facility to the users and social equity, gender and social inclusion in the program, reduction in struggle of fetching water and environmental aspects and the climate change effects. All 15 Locations from Gangtok, users were found to be reasonably aware of the importance of sanitation and hygiene. Also found the remarkable awareness about the conservation of water among the students and authorities visited.

More than 80 % of the users in the project area reported to have toilets in their premises. Similar trend is noticed in case of hand-washing with soap during critical times. Decline in incidences of waterborne diseases, such as diarrhea, dysentery, typhoid etc., was reported by nearly 90 % of the users. Regarding gender and social inclusion, there has been a remarkable positive change in this front. The information revealed that there are many environmental related issues that people have been experiencing over the period of about two decades. Briefly it can be summed that, rainwater harvesting has been proved as the most appropriate and the best option in the given context and is the most suitable adaptation method to the given environment. It is also observed that there is water shortage in many schools in Gangtok due to inadequate supply and non-availability of basic water supply infrastructure.

- Rainwater harvesting has been proved as the most appropriate and the best option in the given context and is the most suitable adaptation to the given environment.
- It has several benefits as it reduces soil erosion, gulley formation and triggering landslides by catching rain before reaching to the ground
- Further added that monsoon rain is also highly fluctuating in terms of its timing. The normal trend is that the monsoon rains are getting pushed further expanding the dry duration gradually.

### 4.3 Institutional Dimensions

In the similar manner under “Institutional” dimensions of the sustainability core factors identified include functioning of users’ institutions, administrative blocks its functioning of selected locations, skills and capacity of trained rainwater harvesters, transparency about the fund and linkages with other government and non-government organizations in the locations. Regarding functioning of users, the findings indicate that more than 90 % of the respondents at institutional level affirmed that it is virtually inactive at present. Simultaneously it is also observed that all the users from various location selected are highly motivated to implement the harvesting project from social and environmental point of view.

### 4.4 Cost Recovery

Under “Cost Recovery”, the core factors identified are managing funds for O&M of RWH systems, managing replacement fund of systems and diversified use of the local fund. Cost recovery in case of RWH system is the full responsibility of the concerned institutions. The major question here is: how and where will the money be coming from to recover these costs? Have RWH systems created opportunities for the institutions. The purpose of this project is not to earn the money. But to save treated water to reduce the Burdon of the existing WTP for effective and sustainable water supply management. Also, to reduce the burden on natural water sources.

### 4.5 Effectiveness of Technology

The feasibility of rainwater harvesting in a locality like Gangtok is highly dependent upon the amount and intensity of rainfall. Other variables, such as catchment area and type of catchment surface, usually can be adjusted according to household/institutional needs. As rainfall is usually unevenly distributed throughout the year, rainwater collection methods can serve as only supplementary sources of usable water. The viability of rainwater harvesting systems is also a function of: the quantity and quality of water available from other sources; user size and per capita water requirements; and budget available. The decision maker has

to balance the total cost of the project against the available budget, including the economic benefit of conserving water supplied from other sources

Accounts of serious illness linked to rainwater supplies are few, suggesting that rainwater harvesting technologies are effective sources of water supply for many household/Private-Government institutional purposes. It would appear that the potential for slight contamination of roof runoff from occasional bird droppings does not represent a major health risk; nevertheless, placing taps at least 10 cm above the base of the rainwater storage tanks for above ground storage system allows any debris entering the tank to settle on the bottom, where it will not affect the quality of the stored water, provided it remains undisturbed. Ideally, storage tanks should have cleaned annually, and sieves/online filter should have fitted to the gutters and down-pipes to further minimize particulate contamination. A coarse sieve should be fitted in the gutter where the down-pipe is located. Such sieves are available made of plastic coated steel-wire or plastic and may be wedged on top and/or inside gutter and near the down-pipe. It is also possible to fit a fine sieve within the down-pipe itself, but this must be removable for cleaning. A fine filter should also be fitted over the outlet of the down-pipe as the coarser sieves situated higher in the system may pass small particulates such as leaf fragments, etc. A simple and very inexpensive method is to use a small, fabric sack, which may be secured over the feed-pipe where it enters the storage tank.

#### 4.6 Project Benefits

- ✓ Rainwater harvesting significantly reduces potable water use. A well-designed house will save about 90,000 litres of rainwater each year, particularly in the toilet, Gardening, washing vehicles which are year-round uses. This saving at a household/institutional level changes the long-term demand for water across the city, smaller treatment plants, smaller pipes, smaller pumps and less pumping, smaller dams and if desalination plants are required they need only be half the size.
- ✓ Rainwater harvesting reduces storm water peak flows and total volume. This improves water quality and waterway health. It reduces the cost of infrastructure to manage storm water, the amount of land required for wetlands and reduces the cost of flooding. In a drought situation rainwater harvesting continues to provide water long after all runoff into dams, ceases. Rainwater harvesting is therefore climate change resilient for both droughts and intense rain events.
- ✓ Reduces Draw on Stressed Systems (Conserve Water): Aging water infrastructure is expensive to update, and groundwater and reservoirs are often overdrawn. When you supply a portion of your own water from the rain that falls on your roof, you reduce your draw on these stressed systems.

- ✓ Protects Local Watershed (Reduce Pollution & Erosion): When rainwater infiltrates onsite, it is filtered naturally by the earth, and is prevented from entering storm drains and surface waters as polluted runoff. Left unmitigated, rainwater sheets off hardscapes collecting contaminants along the way. When storm water runs heavy, it causes stream banks to erode as well, causing further damage to our sensitive waterways and wildlife habitat.
- ✓ Reduces Carbon Footprint (Mitigate Climate Change by Reducing Energy Use): There is a strong nexus between energy and water in our modern world. In India, over 20% of per-capita energy use is dedicated to treating, heating, and transporting water! By reducing your reliance on pumped and treated water sources, you are contributing to a collective savings in energy.
- ✓ Increases the Health of (Mitigate Climate Change with Healthier Plants & Soils): It's no coincidence that rainwater better than any other water source. Not only is rain free of the salts, chemicals and minerals found in other water sources; by nature's design it has the perfect pH balance and nitrate delivery, ready for uptake by your thirsty garden. Benefit from the beauty of a healthy garden ecosystem, while the earth benefits from all that a healthy garden provides- including cleaner air, carbon sink, pollinator habitat, and more!

## 5 PROJECT FINANCE STRUCTURE

### 5.1 Financial Viability & Sustainability

The total project cost for rain water harvesting is amounting to INR 16,25,40,295/- (**Ref Table 7**) as per the detailed analysis, design and costing of all scheduled and non-scheduled items for all 15 locations identified to undertake the RWH project. For ABD area the project cost is Rs. 6,73,96,379. For remaining locations at Pan city level, the project cost is Rs. 9,51,43,916. The total earmarked funds for RWH project under Gangtok Smart City Proposal are INR 15 Crores. Further division of earmarked funds as per SCP shows that Rupees Five crores will be sourced from smart city funds (i.e. Rupees Two & a half crores each from Government of India and State Govt. smart city grants). Rupees Two Crore as a convergence from AMRUT/ CBUD funding that State of Sikkim has received in form of grants from Government of India under the said schemes and remaining eight crores will be sourced from Gangtok State (Parastatals). As per the mandate of government of India the selected cities under SCM are being mandated to make expenditure for any such projects in similar pattern as per the approved SCP. The table below provides the for the said project.

*Table 4: Percentage distribution and project funding for 6 Location of ABD Area*

S. No.	Source of Funding	Percentage Distribution of Funds earmarked	Actual funds to be utilized for project
1	Gol-Smart City Grant	16.67	11,234,976
2	State Government Smart City Grant	16.67	11,234,976
3	AMRUT/CBUD	13.33	8,983,937
4	State (Parastatals)	53.33	35,942,489
	<b>TOTAL</b>	<b>100.00</b>	<b>6,73,96,379</b>

The project finance for PAN City falls under the purview of GSCDL in terms of from where the finance for said locations shall be sourced to undertake this project.

Table 5: Percentage distribution and project funding for 9 Locations in Pan city area

Sl. No.	Source of Funding	Percentage Distribution of Funds earmarked	Actual funds to be utilized for project
1	Gol-Smart City Grant	16.67	To be decided by GSCDL
2	State Government Smart City Grant	16.67	
3	AMRUT/CBUD	13.33	
4	State (Parastatals)	53.33	
	<b>TOTAL</b>	<b>100.00</b>	

## 5.2 User Interview

To collect the user data, the site, visit at every location completed. The interview plan with the selected locations was made and the concerned authorities were pre-informed about the date, time and purpose of the visit to their premises. Ideally interviewed with the respective administrative, engineering department. However, it was not possible in all cases to attend interview by head of the department or institutions because of other important institutional works. In this manner, a total of 15 locations in ABD as well as PAN City Areas were visited and interviewed with a help of semi-structured questionnaire (Annexure 10.3).

To analyze the sustainability of the system four key sustainability dimensions:

- Technical
- socio-environmental
- institutional and;
- cost recovery

were defined and the corresponding core factors and sub factors contributing to these dimensions were identified. The core factors and sub factors were given weightage following the Multi Criteria Analysis (MCA) method.

## 6 RECOMMENDATION OF METHOD AND MATERIAL FOR STORAGE FOR HILLY REGIONS

Most commonly used types of rainwater harvesting storage tanks are:

- a. Concrete tanks
- b. Plastic tanks
- c. Metal tanks
- d. Rain barrels
- e. Open water reservoirs
- f. Modular underground tanks

### 6.1 Advantages and disadvantages of Modular Underground storage tanks

#### 6.1.1 *Advantages*

- **Versatility:** A modular tank can be used for a variety of reasons. The most common kinds of modular tanks are used for storage purposes. These tanks can contain large amounts of liquids, compressed gases or other substances. These tanks are employed for both short term and long-term use.

Other than storage, modular tanks are used for transportation, indoor usage, as liners as well as for emergencies. Their ability to be adaptable to the unique requirements of the client is their biggest advantage.

- **Durability:** Another factor that is integral to the design of a modular tank is its material. *ModuTank* is currently designing tanks made with steel, collapsible fabric, plastic, fibre-reinforced plastic amongst many others.

The material used to construct and design the tank is decided based up on the expected use of the tank, the kind of maintenance it would require and the potential wear and tear it might experience. By accounting for all these, *ModuTank* is able to arrive at a material that is the most durable for the intended usage.

- **Longevity:** The life of a modular tank is long and steady. Owing to its customized designing and durable material, a modular tank can withstand a good amount of wear

and tear. If the tank is in regular use, then with a regular yet minimal maintenance, the tank can deliver on its functions for a long time. This is what makes them a smart investment Sustainability of Interventions.

- **Cost Effective: ModuTank** can meet client requirements within the proposed budget. Therefore, not only is the client able to meet his budgetary stipulations, he is also able to guarantee the durability of the product.

Modular tanks are cost-effective in terms of utility too. Considering the massive storage capacity of such tanks, they are often used by a group of individuals/organizations or a community. Hence, these partnerships incur significantly less cost in buying a collectively owned modular tank.

- **Technologically Relevant:** Modular tanks can stay in touch with the current technology in the market. For instance, modular tanks intended for rain water harvesting, would be able to integrate and function smoothly along with the latest technological inventions in rain water harvesting.

By accounting for the latest and the most updated technological interventions, ModuTank can design and conceptualize modular tanks that can work well with any new technology. In addition to that, modular tanks are also able to adapt to new interfaces and systems that might come up after its installation. Their ability to keep pace with technology is an advantage.

Modular tanks are a demand driven product. There is an increasing demand, worldwide, for products that function optimally, are cost effective and can ensure safety. Thus, modular tanks have emerged as safe and reliable investment option for people/organizations looking for durable and sustainable solutions.

### 6.1.2 *Disadvantages*

- Not easily accessible
- Installed and repaired by expert's Maintenance / repair
- May require excavation

## 6.2 Modular Technology Details

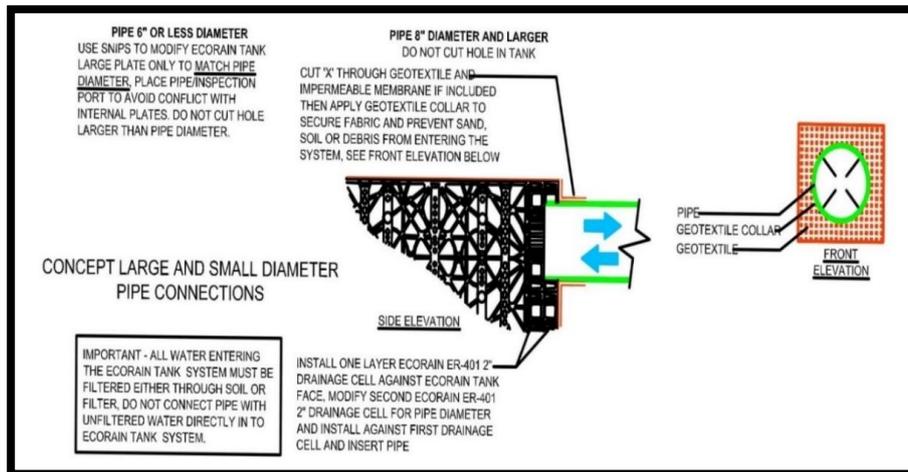


Figure 5: Modular Technology Details

### 6.2.1 Installation Procedure

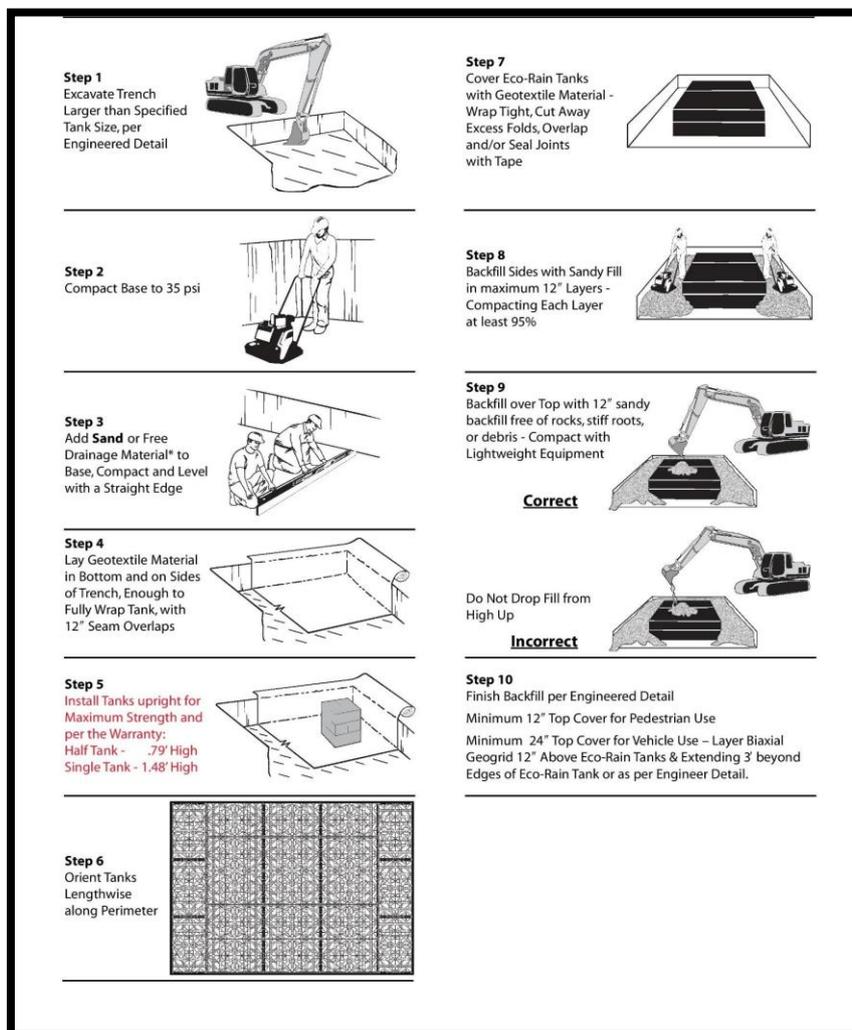


Figure 6: Installation Procedure of Modular Technology

### 6.2.2 Recommendation of method and material w.r.t hilly regions

Below mentioned comparison for rainwater harvesting technology modular versus conventional.

**Table 6: Comparative statement of Modular vs Conventional System**

<b>Modular Cross wave Technology</b>	<b>Conventional RCC Civil Pit</b>
Online Pre-Filter easy to clean	De silting Chamber with Jump walls cumbersome & costly cleaning process
Added Geotextile filter	Pit size depth to provide for 2.0 Mtr. for Filtration, effective holding volume nearly 25-30%
Pit size for the effective holding volume is good enough	50 Cum Pit = 20 Cum effective holding volume.
	Create RCC structure like a well time-consuming construction
Backfill with Soil – Non time consuming	One direction percolation
5-sided percolation	Non-load bearing surface
Load bearing structure	Desalting Chamber with Jump walls cumbersome & costly cleaning process

## 7 ENVIRONMENTAL IMPACT ASSESSMENT

Baseline environment information is used in the assessment of impact from the proposed activities in planning and implementation of mitigation measures. Baseline data on various environmental parameters was collected and the same is presented here. As, the pipeline is a linear activity, information on the 100m width of the alignment is considered. However, the regional information on the –

- Air & Noise environment,
- Water environment including surface and ground water,
- Land environment
- Biological environment/Ecosystem (Flora/Fauna), and
- Socio-economic aspects

were assessed through primary surveys, field monitoring and existing secondary data / information. Integration of these parameters gives an overall perception of positive and negative impacts due to construction of Rain Water Harvesting Components for bulk water storage Air Environment This region has a tropical monsoon climate that borders on a tropical wet and dry climate. Overall climate is equable with high rainfall days and very few days of extreme temperatures. The temperature varies from 4°C to 22°C. In winter temperature is between 4°C to 7°C while summer temperature ranges from 15°C to 22°C. The annual average rainfall is about 3376.8 mm.

Air pollution mainly compounded by the transportation sector, & domestic fuel consumption. However, in urban areas due to large green area the air quality is generally good. The current Rain Water Harvesting project is distributed in whole Gangtok City the contribution to air quality will be from transport sector before, during and operational stages of the project besides the impact of construction activity. As the core transportation sector presently consists mainly of petrol and diesel driven vehicles, the major air pollutants contributed by the automobile exhaust emissions, consist of; Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM), Oxides of Nitrogen and Sulphur dioxide, Carbon Monoxide etc. Presently many of these air pollutant concentrations are being monitored by the Environmental & Wild Life Department at some locations in urban area and by the Sikkim State Pollution Control Board at some selected important intersections of the city. However, there are no sampling stations in this Urban area. The baseline air quality was therefore needing to carry out at locations where construction activity for Rain Water Harvesting components are expected there monitoring was done by using high volume sampler The Sulphur

dioxide was analysed using waste and Geake method and NO<sub>x</sub> using Jacob and Hochheiser modified method and RSPM by gravimetric method.

Noise Level affects the serenity of the environment and poses health and communication hazards. The intensity of noise is measured in decibel (dB). The intensity of more than 65 dB becomes alarming from pollution point of view. At the construction sites, the intensity of noise usually will be much higher for which safeguard measures will be adopted so that the noise pollution could be controlled. To collect the base line data on noise pollution various land use pattern were chosen such as hill section, Clear Zone, Chowk. Noise levels are monitored by using Skypak decibel meter.

## 8 PROJECT COST

### 8.1 Total Project Cost

The total Project cost has been worked out as per SOR 2012, taking escalation at the rate of 46.7% (6.46% per annum for a period of six years) from 2012 to 2018<sup>2</sup>. The table below shows the project cost: -

**Table 7: Total Project Cost for all locations**

S. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Rate	Unit	Quantity	Amount (in INR)
<b>SOR Items</b>						
1	2.1//SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	5.69	Sqm	1100.00	6263
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	146.26	Cum	7175.52	1049512
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	222.37	Cum	1793.88	398910

<sup>2</sup> Report on CPI Numbers on Base 2012 for the Month of June 2018 for Sikkim, Press Information Bureau (Page 8)

S. No.	Ref. SOR- 2012/DSR-2016/ Rate Analysis	Particulars	Rate	Unit	Quantity	Amount (in INR)
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	223.32	Cum	1195.92	267075
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	392.71	Cum	1793.88	704476
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.	99.92	Cum	7440.95	743518
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.	0.00		0.00	0
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20mm & down size)	7923.77	Cum	258.23	2046116
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	6727.86	Cum	1013.70	6820027
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro- reflectorized cautionary, mandatory and informatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade	0.00		0.00	0

S. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Rate	Unit	Quantity	Amount (in INR)
		cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	7110.30	NO.	34.00	241750
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	3905.97	each	376.00	1468644
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar (1cement and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.	7883.90	Cum	565.00	4454402
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.	0.00		0.00	0
	9.3.2	1:4 mix.	243.25	Sqm	1050.00	255413
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm-yard manure or/and good earth to be paid for separately)	23.93	Cum	144.00	3446

S. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Rate	Unit	Quantity	Amount (in INR)
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)	0.00		0.00	0
	i	In rows 15 cm apart in either direction	29.65	Sqm	144.00	4270
	ii	In rows 7.5 cm apart in either direction	53.20	Sqm	0.00	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	90.70	Sqm	61.00	5532
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete	0.00		0.00	0
	23.3.1	15 mm dia G I pipe	264.92	Rmt	7300.00	1933915
	23.3.2	20mm dia G I pipe	336.30	Rmt	5100.00	1715112
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:	0.00		0.00	0
	23.9.2	STOP COCK 15 MM DIA	685.92	each	72.00	49386
	23.9.4	GATE WAY VALVE 20MM DIA	1024.64	each	48.00	49183

S. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Rate	Unit	Quantity	Amount (in INR)
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	504.69	each	46.00	23216
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE	0.00		0.00	0
		1000 LITERS CAPACITY	12702.00	No.	48.00	609696
		<b>Sub Total for SOR items</b>	(i)			<b>2,28,49,861</b>
		<b>Add GST</b>	10% on (i)			<b>22,84,986</b>
		<b>Total for SOR Items</b>	<b>A</b>			<b>2,51,34,848</b>
<b>NON-SOR Items</b>						
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	125.73	Cum	6018.25	756659
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.	0.00		0.00	0
		Add for dewatering @ 5% of cost, of Excavation	0.00	LS	0.00	120999

S. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Rate	Unit	Quantity	Amount (in INR)
21	Rate Analysis (Ref: -Annexure 10.4.1)	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete as directed by Engineer-in-Charge.	776.00	Cubic Meter	763.95	592825
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	824.06	Sqm	7306.00	6020590
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Brick % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	82.00	Sqm	14452.00	1185064
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	28572.90	Each	209.00	5971736
25	Rate Analysis (Ref: -Annexure 10.4.5)	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born	15522.75	Cubic Meter	3058.00	47468571

S. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Rate	Unit	Quantity	Amount (in INR)
		chemicals, bacteria & bitumen and flow rate capacity about 0.019Cu.m/Sec for recharge/storage tank.				
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	NO.	0.00	0
27	Quotation (Ref: - Annexure 10.5.3)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	391.00	Rmt.	2112.00	825792
28	Quotation (Ref: - Annexure 10.5.4)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend, 250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	2571.00	Rmt.	4500.00	11569500
29		Supply and fixing of specials of including 250 mm Half Round Bend, 250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH	0.00	LS	0.00	375000

S. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Rate	Unit	Quantity	Amount (in INR)
		Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.				
30	Quotation (Ref: - Annexure 10.5.5)	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.	3884.00	Meter	3917.82	15216813
31	Quotation (Ref: - Annexure 10.5.5)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	2521.00	Meter	5370.00	13537770
32	Quotation (Ref: - Annexure 10.5.5)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	1674.00	Nos	1430.00	2393820
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0.00	LS	0.00	6229681
34	Quotation (Ref: - Annexure 10.5.3)	Supply and fixing of Air Vent Arrangement at Filter delivery	725.00	Nos	209.00	151525

S. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Rate	Unit	Quantity	Amount (in INR)
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size, design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.	1016.00	Sqm	2144.60	2178914
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	1744.70	Cum	1943.80	3391352
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	13858.00	Set	22.00	304876
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer In charge Etc.	7500.00	Each	22.00	165000
<b>Sub Total for Non-SOR Items</b>			(ii)		<b>11,84,56,486</b>	

S. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Rate	Unit	Quantity	Amount (in INR)
		<b>Add GST</b>	12% on (ii)			<b>1,42,14,778</b>
		<b>Total for Non-SOR Items</b>	<b>B</b>			<b>13,26,71,265</b>
		<b>Total for SOR and Non-SOR Items</b>	A+B = (iii)			<b>15,78,06,112</b>
		<b>Add Contingency</b>	3% on (iii)			<b>47,34,183</b>
		<b>TOTAL Amount for all locations (In ₹)</b>	<b>C</b>			<b>16,25,40,295</b>

## 8.2 Location-wise Project Cost

The location-wise summary of cost for ABD and PAN City areas are given in the table below:

**Table 8: Location-wise Summary of Cost**

Sl. No.	Location	Cost (i/c all taxes) in INR
<b>ABD Areas</b>		
1	Deorali Girls Senior Secondary School	1,55,56,345
2	Krishi Bhawan	81,03,332
3	Nirman Bhawan	1,31,85,013
4	Power Secretariat	66,69,453
5	Yatayat Bhawan	67,85,964
6	Tashi Namgyal Academy	1,70,96,271
<b>Total for ABD Areas (A)</b>		<b>6,73,96,379</b>
<b>PAN City Areas</b>		
7	Bojoghari Senior Secondary School	1,30,32,357
8	Enchey Senior Secondary School	83,61,949
9	Modern Senior Secondary School	1,39,12,759
10	Tourism Secretariat	67,55,329
11	Tashi Namgyal Secondary School	1,47,04,143
12	West Point Senior Secondary School	1,29,03,388
13	Burtuk Junior High School	67,88,183
14	Tadong Senior Secondary School	85,36,691
15	Tashling Secretariat	1,01,49,117
<b>Total for PAN City Areas (B)</b>		<b>9,51,43,916</b>
<b>Total for all Locations (A+B)</b>		<b>16,25,40,295</b>

The detailed cost for all locations is annexed in Annexure 10.6.

## 9 CONCLUSIONS & RECOMMENDATIONS

- **Increase awareness:** There is an acute need to create awareness among people about rainwater harvesting. People should also be trained through government run training programmes conducted by representatives of NGOs, interested individuals at household levels etc. The Rainwater Centre should also be responsible for organizing regular awareness campaigns among people that propagate the need of water conservation and suggest ways of doing it. The Rainwater Centre should also prepare and maintain a database of implementers, best practices, information on techniques and costs etc.
- **Explore more options:** Groundwater recharge options should be explored to save the maximum rainwater and to avoid its wastage by runoff. This can be done by making recharge pits as the surface of Gangtok City is hilly and therefore it doesn't allow natural percolation of rainwater into the ground.
- **Tariffs on water resources:** This is one of the key instruments, which can help to ensure that consumers use water carefully. Incentives such as awards, discount on water bills, tax rebate on property. This will also create an obvious pressure on consumers to use the available water judiciously without its wastage. Adequate infrastructure development for tourism industry: To meet the financial requirements, the local bodies can think on generating income by Additional cess on tourist arriving in hotels. Water demand of tourism industry is usually not met by the authorities. This results in purchase of water from private tankers. This puts unaccounted pressure on water resources in Gangtok. Tourism industry can be included in infrastructural development in tourist residential complexes. Inclusion of tourism industry will ensure the satisfaction of industry as well as decrease the pressure on other water resources. Additional water cess can be charged from hotel industry by the Municipal authorities to meet its expense. Construction of small water storage tanks in newly constructed house in city area be made mandatory. Besides, subsidies for buying collection tanks upto 1000-liter capacity for households needs to be in place.
- Rainwater harvesting consists of collecting precipitation from rooftops and storing it in tanks. Rooftops can have particles and pathogens that might contaminate water that falls through them. Based on the results from the water quality analysis, though not all parameters complied with Honduran Standards, there are basic treatment methods

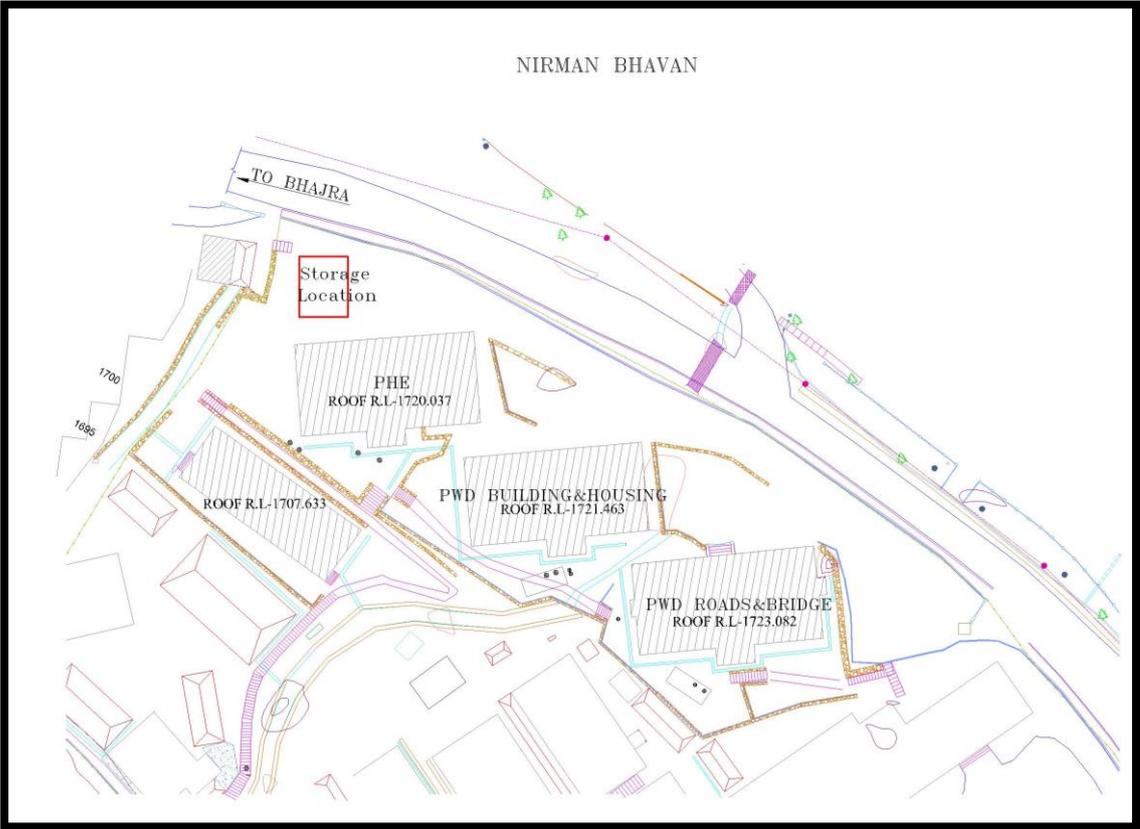
that users can implement at household levels like Solar Disinfection, boiling water and chlorine disinfection that will be low-cost solutions that users can learn to do.

- If such a solution was to be sponsored or promoted by public or private institutions, periodical water quality monitoring is highly recommended to prevent any health threatening diseases. Water stored from rainwater harvesting practices is not intended for human consumption, but since there would be direct contact with it, quality measurements and treatment are important cautions to take in consideration. It is also important for users to maintain clean storage tanks, clean filters, gutters, drains and rooftops and it is recommended to let water from the first strong rainfall of the season wash out the roof without collecting it because it will be more contaminated. A first rain diverter may be installed to ensure better quality from the water stored in tanks. From the results of the water quality analysis, samples collected in between rainy days had higher quality than samples taken from a precipitation event after several days of no rain.
- Many factors are contributing to aggravate this situation, increasing immigration from rural areas settling on the city's outskirts, growing population, disorganized estate development, insufficient storage infrastructure, poor governance from authorities and lack of initiatives from public and private sectors. There are parts of the city receiving water only once a week or no water at all, users are forced to get their supply from private providers that sell water at excessive prices and offering very poor quality. Rainwater harvesting is a solution worth exploring, though not proposed as a single answer to solve water scarcity, it can be used as complement to alleviate the need in many areas of the city.
- Rainwater harvesting is a solution that could give users some independence from high pricing companies and inefficient utility companies, being a chance for them to use the water they collect for their best interests. However, rainwater-harvesting systems are very dependent on the amount of precipitation falling during the wet season in Gangtok. Droughts, climate change, varying precipitation patterns make this system uncertain and that is why it is recommended as a complement to other solutions.
- Alternatives analyzed, the scenario where we assume that there is an elevated water tank already installed, gives the best outcome. Modular tanks are recommended over the other alternatives considered, though not the cheapest option, they require less maintenance, can be cleaned easily, have smooth surfaces that prevent algae growth,

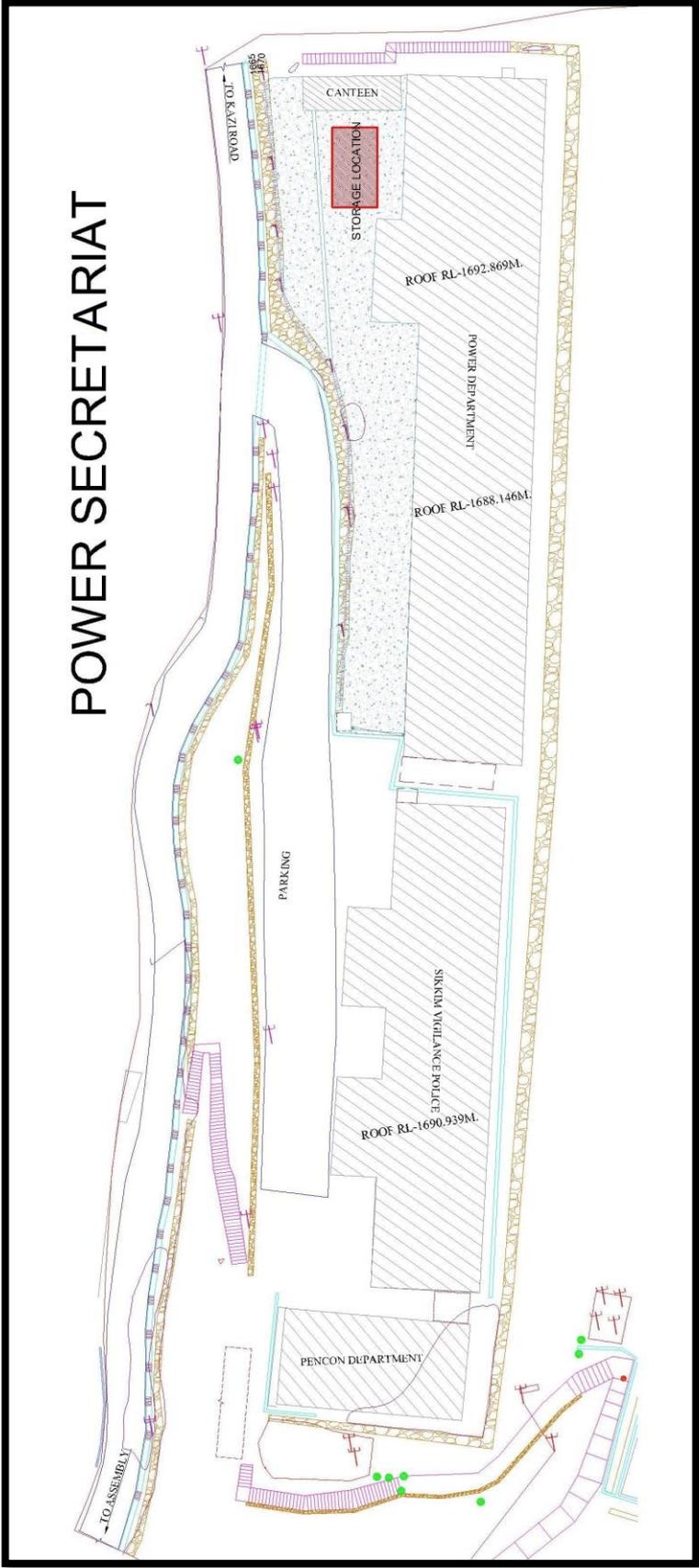
they are usually made up from dark material that prevents sun from passing through, thus preventing photosynthesis and can be transported and installed easier and faster.

- The project is cost-effective for users that purchase water from private companies, they would see the return of their investment in a period of time shorter than the project's lifetime and the savings rendered from using rainwater rather than buying their supply from private providers make the cost-benefit ratio very high. This means that though the initial investment may be high, the savings coming from it would be even higher.
- The highest cost-benefit ratios and shorter payback periods come from larger roofs and areas of the city here water costs are higher. This type of project, however, aims to alleviate scarcity conditions for users who cannot afford high. These users, who often are not connected to the public water supply system from SANAA or receive water once a week only for a few hours would see a great improvement in their living conditions by applying rainwater collection.
- Projects like this cannot be analyzed solely from a financial perspective to determine their feasibility. Social conditions and environmental factors play important roles in the process of analyzing a project's viability. The triple bottom line analysis integrated with the SWOT analysis is a good way to analyze a project from a wider perspective, analysis shows that sometimes, social benefits or opportunities can outweigh the financial situation of an initiative. The need for water may be so critical, and the benefits for a community so large that they cannot be measured by financial tools. The idea of installing rainwater catchment systems in urban areas of Gangtok is not a permanent answer for water scarcity, however it alleviates an immediate need and improves overall quality of users in the city, as access to water is an indicator of development.





Map 5: Plan Layout of Nirman Bhawan



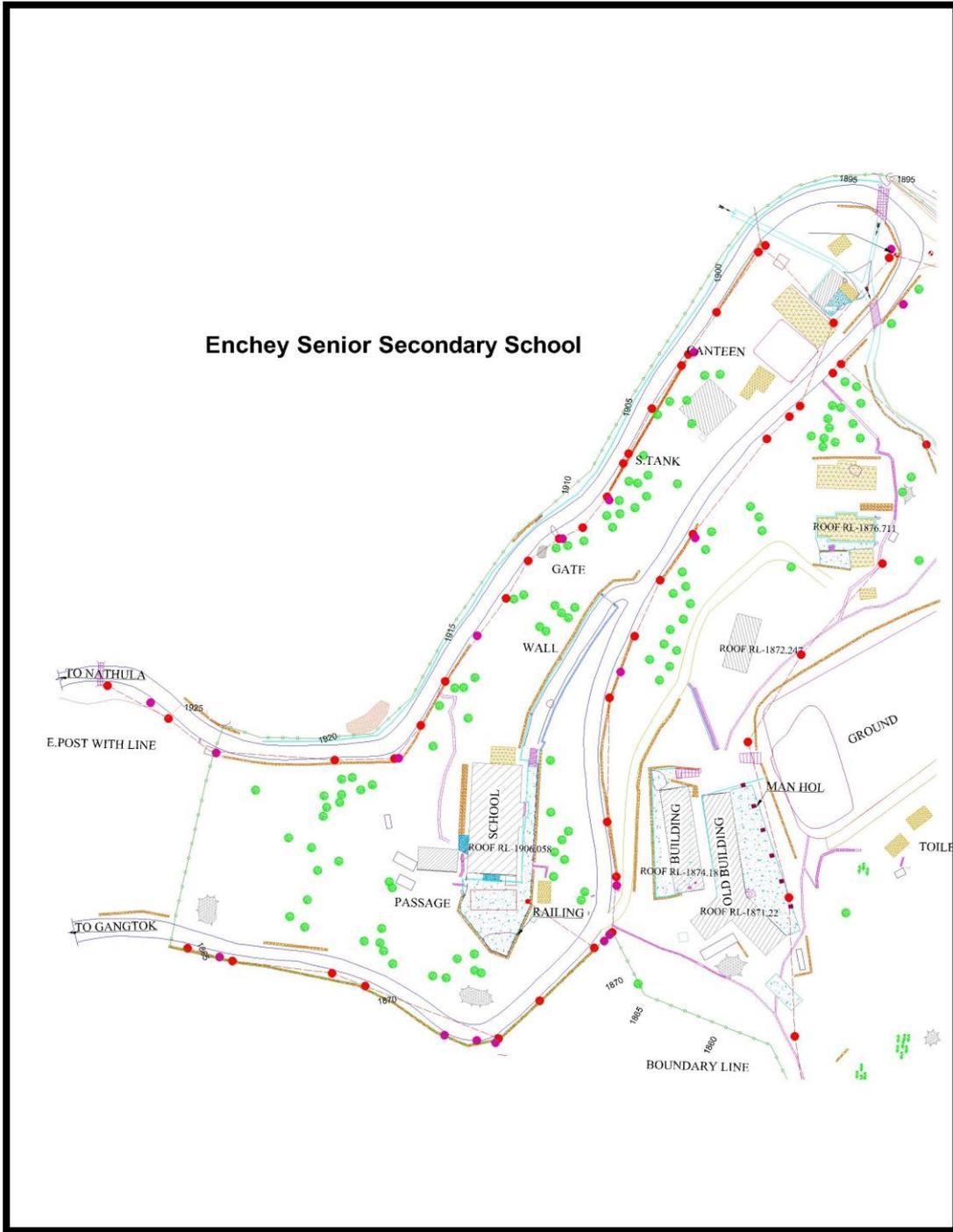
POWER SECRETARIAT

Map 6: Plan Layout of Power Secretariat

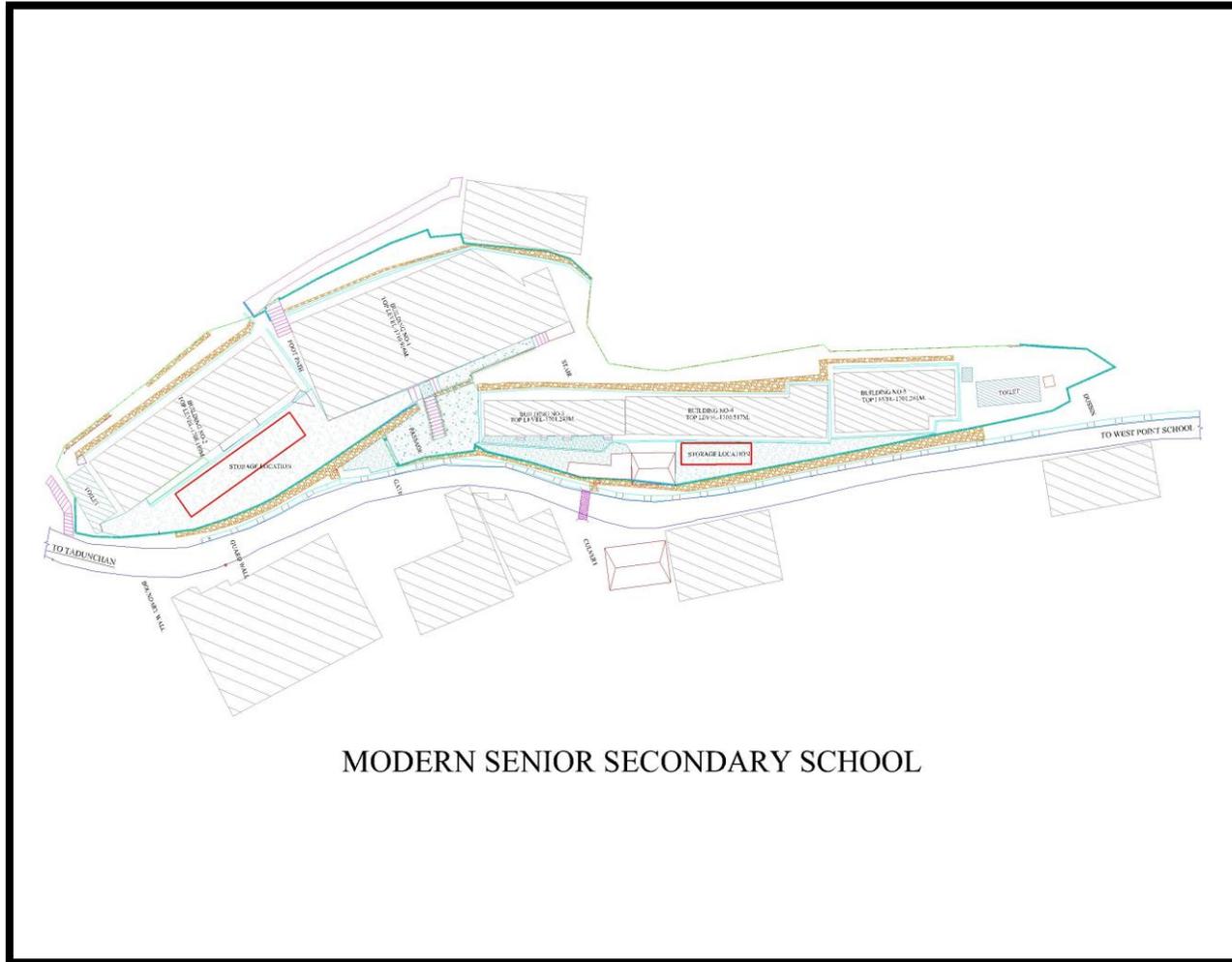


Map 7: Plan Layout of Tashi Namgyal Academy

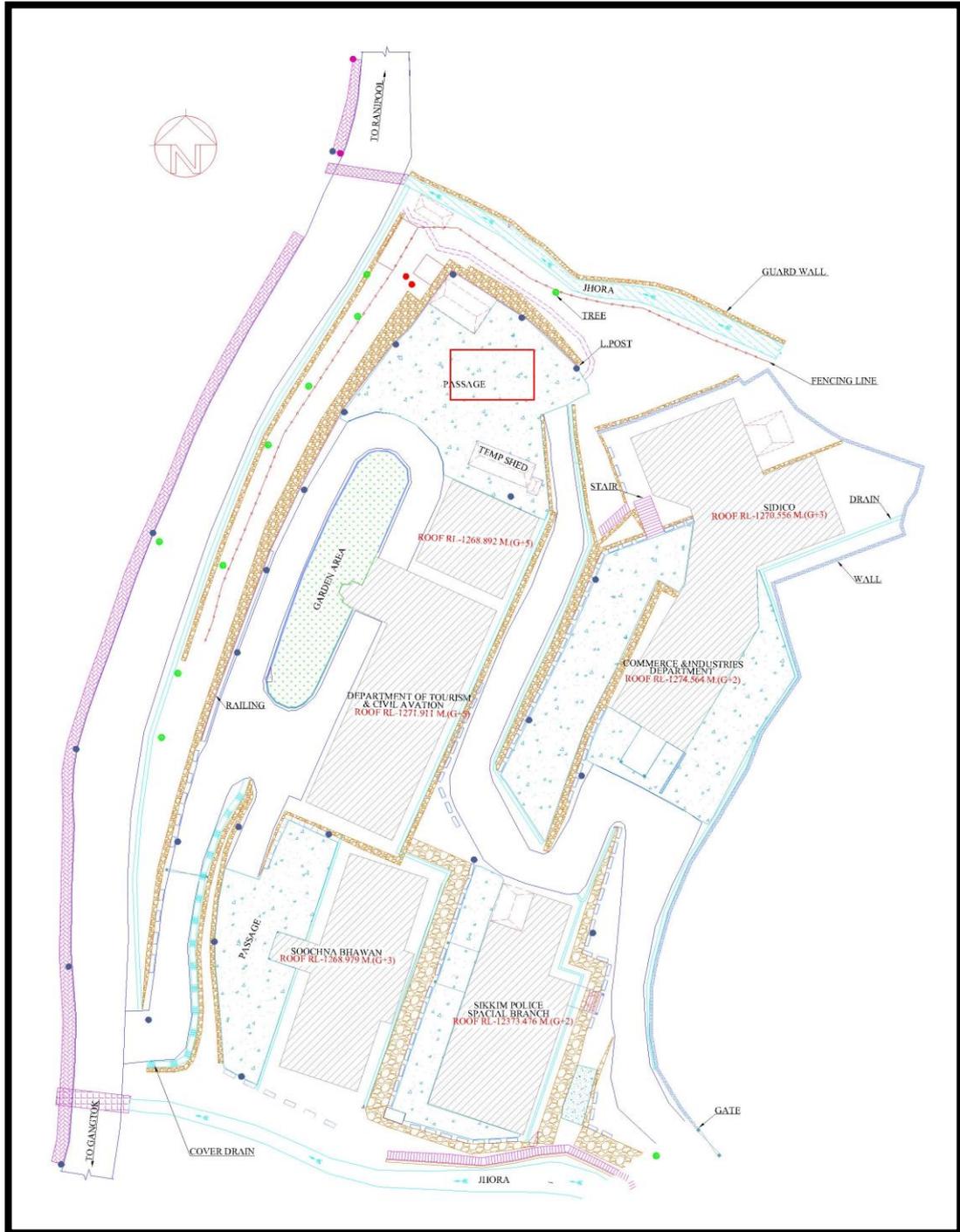




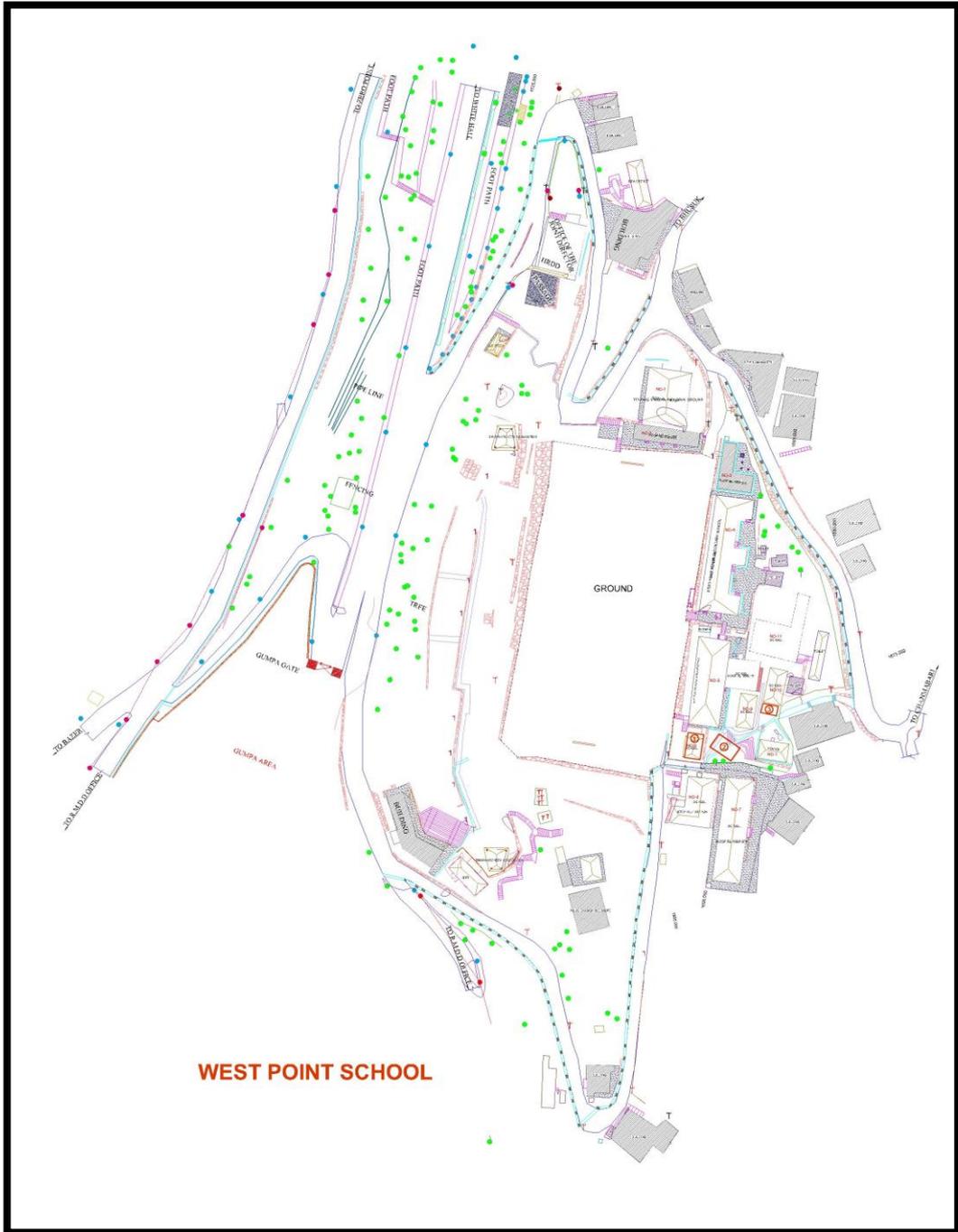
Map 9: Plan Layout of Enchey Sr. Sec. School



Map 10: Plan Layout of Modern Sr. Sec. school



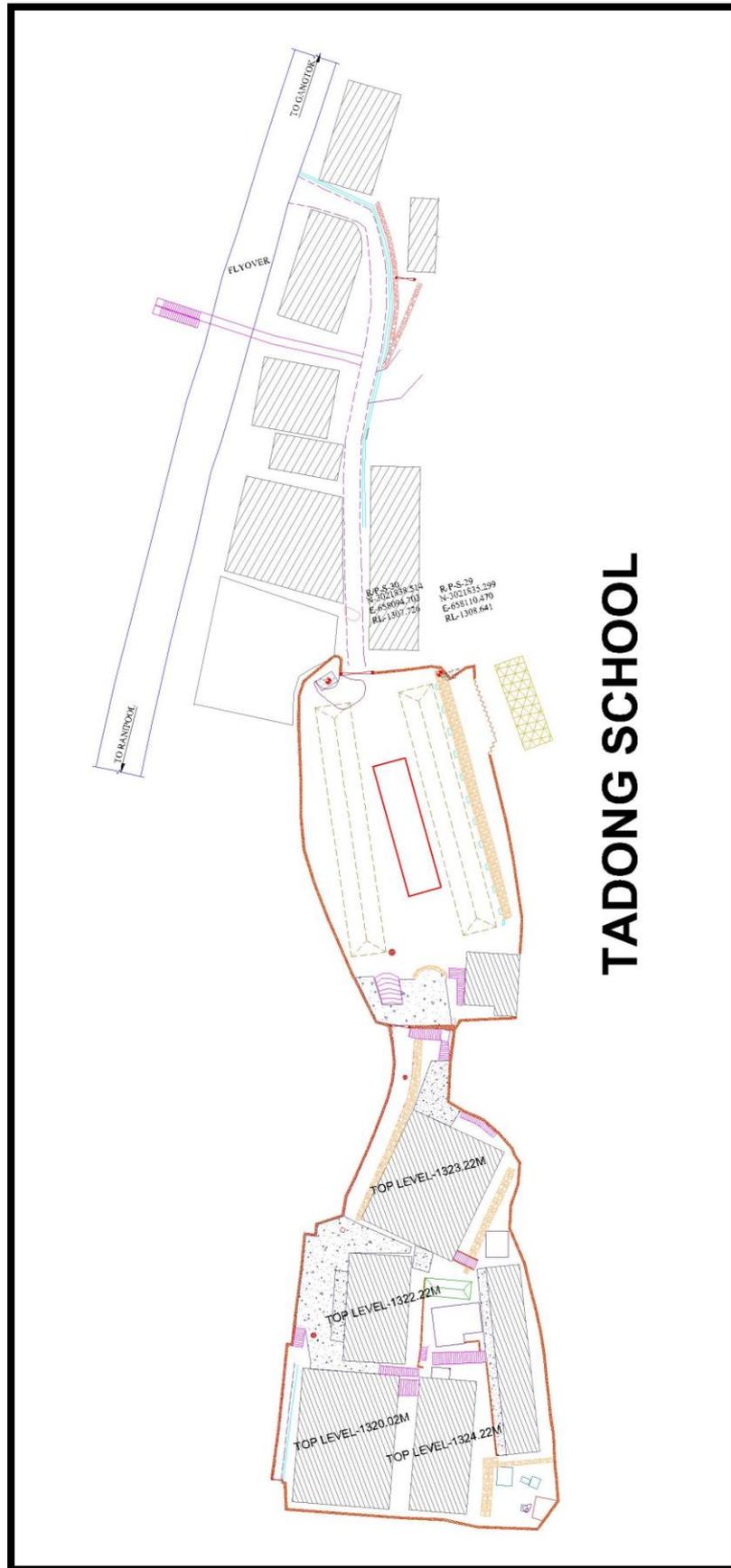
Map 11: Plan Layout of Tourism Secretariat



Map 12: Plan Layout of West Point Sr. Sec. School

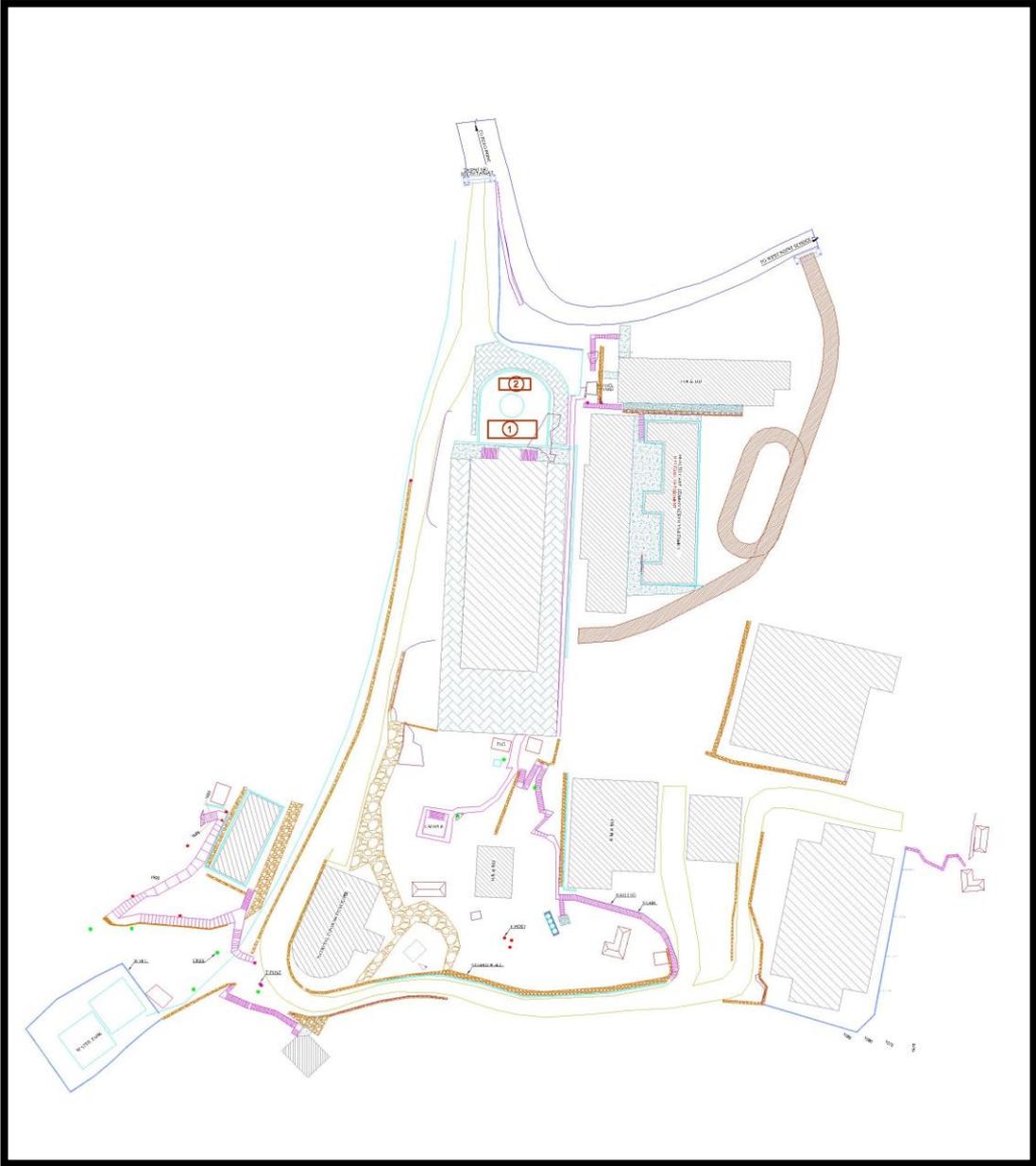






# TADONG SCHOOL

Map 15: Plan Layout of Tadong Sr. Sec. School



Map 16: Plan Layout of Tashiling Secretariat

## 10.2 Rain Water Harvesting Site Visit Record

Sl. No.	Location	Source of Water	Water Supply Timing	No. of Students	No. of Staff	Existing RWH System Capacity/ Primary Use	Metered Connection	Other Issues/Suggestions	Person Contacted
1	Bojoghari Senior Secondary School	PHE Dept. & Presence of spring water	PHE timings	774	84	No	No	PHE water is not enough. Suggestions made for tapping the spring water which can be used for drinking purpose	Principal
2	Burtuk Junior High School	PHE Dept.	PHE timings	800	51	No	No		Local Person
3	Deorali Girls Senior Secondary School	PHE Dept.	PHE timings	1800	156	No	No	PHE water is not enough causing water shortage. This problem especially in a girl's school affects their personal hygiene.	Principal
4	Enchey Senior Secondary School	PHE Dept.	PHE timings	800	90	No	No	Water Shortage. No provision for drinking water. Electricity cost can be an issue after installation of RWH system. Existing space small for construction.	Principal - Mrs. L. Bhutia

Sl. No.	Location	Source of Water	Water Supply Timing	No. of Students	No. of Staff	Existing RWH System Capacity/ Primary Use	Metered Connection	Other Issues/Suggestions	Person Contacted
5	Krishi Bhavan	Local Location (Surface-Store Stream)	No fixed timing	425	175 (Floating)	No	No	Shortage of water. No provision for drinking water.	Principal Director- Mr. Karma D. Bhutia
6	Modern Senior Secondary School	PHE Dept.	PHE timings	1475	73	Yes Capacity- 2000 Lt. Use- gardening & washing	Yes Overhead tank- 5000 Lt. capacity	Water Shortage. Space quite small for construction	Principal & Teachers
7	New Hospital Ground (Multi-Specialty Hospital)	PHE Dept.	PHE timings (Water Storage- 1 lakh lt. capacity)	2000	500	No		Infrastructure is huge, sufficient area for construction, 1000 BED	AGM- Mr. Molai Kr. Das
8	Nirman Bhavan	PHE Dept.	PHE timings	325	90 (Floating)	No		PHE water not sufficient. Spots identified for construction	A.E (Buildings & Housing Dept.)

Sl. No.	Location	Source of Water	Water Supply Timing	No. of Students	No. of Staff	Existing RWH System Capacity/ Primary Use	Metered Connection	Other Issues/Suggestions	Person Contacted
9	Power Secretariat	PHE Dept.	PHE timings	666	200 (Floating)	No		PHE water not sufficient. Spots identified for construction	Under Secy.
10	Tadong Senior Secondary School	PHE Dept.	PHE timings (twice a day)	1650	105	Yes Capacity- 2000 Lt. Use-gardening & washing		PHE water not sufficient. Spots identified for construction. Drainage problem of the area above school ground affecting school premises during heavy rains	Principal & Teachers
11	Tashi Namgyal Academy	PHE Dept.	PHE timings	1800	170	No	Yes	Insufficient water. 3 spots identified for construction.	Admin head
12	Tashling Secretariat	PHE Dept.	PHE timings	425	75(Floating)	No		Water Shortage. Spots identified for construction.	Divisional Engg. & Superintendent Engg.
13	Tashi Namgyal Senior Secondary School	PHE Dept.	PHE timings	1200	84	No	Yes	School being the center for all govt. exams water should be sufficient	Principal

Sl. No.	Location	Source of Water	Water Supply Timing	No. of Students	No. of Staff	Existing RWH System Capacity/ Primary Use	Metered Connection	Other Issues/Suggestions	Person Contacted
14	Tourism Secretariat	PHE Dept.	PHE timings	375	50 (Floating)	No	No	Minimum space for construction	Administration
15	West Point Senior Secondary School	PHE Dept.	PHE timings	1500	65	Yes (construction partially completed)	Yes	Water shortage. Spots identified for construction	Vice-Principal
16	Yatayat Bhavan	PHE Dept.	PHE timings	675	175 (Floating)	No		Water shortage. Spots identified for construction	Chief Engg.

### 10.3 Questionnaire for collecting Users data from the identified locations

Location: -		
Sl. No.	Description	
1	Source of Water	
2	Water Supply Timing	
3	Number of Staff	
4	Existing Rain Water Harvesting System If Yes: (a) Capacity (b) Primary use	(Yes/ No)
5	Metered connection	Yes/ No
6	Other Issues if any	
7	Note:	
		Signature

## 10.4 Rate Analysis of NON-SOR Items based on Quotation/ Market rates

10.4.1 **Coarse Sand**

<b>Non-SOR Item no. 21</b>		<b>Supplying, filling, spreading &amp; levelling Sand in recharge pit, in the required thickness, for all lead &amp; lifts, all complete as directed by Engineer-in-Charge.</b>				
<b>Ref. SOR-2012</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Base Rate as per 2012 SOR SS</b>	<b>Escalated rate for 2018</b>	<b>Amount</b>
	<b>Material</b>					
	Sand = 1Cum					
	Total = 1Cum					
SOR Sikkim State/2012/basic rates	Sand FOR at Site	Cum	1	400	553	553.12
					<b>A</b>	<b>553.12</b>
	<b>Labour</b>					
SOR Sikkim State/2012/basic rates A_5	Beldar	Day	0.26	300	415	107.86
	Sundries	LS	2.73		1.73	4.72
					<b>B</b>	<b>112.58</b>

<b>Non-SOR Item no. 21</b>	<b>Supplying, filling, spreading &amp; levelling Sand in recharge pit, in the required thickness, for all lead &amp; lifts, all complete as directed by Engineer-in-Charge.</b>					
<b>Ref. SOR-2012</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Base Rate as per 2012 SOR SS</b>	<b>Escalated rate for 2018</b>	<b>Amount</b>
	<b>Sub Total</b>		<b>A+B</b>			<b>665.70</b>
	Add 1% W.C on (A+B)					6.66
	<b>Sub Total</b>					<b>672.36</b>
	Add 15% Contractor Profit on C					100.85
	Cost of 1 cum					773.21
<b>Say</b>						<b>776.0</b>

## 10.4.2 EPDM Liner

Non-SOR Item no. 22	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.						
Ref. SOR-2012	Description		Quantity		Rate	Unit	Amount
	<b>Details of cost for 100 sqm</b>						
	<b>Materials:</b>						
	EPDM LINER 1.2 mm		100				
	Wastage 10 %		110				
	<b>Total</b>		110	@	600.00 Ref:-(Quotation 10.5.1)	m2	66000
						<b>A</b>	<b>66000</b>
SOR Sikkim State/2012/basic rates	1 gas welder	1	@		414		414
LS	1 gun + 1 gas cylinder (1200+800)						2000
	<b>Labour :</b>						
SOR Sikkim State/2012/basic rates	Beldar No.	5	@		414		2070

<b>Non-SOR Item no. 22</b>	<b>Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.</b>								
<b>Ref. SOR-2012</b>	<b>Description</b>			<b>Quantity</b>		<b>Rate</b>	<b>Unit</b>	<b>Amount</b>	
SOR Sikkim State/2012/basic rates	Helper 1.5	1.5	@			276		414	
L.S.	Sundries L.S							50	
								<b>B</b>	<b>4948</b>
	Sub Total					A+B		70,948.00	
	Add1% W.C on (A+B)							709.48	
	Sub Total						<b>C</b>	<b>71,657.48</b>	
						Add 15% Contractor Profit		10,748.62	
				Cost of 100 sqm			Say	82,406.10	
				<b>Cost of 1 sqm</b>		<b>(in INR)</b>		<b>824</b>	

10.4.3 **Geotextile**

<b>Non-SOR Item no. 23</b>	<b>Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Brick % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.</b>				
	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Rate</b>	<b>Amount</b>
	Supply and Installation of Geotextile 400 GSM			53.57 Ref:-(Quotation 10.5.2)	
	<b>Material</b>				
	Non-Woven Geotextile 400 GSM Total = 100sqm				
	Add 10% wastage = 10Sqm				
	Total = 110sqm				
	Non-Woven Geotextile 400 GSM	Sqm	110	53.57	5,892.85
				<b>A</b>	<b>5,892.85</b>
	<b>Labour</b>				
LS	Installation charges 20 %				1,178.57
				<b>B</b>	<b>1,178.57</b>
	<b>Sub Total</b>		<b>A+B</b>		<b>7,071.42</b>

<b>Non-SOR Item no. 23</b>	<b>Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Brick % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.</b>				
	Description	Unit	Quantity	Rate	Amount
	Add 1% W.C on (A+B)				70.71
	<b>Sub Total</b>			<b>c</b>	<b>7,142.13</b>
	Add 15% Contractor Profit on C				1,071.32
	Cost of 100Sqm				8,213.45
	Cost of Sqm				<b>82.13</b>
	<b>Cost of Sqm</b>			<b>Say</b>	<b>82.00</b>

10.4.5 *Rainy Filter*

<b>Non-SOR Item no. 24</b>	<b>Supply &amp; fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive &amp; centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm<sup>2</sup>, with efficiency of 90%. The body should be made of High Density Polyethylene housing.</b>				
	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Rate</b>	<b>Amount</b>
	<b>Material</b>				
	Supply and fixing of rainy FL 200 online filter with Attachments			20,500.00 Ref:-(Quotation 10.5.3)	
				<b>A</b>	<b>20,500.00</b>
	<b>Labour</b>				
LS	Installation charges 20 %				4,100.00
				<b>B</b>	<b>4,100.00</b>
	<b>Sub Total</b>		<b>A+B</b>		<b>24,600.00</b>
	Add 1% W.C on (A+B)				246.00
	<b>Sub Total</b>			<b>c</b>	<b>24,846.00</b>
	Add 15% Contractor Profit on C				3,726.90

<b>Non-SOR Item no. 24</b>	<b>Supply &amp; fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive &amp; centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm<sup>2</sup>, with efficiency of 90%. The body should be made of High Density Polyethylene housing.</b>					
	<b>Description</b>		<b>Unit</b>	<b>Quantity</b>	<b>Rate</b>	<b>Amount</b>
	Cost of each					28,572.90
					Say	28,573

10.4.6 **Modular Tank**

Non-SOR Item no. 25	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria & bitumen and flow rate capacity about 0.019 Cum/Sec for recharge/ storage tank.				
	Description	Unit	Quantity	Rate	Amount
	<b>Material</b>				
	Co-Polymer based rainwater harvesting	m3	40	11,137.00 Ref:-(Quotation 10.5.4)	445,480.00
	Total = 1 No.			<b>A</b>	445,480.00
	<b>Labour</b>				
	Labour Charges (20% of Material Cost)	Each			89,096.00
				<b>B</b>	89,096.00
	<b>Sub Total</b>		<b>A+B</b>		<b>534,576.00</b>
	Add 1% W.C on <b>(A+B)</b>				5,345.76
	<b>Sub Total</b>			<b>c</b>	<b>539,921.76</b>
	<b>Sub Total</b>				539,921.76
	Add 15% Contractor Profit on <b>C</b>				80,988.26

<b>Non-SOR Item no. 25</b>	<b>Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria &amp; bitumen and flow rate capacity about 0.019 Cum/Sec for recharge/ storage tank.</b>				
	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Rate</b>	<b>Amount</b>
	Cost of 40M <sup>3</sup>				620,910.02
	<b>Cost of 1Cum</b>			<b>Say</b>	<b>15,523</b>

## 10.4.7 60 mm paver block

Non-SOR Item no. 35	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size, design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.					
	Description	Unit	Quantity	Base Rate SOR 2012/ DSR 2016	Escalated rate 2018	Amount
	Details of cost for 10.00 sqm					
	<b>Material</b>					
	Interlocking C.C. paver block (60 mm thick, M-30)	sqm	10		731.95 Ref:-(Quotation 10.5.1)	7319.53
	Bedding layer - 50mm thick					
	Coarse sand	cum	0.5	400.00	555.04	277.52
	=10x0.050=0.50 cum					
	Carriage of Coarse sand	cum	0.5	127.97	177.57	88.785586
	Fine sand	cum	0.15	400	555.04	83.256
	Carriage of fine sand	cum	0.15	127.97	177.57	26.6356758

<b>Non-SOR Item no. 35</b>	<b>Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size, design &amp; shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.</b>					
	Description	Unit	Quantity	Base Rate SOR 2012/ DSR 2016	Escalated rate 2018	Amount
				<b>A</b>		7795.73
	<b>Labour</b>					
	Labour Charges					
	Mason (brick layer) 1st class	day	0.5	300.00	416.28	208.14
	Mason (brick layer) 2nd class	day	0.5	275.00	381.59	190.795
	Beldar	day	1	300.00	416.28	416.28
	Coolie	day	0.5	200.00	277.52	138.76
					<b>B</b>	953.98
	<b>Sub Total</b>		<b>A+B</b>			<b>8,749.70</b>

<b>Non-SOR Item no. 35</b>	<b>Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size, design &amp; shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.</b>					
	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Base Rate SOR 2012/ DSR 2016</b>	<b>Escalated rate 2018</b>	<b>Amount</b>
	Add1% W.C on (A+B)					87.50
	Sub Total				c	8,837.20
	Sub Total					8,837.20
	Add 15% Contractor Profit on C					1,325.58
	Cost of 10 Sqm					10,162.78
	Cost of Sqm					1,016.28
	<b>Cost of Sqm</b>				<b>Say</b>	<b>1,016.00</b>

10.4.8 **Mono Block Pump Set**

<b>Non-SOR Item no. 37</b>	<b>Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.</b>				
	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Rate as per quotation</b>	<b>Amount</b>
	Details of cost for 1 Pump set				
	<b>Supply</b>				
	1 HP Pump set	Set	1	5,200.00 Ref:-(Quotation 10.5.6)	i/c GST
	1 HP Pump set	Set	1	4,642.86	4,642.86
	30 mtrs cable	Mtrs	30	50.00	1,500.00
	MCB 16 Ampere double pole, other plumbing accessories	No.	1	3,500.00	3,500.00
	Freight charges	Per set	1	300.00	300.00
				<b>A</b>	9,942.86
	<b>Installation</b>				
	Installation charges		20%	B	1,988.57
	<b>Sub Total</b>		<b>A+B</b>		<b>1,931.43</b>

<b>Non-SOR Item no. 37</b>	<b>Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.</b>					
	<b>Description</b>		<b>Unit</b>	<b>Quantity</b>	<b>Rate as per quotation</b>	<b>Amount</b>
	Add1% W.C on (A+B)					119.31
	<b>Sub Total</b>				<b>c</b>	<b>2,050.74</b>
	<b>Sub Total</b>					2,050.74
	Add 15% Contractor Profit on C					1,807.61
	Cost of 1 set					13,858.35
					<b>Say</b>	<b>13,858.00</b>

## 10.5 Quotations for Non-SOR Items from suppliers

### 10.5.1 *Imperial Overseas*

#### **Himanshu Kanani**

---

**From:** Imperial Overseas <info@imperialoverseas.in>  
**Sent:** Wednesday, August 22, 2018 7:55 AM  
**To:** Himanshu Kanani  
**Subject:** Re: RWH Quotation Required  
**Attachments:** image002.png

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Dear Sir,

Apologise for delayed reply. Please find below the products we can supply for your project:

- 1) EPDM membrane 1500micron: Rs.600/sqm
- 2) Non-woven geotextile 400gsm as per specifications mentioned: Rs.88/sqm
- 3) 60mm concrete pavers made with machine after compression and vibration: Rs. 68/sqft

Prices are inclusive of carriage till Gangtok. GST extra as applicable.

**This is material supply price only. We are not doing application.  
Unloading of material is at clients scope.**

Please feel free to contact me for any query.

Rrgards  
Punit Maheshwari  
+91 98304 66099

On Tue, 21 Aug 2018, 16:56 Himanshu Kanani, <[Himanshu.Kanani@in.gt.com](mailto:Himanshu.Kanani@in.gt.com)> wrote:

Please Also quote for All other possible items like 15 mm CPVC & 25 mm CPVC & any other items which may be supplied by u for further probable considerations.

**Himanshu Kanani**

Consultant, Public Sector

**M** +91 97024 73803

**T** +91 124 462 8000

**E** [Himanshu.Kanani@IN.GT.COM](mailto:Himanshu.Kanani@IN.GT.COM)

10.5.2 **Ginni Spectra Pvt. Ltd.**



**GINNI SPECTRA PVT. LTD.**  
HEAD OFFICE: 'Ginni House' # 85-86 Burmese Colony, Near Pink Square Mall, Jaipur  
 +91 99290 69796, 98290 80600 | jaipur.ginni@gmail.com | info@ginnitn | www.ginni.in

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**QUOTATION**

<p><b>Customer</b> Gangtok Smart City Development Ltd.                  Billing Gangtok                  Address                  Contact person :</p>	<p style="text-align: right;"><b>Date: 20/08/2018</b></p>
--	---

S.No.	Description	Quantity	Unit Price
1	NOWOFILL Geotextile  Non woven PET N/P 400 GSM  GST- Inclusive Freight - paid up to Sikkim site	<u>Sq.mtr</u>	<u>Sq.mtr</u>  60.00
<hr/>			
<hr/>			
<hr/>			

<b>S.No.</b>	<b>Terms And conditions:</b>
1	<b>Taxes: 12% GST including in rate</b>
2	<b>Payment Terms:</b> 100% Payment against PI
3	<b>E.&amp;O.E.</b>

For GINNI SPECTRA PVT. LTD.

  
**DIRECTOR**

**Gangtok Smart City Development Ltd.**

Bank ICICI Bank, JDA Branch, Jaipur  
 Name Ginni Spectra Pvt. Ltd.  
 Account 6754 0550 0011  
 IFSC Code ICIC0006754

Authorised Signatory








### 10.5.3 Farmland Rainwater Harvesting Systems



## Farmland Rainwater Harvesting Systems

648, 11th Cross,  
7th Block,  
Jayanagar,  
Bangalore 560 082.  
Telefax: 080-26766252

H.O.: SGS Complex,  
K.M. Road, Chikmagalur 577 101  
Karnataka, India.  
Tel.: 08262-231390, Fax: 08262-231393  
E-mail: farmland\_rhs@yahoo.co.in  
Web: www.rainyfilters.com

Ref: FLRW/01

Date: 23.8.2018

### Quotation

Name Of Work - Rain Water Harvesting for Gangtok City Under Smart City Mission

### Gangtok Smart City Development LTD (GSCDL)

#### ABSTRACT OF COST

**NAME OF WORK :- CONSTRUCTION OF 1 PURE RAIN WATER HARVESTING HOLDING TANK AT TANK TECHNOLOGY 160 CUM CAPACITY UNDERGROUND (PIT SIZE = 19mx4 mx3.30 m)**

Sr.No.	Ref. SOR-2012/DSR-2016/ Market Rate	Particulars	Rate	Unit
22	RA_liner	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	931.00	Sqm
23	RA_Geotextile	Supply and fixing of non woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width wise atleast 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Brick % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of E-I-C.	192.00	Squre Meter



#### WINNER OF NATIONAL AWARD





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Karnataka, India.  
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E-mail: farmland\_rhs@yahoo.co.in

Web: www.rainyfilters.com

24	RA_Rainy filter	Supply & fixing of "Rainy" make self cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250 micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	20500.00	Each
25	RA_Harvesting Structure	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-borne chemicals, bacteria & bitumen and flow rate capacity about 0.019Cu.m/Sec for recharge/storage tank.	14720.00	Cubic Meter
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges : (Sinter or equivalent)	270000.00	Nos.
		500 Litres	4000.00	Nos.
		750 Litres	6750.00	Nos.
		1000 Litres	10500.00	Nos.
		1500 Litres	18000.00	Nos.
		2000 Litres	26000.00	Nos.
		2500 Litres	35000.00	Nos.
		3000 Litres	45000.00	Nos.



WINNER OF NATIONAL AWARD

'Innovation for Climate Protection' Award from JSW - THE TIMES OF INDIA EARTH CARE AWARDS 2010 Awards for Excellence in Climate Change Mitigation & Adaptation

'Most Innovative Water Saving Product' Award from CII

'Green Champions' Award by Indian Green Building Council (IGBC)



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E-mail: farmland\_rhs@yahoo.co.in

Web: www.rainyfilters.com

27	From Quotation Item no.5/1	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials ,Bend,End Cap,Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	391.00	Rmt.
28	From Quotation Item no.6/1	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings , specials of including 250 mm Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee , Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	15700.00	Rmt.
29	From Quotation Item no.1/2	Supply and fixing of specials of including 250 mm Half Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee , Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials .	20000.00	LS



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E-mail: farmland\_rhs@yahoo.co.in

Web: www.rainyfilters.com

30	From Quotation Item no.11/2	Supply and fixing of 250mm HDPE Half round Pipe added with anti sagging property and UV- stabilizer, grey color, fitted with union joint coupling,all specials , fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.	3050.00	Meter
31	From Quotation Item no.12/2	Supply and fixing of 160mm Approved Make HDPE Pipe added with anti sagging property and UV- stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	1180.00	Mtrs
32	From Quotation Item no.14/2	Supply and fixing of 90mm Hallmark Make HDPE Pipe added with anti sagging property and UV- stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	2075.00	Nos
33	From Quotation Item no.15/2	Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee , Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	10700.00	LS
34	From Quotation Item no.16/2	Supply and fixing of Air Vent Arrangement at Filter delivery	725.00	Nos





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Tel.: 08262-231390, Fax: 08262-231393  
E-mail: farmland\_rhs@yahoo.co.in  
Web: www.rainyfilters.com

35	RA_Paver Block	Providing and laying 60mm thick factory made cement concrete interlocking paverblock of M -30 grade made by block making machine with strong vibratory compaction, of approved size, design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.	NA	Sqm
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board)	Granular Sub base: By mix in place method : Construction of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	NA	Cum
37	From Quotation Item no.17/3	Supply, installation and commissioning of 1 HP pump for pumping of water (1 HP) . Includes civil works, fabrication work for mounting the pump , necessary plumbing including starter, cable, with all fittings, complete as per the instructions of Engineer In charge.	40000.00	Nos
38		Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer Incharge Etc	18000.00	Each
39		Supply and fixing of composite 25 MM pipe/cpvc pipe with all fittings for plumbing job (1 set- approx. 800 mtrs pipe)	55000.00	Rmt.

Thanking you  
Farmland Rainwater Harvesting systems



## 10.5.4 Water Technocrats



## QUOTATION

TO,

Gangtok Smart City Development LTD (GSCDL)

NAME OF WORK :- CONSTRUCTION OF 1 PURE RAIN WATER HARVESTING HOLDING TANK AT TANK  
TECHNOLOGY 160 CUM CAPACITY UNDERGROUND (PIT SIZE =19mx4 mx3.30 m)

Sr.No.	Ref. SOR-2012/DSR-2016/Market Rate	Particulars	Rate	Unit
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading ,unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge		Cum
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.		
		Add for dewatering @ 5% of cost, of Excacavation		LS
21	RA_Sand	Supplying,filling,spreading& levelling Sand in recharge pit, in the required thickness, for all lead & lifts,all complete.	7,418.00	Cubic Meter
22	RA_liner	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	878.00	Sqm
23	RA_Geotextile	Supply and fixing of non woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width wise atleast 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Brick % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of E-I-C.	113.00	Squre Meter
24	RA_Rainy filter	Supply & fixing of "Rainy" make self cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250 micron size, minimum operating pressure is 0.060 kg/cm2, with efficiency of 90%. The body should be made of High Density Polyethylene housing.	35,976.00	Each
25	RA_Harvesting Structure	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds,algae,soil-born chemicals, bacteria & bitumen and flow rate capacity about 0.019Cu.m/Sec for recharge/storage tank.	11,137.00	Cubic Meter

26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges : (Sinter or equivalent)	-	Nos.
		500 Litres	7,539.00	Nos.
		750 Litres	10,966.00	Nos.
		1000 Litres	14,564.00	Nos.
		1500 Litres	21,846.00	Nos.
		2000 Litres	29,128.00	Nos.
		2500 Litres	36,409.00	Nos.
		3000 Litres	43,691.00	Nos.
27	From Quotation Item no.5/1	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials ,Bend,End Cap,Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	412.00	Rmt.
28	From Quotation Item no.6/1	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings , specials of including 250 mm Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee , Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	2,571.00	Rmt.
29	From Quotation Item no.1/2	Supply and fixing of specials of including 250 mm Half Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee , Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials .	-	LS
30	From Quotation Item no.11/2	Supply and fixing of 250mm HDPE Half round Pipe added with anti sagging property and UV- stabilizer, grey color, fitted with union joint coupling,all specials , fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.	-	Meter
31	From Quotation Item no.12/2	Supply and fixing of 160mm Approved Make HDPE Pipe added with anti sagging property and UV- stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	2,122.00	Mtrs
32	From Quotation Item no.14/2	Supply and fixing of 90mm Hallmark Make HDPE Pipe added with anti sagging property and UV- stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	600.00	Mtrs
33	From Quotation Item no.15/2	Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee , Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	-	LS
34	From Quotation Item no.16/2	Supply and fixing of Air Vent Arrangement at Filter delivery	6,854.00	Nos
35	RA_Paver Block	Providing and laying 60mm thick factory made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size, design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.	-	Sqm

36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board)	Granular Sub base: By mix in place method : Constructuon of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	-	Cum
37	From Quotation Item no.17/3	Supply, installation and commissioning of 1 HP pump for pumping of water (1 HP) . Includes civil works, fabrication work for mounting the pump , necessary plumbing including starter, cable, with all fittings, complete as per the instructions of Engineer In charge.	16,263.00	Each
38		Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer Incharge Etc	-	Each
39		Supply and fixing of composite 25 MM pipe/cpvc pipe with all fittings for plumbing job (1 set-approx. 800 mtrs pipe)	138.00	Rmt.
40	RA_Aggreg ate	Supplying, filling, spreading & levelling stone aggregate 20mm nominal size in recharge pit, in reduced thickness, for all lead & lifts, all complete.	-	Cubic Meter
41		Supply and installation of upvc fitting with ball valve &the first flush arrangement to the filter.	7,128.00	LS

**S.K.Agarwal**  
Director  
**M.Tech. (Irrigation & Drainage Engineering)**  
+91 9810067054 Email: [skagarwal660@gmail.com](mailto:skagarwal660@gmail.com)

**WATER TECHNOCRATS PRIVATE LIMITED**  
504, SG ALPHA TOWER-1 PLOT NO.-10, SECTOR -9 VASUNDHARA GHAZIABAD PIN: 201012  
91 9810067054, 91 120 4525157

## 10.5.5 Berlia



Regd.office: Village Johripur , Gokulpuri , Delhi- 110094

Quotation Ref: BEPL/SB/Vs/18/08/1459

Quotation Date: 21/08/2018

Party name –

Address:

Email: himanshu26283@gmail.com

Mob:

Kind Attn: Mr. Himanshu Kanani

Subject: Quotation of HDPE/MDPE Pipe

Reference: By Mail

Dear Sir,

We would like to take pleasure to introduce our company Berlia Electricals Pvt. Ltd. as one of the complete piping solution hub and one of the Leading PE PIPE Manufacturer (HDPE/ MDPE/ PLB DUCT PIPES) in North India since 2009. We are in polymer industry since 1975, Berlia Group of Plastics has attained 42 glorious years of manufacturing experience with plastic and polymer products.

We are manufacturers of Hdpe & MDPE Pipes as per IS:4984:1995 / IS:14333:1996 / TEC/Dot specs / ISO-4427 Sizes: 12mm to 500mm , Material Grade :PE 63/80/100, From PN 2.5 to 25.

For any further assistance please feel free to contact us. We look forward to receive your valuable order and ensure our best attention to your requirement.

Thanking you in advance  
Yours faithfully,

Sandeep Tiwari  
Sales Coordinator  
Mob: 7082418620

Berlia Electricals PvtLtd



Shekhar Suman  
Sales Officer  
Mob: 9210520520

Corporate office:  
HSIDC, Plot no - 1684-85  
Rai industrial estate  
Sonepat - 131029  
Tel.No. : 9253610610

Delhi Office:(Dealer)  
1826, 2<sup>nd</sup> floor  
Old amaranth building,  
bhagirath palace, Delhi-110006  
Tel. No.: 9253620620

UP Office:(Dealer)  
Plot No: 131/9  
Shop No. 9, shree ram  
market, Sahibabad, Ghaziabad  
Tel. No.: 7082414620

Guwahati Office:(Dealer)  
109, Dhanuka complex,  
Block - A , 1<sup>st</sup> floor, SJ road  
Athgaon , Guhawati - 781001  
Tel. No.: 9435197825



Regd.office: Village Johripur , Gokulpuri , Delhi- 110094

Quotation Ref: BEPL/SB/Vs/18/08/1459

Quotation Date: 21/08/2018

Sr. No.	Item Description	Qty(mtr/ Nos)	Unit	Rate per Meter/Nos	Taxable Amount	GST@18%	Total
1	Supply of 250mm HDPE Half round Pipe added with anti sagging property and UV- stabilizer, grey color, fitted with union joint coupling,all specials , fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.	-	Mtr	680.00	-	122	802
2	Supply of 160mm Approved Make HDPE Pipe added with anti sagging property and UV- stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	-		371.85	-	67	439
3	Supply of 90mm Hallmark Make HDPE Pipe added with anti sagging property and UV- stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	-		123.95	-	22	146

Corporate office:  
HSIDC, Plot no - 1684-85  
Rai industrial estate  
Sonepat - 131029  
Tel.No.: 9253610610

Delhi Office:(Dealer)  
1826, 2<sup>nd</sup> floor  
Old amaranth building,  
bhagirath palace, Delhi-110006  
Tel. No.: 9253620620

UP Office:(Dealer)  
Plot No: 131/9  
Shop No. 9, shree ram  
market, Sahibabad, Ghaziabad  
Tel. No.: 7082414620

Guwahati Office:(Dealer)  
109, Dhanuka complex,  
Block - A , 1<sup>st</sup> floor, S,J road  
Athgaon , Guhawati - 781001  
Tel. No.: 9435197825



Regd.office: Village Johripur , Gokulpuri , Delhi- 110094

Quotation Ref: BEPL/SB/Vs/18/08/1459

Quotation Date: 21/08/2018

**Terms & Conditions**

G.S.T	@18% applicable
Payment Terms	100% Advance Payment against proforma Invoice
Freight	FOR Site Gangtok
Transit Insurance	On our Account
Dispatch Time	One Week
Local Transport Demurrage	In Your Scope
<b>Quote Validity – 21 days</b>	

Order need to be placed on:

Bank Details:

M/s Berlia Electrical Pvt Ltd  
Plot no. 1684-85, HSIIDC  
Rai industrial estate,  
Sonepat – 131029, Haryana  
GST No: **06AAACB0027F1ZG**  
HSN Code: 39172110

**Berlia Electricals Pvt Ltd**  
A/C No. :4939008700000134  
Bank Name : Punjab National Bank  
Rai Sonepat Haryana  
IFSC : PUNB0493900

Berlia Electricals PvtLtd



Sandeep Tiwari  
Sales Coordinator  
Mob: 7082418620

Shekhar Suman  
Sales Officer  
Mob: 9210520520

Corporate office:  
HSIIDC, Plot no – 1684-85  
Rai industrial estate  
Sonepat – 131029  
Tel.No. : 9253610610

Delhi Office:(Dealer)  
1826, 2<sup>nd</sup> floor  
Old amaranth building,  
bhagirath palace, Delhi-110006  
Tel. No.: 9253620620

UP Office:(Dealer)  
Plot No: 131/9  
Shop No. 9, shree ram  
market, Sahibabad, Ghaziabad  
Tel. No.: 7082414620

Guwahati Office:(Dealer)  
109, Dhanuka complex,  
Block - A, 1<sup>st</sup> floor, SJ road  
Athgaon , Guhawati - 781001  
Tel. No.: 9435197825

## 10.5.6 Mukherjee Pumps

### Himanshu Kanani

---

**From:** Kanchan Patil1  
**Sent:** Saturday, August 18, 2018 8:16 AM  
**To:** Pragyan Nayak  
**Cc:** Himanshu Kanani  
**Subject:** FW: QUOTATION OF PUMPS

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

**From:** somnath Mukherjee <mukherjeepumps@gmail.com>  
**Sent:** Thursday, August 16, 2018 7:31 PM  
**To:** Kanchan Patil1 <Kanchan.Patil1@IN.GT.COM>; kpatiljsr@gmail.com  
**Subject:** QUOTATION OF PUMPS

Dear Sir,  
As discussion held with you :

1. "KSB" Pumpset Delite : 1  
HP : 1  
Head : 21 mtr.  
Discharge : 3100LPH  
Rs.5200/- (Each pump set)  
Including GST.
2. "KSB" Pumpset Deluxe : 2  
HP : 1  
Head : 21 mtr.  
Discharge : 2400 LPH  
Rs.4200/-  
Including GST

With thanks,  
Baun Mukhejee

**Mukherjee pumps**  
**Panitanki more,Sevoke Road**  
**Siliguri.**  
**E-mail: [mukherjeepumps@gmail.com](mailto:mukherjeepumps@gmail.com)**  
**PH:94340-64319,94340-64107 (m)**

## 10.5.7 Rate of Granular Sub-base

Construction of approach road from 1st Turning of Sichey Sewerage Treatment Plant Road towards Rai Gaon , Land of SH&DB and connecting Old Power House Road at Lower Sichey.						
Sl. No	Ref	Description	No. or Qty	Unit	Estimated rate	Amount in Rupees
		SOR				
12	12.3	Providing and laying Hand packed Wall with clean Hard Selected Stones including centering aligning and slopes/curves complete as per direction of Engineer incharge.	505.78	Cum	488.65	247147
13	14.2	Providing,fixing & removing form work for casting RCC items as indicated	1358.24	Sqm	380.25	516472.1897
14	18.2	Providing & laying reinforcement including cutting ,bending ,cranking ,biding with MS wire annealed not less than 8mm dia etc of TMT all as specified .	19287.66	kg	67.28	1297731.628
15		Providing & laying of PVC pipe 10 CM dia for weep holes to permanent structures as per details given in structurewise quantity all as specified	887.70	RM	165.00	146470.5
16	13.5	Providing and laying standard V Shaped drain with cement concrete base in 1:2:4(1 cement 2Clean coarse sand 4 stone chips 20mm and down) mix of 100mm thick over clean hard selected soling of 150mm thick and 1:2:4 mix plum concrete along the vertical side of thickness 150mm and depth of 450mm including curing,compacting as per direction of Engineer In Charge	810.00	RM	752.49	609516.9
<b>Surfacing Works</b>						
	3.15	Compacting original ground supporting subgrade (Loosening of the ground upto a level of 500 mm below the subgrade level, watered, graded and compacted in layers to meet requirement of table 300-2 for subgrade construction.)	2430	Cum	67.5	164025
	3.14	Construction of subgrade and Earthen Shoulders (Construction of Sub-grade and Earthen Shoulders with approved materials obtained from borrow pits with all lift and lead transporting to site, spreading grading to required slope, and compacted to meet requirements of table 300-2)	1215	Cum	266.52	323821.8
		Granular Sub-Base: By mix in place Method (Construction of Granular Sub-Base by providing close graded material, spreading in uniform layer on prepared surface, mixing by mix in place method with rotovator at OMC and compacting with vibratory roller to achieve the desired density complete as per clause				
	4.1 b i	For Grading 1 Material	801.9	Cum	1195	958270.5

## 10.6 Location-wise detailed cost summary

### 10.6.1 *Deorali Girls Senior Secondary School*

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 360 CUM CAPACITY  
(1 NO.) PIT OF SIZE:**

**[L (in mm) X B (in mm) X H (in mm)] : 18X10X3.3**

Sr. No.	Ref. SOR-2012/DSR-2016/Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
<b>SOR Items</b>						
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	50.00	5.69	sqm	285
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	566.82	146.26	Cum	82905
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	141.71	222.37	Cum	31511
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	94.47	223.32	Cum	21097
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	141.71	392.71	Cum	55649

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.	463.65	99.92	Cum	46329
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	29.14	7923.77	Cum	230879
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	58.28	6727.86	Cum	392066
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro-reflectorized cautionary, mandatory and informatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	1.00	7110.30	NO.	7110
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	26.00	3905.97	each	101555

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar (1cement and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.	25.00	7883.90	Cum	197097
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	50	243.25	Sqm	12163
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	0.00	23.93	Cum	0
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	0.00	29.65	Sqm	0
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	5.60	90.70	Sqm	508
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	700.00	264.92	Rmt	185444

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	23.3.2	20mm dia G I pipe	400.00	336.30	Rmt	134519
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				
	23.9.2	STOP COCK 15 MM DIA	7.00	685.92	each	4801
	23.9.4	GATE WAY VALVE 20MM DIA	5.00	1024.64	each	5123
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	5.00	504.69	each	2523
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	5.00	12702.00	No.	63510
			<b>Sub Total for SOR items</b>			<b>15,75,075</b>
				<b>Add GST</b>	<b>10%</b>	<b>1,57,507</b>
			<b>Total for SOR Items</b>			<b>A</b>
						<b>17,32,582</b>
	<b>Non-SOR Items</b>					
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	581.05	125.73	Cum	73054

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	9558
21	Rate Analysis (Ref: -Annexure 10.4.1)	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	66.15	776.00	Cubic Meter	51332
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	944.00	824.06	Sqm	777914
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Break % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	1888.00	82.00	Sqm.	154816
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	20.00	28572.90	Each	571458

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
25	Rate Analysis (Ref: -Annexure 10.4.5)	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria & bitumen and flow rate capacity about 0. 019Cu.m/Sec for recharge/storage tank.	360.00	15522.75	Cubic Meter	5588190
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	0.00	NO.	
27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	144.00	391.00	Rmt.	56304
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
30	Rate Analysis (Ref: -Annexure 10.4.8)	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.	390.5	3884.00	Meter	1516702
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	420	2521.00	Mtrs	1058820
32	Rate Analysis (Ref: -Annexure 10.4.10)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	100	1674.00	Nos	167400
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	548584
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	20	725.00	Nos	14500
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including	252.00	1016.00	Sqm	256032

Sr. No.	Ref. 2012/DSR-2016/ Rate Analysis	SOR- Particulars	Quantity	Rate	Unit	Amount
		50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.				
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board) (Annexure 10.5.6)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	158.06	1744.70	Cum	275772
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	1.00	13858.00	Set	13858
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	1.00	7500.00	Each	7500
			<b>Sub Total for Non-SOR Items</b>			<b>1,19,38,094</b>
				<b>Add GST</b>	<b>12%</b>	<b>14,32,571</b>
			<b>Total for Non-SOR Items</b>			<b>B</b>
			<b>Total for SOR and Non-SOR Items</b>			<b>A+B</b>
			<b>Add Contingency</b>			<b>3%</b>
			<b>TOTAL (In ₹)</b>			<b>1,55,56,345</b>

10.6.2 *Krishi Bhawan*

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 152 CUM CAPACITY  
(1 NO.) PIT OF SIZE:**

**[L (in mm) X B (in mm) X H (in mm)] : 19X4X3.3**

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
<b>SOR Items</b>						
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	50.00	5.69	sqm	285
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	351.00	146.26	Cum	51338
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	87.75	222.37	Cum	19513
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	58.50	223.32	Cum	13064
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	87.75	392.71	Cum	34460
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.	361.00	99.92	Cum	36072

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	13.16	7923.77	Cum	104297
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	26.33	6727.86	Cum	177111
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro-reflectorized cautionary, mandatory and informatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	1.00	7110.30	NO.	7110
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	22.00	3905.97	each	85931
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar (1cement and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.	25.00	7883.90	Cum	197097

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	50	243.25	Sqm	12163
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	0.00	23.93	Cum	0
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	0.00	29.65	Sqm	0
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	4.60	90.70	Sqm	417
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	300.00	264.92	Rmt	79476
	23.3.2	20mm dia G I pipe	350.00	336.30	Rmt	117704
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				
	23.9.2	STOP COCK 15 MM DIA	3.00	685.92	each	2058

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	23.9.4	GATE WAY VALVE 20MM DIA	2.00	1024.64	each	2049
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	2.00	504.69	each	1009
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	2.00	12702.00	No.	25404
			<b>Sub Total for SOR items</b>			<b>9,66,559</b>
			<b>Add GST</b>		<b>10%</b>	<b>96,656</b>
			<b>Total for SOR Items</b>		<b>A</b>	<b>10,63,215</b>
	<b>Non-SOR Items</b>					
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	324.00	125.73	Cum	40736
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	5919
21	Rate Analysis	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	43.80	776.00	Cubic Meter	33989

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Ref: -Annexure 10.4.1)					
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	488.00	824.06	Sqm	402142
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Break % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	976.00	82.00	Sqm.	80032
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	4.00	28572.90	Each	114292
25	Rate Analysis (Ref: -Annexure 10.4.5)	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria & bitumen and flow rate capacity about 0. 019Cu.m/Sec for recharge/storage tank.	152.00	15522.75	Cubic Meter	2359458

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	0.00	NO.	
27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	60.00	391.00	Rmt.	23460
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend, 250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend, 250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000
30	Rate Analysis (Ref: -Annexure 10.4.8)	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.	192.1	3884.00	Meter	746116

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	300	2521.00	Mtrs	756300
32	Rate Analysis (Ref: -Annexure 10.4.10)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	40	1674.00	Nos	66960
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	313875
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	4	725.00	Nos	2900
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.	106.40	1016.00	Sqm	108102
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform layers	116.44	1744.70	Cum	203149

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Annexure 10.5.6)	on prepared surface, mixing by mix in place method, etc. complete.				
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	1.00	13858.00	Set	13858
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	1.00	7500.00	Each	7500
			<b>Sub Total for Non-SOR Items</b>			<b>60,75,087</b>
			<b>Add GST</b>		<b>12%</b>	<b>7,29,010</b>
			<b>Total for Non-SOR Items</b>			<b>B</b>
			<b>Total for SOR and Non-SOR Items</b>			<b>A+B</b>
			<b>Add Contingency</b>		<b>3%</b>	<b>2,36,019</b>
			<b>TOTAL (In ₹)</b>			<b>81,03,332</b>

10.6.3 *Nirman Bhawan*

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 360 CUM CAPACITY  
(1 NO.) PIT OF SIZE:**

**[L (in mm) X B (in mm) X H (in mm)] : 18X10X3.3**

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	<b>SOR Items</b>					
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	50.00	5.69	sqm	285
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	566.82	146.26	Cum	82905
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	141.71	222.37	Cum	31511
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	94.47	223.32	Cum	21097
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	141.71	392.71	Cum	55649
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in	463.65	99.92	Cum	46329

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.				
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	29.14	7923.77	Cum	230879
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	58.28	6727.86	Cum	392066
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro-reflectorized cautionary, mandatory and informatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	1.00	7110.30	NO.	7110
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	26.00	3905.97	each	101555
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar	25.00	7883.90	Cum	197097

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		(1cement and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.				
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	50	243.25	Sqm	12163
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	0.00	23.93	Cum	0
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	0.00	29.65	Sqm	0
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	5.60	90.70	Sqm	508
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	400.00	264.92	Rmt	105968
	23.3.2	20mm dia G I pipe	300.00	336.30	Rmt	100889

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				
	23.9.2	STOP COCK 15 MM DIA	4.00	685.92	each	2744
	23.9.4	GATE WAY VALVE 20MM DIA	3.00	1024.64	each	3074
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	3.00	504.69	each	1514
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	3.00	12702.00	No.	38106
			<b>Sub Total for SOR items</b>			<b>14,31,449</b>
				<b>Add GST</b>	<b>10%</b>	<b>1,43,145</b>
			<b>Total for SOR Items</b>		<b>A</b>	<b>15,74,593</b>
<b>Non-SOR Items</b>						
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	581.05	125.73	Cum	73054
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	9558
21	Rate Analysis (Ref: -Annexure 10.4.1)	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	66.15	776.00	Cubic Meter	51332
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	472.00	824.06	Sqm	388957
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Brick % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	944.00	82.00	Sqm.	77408
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	9.00	28572.90	Each	257156
25	Rate Analysis	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria &	360.00	15522.75	Cubic Meter	5588190

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Ref: -Annexure 10.4.5)	bitumen and flow rate capacity about 0. 019Cu.m/Sec for recharge/storage tank.				
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	0.00	NO.	
27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	144.00	391.00	Rmt.	56304
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000
30	Rate Analysis	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with	218.1	3884.00	Meter	847100

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Ref: -Annexure 10.4.8)	union joint coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.				
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	340	2521.00	Mtrs	857140
32	Rate Analysis (Ref: -Annexure 10.4.10)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	60	1674.00	Nos	100440
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	360936
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	9	725.00	Nos	6525
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with	252.00	1016.00	Sqm	256032

Sr. No.	Ref. 2012/DSR-2016/ Rate Analysis	SOR- Particulars	Quantity	Rate	Unit	Amount
		line sand etc. all complete as per the direction of Engineer-in-charge.				
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board) (Annexure 10.5.6)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	158.06	1744.70	Cum	275772
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	1.00	13858.00	Set	13858
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	1.00	7500.00	Each	7500
			<b>Sub Total for Non-SOR Items</b>			<b>1,00,23,563</b>
				<b>Add GST</b>	<b>12%</b>	<b>12,02,828</b>
			<b>Total for Non-SOR Items</b>			<b>B</b> <b>1,12,26,390</b>
			<b>Total for SOR and Non-SOR Items</b>			<b>A+B</b> <b>1,28,00,984</b>
			<b>Add Contingency</b>			<b>3%</b> <b>3,84,030</b>
			<b>TOTAL (In ₹)</b>			<b>1,31,85,013</b>

10.6.4 **Power Secretariat**

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 100 CUM CAPACITY  
(1 NO.) PIT OF SIZE:**

**[L (in mm) X B (in mm) X H (in mm)] : 10X5X3.3**

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	<b>SOR Items</b>					
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	50.00	5.69	sqm	285
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	283.68	146.26	Cum	41492
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	70.92	222.37	Cum	15771
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	47.28	223.32	Cum	10559
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	70.92	392.71	Cum	27851
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in	316.10	99.92	Cum	31585

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.				
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	8.66	7923.77	Cum	68640
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	17.33	6727.86	Cum	116560
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro-reflectorized cautionary, mandatory and inforatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	1.00	7110.30	NO.	7110
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	15.00	3905.97	each	58590
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar	25.00	7883.90	Cum	197097

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		(1cement and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.				
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	50	243.25	Sqm	12163
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	0.00	23.93	Cum	0
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	0.00	29.65	Sqm	0
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	3.00	90.70	Sqm	272
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	350.00	264.92	Rmt	92722
	23.3.2	20mm dia G I pipe	300.00	336.30	Rmt	100889

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				
	23.9.2	STOP COCK 15 MM DIA	3.00	685.92	each	2058
	23.9.4	GATE WAY VALVE 20MM DIA	1.00	1024.64	each	1025
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	1.00	504.69	each	505
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	1.00	12702.00	No.	12702
			<b>Sub Total for SOR items</b>			<b>7,97,874</b>
				<b>Add GST</b>	<b>10%</b>	<b>79,787</b>
			<b>Total for SOR Items</b>		<b>A</b>	<b>8,77,661</b>
<b>Non-SOR Items</b>						
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	256.70	125.73	Cum	32274
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	4784
21	Rate Analysis (Ref: -Annexure 10.4.1)	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	29.10	776.00	Cubic Meter	22582
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	160.00	824.06	Sqm	131850
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Brick % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	160.00	82.00	Sqm.	13120
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	10.00	28572.90	Each	285729
25	Rate Analysis	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria &	100.00	15522.75	Cubic Meter	1552275

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Ref: -Annexure 10.4.5)	bitumen and flow rate capacity about 0. 019Cu.m/Sec for recharge/storage tank.				
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	0.00	NO.	
27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	180.00	391.00	Rmt.	70380
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000
30	Rate Analysis	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with	224.02	3884.00	Meter	870094

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Ref: -Annexure 10.4.8)	union joint coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.				
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	250	2521.00	Mtrs	630250
32	Rate Analysis (Ref: -Annexure 10.4.10)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	20	1674.00	Nos	33480
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	306765
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	10	725.00	Nos	7250
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with	70.00	1016.00	Sqm	71120

Sr. No.	Ref. 2012/DSR-2016/ Rate Analysis	SOR- Particulars	Quantity	Rate	Unit	Amount
		line sand etc. all complete as per the direction of Engineer-in-charge.				
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board) (Annexure 10.5.6)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	84.94	1744.70	Cum	148190
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	1.00	13858.00	Set	13858
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	1.00	7500.00	Each	7500
			<b>Sub Total for Non-SOR Items</b>			<b>49,97,800</b>
				<b>Add GST</b>	<b>12%</b>	<b>5,99,736</b>
			<b>Total for Non-SOR Items</b>			<b>B</b>
			<b>Total for SOR and Non-SOR Items</b>			<b>A+B</b>
			<b>Add Contingency</b>			<b>3%</b>
			<b>TOTAL (In ₹)</b>			<b>66,69,453</b>

10.6.5 *Yatayat Bhawan*

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 100 CUM CAPACITY  
(1 NO.) PIT OF SIZE:**

**[L (in mm) X B (in mm) X H (in mm)] : 10X5X3.3**

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	<b>SOR Items</b>					
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	50.00	5.69	sqm	285
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	346.05	146.26	Cum	50614
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	86.51	222.37	Cum	19238
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	57.68	223.32	Cum	12880
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	86.51	392.71	Cum	33974
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in	349.88	99.92	Cum	34960

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.				
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	13.13	7923.77	Cum	103999
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	26.25	6727.86	Cum	176606
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro-reflectorized cautionary, mandatory and informatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	1.00	7110.30	NO.	7110
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	21.00	3905.97	each	82025
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar	25.00	7883.90	Cum	197097

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		(1cement and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.				
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	50	243.25	Sqm	12163
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	0.00	23.93	Cum	0
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	0.00	29.65	Sqm	0
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	3.70	90.70	Sqm	336
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	350.00	264.92	Rmt	92722
	23.3.2	20mm dia G I pipe	300.00	336.30	Rmt	100889

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				
	23.9.2	STOP COCK 15 MM DIA	3.00	685.92	each	2058
	23.9.4	GATE WAY VALVE 20MM DIA	2.00	1024.64	each	2049
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	2.00	504.69	each	1009
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	2.00	12702.00	No.	25404
			<b>Sub Total for SOR items</b>			<b>9,55,420</b>
				<b>Add GST</b>	<b>10%</b>	<b>95,542</b>
			<b>Total for SOR Items</b>		<b>A</b>	<b>10,50,962</b>
<b>Non-SOR Items</b>						
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	326.88	125.73	Cum	41097
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	5835
21	Rate Analysis (Ref: -Annexure 10.4.1)	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	38.03	776.00	Cubic Meter	29507
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	230.00	824.06	Sqm	189534
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Brick % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	460.00	82.00	Sqm.	37720
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	2.00	28572.90	Each	57146
25	Rate Analysis	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria &	156.00	15522.75	Cubic Meter	2421549

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Ref: -Annexure 10.4.5)	bitumen and flow rate capacity about 0. 019Cu.m/Sec for recharge/storage tank.				
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	0.00	NO.	
27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	12.00	391.00	Rmt.	4692
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000
30	Rate Analysis	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with	86.3	3884.00	Meter	335189

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Ref: -Annexure 10.4.8)	union joint coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.				
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	200	2521.00	Mtrs	504200
32	Rate Analysis (Ref: -Annexure 10.4.10)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	20	1674.00	Nos	33480
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	174574
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	2	725.00	Nos	1450
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with	109.20	1016.00	Sqm	110947

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		line sand etc. all complete as per the direction of Engineer-in-charge.				
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board) (Annexure 10.5.6)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	102.88	1744.70	Cum	179486
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	1.00	13858.00	Set	13858
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	1.00	7500.00	Each	7500
			<b>Sub Total for Non-SOR Items</b>			<b>49,44,065</b>
				<b>Add GST</b>	<b>12%</b>	<b>5,99,736</b>
			<b>Total for Non-SOR Items</b>			<b>55,97,536</b>
			<b>Total for SOR and Non-SOR Items</b>			<b>65,88,315</b>
				<b>Add Contingency</b>	<b>3%</b>	<b>1,97,649</b>
			<b>TOTAL (In ₹)</b>			<b>67,85,964</b>

10.6.6 *Tashi Namgyal Academy*

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 200 CUM CAPACITY  
(1 NO.) PIT OF SIZE:**

**[L (in mm) X B (in mm) X H (in mm)] : 10X10X3.3**

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	<b>SOR Items</b>					
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	50.00	5.69	sqm	285
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	392.58	146.26	Cum	57420
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	98.15	222.37	Cum	21825
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	65.43	223.32	Cum	14612
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	98.15	392.71	Cum	38543
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in	372.85	99.92	Cum	37256

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.				
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	16.54	7923.77	Cum	131039
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	33.08	6727.86	Cum	222524
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro-reflectorized cautionary, mandatory and informatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	1.00	7110.30	NO.	7110
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	22.00	3905.97	each	85931
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar	25.00	7883.90	Cum	197097

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		(1cement and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.				
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	50	243.25	Sqm	12163
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	144.00	23.93	Cum	3446
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	144.00	29.65	Sqm	4270
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	4.00	90.70	Sqm	363
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	900.00	264.92	Rmt	238428
	23.3.2	20mm dia G I pipe	450.00	336.30	Rmt	151333

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				
	23.9.2	STOP COCK 15 MM DIA	11.00	685.92	each	7545
	23.9.4	GATE WAY VALVE 20MM DIA	8.00	1024.64	each	8197
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	8.00	504.69	each	4038
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	8.00	12702.00	No.	101616
			<b>Sub Total for SOR items</b>			<b>1345040</b>
				<b>Add GST</b>	<b>10%</b>	<b>134504</b>
			<b>Total for SOR Items</b>		<b>A</b>	<b>1,479,544</b>
<b>Non-SOR Items</b>						
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	381.45	125.73	Cum	47959
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	6620
21	Rate Analysis (Ref: -Annexure 10.4.1)	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	43.35	776.00	Cubic Meter	33640
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	280.00	824.06	Sqm	230737
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Break % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	560.00	82.00	Sqm.	45920
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	36.00	28572.90	Each	1028624
25	Rate Analysis	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria &	200.00	15522.75	Cubic Meter	3104550

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Ref: -Annexure 10.4.5)	bitumen and flow rate capacity about 0. 019Cu.m/Sec for recharge/storage tank.				
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	0.00	NO.	
27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	276.00	391.00	Rmt.	107916
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000
30	Rate Analysis	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with	760	3884.00	Meter	2951840

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Ref: -Annexure 10.4.8)	union joint coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.				
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	1270	2521.00	Mtrs	3201670
32	Rate Analysis (Ref: -Annexure 10.4.10)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	160	1674.00	Nos	267840
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	1284270
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	36	725.00	Nos	26100
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with	144.00	1016.00	Sqm	146304

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		line sand etc. all complete as per the direction of Engineer-in-charge.				
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board) (Annexure 10.5.6)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	113.06	1744.70	Cum	197260
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	1.00	13858.00	Set	13858
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	1.00	7500.00	Each	7500
			<b>Sub Total for Non-SOR Items</b>			<b>1,34,98,908</b>
				<b>Add GST</b>	<b>12%</b>	<b>16,19,869</b>
			<b>Total for Non-SOR Items</b>			<b>B</b>
			<b>Total for SOR and Non-SOR Items</b>			<b>A+B</b>
			<b>Add Contingency</b>			<b>3%</b>
			<b>TOTAL (In ₹)</b>			<b>1,70,96,271</b>

10.6.7 *Bojoghari Senior Secondary School*

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 202 CUM CAPACITY  
(3 NOS.) PIT OF SIZE:**

[L (in mm) X B (in mm) X H (in mm)] : 10X4X3.3  
: 6X5.5X3.3  
: 7X4X3.3

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	<b>SOR Items</b>					
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	150.00	5.69	sqm	854
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	737.19	146.26	Cum	107823
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	184.30	222.37	Cum	40983
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	122.87	223.32	Cum	27438
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	184.30	392.71	Cum	72376

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.	882.43	99.92	Cum	88174
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	18.00	7923.77	Cum	142628
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	150.75	6727.86	Cum	1014224
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro- reflectorized cautionary, mandatory and informatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	6.00	7110.30	NO.	42662
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	38.00	3905.97	each	148427
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar (1cement and	90.00	7883.90	Cum	709551

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.				
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	150	243.25	Sqm	36488
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	0.00	23.93	Cum	0
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	0.00	29.65	Sqm	0
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	2.80	90.70	Sqm	254
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	700.00	264.92	Rmt	185444
	23.3.2	20mm dia G I pipe	400.00	336.30	Rmt	134519
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	23.9.2	STOP COCK 15 MM DIA	7.00	685.92	each	4801
	23.9.4	GATE WAY VALVE 20MM DIA	6.00	1024.64	each	6148
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	6.00	504.69	each	3028
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	6.00	12702.00	No.	76212
			<b>Sub Total for SOR items</b>			<b>28,42,033</b>
			<b>Add GST</b>		<b>10%</b>	<b>2,84,203</b>
			<b>Total for SOR Items</b>		<b>A</b>	<b>31,26,237</b>
	<b>Non-SOR Items</b>					
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	446.23	125.73	Cum	56103
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	12431
21	Rate Analysis	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	68.48	776.00	Cubic Meter	53137

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Ref: -Annexure 10.4.1)					
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	696.00	824.06	Sqm	573546
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Brick % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	1392.00	82.00	Sqm.	114144
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	14.00	28572.90	Each	400021
25	Rate Analysis (Ref: -Annexure 10.4.5)	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria & bitumen and flow rate capacity about 0.019Cu.m/Sec for recharge/storage tank.	202.00	15522.75	Cubic Meter	3135596
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for	0.00	0.00	NO.	

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)				
27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	120.00	391.00	Rmt.	46920
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend, 250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend, 250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000
30	Rate Analysis (Ref: -Annexure 10.4.8)	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.	235.4	3884.00	Meter	914294
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	410	2521.00	Mtrs	1033610
32	Rate Analysis (Ref: -Annexure 10.4.10)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint	250	1674.00	Nos	418500

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge				
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	473281
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	14	725.00	Nos	10150
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.	141.40	1016.00	Sqm	143662
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board) (Annexure 10.5.6)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	149.06	1744.70	Cum	260069
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	3.00	13858.00	Set	41574

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	3.00	7500.00	Each	22500
			<b>Sub Total for Non-SOR Items</b>			<b>85,05,837</b>
				<b>Add GST</b>	<b>12%</b>	<b>10,20,700</b>
			<b>Total for Non-SOR Items</b>		<b>B</b>	<b>95,26,538</b>
			<b>Total for SOR and Non-SOR Items</b>		<b>A+B</b>	<b>1,26,52,774</b>
				<b>Add Contingency</b>	<b>3%</b>	<b>3,79,583</b>
			<b>TOTAL (In ₹)</b>			<b>1,30,32,357</b>

10.6.8 *Enchey Senior Secondary School*

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 168 CUM CAPACITY  
(1 NO.) PIT OF SIZE:**

**[L (in mm) X B (in mm) X H (in mm)] : 14X6X3.3**

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	<b>SOR Items</b>					
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	50.00	5.69	sqm	285
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	360.90	146.26	Cum	52786
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	90.23	222.37	Cum	20064
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	60.15	223.32	Cum	13433
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	90.23	392.71	Cum	35432
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in	359.25	99.92	Cum	35897

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.				
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	14.14	7923.77	Cum	112022
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	66.53	6727.86	Cum	447571
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro-reflectorized cautionary, mandatory and inforamatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	2.00	7110.30	NO.	14221
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	19.00	3905.97	each	74213
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar	25.00	7883.90	Cum	197097

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		(1cement and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.				
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	50	243.25	Sqm	12163
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	0.00	23.93	Cum	0
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	0.00	29.65	Sqm	0
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	4.00	90.70	Sqm	363
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	350.00	264.92	Rmt	92722
	23.3.2	20mm dia G I pipe	300.00	336.30	Rmt	100889

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				
	23.9.2	STOP COCK 15 MM DIA	3.00	685.92	each	2058
	23.9.4	GATE WAY VALVE 20MM DIA	2.00	1024.64	each	2049
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	2.00	504.69	each	1009
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	2.00	12702.00	No.	25404
			<b>Sub Total for SOR items</b>			<b>1239678</b>
				<b>Add GST</b>	<b>10%</b>	<b>123968</b>
			<b>Total for SOR Items</b>		<b>A</b>	<b>1,363,645</b>
	<b>Non-SOR Items</b>					
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	342.25	125.73	Cum	43030
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	6086
21	Rate Analysis (Ref: -Annexure 10.4.1)	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	40.95	776.00	Cubic Meter	31777
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	496.00	824.06	Sqm	408734
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Break % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	992.00	82.00	Square Meter	81344
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	14.00	28572.90	Each	400021
25	Rate Analysis (Ref: -Annexure 10.4.5)	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria &	168.00	15522.75	Cubic Meter	2607822

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		bitumen and flow rate capacity about 0. 019Cu.m/Sec for recharge/storage tank.				
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	0.00	NO.	
27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	168.00	391.00	Rmt.	65688
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000
30	Rate Analysis	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint	134	3884.00	Meter	520456

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Ref: -Annexure 10.4.8)	coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.				
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	140	2521.00	Mtrs	352940
32	Rate Analysis (Ref: -Annexure 10.4.10)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	100	1674.00	Nos	167400
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	208159
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	14	725.00	Nos	10150
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with	117.60	1016.00	Sqm	119482

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		line sand etc. all complete as per the direction of Engineer-in-charge.				
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board) (Annexure 10.5.6)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	109.06	1744.70	Cum	190281
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	1.00	13858.00	Set	13858
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	1.00	7500.00	Each	7500
			<b>Sub Total for Non-SOR Items</b>			<b>60,31,028</b>
				<b>Add GST</b>	<b>12%</b>	<b>7,23,723</b>
			<b>Total for Non-SOR Items</b>			<b>B</b>
			<b>Total for SOR and Non-SOR Items</b>			<b>A+B</b>
			<b>Add Contingency</b>			<b>3%</b>
			<b>TOTAL (In ₹)</b>			<b>83,61,949</b>

10.6.9 *Modern Senior Secondary School*

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 220 CUM CAPACITY  
(2 NOS.) PIT OF SIZE:**

**[L (in mm) X B (in mm) X H (in mm)] : 20X4X3.3**

**: 10x3x3.3**

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	<b>SOR Items</b>					
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	100.00	5.69	sqm	569
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	601.02	146.26	Cum	87907
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	150.26	222.37	Cum	33413
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	100.17	223.32	Cum	22370
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	150.26	392.71	Cum	59007
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in	660.65	99.92	Cum	66014

		depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.				
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	19.35	7923.77	Cum	153325
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	115.20	6727.86	Cum	775049
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro-reflectorized cautionary, mandatory and informatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	4.00	7110.30	NO.	28441
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	36.00	3905.97	each	140615
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar (1cement and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.	50.00	7883.90	Cum	394195

11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	100	243.25	Sqm	24325
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	0.00	23.93	Cum	0
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	0.00	29.65	Sqm	0
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	4.80	90.70	Sqm	435
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	700.00	264.92	Rmt	185444
	23.3.2	20mm dia G I pipe	400.00	336.30	Rmt	134519
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				
	23.9.2	STOP COCK 15 MM DIA	7.00	685.92	each	4801
	23.9.4	GATE WAY VALVE 20MM DIA	5.00	1024.64	each	5123

17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	5.00	504.69	each	2523
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	5.00	12702.00	No.	63510
			<b>Sub Total for SOR items</b>			<b>21,81,585</b>
				<b>Add GST</b>	<b>10%</b>	<b>2,18,159</b>
			<b>Total for SOR Items</b>			<b>A</b>
						<b>23,99,744</b>
	<b>Non-SOR Items</b>					
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	441.05	125.73	Cum	53660
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	10135
21	Rate Analysis (Ref: -Annexure 10.4.1)	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	69.15	776.00	Cubic Meter	53453
22	Rate Analysis	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	736.00	824.06	Sqm	606509

	(Ref: -Annexure 10.4.2)					
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Break % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	1472.00	82.00	Sqm.	120704
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	24.00	28572.90	Each	685750
25	Rate Analysis (Ref: -Annexure 10.4.5)	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria & bitumen and flow rate capacity about 0.019Cu.m/Sec for recharge/storage tank.	220.00	15522.75	Cubic Meter	3415005
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	0.00	NO.	

27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	162.00	391.00	Rmt.	63342
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000
30	Rate Analysis (Ref: -Annexure 10.4.8)	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.	350	3884.00	Meter	1359400
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	470	2521.00	Mtrs	1184870
32	Rate Analysis	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting	250	1674.00	Nos	418500

	(Ref: -Annexure 10.4.10)	with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge				
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	592554
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	24	725.00	Nos	17400
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.	154.00	1016.00	Sqm	156464
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board) (Annexure 10.5.6)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	194.25	1744.70	Cum	338908
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	2.00	13858.00	Set	27716

38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	2.00	7500.00	Each	15000
			<b>Sub Total for Non-SOR Items</b>			<b>99,17,669</b>
				<b>Add GST</b>	<b>12%</b>	<b>11,90,120</b>
			<b>Total for Non-SOR Items</b>		<b>B</b>	<b>1,11,07,789</b>
<b>Total for SOR and Non-SOR Items</b>						
			<b>Total for SOR and Non-SOR Items</b>		<b>A+B</b>	<b>1,35,07,533</b>
			<b>Add Contingency</b>		<b>3%</b>	<b>4,05,226</b>
			<b>TOTAL (In ₹)</b>			<b>1,39,12,759</b>

10.6.10 **Tourism Secretariat**

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 150 CUM CAPACITY  
(1 NO.) PIT OF SIZE:**

**[L (in mm) X B (in mm) X H (in mm)] : 10X7.5X3.3**

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	<b>SOR Items</b>					
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	50.00	5.69	sqm	285
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	338.13	146.26	Cum	49456
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	84.53	222.37	Cum	18798
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	56.36	223.32	Cum	12585
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	84.53	392.71	Cum	33197
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in	344.48	99.92	Cum	34421

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.				
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	12.60	7923.77	Cum	99840
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	25.20	6727.86	Cum	169542
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro-reflectorized cautionary, mandatory and informatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	1.00	7110.30	NO.	7110
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	17.00	3905.97	each	66401
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar	25.00	7883.90	Cum	197097

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		(1cement and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.				
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	50	243.25	Sqm	12163
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	0.00	23.93	Cum	0
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	0.00	29.65	Sqm	0
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	3.50	90.70	Sqm	317
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	350.00	264.92	Rmt	92722
	23.3.2	20mm dia G I pipe	300.00	336.30	Rmt	100889

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				
	23.9.2	STOP COCK 15 MM DIA	3.00	685.92	each	2058
	23.9.4	GATE WAY VALVE 20MM DIA	1.00	1024.64	each	1025
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	1.00	504.69	each	505
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	1.00	12702.00	No.	12702
			<b>Sub Total for SOR items</b>			<b>9,11,112</b>
				<b>Add GST</b>	<b>10%</b>	<b>91,111</b>
			<b>Total for SOR Items</b>		<b>A</b>	<b>10,02,223</b>
<b>Non-SOR Items</b>						
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	319.08	125.73	Cum	40116
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	5702
21	Rate Analysis (Ref: -Annexure 10.4.1)	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	36.23	776.00	Cubic Meter	28111
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	220.00	824.06	Sqm	181293
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Brick % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	440.00	82.00	Square Meter	36080
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	10.00	28572.90	Each	285729
25	Rate Analysis	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria &	150.00	15522.75	Cubic Meter	2328413

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Ref: -Annexure 10.4.5)	bitumen and flow rate capacity about 0. 019Cu.m/Sec for recharge/storage tank.				
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	0.00	NO.	
27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	180.00	391.00	Rmt.	70380
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000
30	Rate Analysis	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with	96	3884.00	Meter	372864

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Ref: -Annexure 10.4.8)	union joint coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.				
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	130	2521.00	Mtrs	327730
32	Rate Analysis (Ref: -Annexure 10.4.10)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	20	1674.00	Nos	33480
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	146815
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	10	725.00	Nos	7250
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with	105.00	1016.00	Sqm	106680

Sr. No.	Ref. 2012/DSR-2016/ Rate Analysis	SOR- Particulars	Quantity	Rate	Unit	Amount
		line sand etc. all complete as per the direction of Engineer-in-charge.				
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board) (Annexure 10.5.6)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	99.00	1744.70	Cum	172725
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	1.00	13858.00	Set	13858
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	1.00	7500.00	Each	7500
			<b>Sub Total for Non-SOR Items</b>			<b>49,61,026</b>
				<b>Add GST</b>	<b>12%</b>	<b>5,95,323</b>
			<b>Total for Non-SOR Items</b>			<b>B</b>
			<b>Total for SOR and Non-SOR Items</b>			<b>A+B</b>
			<b>Add Contingency</b>			<b>3%</b>
			<b>TOTAL (In ₹)</b>			<b>67,55,329</b>

10.6.11 **West Point Senior Secondary School**

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 190 CUM CAPACITY  
(3 NOS.) PIT OF SIZE:**

[L (in mm) X B (in mm) X H (in mm)] : 8X5X3.3  
: 8X5X3.3  
: 5X3X3.3

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	<b>SOR Items</b>					
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	150.00	5.69	sqm	854
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	720.36	146.26	Cum	105362
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	180.09	222.37	Cum	40047
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	120.06	223.32	Cum	26812
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	180.09	392.71	Cum	70723

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.	870.20	99.92	Cum	86952
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	16.91	7923.77	Cum	134011
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	148.58	6727.86	Cum	999591
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro-reflectorized cautionary, mandatory and informatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	6.00	7110.30	NO.	42662
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	38.00	3905.97	each	148427

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar (1cement and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.	75.00	7883.90	Cum	591292
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	100	243.25	Sqm	24325
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	0.00	23.93	Cum	0
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	0.00	29.65	Sqm	0
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	2.60	90.70	Sqm	236
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	800.00	264.92	Rmt	211936

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	23.3.2	20mm dia G I pipe	400.00	336.30	Rmt	134519
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				
	23.9.2	STOP COCK 15 MM DIA	9.00	685.92	each	6173
	23.9.4	GATE WAY VALVE 20MM DIA	7.00	1024.64	each	7172
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	7.00	504.69	each	3533
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	7.00	12702.00	No.	88914
			<b>Sub Total for SOR items</b>			<b>27,23,542</b>
				<b>Add GST</b>	<b>10%</b>	<b>2,72,354</b>
			<b>Total for SOR Items</b>			<b>29,95,896</b>
<b>Non-SOR Items</b>						
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	430.40	125.73	Cum	54113

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	12147
21	Rate Analysis (Ref: -Annexure 10.4.1)	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	64.20	776.00	Cubic Meter	49819
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	652.00	824.06	Sqm	537288
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Break % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	1304.00	82.00	Sqm.	106928
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	30.00	28572.90	Each	857187

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
25	Rate Analysis (Ref: -Annexure 10.4.5)	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria & bitumen and flow rate capacity about 0. 019Cu.m/Sec for recharge/storage tank.	190.00	15522.75	Cubic Meter	2949323
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	0.00	NO.	
27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	222.00	391.00	Rmt.	86802
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
30	Rate Analysis (Ref: -Annexure 10.4.8)	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.	366.3	3884.00	Meter	1422709
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	570	2521.00	Mtrs	1436970
32	Rate Analysis (Ref: -Annexure 10.4.10)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	350	1674.00	Nos	585900
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	689116
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	30	725.00	Nos	21750
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including	133.00	1016.00	Sqm	135128

Sr. No.	Ref. 2012/DSR-2016/ Rate Analysis	SOR- Particulars	Quantity	Rate	Unit	Amount
		50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.				
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board) (Annexure 10.5.6)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	152.38	1744.70	Cum	265849
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	3.00	13858.00	Set	41574
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	3.00	7500.00	Each	22500
			<b>Sub Total for Non-SOR Items</b>			<b>1,00,71,403</b>
				<b>Add GST</b>	<b>12%</b>	<b>12,08,568</b>
			<b>Total for Non-SOR Items</b>			<b>B</b>
			<b>Total for SOR and Non-SOR Items</b>			<b>A+B</b>
			<b>Add Contingency</b>			<b>3%</b>
			<b>TOTAL (In ₹)</b>			<b>1,47,04,143</b>

10.6.12 **Tashi Namgyal Senior Secondary School**

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 320 CUM CAPACITY  
(1 NO.) PIT OF SIZE:**

**[L (in mm) X B (in mm) X H (in mm)] : 16X10X3.3**

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	<b>SOR Items</b>					
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	100.00	5.69	sqm	569
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	676.26	146.26	Cum	98912
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	169.07	222.37	Cum	37595
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	112.71	223.32	Cum	25171
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	169.07	392.71	Cum	66394
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth,	668.50	99.92	Cum	66798

Sr. No.	Ref. SOR-2012/DSR-2016/ Analysis Rate	Particulars	Quantity	Rate	Unit	Amount
		consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.				
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	26.03	7923.77	Cum	206216
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	128.55	6727.86	Cum	864866
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro-reflectorized cautionary, mandatory and inforamatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	4.00	7110.30	NO.	28441
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	27.00	3905.97	each	105461
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar (1cement	50.00	7883.90	Cum	394195

Sr. No.	Ref. SOR-2012/DSR-2016/ Analysis Rate	Particulars	Quantity	Rate	Unit	Amount
		and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.				
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	100	243.25	Sqm	24325
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	0.00	23.93	Cum	0
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	0.00	29.65	Sqm	0
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	5.20	90.70	Sqm	472
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	350.00	264.92	Rmt	92722
	23.3.2	20mm dia G I pipe	300.00	336.30	Rmt	100889

Sr. No.	Ref. SOR-2012/DSR-2016/ Analysis Rate	Particulars	Quantity	Rate	Unit	Amount
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				
	23.9.2	STOP COCK 15 MM DIA	3.00	685.92	each	2058
	23.9.4	GATE WAY VALVE 20MM DIA	1.00	1024.64	each	1025
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	1.00	504.69	each	505
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	1.00	12702.00	No.	12702
			<b>Sub Total for SOR items</b>			<b>21,29,315</b>
				<b>Add GST</b>	<b>10%</b>	<b>2,12,931</b>
			<b>Total for SOR Items</b>		<b>A</b>	<b>23,42,246</b>
<b>Non-SOR Items</b>						
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	558.60	125.73	Cum	70231
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	11404
21	Rate Analysis (Ref: -Annexure 10.4.1)	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	61.80	776.00	Cubic Meter	47957
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	848.00	824.06	Sqm	698804
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Brick % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	1696.00	82.00	Sqm.	139072
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	10.00	28572.90	Each	285729
25	Rate Analysis (Ref: -Annexure 10.4.5)	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds,	320.00	15522.75	Cubic Meter	4967280

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		algae, soil-born chemicals, bacteria & bitumen and flow rate capacity about 0. 019Cu.m/Sec for recharge/storage tank.				
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	0.00	NO.	
27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	180.00	391.00	Rmt.	70380
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000
30	Rate Analysis (Ref: -Annexure 10.4.8)	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, all specials, fittings specially designed for Rain Water	185.7	3884.00	Meter	721259

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.				
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	200	2521.00	Mtrs	504200
32	Rate Analysis (Ref: -Annexure 10.4.10)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	0	1674.00	Nos	0
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	245092
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	10	725.00	Nos	7250
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.	224.00	1016.00	Sqm	227584

Sr. No.	Ref. 2012/DSR-2016/ SOR- Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board) (Annexure 10.5.6)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	148.32	1744.70	Cum	258774
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	2.00	13858.00	Set	27716
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	2.00	7500.00	Each	15000
			<b>Sub Total for Non-SOR Items</b>			<b>90,94,031</b>
				<b>Add GST</b>	<b>12%</b>	<b>10,91,284</b>
			<b>Total for Non-SOR Items</b>			<b>1,01,85,315</b>
			<b>Total for SOR and Non-SOR Items</b>			<b>1,25,27,561</b>
			<b>Add Contingency</b>			<b>3%</b>
			<b>TOTAL (In ₹)</b>			<b>1,29,03,388</b>

10.6.13 **Burtuk Junior High School**

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 92 CUM CAPACITY  
(1 NO.) PIT OF SIZE:**

**[L (in mm) X B (in mm) X H (in mm)] : 11.5X4X3.3**

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	<b>SOR Items</b>					
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	50.00	5.69	sqm	285
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	276.75	146.26	Cum	40478
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	69.19	222.37	Cum	15385
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	46.13	223.32	Cum	10301
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	69.19	392.71	Cum	27171
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in	314.13	99.92	Cum	31388

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.				
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	8.10	7923.77	Cum	64183
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	54.45	6727.86	Cum	366332
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro-reflectorized cautionary, mandatory and inforamatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	2.00	7110.30	NO.	14221
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	16.00	3905.97	each	62495
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar	25.00	7883.90	Cum	197097

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		(1cement and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.				
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	50	243.25	Sqm	12163
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	0.00	23.93	Cum	0
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	0.00	29.65	Sqm	0
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	3.10	90.70	Sqm	281
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	350.00	264.92	Rmt	92722
	23.3.2	20mm dia G I pipe	300.00	336.30	Rmt	100889

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				
	23.9.2	STOP COCK 15 MM DIA	3.00	685.92	each	2058
	23.9.4	GATE WAY VALVE 20MM DIA	2.00	1024.64	each	2049
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	0.00	504.69	each	0
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	2.00	12702.00	No.	25404
			<b>Sub Total for SOR items</b>			<b>10,64,901</b>
				<b>Add GST</b>	<b>10%</b>	<b>1,06,490</b>
			<b>Total for SOR Items</b>			<b>A</b>
						<b>11,71,391</b>
<b>Non-SOR Items</b>						
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	247.13	125.73	Cum	31070
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	4667
21	Rate Analysis (Ref: -Annexure 10.4.1)	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	29.18	776.00	Cubic Meter	22640
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	154.00	824.06	Sqm	126905
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Brick % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	308.00	82.00	Sqm.	25256
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	8.00	28572.90	Each	228583
25	Rate Analysis (Ref: -Annexure 10.4.5)	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria & bitumen and flow rate capacity about 0. 019Cu.m/Sec for recharge/storage tank.	92.00	15522.75	Cubic Meter	1428093

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	0.00	NO.	
27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	60.00	391.00	Rmt.	23460
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend, 250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend, 250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000
30	Rate Analysis (Ref: -Annexure 10.4.8)	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.	299.4	3884.00	Meter	1162870

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	170	2521.00	Mtrs	428570
32	Rate Analysis (Ref: -Annexure 10.4.10)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	0	1674.00	Nos	0
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	318288
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	8	725.00	Nos	5800
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.	64.40	1016.00	Sqm	65430
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform	85.50	1744.70	Cum	149172

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Annexure 10.5.6)	layers on prepared surface, mixing by mix in place method, etc. complete.				
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	1.00	13858.00	Set	13858
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	1.00	7500.00	Each	7500
			<b>Sub Total for Non-SOR Items</b>			<b>48,38,462</b>
			<b>Add GST</b>	<b>12%</b>		<b>5,80,615</b>
			<b>Total for Non-SOR Items</b>		<b>B</b>	<b>54,19,078</b>
			<b>Total for SOR and Non-SOR Items</b>			<b>A+B</b>
						<b>65,90,469</b>
			<b>Add Contingency</b>		<b>3%</b>	<b>1,97,714</b>
			<b>TOTAL (In ₹)</b>			<b>67,88,183</b>

10.6.14 **Tadong Senior Secondary School**

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 190 CUM CAPACITY  
(1 NO.) PIT OF SIZE:**

**[L (in mm) X B (in mm) X H (in mm)] : 19X5X3.3**

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	<b>SOR Items</b>					
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	50.00	5.69	sqm	285
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	390.60	146.26	Cum	57130
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	97.65	222.37	Cum	21715
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	65.10	223.32	Cum	14538
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	97.65	392.71	Cum	38348
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in	380.00	99.92	Cum	37971

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.				
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	16.09	7923.77	Cum	127474
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	70.43	6727.86	Cum	473809
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro-reflectorized cautionary, mandatory and inforatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	1.00	7110.30	NO.	7110
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	22.00	3905.97	each	85931
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar	25.00	7883.90	Cum	197097

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		(1cement and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.				
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	50	243.25	Sqm	12163
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	0.00	23.93	Cum	0
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	0.00	29.65	Sqm	0
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	4.80	90.70	Sqm	435
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	350.00	264.92	Rmt	92722
	23.3.2	20mm dia G I pipe	300.00	336.30	Rmt	100889

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				
	23.9.2	STOP COCK 15 MM DIA	3.00	685.92	each	2058
	23.9.4	GATE WAY VALVE 20MM DIA	2.00	1024.64	each	2049
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	2.00	504.69	each	1009
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	2.00	12702.00	No.	25404
			<b>Sub Total for SOR items</b>			<b>12,98,138</b>
				<b>Add GST</b>	<b>10%</b>	<b>1,29,814</b>
			<b>Total for SOR Items</b>			<b>14,27,951</b>
	<b>Non-SOR Items</b>					
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	371.00	125.73	Cum	46645
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	6587
21	Rate Analysis (Ref: -Annexure 10.4.1)	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	48.00	776.00	Cubic Meter	37248
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	286.00	824.06	Sqm	235681
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Brick % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	572.00	82.00	Sqm.	46904
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	8.00	28572.90	Each	228583
25	Rate Analysis (Ref: -Annexure 10.4.5)	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria &	190.00	15522.75	Cubic Meter	2949323

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		bitumen and flow rate capacity about 0. 019Cu.m/Sec for recharge/storage tank.				
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	0.00	NO.	
27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	24.00	391.00	Rmt.	9384
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend,250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000
30	Rate Analysis	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint	164	3884.00	Meter	636976

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	(Ref: -Annexure 10.4.8)	coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.				
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	180	2521.00	Mtrs	453780
32	Rate Analysis (Ref: -Annexure 10.4.10)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	40	1674.00	Nos	66960
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	231543
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	8	725.00	Nos	5800
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with	133.00	1016.00	Sqm	135128

Sr. No.	Ref. 2012/DSR-2016/ Rate Analysis	SOR- Particulars	Quantity	Rate	Unit	Amount
		line sand etc. all complete as per the direction of Engineer-in-charge.				
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board) (Annexure 10.5.6)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform layers on prepared surface, mixing by mix in place method, etc. complete.	124.31	1744.70	Cum	216888
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	1.00	13858.00	Set	13858
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	1.00	7500.00	Each	7500
			<b>Sub Total for Non-SOR Items</b>			<b>61,25,088</b>
				<b>Add GST</b>	<b>12%</b>	<b>7,35,011</b>
			<b>Total for Non-SOR Items</b>			<b>B</b> <b>68,60,098</b>
			<b>Total for SOR and Non-SOR Items</b>			<b>A+B</b> <b>82,88,050</b>
				<b>Add Contingency</b>	<b>3%</b>	<b>2,48,641</b>
			<b>TOTAL (In ₹)</b>			<b>85,36,691</b>

10.6.15 **Tashiling Secretariat**

**NAME OF WORK: CONSRUCTION OF PURE RAIN WATER HARVESTING HOLDING TANK (UNDERGROUND) OF TOTAL 198 CUM CAPACITY  
(2 NOS.) PIT OF SIZE:**

**[L (in mm) X B (in mm) X H (in mm)] : 13.5X5X3.3**

**: 9X3.5X3.3**

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
	<b>SOR Items</b>					
1	2.1/SOR	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.	100.00	5.69	sqm	569
2	SOR 2012, I.N. 3.1.1	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 meters.	567.36	146.26	Cum	82984
3	SOR 2012, I.N. 3.2.1	Excavation in soil in hilly area by manual means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 50 meters.	141.84	222.37	Cum	31541
4	SOR 2012, I.N. 3.3.1	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 meters.	94.56	223.32	Cum	21117
5	SOR 2012, I.N. 3.4.1	Excavation in hilly area in ordinary rock not requiring blasting by Manual means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 50 meters.	141.84	392.71	Cum	55702

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
6	5.2/ SOR	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and water. Lead upto 50 m and lift upto 1.5 m.	634.20	99.92	Cum	63371
7	7.1/ SOR 2012, I.N.	Providing and Laying in position cement concrete of specified grade including compacting curing etc. all complete.				
	7.1.2	1:1.5:3 (1cement, 1.5 coarse sand,3 graded stone aggregate of 20 mm & down size)	17.25	7923.77	Cum	136685
	7.1.3	1:2:4 mix. (1 cement, 2 coarse sand, 4 graded stone aggregate of 20mm & down size)	34.50	6727.86	Cum	232111
8	8.40/SOR	Retro- reflectorized Traffic signs (Providing and fixing of retro-reflectorized cautionary, mandatory and informatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
		60 cm x 45 cm rectangular	2.00	7110.30	NO.	14221
9	8.43/SOR	Portable Barricade in Construction Zone (Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 ) at least 5 times reusable	31.00	3905.97	each	121085
10	10.2/ SOR	Providing and Laying first class brick work in one brick thick in superstructure of standard size bricks with 1:5 cement mortar	50.00	7883.90	Cum	394195

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		(1cement and 5 clean coarse sand) as per the direction of Engineer in Charge including curing etc. all complete.				
11	9.3/ SOR	Providing and Laying 20 mm thick cement plaster of specified mix in single coat including finishing even and smooth and curing etc. all complete.				
	9.3.2	1:4 mix.	100	243.25	Sqm	24325
12	11.1/ SOR	Spreading of Sludge Farm Yard Manure or/and good Earth (Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately)	0.00	23.93	Cum	0
13	11.2/ SOR	Grassing with ' Doobs' Grass (Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)				
	i	In rows 15 cm apart in either direction	0.00	29.65	Sqm	0
	ii	In rows 7.5 cm apart in either direction	0.00	53.20	Sqm	0
14	22.2.1/SOR	Providing and painting with ready mixed paint of approved quality and shade with two or more coats to give an even and smooth shade including clearing the surface complete on new surface.	3.70	90.70	Sqm	336
15	SOR/ 23.3	Providing, Fitting and fixing GI pipe of medium class, (excluding trenching, refilling, compacting) and including cost of fittings (20% of cost) all complete				
	23.3.1	15 mm dia G I pipe	350.00	264.92	Rmt	92722
	23.3.2	20mm dia G I pipe	300.00	336.30	Rmt	100889

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
16	SOR/ 23.9	Providing, Fitting and fixing brass fittings of approved quality and size complete:				
	23.9.2	STOP COCK 15 MM DIA	3.00	685.92	each	2058
	23.9.4	GATE WAY VALVE 20MM DIA	1.00	1024.64	each	1025
17	23.11/ SOR	Providing, Fitting and fixing ball valve (Brass) of approved quality complete with high or low pressure with plastic floats:	1.00	504.69	each	505
18	23.10/SOR	Providing and placing on terrace high density polyethylene water storage tank for pure water storage with manhole lid and suitable locking arrangement including making holes for inlet, outlet, ball cock i/c testing, etc. all complete (Sintex or equivalent) as per instructed by ENGINEER-IN-CHARGE				
		1000 LITERS CAPACITY	1.00	12702.00	No.	12702
			<b>Sub Total for SOR items</b>			<b>1388142</b>
			<b>Add GST</b>	<b>10%</b>		<b>138814</b>
			<b>Total for SOR Items</b>		<b>A</b>	<b>1,526,956</b>
<b>Non-SOR Items</b>						
19	1.1.2/ DSR 2016	Carriage of Material by mechanical transport including loading, unloading etc. Complete lead 2 km the place of disposal shall be approved by the engineer-in-charge	411.40	125.73	Cum	51724
20		Dewatering the excavated trenches and flow of water in trench area by using pumps and other devices including disposing of water as directed.				

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
		Add for dewatering @ 5% of cost, of Excavation		0.00	LS	9567
21	Rate Analysis (Ref: -Annexure 10.4.1)	Supplying, filling, spreading & levelling Sand in recharge pit, in the required thickness, for all lead & lifts, all complete.	59.40	776.00	Cubic Meter	46094
22	Rate Analysis (Ref: -Annexure 10.4.2)	Supply EPDM Liner 1500 Micron as per specification to retain water including welding of sheets. Installation practice should not result into smell to the stagnated water.	644.00	824.06	Sqm	530695
23	Rate Analysis (Ref: -Annexure 10.4.3)	Supply and fixing of non-woven Geotextile having thickness of 400 gsm, having minimum tear strength of 250 ASTM D4533, width-wise at least 215 ASTM D4533 having puncture strength of 1550 plus as per ASTM D6241 having elongation at Brick % of 57 plus as per ASTM D4595 in Two layers, made out of long fibers to hold the modules and protect liner including cutting, sizing, head welding, and needle punched for high porosity and proper percolation. Complete as per entire satisfaction of ENGINEER-IN-CHARGE.	1288.00	82.00	Sqm.	105616
24	Rate Analysis (Ref: -Annexure 10.4.4)	Supply & fixing of "Rainy" make self-cleaning dual intensity online filters having the capacity to capture rainfall load varying from 5 mm to 75 mm/hr. without affecting the efficiency of filter. The working principle of the filter should be based on cohesive & centrifugal force. Filter element is of SS304 with 250-micron size, minimum operating pressure is 0.060 kg/cm <sup>2</sup> , with efficiency of 90%. The body should be made of High Density Polyethylene housing.	10.00	28572.90	Each	285729
25	Rate Analysis (Ref: -Annexure 10.4.5)	Supply modular tank made up of 100% recycled polypropylene which is having void storage area 97% as per specification unaffected by moulds, algae, soil-born chemicals, bacteria & bitumen and flow rate capacity about 0. 019Cu.m/Sec for recharge/storage tank.	198.00	15522.75	Cubic Meter	3073505

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
26		Providing and placing high density polyethylene water storage tank of 15,000 liters capacity for over ground installation; with man hole lid and suitable locking arrangement including making holes for inlet, out let and ball cock including testing etc. all complete including freight charges: (Sinter or equivalent)	0.00	0.00	NO.	
27	Rate Analysis (Ref: -Annexure 10.4.6)	Supply and Installation of 110 mm dia. 4 kg/sq.cm pressure rating PVC pipe with 1% gradient from filtration unit to recharge/storage/bore well Retention including all fittings accessories with all specials, Bend, End Cap, Tee, U-Clamp-L-Clamp with anchor bolts and accessories.	180.00	391.00	Rmt.	70380
28	Rate Analysis (Ref: -Annexure 10.4.7)	Supply and installation of inlet & outlet connection of 4" dia. Pipe by using 50 mm grass paver including fitting and accessories with all fittings, specials of including 250 mm Round Bend, 250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. and respect to gravity line with 1% gradient from storage tank to recharge tank & retention /Buffer bore well tank.	300.00	2571.00	Rmt.	771300
29		Supply and fixing of specials of including 250 mm Half Round Bend, 250 mm End Cap, 250mm to 110mm Down Take Tee with 110mm FLC and RSR, 110mm RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories. Considering 20 % cost for all types of specials.	0.00	0.00	LS	25000
30	Rate Analysis (Ref: -Annexure 10.4.8)	Supply and fixing of 250mm HDPE Half round Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, all specials, fittings specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge.	216	3884.00	Meter	838944

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount
31	Rate Analysis (Ref: -Annexure 10.4.9)	Supply and fixing of 160 mm Approved Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	320	2521.00	Mtrs	806720
32	Rate Analysis (Ref: -Annexure 10.4.10)	Supply and fixing of 90 mm Hallmark Make HDPE Pipe added with anti-sagging property and UV-stabilizer, grey color, fitted with union joint coupling, specially designed for Rain Water Harvesting with 'zero' leakage at 'zero' pressure or as per the instruction of engineer in charge	20	1674.00	Nos	33480
33		Supply and fixing of specials of including Half Round Bend, End Cap, Down Take Tee with 110mm FLC and RSR, RWH Tee, Bends, U-Clamp-L-Clamp with anchor bolts and accessories.	0	0.00	LS	335829
34	Rate Analysis (Ref: -Annexure 10.4.11)	Supply and fixing of Air Vent Arrangement at Filter delivery	10	725.00	Nos	7250
35	Rate Analysis (Ref: -Annexure 10.4.12)	Providing and laying 60 mm thick factory-made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.	138.60	1016.00	Sqm	140818
36	Ref. 4.1.b.i (Estimate Sikkim Housing and Development Board)	Granular Sub base: By mix in place method: Construction of GSB by providing close graded material, spreading in uniform	148.48	1744.70	Cum	259057

Sr. No.	Ref. SOR-2012/DSR-2016/ Rate Analysis	Particulars	Quantity	Rate	Unit	Amount	
	(Annexure 10.5.6)	layers on prepared surface, mixing by mix in place method, etc. complete.					
37	Rate Analysis (Ref: -Annexure 10.4.13)	Supply, installation and commissioning of 1 HP Horizontal Mono Block Pump Set of suitable head, discharge, speed and suction depth for pumping of water, including civil works, fabrication work for mounting the pump, necessary plumbing including cable, with all fittings, complete as per the instructions of Engineer In charge.	2.00	13858.00	Set	27716	
38	Rate Analysis (Ref: -Annexure 10.4.14)	Supply and fixing of water level indicator with Manual shut-off/on sensor, alarm with switch, As approved by Engineer-in-Charge etc.	2.00	7500.00	Each	15000	
			<b>Sub Total for Non-SOR Items</b>			<b>74,34,425</b>	
				<b>Add GST</b>	<b>12%</b>	<b>8,92,131</b>	
			<b>Total for Non-SOR Items</b>			<b>B</b>	<b>83,26,556</b>
			<b>Total for SOR and Non-SOR Items</b>			<b>A+B</b>	<b>98,53,511</b>
				<b>Add Contingency</b>	<b>3%</b>	<b>2,95,605</b>	
			<b>TOTAL (In ₹)</b>			<b>1,01,49,117</b>	