



**A/Y: 2022-2023**




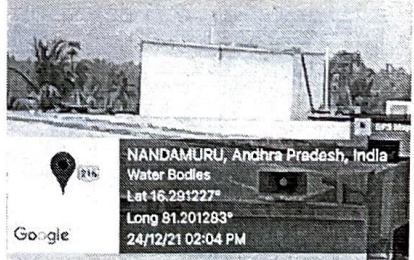
### WATER CONSERVATION FACILITIES

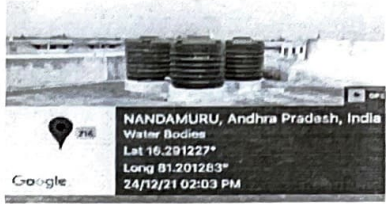

#### 1. Rain water Harvesting:

SVIET is located at distance of 15 kms from Machilipatnam, Andhra Pradesh (India). The population of SVIET campus including staff and students are approximately 1400 on an average. Entire SVIET campus contains 10.06 acres of land. It holds three buildings viz. B1- Block, B2- Block, and B3 Block and Canteen with Roof Structure.

All the rainwater in each block is collected from roof top and this water is directed to rainwater harvesting pits situated at each block. The excess amount viz. water from roads, landscapes and other is directed to Open well recharge pit through open and closed drain distribution system.

The technical details of rain water harvesting potential will be dealt in the following sessions.

Description		Links for geo-tagged photos	Geo tagged photo
Rain water harvesting	All the rainwater in each block is collected from roof top and this water is directed to rainwater harvesting pits situated at each block	<a href="https://sviet.edu.in/public/images/1%2020211224_121921pm_ByGPSMapCamera.jpg">https://sviet.edu.in/public/images/1%2020211224_121921pm_ByGPSMapCamera.jpg</a>	
		<a href="https://sviet.edu.in/public/images/rwhi2.jpg">https://sviet.edu.in/public/images/rwhi2.jpg</a>	
Open well recharge	All the rainwater is collected through open well recharge	<a href="https://sviet.edu.in/public/images/well%20Slide2.JPG">https://sviet.edu.in/public/images/well%20Slide2.JPG</a>	
Construction of tanks	Construction of tanks purpose to Distribute the water in sviet campus	<a href="https://sviet.edu.in/public/images/1%2020211224_20413PM_ByGPSMapCamera.jpg">https://sviet.edu.in/public/images/1%2020211224_20413PM_ByGPSMapCamera.jpg</a>	

Construction of tanks	Construction of tanks purpose to Distribute the water in sviet campus	<a href="https://sviet.edu.in/public/images/2%2020211224_20305PM_ByGPSMapCamera.jpg">https://sviet.edu.in/public/images/2%2020211224_20305PM_ByGPSMapCamera.jpg</a>	 <p>NANDAMURU, Andhra Pradesh, India Water Bodies Lat 16.201227° Long 81.201283° 24/12/21 02:03 PM</p>
Construction of tanks	Construction of tanks purpose to Distribute the water in sviet campus	<a href="https://sviet.edu.in/public/images/3%2020211224_20347PM_ByGPSMapCamera.jpg">https://sviet.edu.in/public/images/3%2020211224_20347PM_ByGPSMapCamera.jpg</a>	 <p>NANDAMURU, Andhra Pradesh, India Water Bodies Lat 16.201227° Long 81.201283° 24/12/21 02:03 PM</p>

**(a) Rain water harvesting system at SVIET:-**

**1. Catchment area**

Catchment area is the surface on which the rain water falls. In the campus, all the building's roofs are taken as catchment area. The total estimated area of building roofs/terraces is 3,211.21 Sq.m. as shown in Table 1.

**Rain water Harvesting potential from Terrace and roads of SVIET:-**

Under water conservation facilitates available in the institution, Rain water harvesting pits at two locations are identified and are installed at suitable locations. The table1 shows the annual rain water harvested at each block every year. Coarse mesh / leaf screen is used to prevent the entry of leaves and other debris in the system. For every build of SVIET, this facility is provided to stop the debris to enter into the Recharge pit.

Artificial recharge to ground water is a process by which the ground water reservoir is augmented at a rate exceeding that obtaining under natural conditions or replenishment. Any man-made scheme or facility that adds water to an aquifer may be considered to be an artificial recharge system. Based on the above factors, the water harvesting potential of site could be estimated using the following equation:-

**Rain Water harvesting potential = Amount of Rainfall \* Area of catchment \* Runoff coefficient**

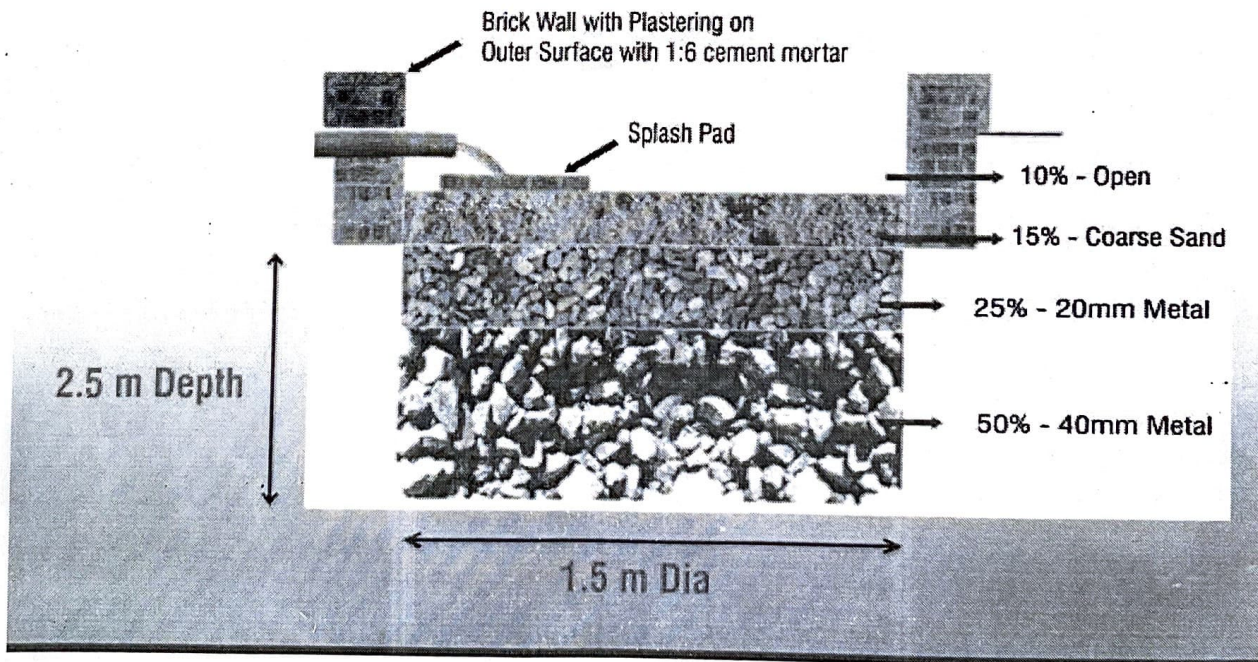
Terrace Area = 3,211.21 m<sup>2</sup>

Annual water harvesting potential = 1464.29 m<sup>3</sup>  
 = 1464290 litres

Block	Roof Area (sq. m) (1)	Annual Rainfall (m) (2)	(Evaporation, flushes) Losses (3)	Surface efficiency (4)	Annual Rain Harvesting (1)*(2)*(3)*(4) (m <sup>3</sup> )
BLOCK 1	1441.6	0.95	0.8	0.6	657.36
BLOCK-2	692.38	0.95	0.8	0.6	315.72
BLOCK-3	519.63	0.95	0.8	0.6	236.95
Canteen	557.6	0.95	0.8	0.6	254.26
<b>Total</b>	<b>3,211.21</b>				<b>1464.29</b>

Based on the harvesting potential, the design of recharge pit is arrived (fig.1) and is installed in various locations of SVIET as shown below. In addition to that mostly the college is having a green landscape. These landscape acts as a natural rain water harvesting pits for ground water recharge.

**Fig 1. Design of Recharge Pit Implemented at SVIET**



## 2. Percolation pit

Figure 8 shows an open well recharge with bund protection where excess rainwater is collected from roof tops and through underground drains, roads and others (Open spaces, land scapings) through suitable drainage system. In every building the drainage system is in such a way that, all the rain water from roof of buildings is collected and is directed towards open well recharge pit/pond which is situated at lower elevation situated near BLOCK-1, and BLOCK-3 of SVIET . The capacity of the Percolation pits is about one Lakh liters covering an area of 10,000 sq m.

## 3. Constructions of Tanks and bunds

In SVIET, every block is having water storage tank (Fig 11 &12) to cater the need of students and faculty. There are 4 tanks and the total capacity of all tanks is shown in Table. 2. The total capacity of tanks is about 1.8 Lakh liters. Hence these tanks are sufficient to meet the Per Capita Consumption of all blocks which is about 1.75 Lakh Liters.

**Table: 2 Block Wise Per capita consumption and requirement**

SIN o	Name of the Block	No. of tanks	Dimensions of Tank (m) L × B × H	Capacity of Tank (Litres)	Per Capita Consumption of each block (Litres)	No of times Refilling required	Maintenace in a week
1	BLOCK-1	2	4.20 × 3.90 × 1.6	26000	84330	1	1
			4.10 × 3.80 × 1.52	23500			
			<b>Total</b>	<b>49500</b>			
2	BLOCK-2	1	4.1 × 4.1 × 2.3	38500	81810	1	1
			<b>Total</b>	<b>38500</b>			
3	BLOCK-3	1	14.20 × 4.60 × 2.0	130000	77670	1	1
			<b>Total</b>	<b>130000</b>			
			<b>Total</b>	<b>86000</b>			
<b>Total LPCD</b>				<b>734000</b>	<b>551700</b>		

#### 4. Waste Water Recycling

The quantity of water utilized in each block and to treat this waste water, an innovative green technology "constructed wetland system" has been used.

##### Technology adaptation for Wetlands

1) **Bio-Passive Wetlands:** Passive wetland application is one where the area needed for wetland cell is equal to or more than 4 sq mtr per kl of treatment and microbial dosing is done in parallel.

2) **Bio-Aerated Wetlands:** Aerated wetland application is one where aeration is introduced in the wetland cells with external blowers and the area needed for a wetland cell is approximately 1 sq mtr per KL of treatment and microbial dosing is done in parallel. Aeration is introduced in the wetland cells with external blowers. The maximum runtime of the blowers being 4 to 6 hrs per day at peak load.

#### 5. Maintenance of Water Bodies and Distribution systems

The conduits used in SVIET building are of type viz., cement asbestos, PVC, GI or cast iron. All the overflowed rain water from roof tops enters into the drainage system to rain water harvesting pond will undergo initial screening process, where all the dirt, leaves, stones other materials will be collected at the screen bars to prevent bad smell, silting and eutrophication.

For efficient operation and maintenance of distribution system, the following activities are undertaken by SVIET technicians.

- Preventive Maintenance, this is the regular activity carried out to prevent breakdowns and to ensure that assets fulfil its service life.
- Preventive maintenance includes servicing of equipment and distribution system, inspecting wear and tear replacing with necessary parts.
- It is the daily task, which includes checking water levels, eutrophication areas, floating materials, Inspecting inlet pumps, motors and controls, maintaining a registrar.
- Annual task includes flushing the distribution system and checking all the fire hydrant valves. Corrective maintenance is carried out when a part of system is fulfilled its service life, replacing it with necessary new parts.
- To reduce the harmful bacterial activities chlorine tabs has been used.

  
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