St. Vincent's High School, Pune

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(Data Generated for JAAI West Zone Conference 14-16 Nov 2025)

Rainwater Harvesting, Terrain-Based Recharge Assessment Solar Installation, Carbon Sequestration Study

1 RAINWATER HARVESTING ANALYSIS

RWH Formula:

$$RWH = P \times A \times C$$

Where:

- **P** = Mean annual rainfall (in meters)
- **A** = Surface area (m^2)
- **C** = Runoff coefficient

Runoff Coefficients:

- Rooftop: **0.875**
- Paved: **0.7**
- Unpaved: **0.6**
- Green: **Excluded from RWH (used for carbon sequestration only)**

Data Considered

- **Rainfall Data (CHIRPS - Last Three Years)**

Year	Rainfall (mm)	Rainfall (m)
2024	981.76	0.9818
2023	707.35	0.7074
2022	1041.68	1.0417

- **Mean Annual Rainfall (P):** (0.9818 + 0.7074 + 1.0417) / 3 = **0.9103 m/year**

- Surface Area Data

Surface Type	Area (m^2)	Runoff Coefficient
Roof	3,902.58	0.875
Unpaved	18,173.68	0.6
Green	8,604.15	*Excluded*

RWH Calculations

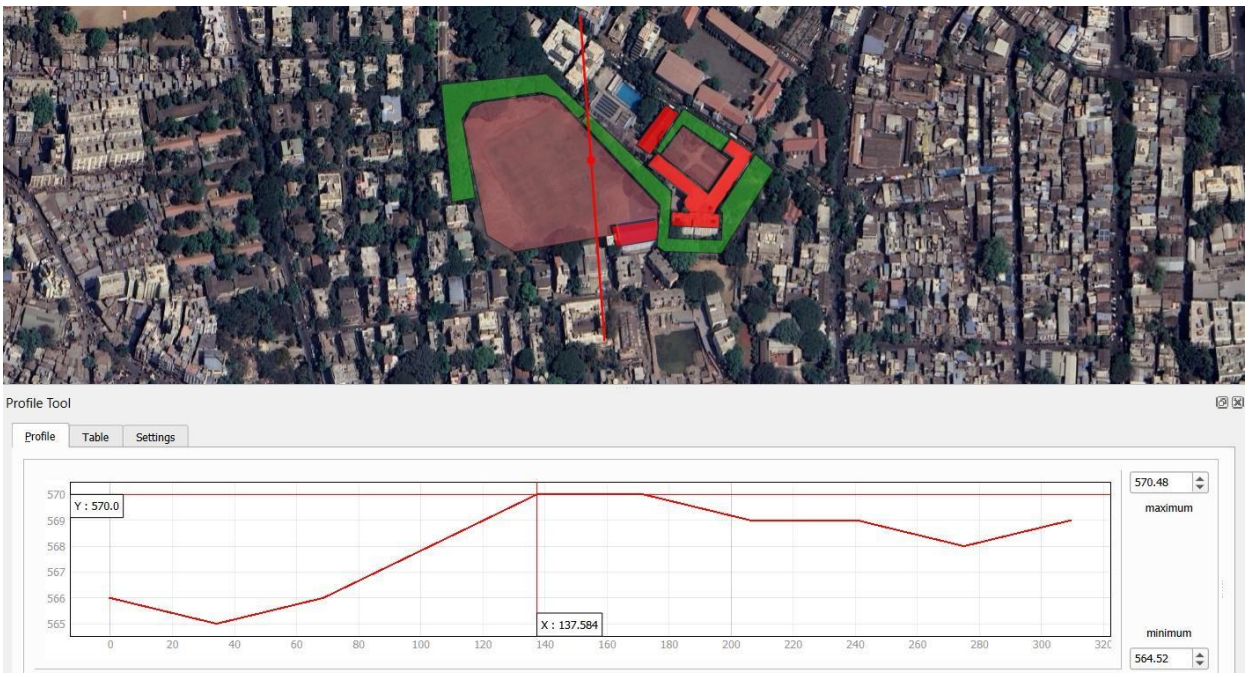
- **RWH (Roof)** = 0.9103 × 3,902.58 × 0.875 = **3,107.35 m^3**
- **RWH (Unpaved)** = 0.9103 × 18,173.68 × 0.6 = **9,927.13 m^3**

Total Annual Harvestable Rainwater: Total RWH = 3,107.35 + 9,927.13 = **13,034.48 m^3 = 13,034,480 liters/year**

TERRAIN PROFILE ANALYSIS

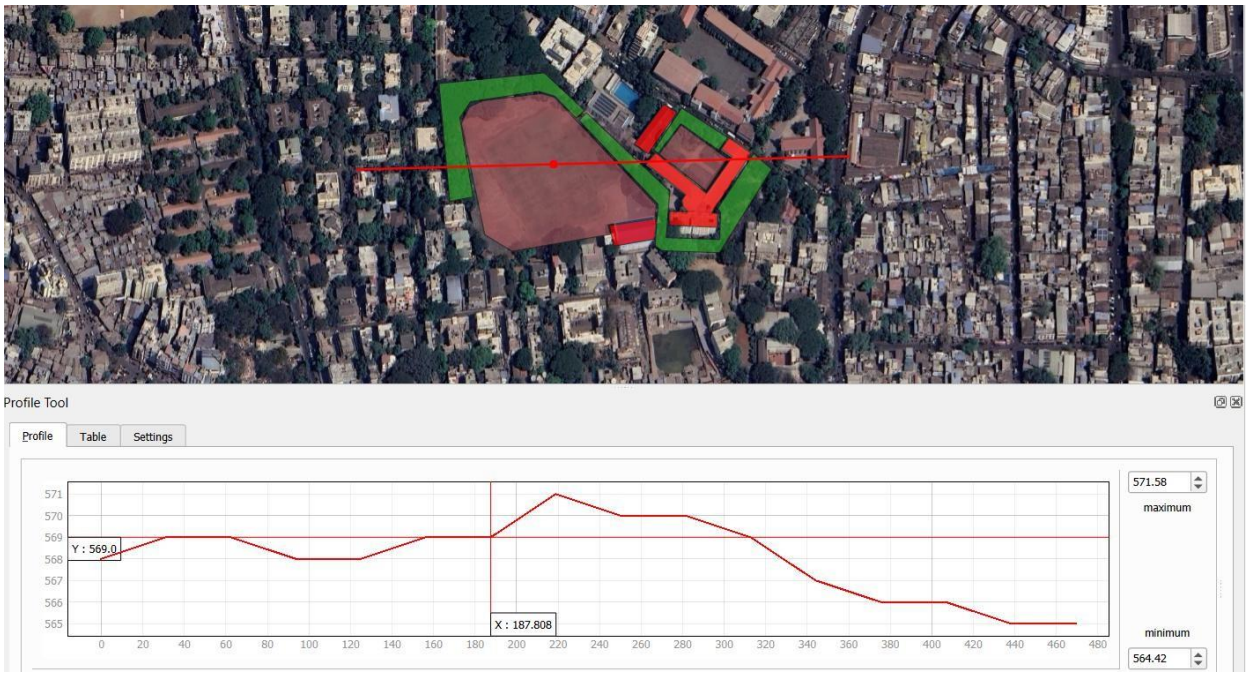
Profile 1: North–South

- **Elevation Range:** 564.52 m to 570.48 m → **Relief: ~5.G6 m**
- **Slope Pattern:** Slight incline northward from central area
- **Drainage Implication:** South and southeastern zones likely to collect runoff; potential recharge trench zone



Profile 2: East–West

- **Elevation Range:** 564.42 m to 571.58 m → **Relief: ~7.16 m**
- **Slope Pattern:** Moderately rising from east to west
- **Drainage Implication:** Drainage likely westward; infiltration features should be focused on western periphery



Recommendations: Storage s Recharge Zones

- Prioritize **southern and western boundaries** for infiltration trenches or tanks
- Install **permeable paving** or soakaways in unpaved play areas
- Add **vegetated bioswales** along west-facing perimeter
- Display **eco-awareness signage** around green zones for educational impact

2 POTENTIAL OF RWH WATER THAT CAN BE USED FOR TOILET FLUSHING, GARDENING, TREES

- Rain Water Harvesting Potential: 13,034.48 m^3/year
- If RWH water is used *for toilet flushing* then the number of students whose flushing needs can be met in a year is: 4,937
- If RWH water is used *for Gardening* then the garden area that can be supported annually is : 7,142 m^2
- If RWH water is used for watering of trees, then the number of trees that can be irrigated annually is: 2,172

Formulas (with planning assumptions) :

Number of students who can flush for the school year :
Assumptions: 220 school days, 6 L per flush, 2 flushes per student per day
Supported Flushing = RWH (L) / (6 L/flush × 2 flushes/student/day × 220 days)

Garden area watering supported annually :
Assumption: 5 L/m²/day year-round (365 days)
Garden Area = RWH (L) / (5 L/m²/day × 365 days)

Number of trees watering supported in the dry season :
Assumptions: 50 L/tree/day, dry season = 120 days
Trees Supported = RWH (L) / (50 L/tree/day × 120 days)

Notes:
Unit equivalence used: ***1 m³ = 1 kL = 1,000 liters.***
If a school uses low-flow fixtures (e.g., 4 L/flush), swap ***6*** *with* ***4*** *in the formula to show a conservative/efficient scenario.*

References:

Flush volume (6 L/flush baseline): *WHO/UNICEF Joint Monitoring Programme (JMP) documentation and sector guidance indicate typical modern cistern volumes of* ***~6 L/flush*** *(with dual-flush/low-flow options ~3–4.5 L).*

Garden water demand (5 L/m²/day): *Based on FAO irrigation planning practice using crop evapotranspiration (ETc). FAO Irrigation & Drainage Paper 56 (Allen et al.) gives the ETc methodology.*

Tree water need (50 L/tree/day): *Practical planning baseline used in municipal/urban forestry guidance for* ***medium-sized*** *trees under warm conditions. This aligns with typical dry-season irrigation allowances derived from canopy size and ET; it's an assumption you can scale by species/size if schools provide*

3 Carbon Sequestration Potential

- **Total Green Area** = 8,604.15 m²
- **IPCC sequestration rate** = 0.9 kg CO_2/m²/year
- **Estimated Annual CO_2 Sequestration** = 8,604.15 × 0.9 = **7,743.73 kg/year**
  = 7.74 metric tons CO_2/year

4 SOLAR INSTALLATION

- Refer to : https://ecosjwestzone.org/solar-dashboard/ for Province/School information.
- Installed On Grid kW Capacity : 100 kW
- Installed Off Grid kW Capacity : 0
- Zero Bill Status: Not clear

5 Legend

- RWH: Rain Water Harvesting
- CHIRPS: Climate Hazards Group InfraRed Precipitation with Station data (It is a quasi-global dataset that blends satellite infrared imagery with ground-based rain gauge observations.)
- IPCC: Intergovernmental Panel on Climate Change (a United Nations body that assesses the science related to climate change, its causes, impacts, and possible solutions.)
- Carbon Sequestration: the process of capturing carbon dioxide (CO2) from the atmosphere and storing it long-term in reservoirs like oceans, soil, trees. For the report the Trees/Greenery area in the school is considered.