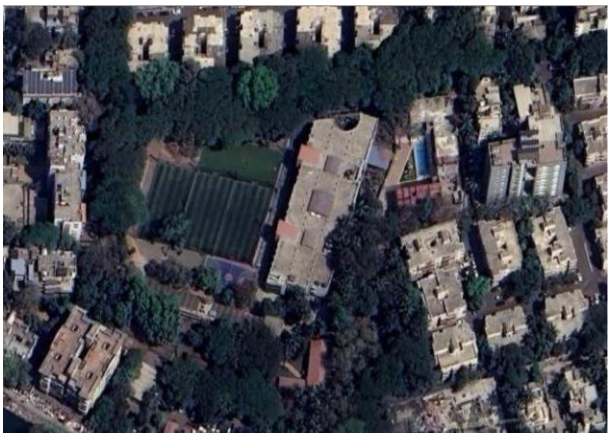
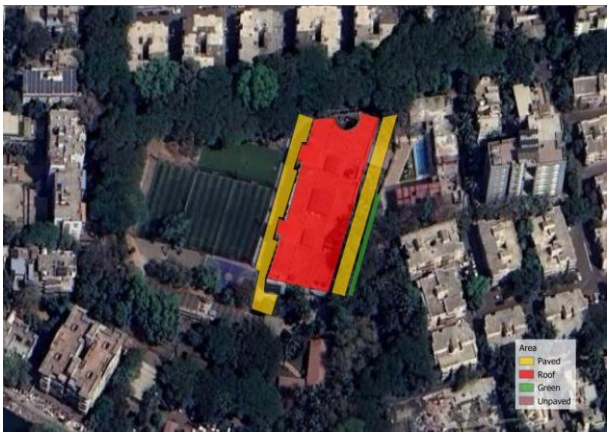
St. Vincent College of Commerce, Pune

(For any queries, clarifications kindly email: jaaiwzc25@gmail.com)
(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	950.66	0.9507
2023	713.53	0.7135
2022	1009.75	1.0098

- **Mean Annual Rainfall (P)** = (0.9507 + 0.7135 + 1.0098) / 3 = **0.8913 m/year**

- ## Surface Area Data

Surface Type	Area (m^2)	Runoff Coefficient
Roof	2,681.00	0.875
Paved	1,283.10	0.7
Green	134.40	*Excluded*

RWH Calculations

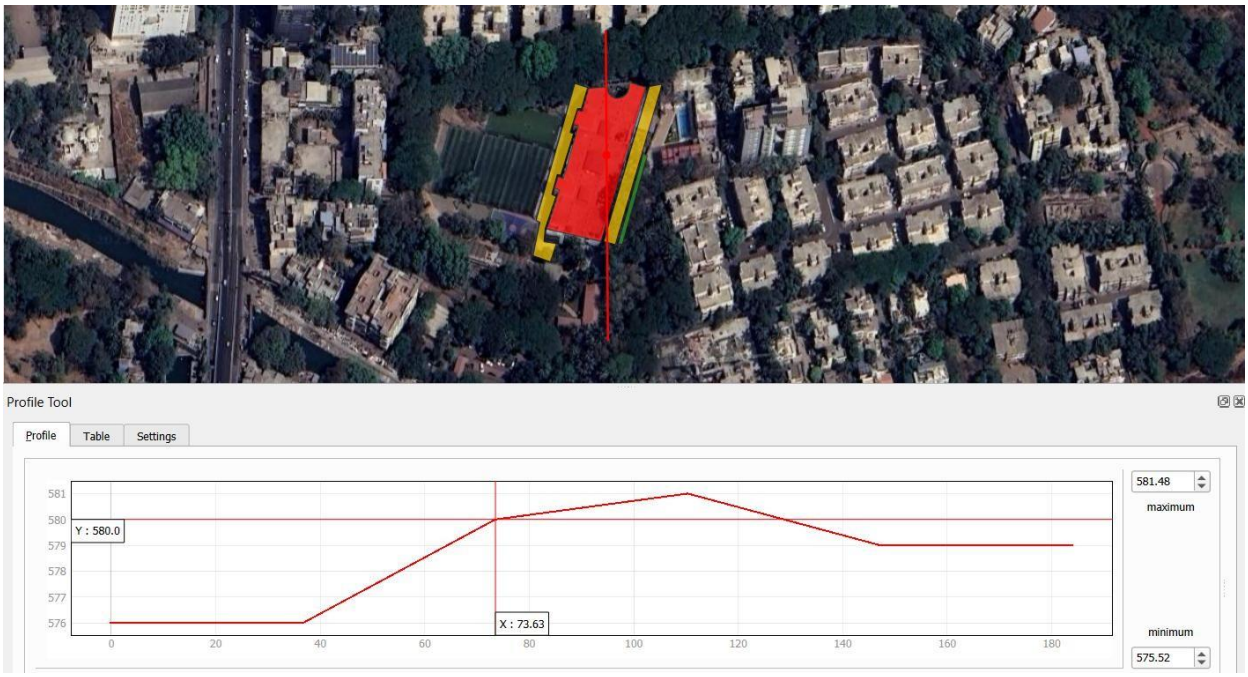
- **RWH (Roof)** = 0.8913 × 2,681.00 × 0.875 = **2,089.86 m^3**
- **RWH (Paved)** = 0.8913 × 1,283.10 × 0.7 = **800.55 m^3**

Total Annual Harvestable Rainwater = 2,089.86 + 800.55 = 2,890.41 m^3/year = **2,890.410 liters/year**

TERRAIN PROFILE ANALYSIS

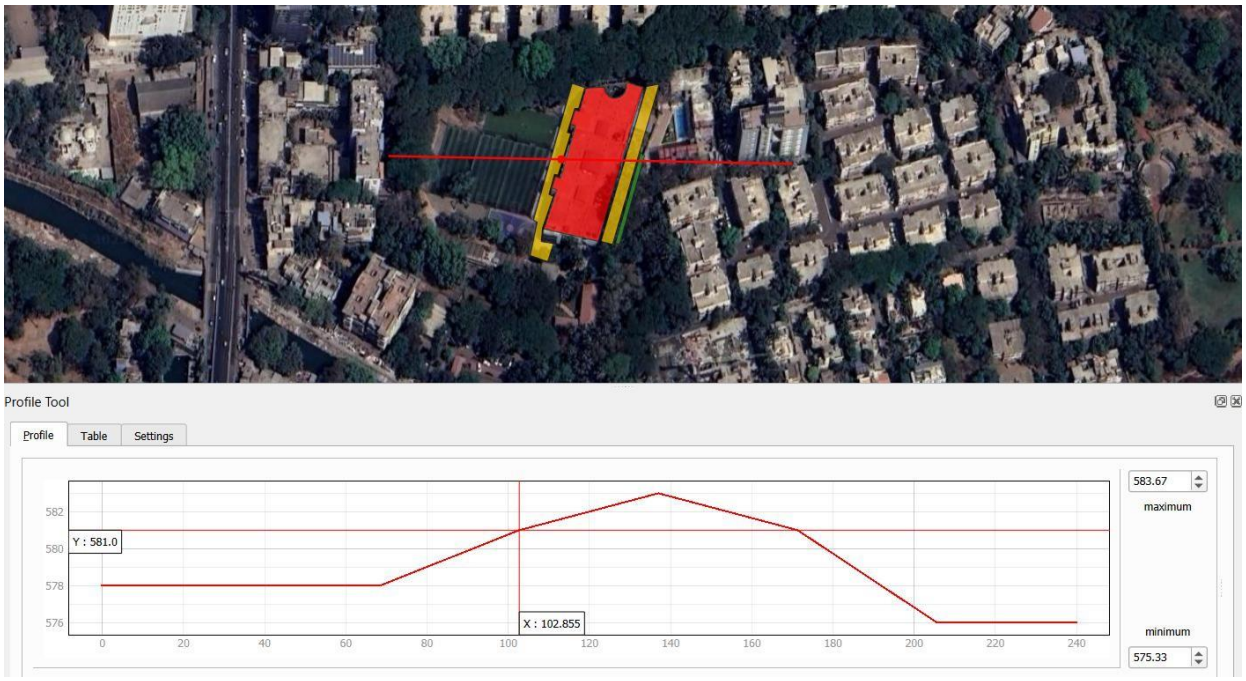
Profile 1: North–South

- **Elevation Range**: 575.52 m to 581.48 m → **Relief: ~5.96 m**
- **Slope Pattern:** Gentle slope northwards with flat mid-zone
- **Drainage Implication:** Likely pooling in central area; minor flow northward



Profile 2: East–West

- **Elevation Range**: 575.33 m to 583.67 m → **Relief: ~8.34 m**
- **Slope Pattern:** West to east slope; consistent drainage toward eastern boundary
- **Drainage Implication:** Recommend recharge interventions along eastern edge



Recommendations: Storage & Recharge Zones

- Rainwater storage tanks can be installed adjacent to the building's eastern face
- Consider permeable paving along walkways to maximize infiltration
- Minor recharge pits can be placed in central areas to capture local runoff
- Display signage promoting water conservation and sustainability awareness

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

- Rain Water Harvesting Potential: 2,890.41 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: 1,094
- If RWH water is used *for Gardening* then the garden area that can be supported annually is : 1,583 m^2
- If RWH water is used for watering of trees, then the number of trees that can be irrigated annually is: 481
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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/m^2/day year-round (365 days)
Garden Area = RWH (L) / (5 L/m^2/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 m^3 = 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** = 134.40 m²
- **Sequestration Rate** (IPCC standard): 0.9 kg CO_2/m²/year
- Estimated Annual CO_2 Sequestration

  = 134.40 × 0.9 = **121.00 kg/year** = **0.12 metric tons CO_2/year**

4 SOLAR INSTALLATION

- Refer to : https://ecosjwestzone.org/solar-dashboard/ for Province/School information.
- Installed On Grid kW Capacity : Not Available
- 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.