SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated of Pondicherry University)
(Accredited by NBA-AICTE, New Delhi, ISO 9001:2000 Certified Institution &
Accredited by NAAC with "A" Grade)

Madagadipet, Puducherry - 605107

CAMPUS

SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(AN AUTONOMOUS INSTITUTION)

SAFE, SECURE AND SUSTAINABLE CAMPUS

Sri Manakula Vinayagar Engineering College (SMVEC), Puducherry, is committed to providing a safe, secure, healthy, inclusive, and sustainable campus environment for all stakeholders. The institution has implemented comprehensive safety and security measures including security personnel, CCTV surveillance, fire safety systems, electrical safety infrastructure, and healthcare facilities. Accessibility is ensured through ramps, lifts, wheelchairs, and safe drinking water is provided through RO purification plants. Additionally, sanitary napkin vending machines and disposal units support menstrual hygiene and women's well-being, reflecting SMVEC's commitment to holistic campus welfare and sustainability.

Sustainable practices such as battery-operated vehicles, waste segregation, recycling, e-waste management, and the prohibition of single-use plastics contribute significantly to environmental conservation. The campus further promotes sustainability through the operation of a Sewage Treatment Plant (STP) for wastewater treatment and reuse, Solar Photovoltaic (PV) Panels for renewable energy generation, and Rainwater Harvesting Systems for groundwater recharge and water conservation.

Extensive campus green cover, tree plantations, landscaped gardens, and herbal gardens enhance biodiversity, improve air quality, and create a healthy learning atmosphere.

Collectively, these initiatives demonstrate the institution's dedication to creating a safe, healthy, accessible, energy-efficient, and environmentally responsible learning environment while fostering the well-being and overall development of all stakeholders.

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SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
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CONTENTS

SAFETY & SECURITY MEASURES

1. SECURITY PERSONNEL DEPLOYMENT

SMVEC engages security personnel through external contract agencies to ensure a safe, disciplined, and secure campus environment. Outsourcing security services allows to access trained manpower, professional supervision, and cost-effective operations without maintaining a permanent security workforce. Trained security officers and guards patrol the campus 24/7, with female guards specifically assigned to each floor in every block of the buildings and sensitive areas. They manage by verifying IDs, log visitors, respond to incidents, and coordinate with local authorities for offenses. Patrols prevent unauthorized entry and ensure a secure teaching environment. A dedicated group of men and women security personnel are deployed at entry and exit points and help enforce access control policies. 24/7 coverage uses rotating shifts: Day shift (8 AM - 8 PM) and night shift (8 PM - 8 AM), with patrols at peak hours. Static guards posted at main and rear gates; mobile teams patrol interiors, boundaries, and parking. The dedicated security guard deployment encompasses Male Security guards, Lady Security Guards, Assistant Security officer and Security Officer. A team of security personnel is also deployed to monitor CCTV feeds and report anomalies The morning shift consists of all the security personnel deployment and during night Male Security guards, Assistant Security officer and Security Officer are made available. The deployment of security personnel at SMVEC, in morning and evening shift is given below:

(i) Morning shift

Male Security Guard – 24 Numbers

Lady Security Guard – 18 Numbers

Assistant Security officer – 2 Numbers and

Security Officer – 2 Numbers

(ii) Night shift

13 male security guards -13 Numbers

1 Assistant Security Officer - 1 Number and

Security Officer – 1 Number

MALE AND FEMALE SECURITY PERSONNEL DEPLOYMENT INSIDE CAMPUS

2. CCTV SURVEILLANCE

INTRODUCTION

Sri Manakula Vinayagar Engineering College (SMVEC), Puducherry, has established a comprehensive Closed-Circuit Television (CCTV) surveillance system across the campus. The CCTV network enables continuous monitoring of key locations, enhances situational awareness, and assists in preventing unauthorized activities. The surveillance system serves as an important tool for maintaining discipline, ensuring safety, monitoring campus operations, and providing evidence when required for incident investigation. The initiative reflects the institution's commitment to creating a safe, secure, and technology-enabled learning environment.

OBJECTIVES

1. To enhance the overall safety and security of the campus community.
2. To monitor and prevent unauthorized access and suspicious activities.
3. To safeguard institutional infrastructure, equipment, and other assets.
4. To support effective campus administration and security management.
5. To assist in incident investigation through recorded surveillance footage.
6. To promote discipline and responsible behavior among campus occupants.
7. To ensure a secure and conducive environment for teaching, learning, and research activities.

Placement of CCTV Cameras

443 numbers of CCTV cameras have been strategically installed across the SMVEC campus to provide comprehensive surveillance coverage. The cameras are positioned at critical and high-traffic locations, including:

- Main entrance and exit gates
- Academic blocks and classroom corridors
- Laboratories and workshops
- Library and administrative offices
- Seminar halls and auditoriums
- Hostel premises and common areas
- Parking areas and transportation facilities
- Cafeteria and student gathering zones
- Staircases, corridors, and open spaces

- Perimeter boundaries and other sensitive locations

The CCTV system is connected to a centralized monitoring facility, enabling continuous surveillance and secure storage of recorded footage for future reference.

Conclusion

The installation of a CCTV surveillance system at Sri Manakula Vinayagar Engineering College has substantially enhanced the institution's security infrastructure and monitoring capabilities. Through continuous surveillance of critical locations, the system contributes to the prevention of security threats, protection of institutional assets, and maintenance of a safe and disciplined campus environment. Adequate outdoor lighting also minimizes risks of slips, trips, or security breaches during evening hours

CCTV SURVEILLANCE AT COMMON PLACES AND CLASSROOMS

3. FIRE EXTINGUISHER

Introduction

To ensure the safety of occupants and protect institutional assets, Sri Manakula Vinayagar Engineering College (SMVEC), Puducherry, has established an extensive fire safety system through the installation of fire extinguishers at strategic locations across the campus. These fire extinguishers serve as the first line of defense during fire emergencies, enabling immediate response and minimizing the risk of injury, property damage, and disruption of academic activities. The initiative reflects the institution's commitment to maintaining a safe, secure, and disaster-resilient campus environment.

Objectives

1. To provide immediate firefighting capability during the early stages of a fire incident.
2. To safeguard students, faculty, staff, and visitors from fire-related hazards.
3. To protect institutional infrastructure, laboratories, equipment, and records from fire damage.
4. To comply with statutory fire safety regulations and safety standards.
5. To enhance emergency preparedness and response capabilities within the campus.
6. To create awareness among campus occupants regarding fire safety and emergency procedures.
7. To minimize potential losses arising from fire accidents.

Placement of Fire Extinguishers

Fire extinguishers have been strategically installed throughout the SMVEC campus based on risk assessment and occupancy requirements. The extinguishers are placed at easily accessible and highly visible locations, including:

- Academic blocks and classrooms
- Laboratories and workshops
- Library and administrative offices
- Seminar halls and auditoriums
- Hostels and dining facilities
- Electrical rooms and generator areas
- Corridors, staircases, and common areas
- Transportation and maintenance facilities

Different types of fire extinguishers, such as ABC Dry Chemical Powder and Carbon Dioxide (CO_2) based extinguishers, are provided according to the nature of fire risks present in specific locations. The fire extinguishers are available in two capacities namely 4.5 kg for Carbon

Dioxide and 6 kg for Dry Chemical Powder. There are about 110 fire extinguishers available with proper numbering for easy traceability. Regular inspection, maintenance, and refilling schedules are followed to ensure operational readiness.

Outcomes

The establishment of fire extinguishers across the campus has resulted in significant improvements in fire safety preparedness and risk mitigation. The key outcomes include:

- Enhanced capability to control fire incidents at their initial stages.
- Improved safety and protection for students, faculty, staff, and visitors.
- Reduced risk of property damage and operational disruptions.
- Increased awareness of fire safety practices among campus stakeholders.
- Strengthened emergency response mechanisms and disaster preparedness.
- Compliance with fire safety regulations and institutional safety standards.

Conclusion

The installation and maintenance of fire extinguishers at Sri Manakula Vinayagar Engineering College represent a proactive approach toward ensuring campus safety and emergency preparedness. By providing readily accessible firefighting equipment at critical locations, the institution has significantly enhanced its ability to respond effectively to fire emergencies.

CO_2 – FIRE EXTINGUISHER

DRY CHEMICAL FIRE EXTINGUISHER

4. ELECTRICAL SAFETY

Introduction

Sri Manakula Vinayagar Engineering College (SMVEC), Puducherry, places utmost importance on the safety of its students, faculty, staff, and infrastructure through the implementation of robust electrical safety measures. To ensure the safe operation of electrical systems and equipment across the campus, the institution has established comprehensive electrical safety practices, including proper earthing, regular inspections, preventive maintenance, and structural safety assessments. These measures help prevent electrical hazards such as electric shocks, equipment failures, short circuits, and fire accidents while ensuring a secure learning and working environment.

Objectives

1. To ensure the safety of students, faculty, staff, and visitors from electrical hazards.
2. To provide effective grounding and protection for electrical installations and equipment.
3. To prevent electrical accidents caused by voltage fluctuations, short circuits, and lightning strikes.
4. To maintain the reliability and efficiency of electrical systems across the campus.
5. To identify and rectify potential electrical risks through periodic inspections and maintenance.
6. To comply with statutory electrical safety standards and regulations.
7. To protect institutional infrastructure and electrical assets from damage.

Practice

SMVEC has implemented a comprehensive electrical safety management system throughout the campus. All buildings and electrical installations are equipped with properly designed earthing systems to ensure effective grounding and protection. A total of **53 earth pits** has been established at strategic locations across the campus to safeguard electrical equipment and enhance personal safety. These earth pits help dissipate fault currents safely into the ground, thereby minimizing the risks associated with electric shocks, equipment damage, electrical fires, and lightning-induced surges.

To further strengthen electrical safety, circuit breakers, surge protection devices, and proper earthing arrangements have been installed in electrical panels and distribution systems. Regular inspections of wiring systems, switchgear, electrical panels, transformers, generators, and associated equipment are carried out to ensure their safe and efficient functioning. The institution also conducts periodic assessments of building infrastructure to verify structural safety and identify any potential risks.

The resistance values of all earth pits are tested annually by qualified and licensed third-party electrical technicians. These inspections help detect issues such as insulation deterioration, loose connections, corrosion, overloading, and aging electrical components at an early stage. Based on the inspection findings, necessary maintenance, repairs, replacements, and system upgrades are undertaken promptly to maintain the highest standards of electrical safety and operational reliability.

Conclusion

The implementation of a comprehensive electrical safety and earthing system at Sri Manakula Vinayagar Engineering College demonstrates the institution's commitment to maintaining a safe and secure campus environment. The provision of 53 earth pits, regular third-party inspections, preventive maintenance practices, and advanced electrical protection systems significantly reduce the risk of electrical accidents and equipment failures. Through continuous monitoring and proactive safety measures, SMVEC ensures the protection of human life, institutional assets, and critical infrastructure while fostering a safe and reliable educational environment for all stakeholders.

DB PANEL

EARTH PIT

5. HEALTH CARE AND FIRST AID FACILTIES

Introduction

The health, safety, and well-being of students, faculty, and staff are of paramount importance at Sri Manakula Vinayagar Engineering College (SMVEC), Puducherry. To ensure timely medical assistance and effective healthcare support, the institution has established comprehensive healthcare facilities within the campus. A dedicated and qualified medical doctor is available on campus to provide primary healthcare services, medical consultation, emergency care, and health guidance to all stakeholders. In addition, first aid facilities have been made readily accessible throughout the campus, with first aid boxes provided in all academic departments and laboratories. These facilities contribute significantly to maintaining a safe and healthy learning and working environment.

Objectives

1. To provide immediate medical assistance to students, faculty, staff, and visitors.
2. To ensure prompt response to health emergencies and minor injuries within the campus.
3. To promote the overall health and well-being of the campus community.
4. To provide easily accessible first aid facilities in all departments and laboratories.
5. To minimize the impact of accidents, injuries, and sudden illnesses through timely intervention.
6. To support occupational health and safety practices across the institution.
7. To create a safe, secure, and health-conscious campus environment.

Practice

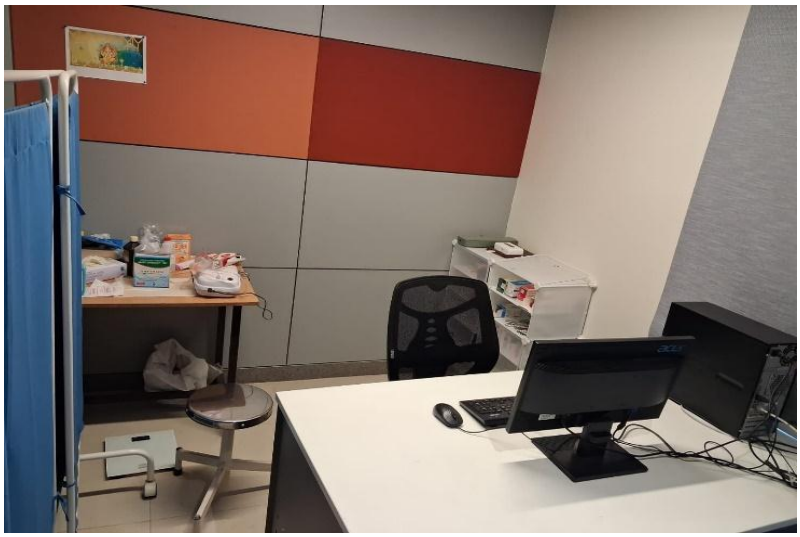
SMVEC has appointed a dedicated and qualified medical doctor who is available on campus to attend to the healthcare needs of students, faculty, and staff. The doctor provides medical consultation, first-level diagnosis, emergency care, health monitoring, and guidance on preventive healthcare practices. Medical assistance is readily available for common illnesses, injuries, and other health-related concerns arising within the campus.

To further strengthen emergency preparedness, first aid boxes are strategically placed in all academic departments and laboratories. These first aid kits are equipped with essential medical supplies required for immediate treatment of minor injuries, cuts, burns, and other emergencies until professional medical care is provided. The contents of the first aid boxes are periodically inspected, replenished, and maintained to ensure their availability and effectiveness when needed.

In addition, an ambulance is available on campus 24×7 to provide immediate transportation during medical emergencies. The ambulance ensures prompt transfer of patients to nearby medical colleges and hospitals for advanced treatment whenever required, thereby strengthening the institution's emergency response mechanism.

Conclusion

The availability of a dedicated medical doctor and comprehensive first aid facilities at Sri Manakula Vinayagar Engineering College reflects the institution's strong commitment to the health, safety, and welfare of its stakeholders. By ensuring timely medical attention and easy access to first aid resources in all departments and laboratories, SMVEC has established a proactive healthcare support system that enhances campus safety and well-being.



MEDICAL DOCTOR CONSULTATION ROOM

FIRST AID BOX

6. ACCESSIBILITY AND SAFETY INFRASTRUCTURE

Introduction

Sri Manakula Vinayagar Engineering College (SMVEC), Puducherry, is committed to providing a safe, secure, and inclusive campus environment for all stakeholders. As part of its safety and security framework, the institution has established barrier-free accessibility infrastructure, including ramps, lifts, and wheelchairs, to ensure convenient and safe movement for students, faculty, staff, visitors, and persons with disabilities. These facilities not only promote accessibility and inclusiveness but also contribute significantly to campus safety by facilitating easy mobility, emergency evacuation, and equal access to educational and administrative facilities.

Objectives

1. To provide a barrier-free and inclusive campus environment.
2. To ensure safe and convenient movement for persons with disabilities and mobility-impaired individuals.
3. To enhance accessibility to classrooms, laboratories, libraries, offices, and other campus facilities.
4. To support emergency preparedness and safe evacuation during emergencies.
5. To comply with accessibility and safety standards prescribed for educational institutions.
6. To promote equal opportunities and inclusive education for all students.

Arrangements Made

To facilitate accessibility and safety across the campus, SMVEC has implemented the following arrangements:

- Ramps have been constructed at building entrances and key locations to enable smooth access for wheelchair users and individuals with mobility challenges.
- Lifts have been installed in multi-storey academic and administrative buildings to ensure safe and convenient vertical movement between floors.
- Wheelchairs are made available for students, staff, visitors, and individuals requiring mobility assistance.
- Accessible pathways and entry points have been provided to connect major facilities across the campus.
- The accessibility infrastructure is regularly inspected and maintained to ensure safety, functionality, and ease of use.

Benefits

The accessibility infrastructure provides numerous benefits to the campus community, including:

- Improved mobility and independence for differently-abled individuals.
- Enhanced safety and reduced risk of accidents during movement within buildings.
- Easy access to academic, administrative, and recreational facilities.
- Support for emergency evacuation and disaster management procedures.
- Promotion of inclusiveness, equality, and social responsibility.
- Increased comfort and convenience for senior citizens, injured individuals, and visitors with temporary mobility limitations.
- Compliance with universal accessibility and institutional safety requirements.

Conclusion

The provision of ramps, lifts, and wheelchairs at Sri Manakula Vinayagar Engineering College demonstrates the institution's commitment to ensuring accessibility, safety, and equal opportunities for all members of the campus community. These facilities play a vital role in creating an inclusive educational environment while also supporting campus safety and emergency preparedness.

RAMP

WHEEL CHAIR

LIFT

7. INSTALLATION OF REVERSE OSMOSIS (RO) WATER PURIFICATION PLANT

Introduction

Recognizing the importance of providing high-quality drinking water, Sri Manakula Vinayagar Engineering College (SMVEC), Puducherry, has installed Reverse Osmosis (RO) Water Purification Plants at strategic locations within the campus. The RO system utilizes advanced water purification technology to remove dissolved salts, impurities, microorganisms, and other contaminants, ensuring the supply of safe and potable drinking water.

Objectives

1. To provide safe, clean, and purified drinking water to students, faculty, staff, and visitors.
2. To remove harmful contaminants, dissolved solids, and microorganisms from the water supply.
3. To promote health, hygiene, and well-being within the campus community.
4. To ensure compliance with drinking water quality standards and public health requirements.
5. To reduce dependence on packaged drinking water and support sustainable practices.
6. To enhance campus facilities and improve user satisfaction.
7. To create awareness regarding the importance of safe drinking water and water quality management.

Installation and Placement of RO Plants

The Reverse Osmosis (RO) water purification plants at Sri Manakula Vinayagar Engineering College (SMVEC) have been installed at two strategic locations: one near the rear gate of the campus (2 numbers of 500 lph) and the other on the terrace of the Engineering Block (1 number of 2000 lph). Water extracted from bore wells is treated through advanced RO filtration systems that effectively remove dissolved impurities, contaminants, and microorganisms, ensuring a continuous supply of safe and high-quality drinking water. The purified water is distributed through a dedicated pipeline network to various locations across the campus for drinking purposes. Water dispensers providing both hot and cold drinking water have been installed at convenient locations to ensure easy access for students, faculty, and staff. Regular maintenance activities, including water quality testing, filter replacement, system inspections, and scheduled cleaning of water dispensers, are carried out to ensure efficient operation, hygiene, and uninterrupted availability of potable water throughout the campus.

Outcomes

The installation of RO water purification plants has resulted in several positive outcomes, including:

- Continuous availability of safe and purified drinking water across the campus.
- Improved health and hygiene among students, faculty, and staff.
- Reduction in waterborne diseases and health risks associated with contaminated water.
- Enhanced user confidence in the quality of drinking water provided by the institution.
- Reduced dependence on bottled drinking water, contributing to environmental sustainability.
- Improved campus infrastructure and student welfare facilities.
- Compliance with health and safety standards related to drinking water quality.

Conclusion

The installation of Reverse Osmosis (RO) Water Purification Plants at Sri Manakula Vinayagar Engineering College demonstrates the institution's commitment to ensuring the health, safety, and well-being of its stakeholders. By providing access to high-quality purified drinking water, the college has created a healthier and more sustainable campus environment. Continuous monitoring and maintenance of the RO systems ensures the long-term availability of safe drinking water and contribute to the institution's vision of a student-friendly and sustainable campus.

Reverse Osmosis Plant

8. NAPKIN VENDING MACHINE

Introduction

Sri Manakula Vinayagar Engineering College (SMVEC), Puducherry, is committed to promoting the health, hygiene, well-being, and dignity of women students and staff by providing essential menstrual hygiene management facilities within the campus. As part of this initiative, the institution has installed sanitary napkin vending machines along with sanitary napkin destroyers at strategic locations in ladies' restrooms. These facilities ensure convenient, hygienic, and affordable access to sanitary napkins while also enabling the safe disposal of used sanitary products. The initiative reflects SMVEC's commitment to creating a supportive, inclusive, and health-conscious campus environment for women.

Objectives

1. To promote menstrual hygiene and health awareness among women students and staff.
2. To provide easy, affordable, and timely access to sanitary napkins within the campus.
3. To support the dignity, comfort, and well-being of women during menstruation.
4. To reduce inconvenience and absenteeism resulting from inadequate access to menstrual hygiene products.
5. To ensure the hygienic and environmentally responsible disposal of used sanitary napkins.
6. To create a safe, supportive, and inclusive learning and working environment for women.
7. To enhance campus health and sanitation infrastructure.

Practice

SMVEC has installed 11 sanitary napkin vending machines in ladies' restrooms located at strategic points across the campus to ensure easy accessibility for women students and staff. The vending machines are designed to provide sanitary napkins conveniently during academic hours and emergency situations. The machines operate through the insertion of a □5 coin, enabling users to obtain a sanitary napkin quickly and discreetly whenever required.

To ensure uninterrupted availability, the vending machines are regularly inspected, refilled, and maintained by designated personnel. Alongside each vending machine, a sanitary napkin destroyer has been installed to facilitate the hygienic and safe disposal of used sanitary napkins. These destroyers help prevent improper disposal, maintain cleanliness in restrooms, and support environmentally responsible waste management practices.

The institution continuously monitors the functionality and maintenance of these facilities to ensure reliability, hygiene, and user convenience. Through this initiative, SMVEC promotes menstrual health management while fostering awareness regarding personal hygiene and sanitation.

Conclusion

The installation of sanitary napkin vending machines and sanitary napkin destroyers at Sri Manakula Vinayagar Engineering College demonstrates the institution's commitment to supporting the health, hygiene, and well-being of women students and staff. By providing affordable access to menstrual hygiene products and ensuring their safe disposal, SMVEC has created a more inclusive, supportive, and student-friendly campus environment.

NAPKIN VENDING MACHINE IN LADIES REST ROOM

SUSTAINABLE PRACTICES

9. BATTERY OPERATED VEHICLES

Introduction

Sri Manakula Vinayagar Engineering College (SMVEC), Puducherry, is committed to promoting sustainable transportation practices and reducing the environmental impact of campus operations. As part of its green campus initiatives, the institution has introduced battery-operated vehicles for internal transportation and mobility within the campus. The campus currently operates one battery-powered two-wheeler and one battery-powered four-wheeler for official and maintenance-related activities. To maintain a safe, pollution-free, and pedestrian-friendly environment, the movement of outside vehicles within the campus is strictly prohibited, except under special circumstances. This initiative supports the institution's efforts to reduce carbon emissions, minimize noise pollution, and create a clean and eco-friendly campus environment.

Objectives

1. To promote environmentally sustainable transportation within the campus.
2. To reduce greenhouse gas emissions and air pollution from conventional fuel-based vehicles.
3. To minimize noise pollution and enhance the quality of the campus environment.
4. To encourage the adoption of clean energy technologies.
5. To provide safe and efficient transportation for institutional activities.
6. To restrict unnecessary vehicular movement and improve pedestrian safety.
7. To support the institution's green campus and sustainability goals.

Practice

SMVEC has deployed one battery-operated two-wheeler and one battery-operated four-wheeler for use within the campus premises. These vehicles are utilized for administrative work, maintenance activities, transportation of materials, and mobility support when required. To preserve the eco-friendly nature of the campus and ensure the safety of students and staff, entry of outside vehicles into the campus is strictly regulated and generally prohibited. Designated parking facilities are provided near the campus entrance, encouraging internal movement through walking and the use of battery-operated vehicles.

The battery-operated vehicles are regularly maintained to ensure efficient performance, reliability, and safety. Charging facilities and operational schedules are managed to maximize their utilization while minimizing energy consumption. This practice contributes to reducing dependence on fossil fuels and supports sustainable campus management.

Benefits

The use of battery-operated vehicles provides several environmental, social, and operational benefits, including:

- Reduction in carbon dioxide emissions and air pollutants.
- Elimination of fuel consumption and associated environmental impacts.
- Reduction in noise pollution, creating a peaceful academic environment.
- Improved pedestrian safety due to restricted movement of external vehicles.
- Lower operating and maintenance costs compared to conventional vehicles.
- Promotion of clean energy technologies and sustainable transportation practices.
- Enhanced campus aesthetics and environmental quality.
- Contribution towards achieving institutional sustainability goals and green campus initiatives.

Conclusion

By operating battery-powered vehicles for internal mobility and restricting outside vehicular movement within the campus, SMVEC has successfully created a cleaner, safer, and more environmentally responsible campus environment. This initiative reduces the institution's carbon footprint a sustainable and future-ready campus.

BATTERY OPERATED TWO AND FOUR-WHEELER

10. WASTE MANAGEMENT PRACTICES

Introduction

Sri Manakula Vinayagar Engineering College (SMVEC), Puducherry, is committed to maintaining a clean, healthy, and environmentally sustainable campus through the implementation of effective waste management practices. Recognizing the importance of responsible waste handling in protecting the environment and conserving natural resources, the institution has adopted a systematic approach to waste management based on the principles of waste reduction, segregation, recycling, and safe disposal. SMVEC has established a well-defined Waste Management Policy that guides the collection, segregation, storage, transportation, and disposal of various waste streams generated within the campus. Through these initiatives, the institution promotes environmental awareness and encourages sustainable practices among students, faculty, staff, and visitors.

Objectives

1. To ensure environmentally responsible management of waste generated on the campus.
2. To promote segregation of waste at the source for effective recycling and disposal.
3. To minimize the quantity of waste sent to landfills through recycling and resource recovery.
4. To facilitate the safe collection and disposal of electronic waste (e-waste).
5. To eliminate the use of single-use plastics and promote eco-friendly alternatives.
6. To maintain a clean, hygienic, and sustainable campus environment.
7. To create awareness among stakeholders regarding responsible waste management practices.
8. To comply with applicable environmental regulations and sustainability goals.

Practice

SMVEC follows a comprehensive waste management system that begins with the segregation of waste at the source. Separate covered dustbins with appropriate labels and markings are provided across the campus for the collection of paper waste, plastic waste, and other recyclable materials. This segregation practice facilitates efficient handling and recycling of waste while preventing contamination of recyclable resources.

Dry Solid Waste

The institution has established procedures for the collection and transfer of segregated waste to authorized recycling vendors. Paper waste, plastic waste, and other recyclable materials are periodically handed over to authorized agencies for recycling and resource recovery. This practice significantly reduces the environmental impact of waste generated within the campus.

Dried leaves and other biodegradable garden waste generated from the extensive green cover within the campus are collected and utilized for vermicomposting. Through the vermicomposting process, organic waste is converted into nutrient-rich manure, which is subsequently used for maintaining the campus gardens, herbal gardens, and green landscapes.

Wet Solid Waste

Food waste generated from the hostel mess kitchen and dining facilities is collected separately and supplied to animal feed, thereby preventing the disposal of biodegradable waste in landfills.

Electronic waste

Electronic waste (e-waste), including obsolete computers, printers, electronic components, and other electrical equipment, is collected separately and disposed of through authorized e-waste recyclers. This ensures environmentally sound handling, recycling, and disposal of hazardous electronic materials in accordance with applicable regulations.

Ban on Single Use Plastic

As part of its commitment to reducing plastic pollution, SMVEC has imposed a strict ban on the use of single-use plastic items within the campus. Awareness signboards and display notices highlighting the prohibition of single-use plastics are prominently placed at various locations to educate and remind stakeholders about sustainable consumption practices.

Conclusion

Through source segregation, provision of labelled waste collection bins, recycling through authorized vendors, proper e-waste disposal, and the strict prohibition of single-use plastics, All waste management activities are implemented in accordance with the institution’s well-defined Waste Management Policy, which provides guidelines for waste minimization, segregation, recycling, and environmentally responsible disposal practices. These initiatives contribute significantly to maintaining a clean and eco-friendly campus while fostering environmental awareness and responsible behavior among all stakeholders.

SEGREGATION OF WASTES AT SOURCE

BAN ON SINGLE USE PLASTIC INSIDE THE CAMPUS

E-WASTES STORED COLLECTED AND STORED IN A DEDICATED AREA

DECOMPOSITION OF DRIED LEAVES AND BIODEGRADABLE GARDEN WASTES IN VERMICOMPOSTING YARD

11. SEWAGE TREATMENT PLANT (250 KLD)

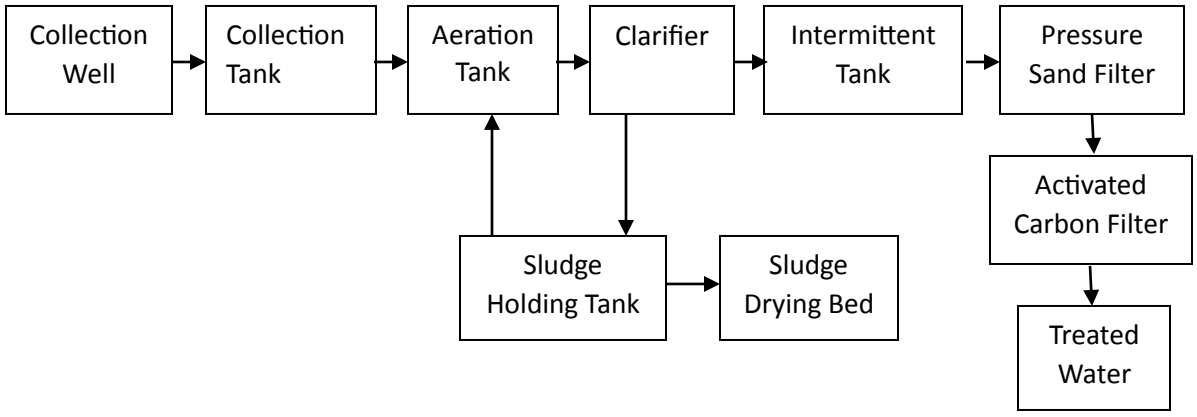
INTRODUCTION

Sri Manakula Vinayagar Engineering College (SMVEC) has installed a 250 KLD Sewage Treatment Plant (STP) to effectively manage and treat wastewater generated from hostels, academic buildings, restrooms, and canteen facilities. The STP is designed to meet Central Pollution Control Board (CPCB) and Puducherry Pollution Control Committee (PPCC) norms and ensure safe discharge or reuse of the treated wastewater for gardening, flushing, and landscaping.

The system integrates mechanical, biological, and filtration processes to achieve high-quality effluent. The plant includes various components such as collection wells, aeration tanks, clarifiers, sludge management systems, and tertiary treatment units.

PROCESS FLOW SUMMARY OF EXISTING SEWAGE TREATMENT PLANT

1. Collection well → Collection tank
2. Collection tank → Aeration tank
3. Aeration tank → Clarifier
4. Clarified water → Intermittent tank
5. Intermittent tank → Pressure Sand Filter → Activated Carbon Filter
6. Final treated water → Treated water tank
7. Sludge from clarifier → Sludge holding tank → Drying beds



Objectives of the STP

1. To treat 250 KLD of sewage generated on campus using modern treatment technologies.
2. To produce high-quality treated water suitable for gardening, toilet flushing, and general utility.
3. To prevent contamination of soil, groundwater, and nearby ecosystems.
4. To safely process and dispose of sludge through drying beds.
5. To meet CPCB/PPCC discharge standards.
6. To reduce freshwater intake by maximizing wastewater recycling.

Components of the STP and Functional Description

Collection Well

Dimensions: 10 × 3 × 2 m

Capacity: 60 kL

The Collection Well is the first unit of the Sewage Treatment Plant (STP). It collects all the raw sewage generated from hostels, academic blocks, restrooms, canteen areas, and other buildings of the campus. It helps in regulating uneven incoming sewage flow before it is pumped to the next treatment unit. This prevents sudden shock loads on downstream tanks Submersible sewage pumps or non-clog pumps are typically installed. These pumps transfer sewage to the collection tank**.** The well maintains sufficient freeboard to control pump operation and avoid overflow during peak inflow periods.

COLLECTION TANK

Dimensions: 10 × 8 × 3.5 m

Capacity: 280 kL

This tank stores and equalizes the incoming sewage, ensuring uniform flow into the aeration tank. It prevents shock loads and stabilizes the organic concentration. The Collection Tank stores sewage and releases it at a controlled, steady rate, ensuring uniform hydraulic loading. By equalizing the flow, the Collection Tank prevents sudden surges, allowing stable biological activity. The Collection Tank mixes incoming sewage aided by air diffusers so that the effluent entering the aeration tank has uniform organic concentration, resulting in (i) better microbial performance (ii) improved degradation and (iii) consistent treatment quality. The tank provides adequate retention time, ensuring that raw sewage is temporarily stored safely before biological treatment. If the aeration tank or any other downstream unit is momentarily offline (maintenance or power failure), the Collection Tank prevents overflow and protects the system from

disruptions. The tank typically includes submersible sewage pumps which help in smooth pumping of sewage to the aeration tank.

AERATION TANK

Dimensions: 10 × 6 × 4 m

Capacity: 240 kL

The aeration tank forms the heart of the biological process. Using diffused aeration microorganisms break down organic matter. The aeration tank contains mixed liquor, a combination of wastewater, microorganisms (biomass) and suspended solids. This reduces the BOD level significantly. To keep microorganisms alive and active, a continuous supply of oxygen is needed. Oxygen is supplied using diffused aerators (air blowers + diffusers) to maintain Dissolved Oxygen (DO) 2–4 mg/L, healthy microbial activity and proper mixing and suspension of solids With a capacity of 240 kL, the aeration tank provides 6–8 hours of retention time, which is sufficient for stabilization of organic load, oxidation of ammonia and proper biological growth Continuous aeration keeps microorganisms in suspension, preventing sludge deposition at the bottom. This ensures uniform treatment, no foul odor formation and avoidance of anaerobic conditions. The mixture of water + biomass (called mixed liquor) flows from the aeration tank to the clarifier, where solids settle down, and clear water moves on to further treatment.

CLARIFIER

Dimensions: 6 m Diameter × 3 m Height

Capacity: 85 kL

The Clarifier also known as the Secondary Settling Tank (SST) is a crucial component of the Activated Sludge Process. Its main purpose is to separate the biological sludge from the treated wastewater after the aeration process. In the clarifier, the biological solids settle naturally by gravity, forming activated sludge at the bottom. A portion of the settled sludge is pumped back to the aeration tank as Return Activated Sludge (RAS). This helps to maintains MLSS concentration (1800–2500 mg/L) and keeps the microbial population active which stabilizes the treatment process. Without adequate RAS, biological treatment efficiency would drop. Excess sludge is periodically removed as Waste Activated Sludge (WAS) and sent to the Sludge Holding Tank.

SLUDGE HOLDING TANK

Dimensions: 1.5 × 1.5 × 3.5 m

Capacity: 8 kL

The Sludge Holding Tank is an essential intermediate unit in the sludge handling system of the STP. It temporarily stores excess sludge from the clarifier before it is transferred to the sludge drying beds for dewatering.

INTERMITTENT TANK

Dimensions: 5 × 5.5 × 3 m

Capacity: 83 kL

The Intermittent Tank serves as an intermediate storage unit between the clarifier and the tertiary treatment units (Pressure Sand Filter and Activated Carbon Filter). It ensures smooth, continuous, and controlled flow of clarified water to the final polishing units.

TREATED WATER TANK

Dimensions: 5 × 5.5 × 3 m

Capacity: 83 kL

The Treated Water Tank is the final storage unit in the Sewage Treatment Plant (STP) before the water is reused or discharged for non-potable applications. After the treated water passes through the biological treatment units and polishing filters (PSF and ACF), it is collected in this tank for safe storage and distribution.

SLUDGE DRYING BEDS (9 NOS)

Dimensions: 3 × 3 × 1 m per bed

Sludge Drying Beds (SDBs) are essential components in the sludge management system of the STP. Their primary purpose is to dewater and dry the excess sludge generated in the clarifier and stored in the sludge holding tank. They represent a cost-effective, natural, and environmentally friendly method for sludge drying.

PRESSURE SAND FILTER (PSF)

Dimensions: 1 m Diameter × 2 m Height

The Pressure Sand Filter (PSF) is a key component of the tertiary (final polishing) treatment in the STP.It removes fine suspended solids, turbidity, and residual impurities from the clarified water before it enters the Activated Carbon Filter. The PSF ensures the treated water achieves high clarity and meets reuse or discharge standards.

ACTIVATED CARBON FILTER (ACF)

Dimensions: 1 m Diameter × 2 m Height

The Activated Carbon Filter (ACF) is the final polishing unit in the sewage treatment process and is responsible for improving the aesthetic and chemical quality of the treated water. After passing through the Pressure Sand Filter (PSF), the water enters the ACF to remove dissolved organic impurities, residual chlorine, odour-causing compounds, colours, and traces of hydrocarbons.

CONCLUSION

The 250 KLD Sewage Treatment Plant at SMVEC plays a vital role in achieving a sustainable and eco-friendly campus. Through its advanced treatment units—collection, aeration, clarification, filtration, and sludge management - the STP ensures high-quality effluent suitable for reuse. By implementing modern wastewater treatment practices, SMVEC significantly reduces its environmental impact and sets a benchmark for green educational institutions.

12. ROOFTOP SOLAR PHOTOVOLTAIC POWER PLANT

INTRODUCTION

In recent years, the need for sustainable and renewable energy sources has become increasingly important due to rising energy demands, depletion of fossil fuels, and growing environmental concerns. With the growing awareness of climate change and the need for sustainable energy, many countries are promoting the use of solar power through policies, subsidies, and research initiatives. Solar panels not only contribute to energy security but also play a vital role in achieving sustainable development goals (SDGs) by ensuring access to affordable, reliable, and clean energy for all. Among various renewable energy technologies, solar energy stands out as one of the most promising and widely adopted solutions. Solar cell panels, commonly referred to as photovoltaic (PV) systems, convert sunlight directly into electricity using semiconductor materials.

WORKING PRINCIPLE OF SOLAR PANELS

Solar cell panels are made up of numerous photovoltaic cells that convert sunlight into direct current (DC) electricity. When sunlight (made up of photons) strikes the surface of a solar cell, it transfers energy to electrons in the semiconductor material. These energized electrons start to move, creating an electric current.

The top layer of the solar cell absorbs photons from sunlight. The absorbed energy excites electrons in the semiconductor material (usually silicon), causing them to break free from their atoms. This creates electron-hole pairs (a negatively charged electron and a positively charged hole). An internal electric field, formed at the junction of two semiconductor layers (p-type and n-type), pushes the electrons toward one side and holes toward the other. The movement of electrons through an external circuit produces direct current (DC) electricity. This current can be used to power devices or stored in batteries. The DC power produced by the cells is converted into alternating current (AC) through an inverter, which can then be used to power lights, fans, laboratory equipment, computers, and other electrical devices within the institution. The system can also be connected to the national grid to feed excess electricity, further improving energy efficiency.

BENEFITS OF SOLAR CELL PANELS

1. Unlike fossil fuels, solar energy will never run out as long as the sun exists. This makes it one of the most sustainable options for meeting present and future energy needs.
2. Solar energy generation does not produce greenhouse gases, air pollutants, or noise. By replacing conventional electricity generated from coal and petroleum, solar panels help reduce carbon emissions, global warming, and climate change. They contribute significantly to maintaining a clean and healthy environment. This helps institutions reduce their carbon footprint and contribute to environmental sustainability.
3. Solar energy significantly reduces dependence on electricity from the grid, lowering monthly utility bills. Over time, the cost savings can offset the initial investment and provide long-term economic benefits.
4. Solar installations serve as live laboratories for students. They offer practical insights into renewable energy technologies, sustainability practices, and energy management systems.
5. Solar power set a strong example for society, demonstrating leadership in sustainability. They inspire nearby communities and students to adopt eco-friendly practices.
6. Solar panels require minimal maintenance once installed. They only need occasional cleaning and inspection to maintain efficiency. Most panels have a lifespan of 20–25 years or more, providing long-term and reliable performance.

ROOFTOP SOLAR PV POWER PLANT PANEL AT SMVEC CAMPUS

Grid connected rooftop Solar PV power plant of 744 panels of 0.38kW capacity each with a total of 282.56 kW has been installed. These panels spread across a total roof area of 30,606 square feet at School of Architecture Building, Centre of Legal Education Block Building, School of Agricultural Sciences Building, and Old Administrative building. These rooftop solar PV power plant generates an average of 28,000 kW to 30,000 kW of electrical energy per month. This accounts to saving of electricity bill by Rs.1,80,000/- per month. The details of the Rooftop Solar PV Power Plant Panel at SMVEC Campus are as follows

Location **: Block - II**

1. No. of Panels : 76 Numbers
2. Capacity : 28.8 kW

Location **: Block - III**

1. No. of Panels : 277 Numbers
2. Capacity : 105.26 kW

Location **: Block - IV**

1. No. of Panels : 276 Numbers
2. Capacity : 104.8 kW

Location **: Administrative Building**

1. No. of Panels : 115 Numbers
2. Capacity : 43.7 kW

Conclusion

The annual solar energy generation of 326,967 kWh results in an estimated carbon dioxide emission reduction of approximately 307.35 tonnes of CO_2 equivalent (tCO_2e) per year. The annual solar energy generation resulting in a reduction of 307.35 tonnes of CO_2 equivalent is approximately equal to the carbon sequestration capacity of 14,119 trees annually.

No. 3727/ED/SE-O&M-PR/Tech-III/F.64-A/2021-22
GOVERNMENT OF PUDUCHERRY
ELECTRICITY DEPARTMENT
-oOo-

Puducherry,
Dt: 18.02.2022

OFFICE MEMORANDUM

Sub : Electricity Department, Puducherry - SE-O&M-PR – Tech-III – Setting up of grid connected Roof Top Solar PV Power Plant of capacity 148.58 KWp over and above the existing Solar PV Power Plant of capacity 134.14 KWp out of the total approved capacity of 350 KWp installed by M/s. Sri Manakula Vinayagar Engineering College in their premises at No. 23, Mariyamman Koil Street, Madagadipet, Puducherry (Consumer Code No. 383/HT-Commercial) having a CMD of 950 KVA - Synchronization with grid – Approval - Accorded.

Ref : 1) Approval for installation No.3984/ED/SE-O&M-PR/ Tech-III/F.64A/2019-20 dt.17.01.2020.
2) Approval for synchronization for 134.14 KWp No.3000/ED/ SE-O&M-PR/Tech-III/F.64A/2020-21 dt.19.01.2021.
3) Letter No. Nil dt. 28.07.2021 from M/s Sri Manakula Vinayagar Engineering College with work completion report for 148.58 KWp.
4) Technical feasibility report of AE/TBI SS vide No. 196/ED/ AE-TSS/F.43/2021-22 dt.03-01-2022.
5) I.D. No. 2588/ED/EE-R(S) O&M/Tech/F-Solar/2021-22 dt. 09.02.2022.

-oOo-

Approval of the undersigned is hereby accorded for synchronizing the Roof Top Solar PV Power Plant of capacity 148.58 KWp over and above the existing Solar PV Power Plant of capacity 134.14 KWp out of the total approved capacity of 350 KWp installed by M/s. Sri Manakula Vinayagar Engineering College in their premises at No. 23, Mariyamman Koil Street, Madagadipet, Puducherry (Consumer Code No. 383/HT-Commercial) having a CMD of 950 KVA, subject to the following conditions:

i) The Prosumer shall sign the Group Net Metering Agreement,

ii) The Prosumer shall provide access to the Department personnel, for verification, monitoring of the performance of Solar Power Plant on real time.

2. The Executive Engineer-Rural South O&M shall arrange to record the energy import and export reading at interconnection point in a standard format on monthly basis (billing cycle) and intimate to the HT Section, so as to raise the invoice to the prosumer after adjusting the export Units. Further, the field officer shall also arrange to record the gross solar energy generated from the Power Plant on monthly basis and report to the Executive Engineer-MRT & MMC-cum- Nodal Officer (Renewable Energy), Electricity Department for the purpose of RPO accounting.

3. The Executive Engineer- Rural South O&M shall submit a detailed post connection report containing the particulars such as Name of the Prosumer, Plant location, existing service connection along with connected load, details of PV panels, MPPT, inverter and metering details (both bi-directional and unidirectional solar energy meters) along with initial readings, meter constants and multiplying factor in case of CT meter, etc. to the Executive Engineer-MRT & MMC for record and reference.

Superintending Engineer-O&M
Puducherry Region

To
The Executive Engineer – Rural South O&M, - 2 Copies
Electricity Department, Puducherry.

Copy to:-
1. The Executive Engineer -MMC & MRT, Electricity Department, Puducherry.
2. The Executive Engineer-General, Electricity Department, Puducherry.
3 The Managing Director, REAP, Bungalow No.2, APT Campus, Puducherry.
4. The Senior Accounts Officer-HT Section, Electricity Department, Puducherry.
5. The Assistant Engineer-HTM, Electricity Department, Puducherry.

13. RAIN WATER HARVESTING SYSTEM

Introduction

Rainwater Harvesting (RWH) is the scientific process of collecting, storing, and recharging rainwater from surfaces such as rooftops, pavements, and open grounds. Engineering colleges, with their large building areas and landscaped campuses, provide excellent opportunities to harvest significant quantities of rainwater. Implementing RWH promotes sustainability, reduces water dependence, and improves groundwater levels.

This report explains the design, construction, functioning, and benefits of Rainwater Harvesting Systems (RWH Pits) installed in Sri Manakula Vinayagar Engineering College.

Objectives of Rainwater Harvesting

The major objectives of constructing RWH pits in the campus are:

- To harvest rainwater from rooftops and surface runoff.
- To conserve rainwater and replenish groundwater table
- To reduce dependency on municipal/borewell water
- To prevent waterlogging and soil erosion
- To promote environmentally sustainable practices
- To comply with regulatory provisions for water conservation
- To make students and staff aware of water resource protection

RAIN WATER HARVESTING SYSTEM AT SMVEC

Catchment Areas Connected

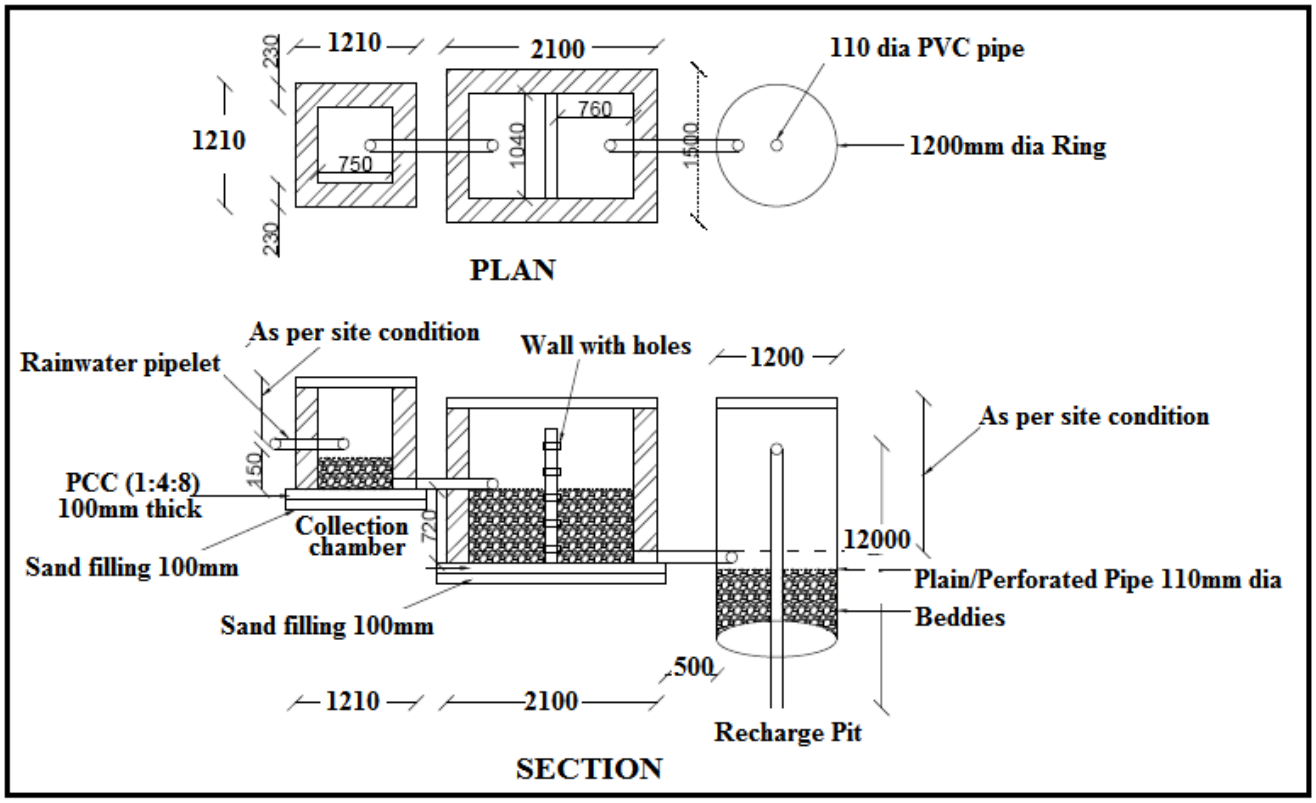
- Rooftop catchment areas (block-wise)
- Open ground runoff channels
- Parking and pavement drainage

At SMVEC, there are 17 Rainwater harvesting pit existing as on date for a total roof catchment area of 15968.02 m^2 (For every 939 m^2 one rainwater harvesting pit is constructed). From these 17 rain water harvesting pits around 14306.94 kL of rain water can be captured from roof top of engineering block and recharged to the ground.

- **Type of Soil:** Clay and Sand
- **Area of Pathways –** 2533 m^2
- **Area of Road –** 7198.8 m^2
- **Total Roof Area –** 17,363.37 m^2
- **Landscape area –** 21,994.19 m^2 (Not diverted to rain water harvesting pit)
- **Parking Area –** 22432 m^2

The approximate cost involved for 1 Rain water Harvesting pit is Rs. 1,95,000/- (Rupees One Lakh Ninety-Five Thousand Only).

4. Design of Rain Water Harvesting System



Schematic representation of Rain water Harvesting Pit Constructed in SMVEC

Collection Chamber

The collection chamber is the first component of a rainwater harvesting system where rainwater from the rooftop, paved surfaces, or catchment area is initially collected. They act as a temporary storage and settling space. It allows heavier particles like leaves, dust, and debris to settle at the bottom before entering the filtration chamber. It is very much useful in preventing sudden surges of water from overloading the filtration unit.

Filtration Chamber

The filtration chamber is the most important component because it removes impurities and improves water quality before it reaches the recharge pit or storage tank. It ensures that only clean water passes into the recharge pit or sump.

Typical Filter Media (Layered System):

- **Top layer:** Coarse sand (removes fine suspended impurities)
- **Middle layer:** Activated charcoal (removes odor and organic impurities)
- **Bottom layer:** Gravel/pebbles (supports sand layer and filters larger particles)

Recharge Pit

The recharge pit is the final component in the system used to percolate clean water into the ground to replenish groundwater aquifers. It allows filtered rainwater to infiltrate and recharge the groundwater table. This pit is filled with layers of coarse aggregates such as large stones, pebbles, and gravel. It is fitted with a PVC perforated pipe to increase infiltration rate.

Materials Used

- Bricks/stones for pit lining (optional)
- Coarse aggregates (40 mm)
- Gravels (20 mm)
- River sand
- Charcoal (optional)
- PVC/HDPE downpipes

Filter Material:

- 40% coarse aggregate (40 mm)
- 30% gravel (20 mm)
- 20% sand
- 10% charcoal

Working Mechanism

1. Rainwater from roofs and paved surfaces is directed through gutters and pipes.
2. Water enters a silt trap chamber, where debris and sediments settle.
3. Filtered water flows into the RWH pits.
4. Water slowly infiltrates into the ground, recharging the aquifer.
5. Excess water is safely discharged through an overflow system.

Maintenance Activities

To ensure effective functioning, the following maintenance practices are carried out:

- Cleaning gutters and downpipes before monsoon

- Removing silt and debris from filter chambers every 3–6 months
- Checking for clogging of pits after every heavy rainfall
- Replacing sand and gravel layers once every 2–3 years
- Monitoring groundwater level annually

Benefits Achieved

- Significant improvement in groundwater level over campus
- Reduced reliance on external water supply
- No waterlogging during monsoons
- Increased awareness among students about water conservation
- Sustainable and eco-friendly campus development
- Long-term financial saving in water supply charges

EXISTING RAIN WATER HARVESTING (RWH) PITS

Sl.No.	Description	Number of RWH Pits
1	Administrative Block	02
2	Boys Hostel -1	02
3	Block - I	01
4	Block - II	02
5	Block - III	02
6	Block - IV	02
7	Boys Hostel - 2	01
8	Engineering Block	05
Total		**17**

PIT - 1

Location	**:**	**South East – Admin Block**
Catchment Area	:	429.14 m^2
Rainfall Harvesting Potential	:	377 kL (429.14 x 1100 x 0.8 = 377 kL)
Collection Chamber	:	1.20 m x 1.20 m
Filtration Chamber	:	2.1 m x 1.50 m
Recharge Pit	:	1.2 m Dia and 12m Depth

PIT - 2

Location	**:**	**North East – Admin Block**
Catchment Area	:	429.14 m^2
Average runoff per year	:	377 kL (429.14 x 1100 x 0.8 = 377 kL)
Collection Chamber	:	1.20 m x 1.20 m
Filtration Chamber	:	2.1 m x 1.50 m
Recharge Pit	:	1.2 m Dia and 12m Depth

PIT - 3

Location	:	**North West – Boys Hostel -II**
Catchment Area	:	185.50 m^2
Average runoff per year	:	163 kL (185.5 x 1100 x 0.8 = 163 kL)
Collection Chamber	:	1.20 m x 1.20 m
Filtration Chamber	:	2.1 m x 1.50 m
Recharge Pit	:	1.2 m Dia and 12m Depth

PIT - 4

Location	:	**South East – Block - I**
Catchment Area	:	767.30 m^2
Average runoff per year	:	675 kL (767.3 x 1100 x 0.8 = 675 kL)
Collection Chamber	:	1.20 m x 1.20 m
Filtration Chamber	:	2.1 m x 1.50 m
Recharge Pit	:	1.2 m Dia and 12m Depth

PIT - 5

Location	:	**North West – Block - II**
Catchment Area	:	317.50 m^2
Average runoff per year	:	279 kL (462.5 x 1100 x 0.8 = 279 kL)
Collection Chamber	:	1.20 m x 1.20 m
Filtration Chamber	:	2.1 m x 1.50 m
Recharge Pit	:	1.2 m Dia and 12m Depth

PIT - 6

Location	:	**North East – Block - II**
Catchment Area	:	317.50 m^2
Average runoff per year	:	279 kL (462.5 x 1100 x 0.8 = 279 kL)
Collection Chamber	:	1.20 m x 1.20 m
Filtration Chamber	:	2.1 m x 1.50 m
Recharge Pit	:	1.2 m Dia and 12m Depth

PIT - 7

Location	**:**	**North West – Block - III**
Catchment Area	:	462.50 m^2
Average runoff per year	:	407 kL (462.5 x 1100 x 0.8 = 407 kL)
Collection Chamber	:	1.20 m x 1.20 m
Filtration Chamber	:	2.1 m x 1.50 m
Recharge Pit	:	1.2 m Dia and 12m Depth

PIT - 8

Location	**:**	**North East – Block - III**
Catchment Area	:	462.50 m^2
Average runoff per year	:	407 kL (462.5 x 1100 x 0.8 = 407 kL)
Collection Chamber	:	1.20 m x 1.20 m
Filtration Chamber	:	2.1 m x 1.50 m
Recharge Pit	:	1.2 m Dia and 12m Depth

PIT - 9

Location	**:**	**South East – Block - IV**
Catchment Area	:	1013 m^2
Average runoff per year	:	891 kL (1013 x 1100 x 0.8 = 891 kL)
Collection Chamber	:	1.20 m x 1.20 m
Filtration Chamber	:	2.1 m x 1.50 m
Recharge Pit	:	1.2 m Dia and 12m Depth

PIT - 10

Location	**:**	**South West – Block - IV**
Catchment Area	:	1013 m^2
Average runoff per year	:	891 kl (1013X1100X0.8)
Collection Chamber	:	1.2mx1.2m
Filtration Chamber	:	2.1mx1.5m
Recharging Pit	:	1.2m dia and 12m Depth

PIT - 11

Location	**:**	**North East – Boys Hostel - I**
Catchment Area	:	509.95 m^2
Average runoff per year	:	448 kl (1013X1100X0.8)
Collection Chamber	:	1.20 m x 1.20 m
Filtration Chamber	:	2.1 m x 1.50 m
Recharge Pit	:	1.2 m Dia and 12m Depth

PIT - 12

Location	**:**	**South West – Boys Hostel - I**
Catchment Area	:	509.95 m^2
Average runoff per year	:	448 kl (1013X1100X0.8)
Collection Chamber	:	1.20 m x 1.20 m
Filtration Chamber	:	2.1 m x 1.50 m
Recharge Pit	:	1.2 m Dia and 12m Depth

PIT - 13

Location	**: North wing /North East (Engineering block)**
Catchment Area	: 2487.51 m^2
Average runoff per year	: 2189 KL (2487.51X1100X0.8)
Collection Chamber	: 1.2mx1.2m
Filtration Chamber	: 2.1mx1.5m
Recharging Pit	:1.2m dia and 12mDepth

PIT - 14

Location	**: North Wing /East side (Engineering block)**
Catchment Area	: 2167 m^2
Average runoff per year	: 1906 KL (2167X1100X0.8)
Collection Chamber	: 1.2mx1.2m
Filtration Chamber	: 2.1mx1.5m
Recharging Pit	: 1.2m dia and 12m Depth

PIT – 15

Location	**: Centre wing / East side (Engineering block)**
Catchment Area	: 547.5 m^2
Average runoff per year	: 481.8 kl (547.5X1100X0.8)
Collection Chamber	: 1.2mx1.2m
Filtration Chamber	: 2.1mx1.5m
Recharging Pit	: 1.2m dia and 12mDepth

PIT - 16

Location	**: South wing / East side (Engineering block)**
Catchment Area	: 950 m^2
Average runoff per year	: 836 kl (950X1100X0.8)
Collection Chamber	: 1.2mx1.2m
Filtration Chamber	: 2.1mx1.5m
Recharging Pit	: 1.2m dia and 12mDepth

PIT - 17

Location	**: South wing/ West side (Engineering block)**
Catchment Area	: 3399.03 m^2
Average runoff per year	: 2991.14 kl (3399.03X1100X0.8)
Collection Chamber	: 1.2mx1.2m
Filtration Chamber	: 2.1mx1.5m
Recharging Pit	: 1.2m dia and 12mDepth

Conclusion:

The analysis of the catchment areas and their corresponding annual runoff values indicates that the site has a total catchment area of 15,968.02 m² with an estimated annual rainwater harvesting potential of 14,045.94 kL (14.05 million liters). Based on the annual rainwater harvesting potential of 14,045.94 m³ and considering 80% recharge efficiency over a recharge influence area of 125 acres, the groundwater table is estimated to improve by approximately 0.22 m (22 cm) annually. The larger catchment areas contribute significantly to the overall runoff volume, demonstrating the effectiveness of utilizing available roof and surface areas for rainwater collection. The estimated runoff potential shows that a considerable quantity of water can be harvested annually, which can reduce dependency on external water sources, support groundwater recharge, and promote sustainable water resource management within the campus/site.

GREEN CAMPUS

14. CAMPUS GREEN COVER AND HERBAL GARDENS

INTRODUCTION

Sri Manakula Vinayagar Engineering College (SMVEC) is committed to fostering an eco-friendly, sustainable, and academically conducive environment. As part of its Green Campus and Sustainable Development initiatives, the institution has undertaken systematic efforts to enhance the green cover by planting, nurturing, and monitoring a wide range of tree species across the campus. This report provides a comprehensive overview of the varieties of trees grown within the college premises and highlights their significance in promoting ecological sustainability.

OBJECTIVES OF CAMPUS TREE-GROWING INITIATIVES

The primary objectives include:

1. **Enhancing Green Cover:** Increasing plantation density to create a cleaner and greener learning environment.
2. **Promoting Sustainability:** Supporting long-term ecological balance and reducing the campus carbon footprint.
3. **Improving Micro-Climate:** Providing natural shading, reducing heat, and enhancing air quality.
4. **Conserving Biodiversity:** Supporting native species and attracting beneficial fauna.
5. **Environmental Education:** Creating a living laboratory for students to observe ecological principles first-hand.

TREE SPECIES GROWN IN SMVEC CAMPUS

SMVEC has a diverse collection of native and climate-resilient tree species, selected for their environmental benefits, adaptability, and contribution to campus aesthetics. SMVEC maintains a rich and diverse green campus ecosystem that reflects its commitment to environmental sustainability and biodiversity conservation. The campus houses two dedicated herbal gardens: Herbal Garden – I, covering an area of 1,800 square feet and containing 20 species of medicinal plants, and Herbal Garden – II, spread over 6,752 square feet with 50 medicinal plant species. In addition to these herbal gardens, the campus is enriched with approximately 667 native tree species that contribute to ecological balance, carbon sequestration, and habitat creation. Overall, nearly 60% of the campus area is covered by green vegetation, creating a healthy and sustainable environment that supports biodiversity, enhances air quality, and promotes environmental awareness among students, faculty, and visitors. The major tree varieties grown across the campus include:

Native Shade-Giving Trees

- Neem (Azadirachta indica) – Known for air purification and medicinal value.
- Pongamia (Pongamia pinnata) – Drought-resistant and suitable for avenues.
- Rain Tree (Samanea saman) – Provides extensive canopy and natural cooling.
- Tamarind (Tamarindus indica) – Hardy species contributing to biodiversity.

Indigenous Ficus Varieties

- Banyan (Ficus benghalensis) – A keystone species supporting avian life.
- Peepal (Ficus religiosa) – High oxygen-releasing tree with strong ecological value.
- Indian Laurel (Ficus microcarpa) – Ideal for landscaping and shade.

Ornamental and Aesthetic Trees

- Gulmohar (Delonix regia) – Enhances the beauty of pathways with vibrant flowers.
- Copper Pod / Yellow Flame (Peltophorum pterocarpum) – Adds visual appeal and shade.
- **Ashoka (Polyalthia longifolia)** – Enhances greenery along building perimeters.

Fruit-Bearing Trees

- Mango (Mangifera indica)
- Guava (Psidium guajava)
- Jack fruit (Moris
- Indian Almond (Terminalia catappa) etc.,

  These species support campus ecology by attracting birds, insects, and pollinators.

Medicinal Plants and Herbal Species

- Tulsi (Ocimum sanctum)
- Amla (Phyllanthus emblica)
- Aloe Vera etc.,

  These contribute to biodiversity and student awareness of traditional medicinal systems.

The native trees available inside the campus and the medicinal value species are annexed in this report.

NATIVE TREES MAINTAINED INSIDE THE CAMPUS

S. No	Scientific Name	Common Name	Tamil Name	Available Numbers
1.	Peltophorum pterocarpum	Copper pod tree	பெருங்கொன்றை	66
2.	Calophyllum inophyllum	Punnai tree	புன்னை	2
3.	Wodyetia bifurcata	Foxtail palm	நரிவால் பனை	3
4.	Caryota urens	Fishtail palm	கூந்தல் பனை	10
5.	Roystonea regia	Royal palm	ராஜபனை	27
6.	Dypsis lutescens	Butterfly palm	பட்டாம்பூச்சி பனை	32
7.	Ravenala madagascariensis	Traveller's palm	பயணி பனை	4
8.	Tabebuia rosea	Pink trumpet tree	இளஞ்சிவப்பு டிரம்பெட் மரம்	27
9.	Bauhinia purpurea	Camel foot tree	மந்தாரை	18
10.	Pongamia pinnata	Pungam	புங்கம்	19
11.	Madhuca longifolia	Mahua tree / Butter tree	இலுப்பை	17
12.	Swietenia mahagoni	Mahogany	மகோகனி	5
13.	Lannea coromandelica	Indian ash tree	ஓதி மரம்	2
14.	Cassia fistula	Golden shower	கொன்றை	4
15.	Bambusa vulgaris	Bamboo	மூங்கில்	17
16.	Spathodea campanulata	African tulip	ஆப்பிரிக்க துளிப் மரம்	3
17.	Plumeria alba	Pagoda tree	கப்பல் அரளி	43
18.	Tecoma stans	Yellow trumpet	மஞ்சள் டெகோமா	17
19.	Bombax ceiba	Silk cotton	இலவம் பஞ்சு	3

S. No	Scientific Name	Common Name	Tamil Name	Available Numbers
20.	Saraca asoca	Ashoka	அசோகம்	2
21.	Pterygota alata	Buddha coconut	கொடைத்தோண்டி	4
22.	Mussaenda erythrophylla	Bangkok rose	வெள்ளிமடந்தை	4
23.	Muntingia calabura	Singapore cherry	தேன் பழம்	1
24.	Cycas revoluta	Cycad	சாகு பனை	2
25.	Ficus benjamina	Weeping fig	அழுகும் அத்தி	15
26.	Terminalia catappa	Indian almond	நாட்டுப் பாதாம்	34
27.	Thespesia populnea	Indian tulip tree	பூவரசு	3
28.	Artocarpus heterophyllus	Jackfruit tree	பலா	9
29.	Tectona grandis	Teak	தேக்கு	15
30.	Azadirachta indica	Neem	வேம்பு	71
31.	Mimusops elengi	Spanish cherry / Bullet wood	மகிழம்	8
32.	Syzygium cumini	Java plum / Jamun	நாவல்	23
33.	Manilkara zapota	Sapota	சப்போட்டா / சிக்கூ	12
34.	Moringa oleifera	Drumstick / Moringa	முருங்கை	15
35.	Cassia fistula	Golden shower tree	கொன்றை	4
36.	Phyllanthus acidus	Indian gooseberry	நெல்லிக்காய்	4
37.	Phyllanthus emblica	Wild amla	காட்டு நெல்லி	2
38	Pithecellobium dulce	Manila tamarind / Madras thorn	கொடுக்காப்புளி	4
39	Delonix regia	Royal poinciana / Gulmohar	மயில்கொன்றை	14
40	Butea	Flame of the forest	பராசு	2

S. No	Scientific Name	Common Name	Tamil Name	Available Numbers
	monosperma			
41	Citrus limon / Citrus spp.	Lemon / Citrus	எலுமிச்சை	7
42	Lagerstroemia parviflora	Small-flowered crape myrtle	சிறு கடம்பு	8
43	Morinda citrifolia	Noni / Indian mulberry	நோனி	3
44	Carica papaya	Papaya	பப்பாளி	4
45	Samanea saman	Rain tree	தூங்குமூஞ்சி மரம்	13
46	Filicium decipiens	Fern tree / Japanese fern tree	பெர்ன் மரம்	2
47	Averrhoa carambola	Star fruit / Carambola	நட்சத்திரப் பழம்	7
48	Albizia amara	Albizia / Arappu tree	உசிலை / அரப்பு	1
49	Bauhinia racemosa	Bidi leaf tree	ஆத்தி மந்தாரை	1
50	Chloroxylon swietenia	East Indian satinwood	வெண்பட்டை	1
51	Couroupita guianensis	Cannonball tree	நாகலிங்கம்	1
52	Enterolobium cyclocarpum	Elephant's ear tree	யானைக்காது மரம்	1
53	Ficus religiosa	Peepal tree / Sacred fig	அரசு	2
54	Gmelina arborea	White teak / Gmelina	குமிழ்	1
55	Santalum album	Indian sandalwood	சந்தனம்	1
56	Phoenix roebelenii	Pygmy date palm	ஈச்சம் பனை	5
57	Mangifera indica	Mango	மா	40
58	Mussaenda philippica	Buddha's Lamp	வெள்ளையிலை	1
59	Dalbergia latifolia	Indian Rosewood	தோதகத்தி	1
			Total	**667**

HERBAL PLANT GARDEN – I

Area : 1800 Square Feet **Date of Planting : 12.07.2017**

S. NO	COMMON NAME	VERNACULAR NAME	BOTANICAL NAME	USES
1	Malabar Nut	ஆடாதோடை	*Adhatoda vasica*	Cough and cold infections
2	Cluster Fig	அத்தி	*Ficus racemosa*	Protein booster
3	Neem	வேம்பு	*Azadirachta indica*	Skin disease, stomach worms
4	Crape Jasmine	நந்தியாவட்டம்	*Ervatamia coronaria*	Madras eye
5	Indian Acalypha	குப்பைமேனி	*Acalypha indica*	Skin problems
6	Five-Leaved Chaste Tree	நொச்சி	*Vitex negundo*	Skin allergy
7	Gymnema	சிறுகுறிஞ்சான்	*Gymnema sylvestre*	Diabetes mellitus
8	Touch me not	தொட்டாச்சுருங்கி	*Mimosa pudica*	Skin allergies
9	Jamun / Java Plum	நாவல்	*Syzygium cumini*	Diabetes mellitus
10	Indian Gooseberry	நெல்லி	*Phyllanthus emblica*	Immunity booster, mouth ulcers
11	Kalmegh	நிலவேம்பு	*Andrographis paniculata*	Immunity booster, eczema
12	Wood Apple	விளாம்பழம்	*Limonia acidissima*	Digestive aid, diarrhea
13	Insulin	இன்சுலின் செடி	*Costus igneus*	Blood sugar control

S. NO	COMMON NAME	VERNACULAR NAME	BOTANICAL NAME	USES
14	Indian Catmint	கற்பூரவள்ளி	*Plectranthus amboinicus*	Cough and cold
15	Betel vine	வெற்றிலை	*Piper betle*	Digestive, antiseptic
16	Yellow Bauhinia	மஞ்சள் மந்தாரை	*Bauhinia tomentosa*	Wound healing
17	Arrowroot	கூவைக்கிழங்கு	*Maranta arundinacea*	Digestive disorders
18	Galangal	பெரரத்தை	*Alpinia galanga*	Indigestion, cough
19	Blue Flower Rattlepod	கிளிகிளுப்பை	*Crotalaria verrucosa*	Skin diseases
20	Indian Coral Tree	கல்யாண முருங்கை	*Erythrina indica*	Joint pain relief

HERBAL PLANT GARDEN – II

Area : 6752 square feet **Date of Planting : 14.10.2023**

S. NO	COMMON NAME	VERNACULAR NAME	BOTANICAL NAME	USES
1	Kalmeg	நிலவேம்பு	*Andrographis paniculata*	Dengue fever, immunity booster
2	Gymnema	சிறுகுறிஞ்சான்	*Gymnema sylvestre*	Diabetics
3	Ashwagandha	அமுக்கரா	*Withania somnifera*	Nerves disorder, cure inflammations
4	Long pepper	திப்பிலி	*Piper longum*	Respiratory problem
5	Sweet basil	திருநீற்றுப்பச்சை	*Ocimum basilicum*	Inflammation, fight against cancer
6	Insulin plant	இன்சுலின்	*Costus igneus*	Diabetics
7	Galangal	சித்தரத்தை	*Alpinia galanga*	Treat cold, cough
8	Sweet flag	வசம்பு	*Acorus calamus*	Stimulant, stomachic
9	Veld grape	பிரண்டை	*Cissus quadrangularis*	Scurvy, piles

S. NO	COMMON NAME	VERNACULAR NAME	BOTANICAL NAME	USES
10	Malabar nut	ஆடாதோடை	*Justicia adhatoda*	Cough and cold
11	Thuthuvalai	தூதுவளை	*Solanum trilobatum*	Cough, antioxidant
12	Vetiver	வெட்டிவேர்	*Chrysopogon zizanioides*	Relieving stress, refrigerant
13	Aloe	சோற்றுக் கற்றாழை	*Aloe barbadensis*	Coolent, laxative
14	Mexican mint	கற்பூரவல்லி	*Coleus amboinicus*	Cough and cold
15	Medicinal coleus	மருந்து கூர்க்கன்	*Coleus barbatus*	Hypertension
16	Lemon grass	எலுமிச்சை புல்	*Cymbopogon citratus*	Antimicrobial, anxiety
17	Bee Sting Bush	முட்சங்கன்	*Azima tetracantha*	Rheumatism
18	Indian penny wort	வல்லாரை	*Centella asiatica*	Increase brain power
19	Waterhyssop	நீர் பிரம்மி	*Bacopa monnieri*	Improve memory
20	Yellow bauhinia	திருவாச்சி	*Bauhinia tomentosa*	Ulcer and respiratory problem
21	Crape jasmine	நந்தியாவட்டை	*Tabernaemontana divaricata*	Eye pain, antihypertensive
22	Balloon vine	முடக்கத்தான்	*Cardiospermum halicacabum*	Rheumatism and stiffness of limbs
23	Turmeric	மஞ்சள்	*Curcuma longa*	Wound healing, anti inflammatory
24	Clitoria	சங்கு பூ	*Clitoria ternatea*	Indigestion and kidney problem
25	Touch me not	தொட்டால் சிணுங்கி	*Mimosa pudica*	Skin allergy, piles treatment
26	Cat Whiskers	பூனை மீசை	*Orthosiphon stamineus*	Kidney disorder

S. NO	COMMON NAME	VERNACULAR NAME	BOTANICAL NAME	USES
27	Turkey tangle	பொடுதலை	*Phyla nodiflora*	Joint pain, anti-dandruff, hook worm
28	Kesavardhini	கேசவர்த்தினி	*Centratherum punctatum*	Improves scalp health
29	Malabar catmint	பேய் விரட்டி	*Anisomeles malabarica*	Flatulence
30	Indigo plant	அவுரி	*Indigofera tinctoria*	Sores and blisters
31	Bryophyllum	ரணக்கள்ளி	*Kalanchoe pinnata*	Kidney stone
32	Milk weed	பால் பெருக்கி	*Euphorbia heterophylla*	Milk production in breastfeeding women
33	Black nightshade	மணத்தக்காளி	*Solanum nigrum*	Ulcer
34	Betelvine	வெற்றிலை	*Piper betle*	Good for digestion
35	Phyllanthus	கீழாநெல்லி	*Phyllanthus niruri*	Jaundice treatment
36	Medicinal solanum	கண்டங்கத்திரி	*Solanum xanthocarpum*	Cough, increase urination
37	Ocimum	துளசி	*Ocimum sanctum*	Cough and cold
38	Indian sarsaparilla	நன்னாரி	*Hemidesmus indicus*	Reduce body heat, blood purification
39	Dwarf copper leaf	பொன்னாங்கண்ணி	*Alternanthera sessilis*	Ulcer, haemorrhoids, reduces body weight
40	Arrow root	கூகைக் கிழங்கு	*Maranta arundinacea*	Diarrhea treatment and weight loss
41	Hibiscus	செம்பருத்தி	*Hibiscus rosa-sinensis*	Lowers blood pressure
42	Cape goose berry	சொடக்கு தக்காளி	*Physalis minima*	Anaemia, liver problem
43	Thaluthalai	தழுதாழை	*Clerodendrum phlomidis*	Cure paralysis, rheumatic disorders
44	Bone joint leaves	எலும்பொட்டி	*Blepharis maderaspatensis*	Bone related problem, reduce back & joint pains

S. NO	COMMON NAME	VERNACULAR NAME	BOTANICAL NAME	USES
45	Periwinkle	நித்திய கல்யாணி	*Catharanthus roseus*	Anti cancer
46	Sansevieria	பாம்பு கற்றாழை	*Sansevieria hyacinthoides*	Ear infection and earache
47	Acalypha	குப்பைமேனி	*Acalypha indica*	Cure skin rashes and wounds
48	Chekurmanis	தவசிக்கீரை	*Sauropus androgynus*	Cure anaemia, reduces blood pressure
49	Crotalaria	கிளுகிளுப்பை	*Crotalaria retusa*	Remove kidney stones
50	Red spiderling	மூக்கிரட்டை	*Boerhavia diffusa*	Treat renal stones, anaemia, vatha diseases

TREE PLANTING STRATEGY AND MANAGEMENT

Identification and Preparation of Planting Zones

Strategic plantation zones are identified based on available open space, building surroundings, academic blocks, parking areas, and internal roads.

Planting Process

- Preparation of planting pits (45–60 cm depth).
- Soil enrichment using compost and organic manure produced from campus waste.
- Planting during monsoon or post-monsoon season for higher survival rates.

Maintenance and Irrigation

- Scheduled watering using drip or manual irrigation systems.
- Periodic pruning and deweeding to support healthy growth.
- Organic fertilization through composting and vermicompost generated on campus.

ENVIRONMENTAL AND SUSTAINABILITY BENEFITS

Reduction in Carbon Footprint

Trees absorb large volumes of carbon dioxide, contributing significantly to the mitigation of greenhouse gases and improving air quality across the institution.

Enhancement of Campus Micro-Climate

The dense tree cover reduces ambient temperature, provides natural shading, minimizes heat island effect, and creates comfortable outdoor study spaces.

Support to Biodiversity

Flowering and fruit-bearing trees attract birds, butterflies, and beneficial insects, contributing to ecological balance and improving the campus biodiversity index.

Contribution to Sustainable Development Goals (SDGs)

Tree-growing efforts directly support:

- SDG 11 – Sustainable Cities and Communities
- SDG 13 – Climate Action
- SDG 15 – Life on Land
- SDG 12 – Responsible Consumption and Production
- SDG 4 – Quality Education (through environmental awareness)

GREEN CAMPUS INITIATIVES COMPLEMENTING TREE PLANTATION

- A well established Green campus Committee for monitoring plantation programs.
- Celebration of World Environment Day and NSS Day with plantation drives.
- Use of treated water from the campus Sewage Treatment Plant for irrigation needs.
- Composting of organic waste for sustainable fertilization.

OUTCOMES

The plantation activities at SMVEC have contributed to:

- Increased overall green cover and improved landscape aesthetics.
- Noticeable enhancement in air quality and reduction in temperature during peak summer.
- Increased biodiversity, particularly in bird and butterfly populations.
- Enhanced student awareness about environmental conservation.

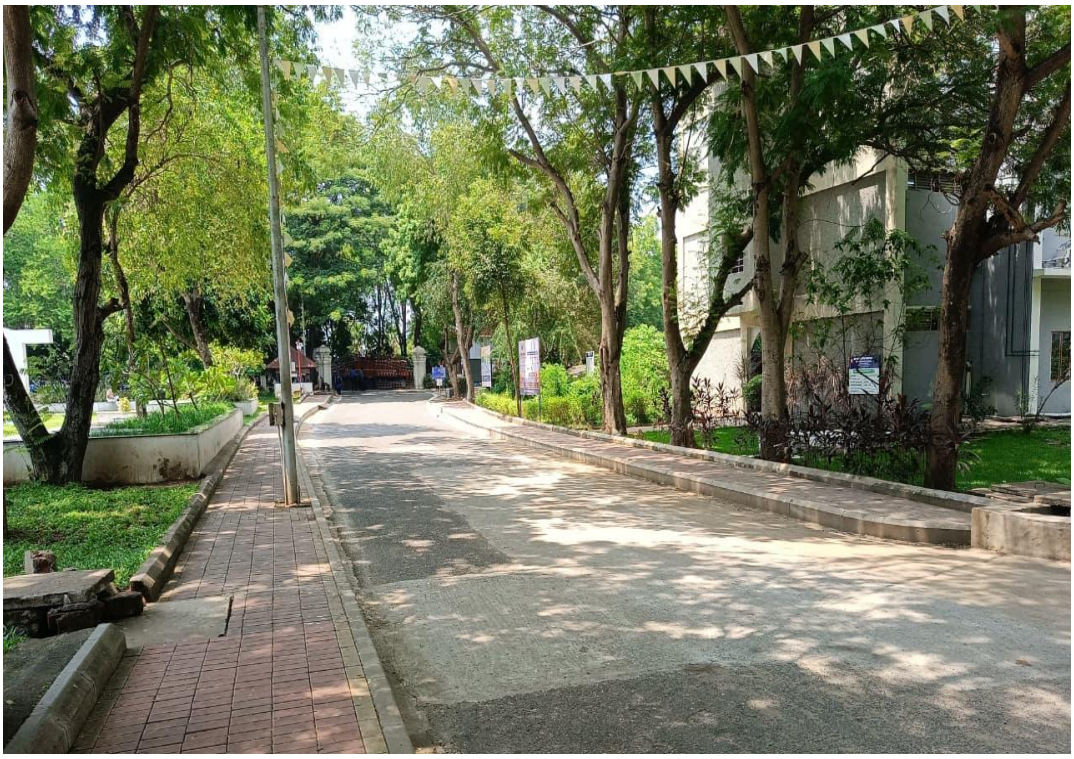
CONCLUSION

SMVEC's commitment to growing a wide variety of native, ornamental, and medicinal trees reflects its long-term vision toward achieving a fully sustainable and eco-friendly campus. Using a conservative average of 22 kg CO_2 absorbed per tree per year, out of 667 trees inside the campus , the Annual CO_2 Sequestration is 14.67 tonnes of CO_2 per year.

Through careful planning, effective plantation practices, and continuous maintenance, the institution has successfully enhanced its green cover and created a healthier learning environment.

Herbal Garden – I

Herbal Garden - II



Plantation of Native Trees on Both Sides of Road