# A Report on Physical Infrastructure as part of preparation of IDP, For CET Trivandrum

**COLLEGE OF ENGINEERING TRIVANDRUM**
**Thiruvananthapuram**
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# Physical Infrastructure

**College of Engineering Trivandrum (CET), Thiruvananthapuram**

## 1. Purpose and Scope

This report sets out how CET will plan, build, upgrade and review its physical infrastructure.

Physical infrastructure is the basic structures an institution needs to function. It supports the academic and research work of every school and department, and is a key component in developing an attractive campus, and brand building.

## 2. Overview: CET Campus Today

| Parameter | Current status |
|---|---|
| Established / affiliation | 1939; on present campus since 1960; affiliated to APJ Abdul Kalam Technological University |
| Building footprint (Fig 1) | About 50,600 sq.m |
| Terrain (Fig 1) | Hilly; 40 m level difference; steep slopes mostly on the periphery; built area on gentle slopes |
| Ecology (Fig 2) | Dense tree canopy, diverse wildlife, porous soil; existing drains must be protected |
| Site structure | The campus is split into academic (north), residential (west) and MBA/KTU (south) parts |
| Circulation (Fig 3) | Vehicles limited to staff and faculty; students walk; entries on three sides, main entrance in the north |
| Infrastructure (Figure 4) | Positions of infrastructure elements are detailed in figure 4 |
| Building stock | Around 47 listed built elements, from roughly 80-year-old buildings to new blocks; mixed architectural styles |

*Figure 1 Terrain and Built Plan*

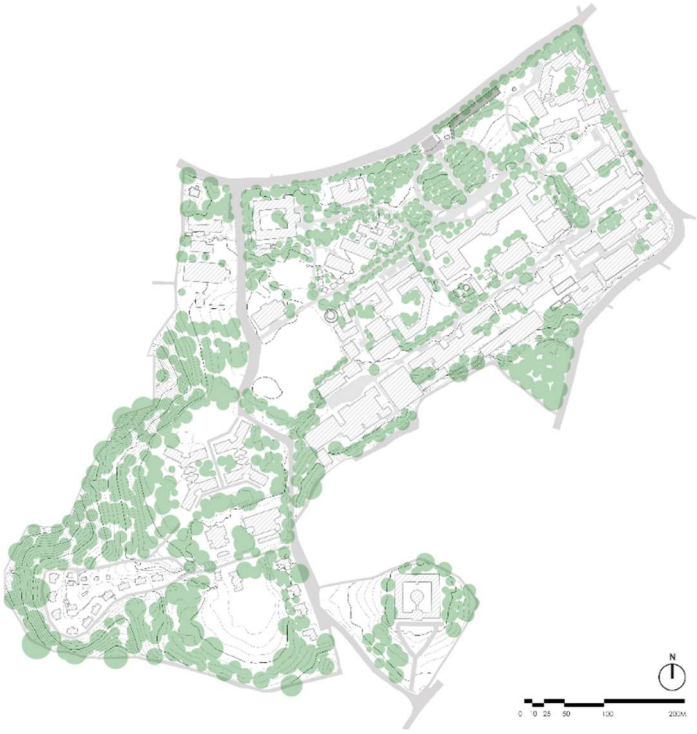


*Figure 2 Tree Coverage on Site*

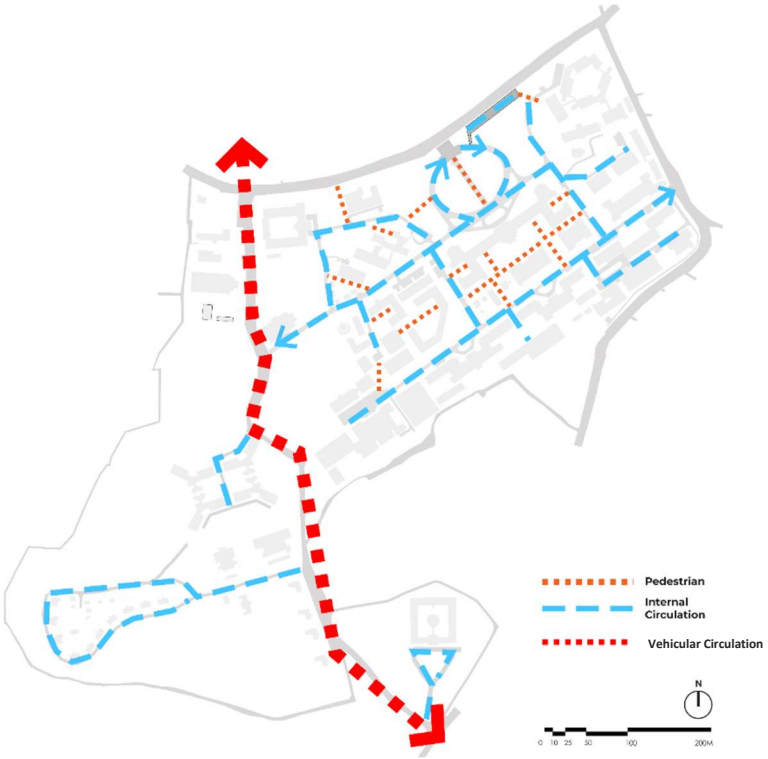


*Figure 3 Campus circulation network*

*Figure 4 Campus Infrastructure*

## 3. Planning Principles and CET Development Objectives

The following are eight general campus planning principles. Each is mapped below to CET's current status and a development objective.

| | Planning Criteria | Current Status | Development objective |
|---|---|---|---|
| A | **Integrated Activity**: Design the campus layout so academic, research, cultural, and operational facets harmoniously interact. | Academic, Research, Cultural and operational functions are clustered in the northern section of the campus along with Ladies Hostel; MBA block, Male hostel, and staff residences are separated | Strengthen circulation pathways so related functions are connected and walkable |
| B | **Preservation of Essence**: Uphold the campus as a vital component of the university's living and learning mission, maintaining its aesthetic appeal. | Regular maintenance of the campus, and usage of public space by students ensure that the campus is a vital component of the university's living and learning mission. | Modernizing/repairing all basic infrastructure within the campus.<br>Adopt a campus design language and landscape plan that reclaims unused spaces |
| C | **Environmental Responsibility**: Champion environmental stewardship by enhancing energy efficiency, minimizing waste, and reducing environmental impacts. | Rich canopy, ecology and fauna | Protect tree cover and habitats; site new buildings around them in a ecologically sensitive manner. |
| D | **Facility Integration**: Ensure facilities and equipment are integrated, especially for Vocational Education, Training, and Skilling. | A variety of workshops and labs provided as per requirements of respective departments | Confirm adequacy and plan upgrades with departments |
| E | **Inclusivity and Safety**: Ensure accessibility for Persons with Disability (PwD), promote gender inclusivity, and ensure a zero-tolerance approach towards discrimination, | First floors of all floors accessible via ramps, terrain differences hinder movement<br>No tolerance for ragging, discrimination and bullying within campus | Universal-design pathway network; accessible entry and lift access to all floors; toilets and facilities to be prioritized in future construction |

| | Planning Criteria | Current Status | Development objective |
|---|---|---|---|
| | ragging, bullying, including cyberbullying. | culture | |
| F | **Safety and Risk Management**: Prioritize the safety of the campus community and establish protocols for risk management in design and operation. | Campus functions from 9am to 9pm, with watchmen posted at entry's and exits throughout, vehicular entry is restricted to staff and faculty. | Assess the possibility of transitioning to a 24 hour campus, and the necessary infrastructure required to support it. |
| G | **Holistic Development**: Provide facilities for artistic expression, sports, fitness, and health, including mental health services like counselling and wellbeing centres. | Indoor court, gym, three grounds, Dhwani and Sargam stages<br>Gym and sports facilites available for common use, Campus counsellor available to students | Maintain and extend; add multi-use recreational and cultural spaces<br>Provide dispensary and counselling/wellbeing space |
| H | **Resource Management**: Emphasize knowledge management as a principle for resource generation and management. | Conventional System | Record assets and utilisation; explore revenue from rentable spaces |

## 4. Green Campus Strategy

Green campus strategies calls for protecting the ecological footprint through strategic planning. For CET this means:

| | Green Strategies | Current Status | Development objective |
|---|---|---|---|
| A | **Ecological Preservation:** Protect the natural topography, minimize carbon footprint, and conserve water and natural resources. | Campus is planned around existing tree stock, ensuring equitable access to green spaces. Natural slope and topography of the campus influences building design. | Detailed studies into water consumption and potential for water harvesting.<br>Future construction efforts should aim to minimize carbon footprint. |
| B | **Environmental Awareness:** Foster sensitivity towards the environment and promote awareness campaigns. | Student run clubs hosts planting drives to spread awareness.<br>Campus waste collection system encourages segregation of waste at source. | Active steps must be taken to ensure that future events are run with ecologically sustainable practices taken into consideration. |
| C | **Sustainable Infrastructure:** Prioritize the use of recycled materials and consider heat island effects in construction designs. | Campus buildings and roads are separated and protected by strong tree cover, minimizing urban heat island effect. | Promote integration of recycled materials into future construction. |
| D | **Sustainable Mobility:** Reduce fossil fuel consumption with efficient transport strategies | Vehicular access within the campus is limited to faculty and staff, encouraging maximum pedestrian movement within the campus. | Strengthen accessibility of pedestrian networks within campus |
| E | **Technology and Energy:** Embrace alternative energy sources and adapt to eco friendly technologies. | Solar panels installed on the roofs of certain buildings | Campus wide strategies for alternative energy sources and eco-friendly technologies to be investigated. |

## 5. Overall Gap Analysis

| | Criteria | Current Status | Development objective |
|---|---|---|---|
| 1 | Smart campus | Free wifi systems, and smart classrooms available, within departments | Future renovations and new constructions to consider the possibility of building-management and utility monitoring.<br>Infrastructure requirements for paperless administration to be investigated |
| 2 | Green / sustainable building | Solar panels installed on certain buildings. | Solar audit; green building standard for new work |
| 3 | Infrastructure to commute | Pedestrian pathways | Accessible pedestrian network; cycle routes |
| 4 | Administrative block | Dedicated Administration Block (9,700 sq.m) available | Maintain; review admission and counselling space |
| 5 | Library / digital resource centre | Central Technical Library, (2,730 sq.m) | Maintain; review necessary upgrades and future proof resources. |
| 6 | Lecture complex, classrooms, tutorial rooms | Department blocks and lecture halls | Upgrade teaching spaces; add video recording |
| 7 | Examination branch | Existing classrooms are repurposed for examinations, confidential documents stored in dedicated offices within administrative block. | Verify/strengthen security measures within exam blocks. |
| 8 | Faculty and staff facilities | Faculty apartments, D Quarters, staff apartments, available | Refurbish and modernize existing staff facilities |
| 9 | Meeting rooms | Each department has designated meeting rooms | Modernize meeting rooms in all departments with smart technology |
| 10 | Office rooms | Within department blocks | Modernize office rooms in all departments, renovate and refurbish as required. |
| 11 | Laboratories and research centres | Many labs, High Voltage Lab, research labs | Condition and equipment review |
| 12 | Computer centre / multimedia studios | Provided within the Admin block and Central library | Plan the provision of multimedia studio |

| | Criteria | Current Status | Development objective |
|---|---|---|---|
| 13 | Cafeteria / dining | Canteens between civil and architecture; one café in the eastern half | Add food outlets in underserved zone |
| 14 | Games and sports | Indoor court, gym, basketball, football, cricket grounds | Maintain; consider pool and multi-purpose arena |
| 15 | Auditorium and conference rooms | Convention Centre (DJ Hall), Dhwani, Sargam | Maintain; plan event circulation and parking |
| 16 | Hostels | Men's, Ladies' hostels; First Year Men's under construction; | Complete ongoing construction, refurbish old facilities, then assess need for further expansion |
| 17 | Parking | Restricted | Formalise zones by vehicle type; event plan |
| 18 | Exhibition hall | Exhibitions currently hosted within flexible/multipurpose spaces within admin block/departments. | Modernize exhibition rooms in all departments with smart technology |
| 19 | Guest accommodation | Guests are currently accommodated in external hotel facilities. | Future construction to develop guest accommodation within the campus. |
| 20 | Commercial shops / centres | Cooperative store provides students and faculty with essentials at discounted rates. | Asses scope for further commercial opportunities in future construction. |
| 21 | Health and wellbeing | Indoor Gym and play courts are accessible to students. Campus counsellor available to students. | Dedicated space for college counsellor to be made available. |
| 22 | International student centre | Currently not required within the campus. | Identify proposals for international student centre, and scope for future addition. |
| 23 | Incubation centre and research park | CSD Research Park, TBI Cell | Expand TBI coworking space to host and support a stronger in campus start up culture. |
| 24 | Botanical park / garden | Rich natural vegetation, flora and fauna | Document and curate existing flora, plan landscaped zones integrating existing fauna, |
| 25 | Vocational education, training and skilling infrastructure | Numerous workshop spaces available to students. | Modernize workshop spaces in all departments, assess changing needs of updated courses |

## 6. Conclusion

This report has set out CET's existing physical infrastructure and the requirements for its future development. It uses campus planning principles, and green campus strategies as its reference points.

CET's campus has a dense tree canopy, rich ecology and has a walkable, largely pedestrian layout. Academic, research and cultural functions are clustered in the north, and facilities for sports, research, incubation and events are already in place. These assets give the campus its identity, and future development should protect them.

The analysis also shows gaps that need attention:

- **Accessibility and safety:** While all departments meet basic accessibility criteria, future renovations and upgradations can aim to ensure that all floors are accessible via lifts where required.
- **Ageing buildings:** numerous buildings within the campus are ageing and form a part of the campus's heritage. Built with climate responsive strategies, these buildings, if maintained and upgraded to meet modern requirements, will remain an asset to the campus.
- **Fragmented campus:** Fragmented green spaces within the campus can be connected with planned landscaping and accessible pathways, reinforcing the pedestrian nature of the campus

Taken together, the objectives in this report fall under four priorities:

1. **Repair and complete.** Refurbish basic infrastructure, and complete the construction of planned hostels and residences before assessing requirements for new capacity.
2. **Connect and include.** Build a universal-design pedestrian network, so the campus is safe and accessible for everyone, including Persons with Disabilities.
3. **Build with the landscape.** Site new construction around existing trees, drainage and slopes. Use recycled materials, reduce carbon footprint, and study water use and harvesting. Extend solar and other alternative energy beyond the few buildings that have it today.
4. **Strengthen academic and community life.** Add counselling and wellbeing spaces, and food outlets in underserved zones. Expand incubation space and plan for guest and international student facilities.

The report is a starting point for decisions. The future steps are to attach costs, responsibilities and timelines to each objective, and to review progress at regular. When future planning and construction is guided by the wider Institution Development Plan, CET's infrastructure will better support its academic and research mission while preserving the character of its campus.