

WASTE AUDIT

The waste audit is a process which is used to determine the amount and types of waste that are generated by the institute. The audit is also done to identify how the solid waste is managed in the institute and provide guidance to improve and manage waste in a sustainable way at the source itself. In order to identify the composition of solid waste, waste is segregated and collected at each locations and is classified as food waste, cardboard, paper, plastics, metal, wood, concrete etc.. Figure1 shows the details of the building inside the campus. Waste audit is carried out in the campus by the coordination of department of Civil Engineering with the support of all the departments come under 12 building as provided in the Figure 1. Table 1 shows the coordinating faculty and staff involved in the waste audit with the support of the final year students of Civil Engineering.

Table 1: List of Members in the waste Audit

Sl No	Name	Designation
1	Dr Mini Mathew	HOD CE
2	Grace Mary Abraham	Assistant Professor, Department of Civil Engineering
3	Fr. Siju Pullempampil	Assistant Professor, Department of Computer Science
4	Dr Sunnichan Veliyil George	Professor, Department of Food Technology
5	Mr Shaji Joseph	Lab Instructor, Department of Civil Engineering
6		
7	Final year students of CE	

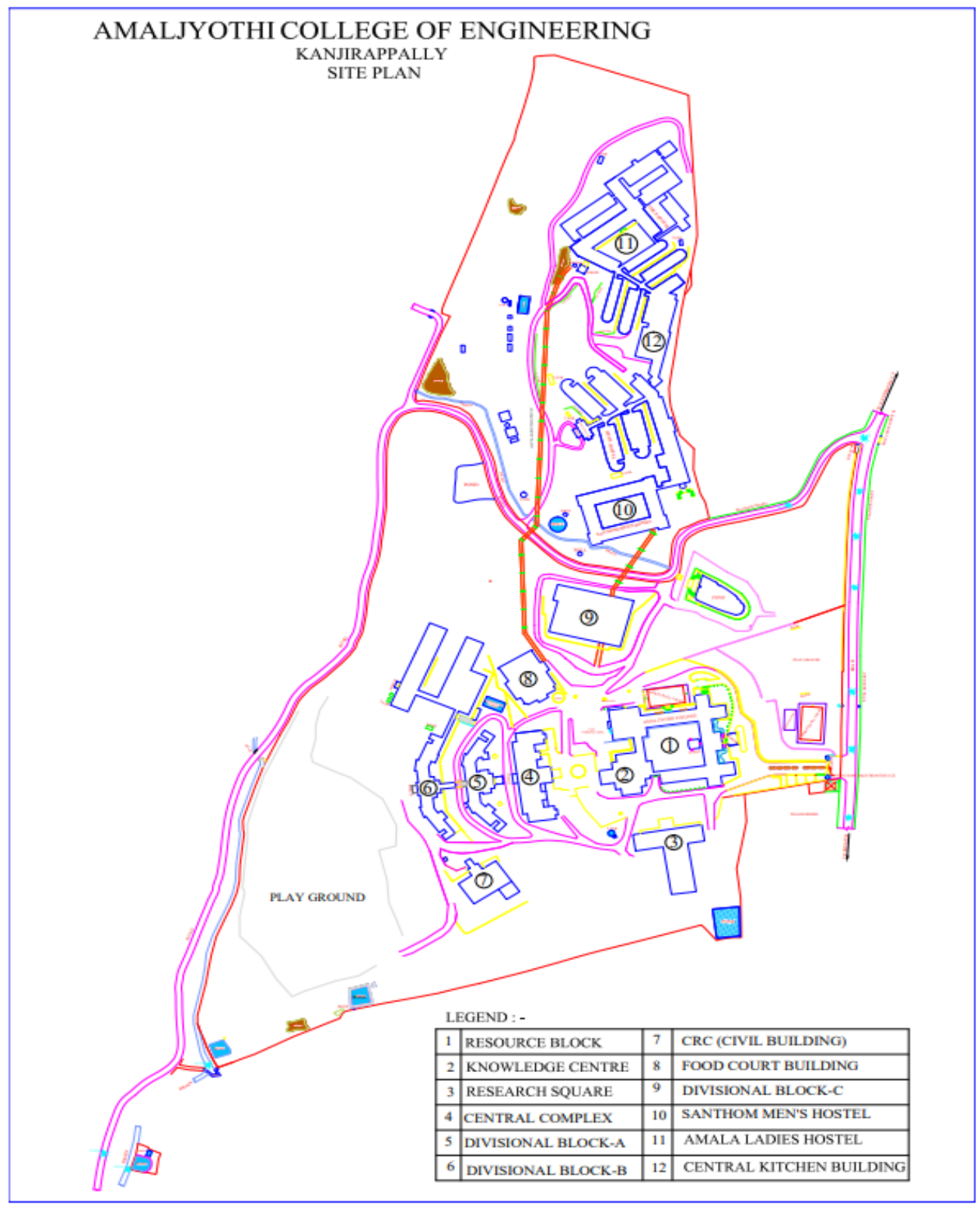


Figure 1: SitePlan & Details of Building inside the campus

Methodology followed for the waste Audit

Baseline data/survey are collected/done by preparing Questionnaires and by conducting/visiting walk through/ survey at all the waste sources/locations in all the building mentioned earlier. Figure 2 shows the questionnaire made for conducting the walk through survey. The students community with the support of staffs in all the departments and labs have first completed the walk through survey and the locations and sources of solid waste is identified. The solid waste collected in each day is weighed with the assistance of cleaning staff at each locations. Collection Bins are provided in the front of each building and the sample is shown in Figure 3. Figure 4 shows the sample data sheet made for one of the building after the Audit have done.



SURVEY ON SOLID WASTE MANAGEMENT PRACTICES AT AMAL JYOTHI COLLEGE OF ENGINEERING, KOTTAYAM DISTRICT

1. Name of Building/House/Person

2. Details of Building/labs/classrooms/

3. Socio Economic Conditions:

Type of Building	Built up area (sq. ft)	No of occupants Students/staff

4. Waste Type & Amount of Solid Waste on a daily basis (gms):

Solid											Liquid
Biodegradable(wet/Dry)				Non-Biodegradable							
Food Waste	Garden trimming	Paper	Human and animal waste	Plastics	Rubber	Glass & Ceramic	Metal	wood	Any other	Concrete	

5. Nature of Disposal at present:

Solid											Liquid
Biodegradable(wet/Dry)				Non-Biodegradable							
Food Waste	Garden trimming	Paper	Human and animal waste	Plastics	Rubber	Glass & Ceramic	Metal	wood	Any other	Concrete	

**D: Compositing; RU: reusing; OS: Open Space; RC: Dumping into Water Bodies, OPB: Open Burning

Figure 2 : Questionnaire for conducting survey sample



Figure 3. Collection Bins used in the buildings

Annex 2: Solidwaste Data Sheet for Divisional Block B																				
Date	Department/ Area of source of waste (Everypoint of waste generation within the campus should be identified and listed- cross	Type of waste generated										Toxic (g/day)	Treatm ent/disp osal method	In- camp us	Evide nce (photo / video)	Outso urred to specifi c vendo	Evide nce (Cont ract copy)	Other metho ds - specif y	Smart	Rema rks
		Wet (g/day)			Dry (g/day)															
		veget able	Food	other	plastic	paper	concret e	wood	metal	Yard Waste	Any other									
1-6-2020	ChE,EEE,ECE,WORKSHOP		2000		1000	1000						100	n g .	Y	Yes	F			o c k	
2/6/2020	ChE,EEE,ECE,WORKSHOP		2500		1100	1200				40347		100								

Figure 4: Data sheet

The quantity of waste generated in the campus is identified and Figure 5 shows the percentage composition of the solid waste generated in the campus. From the data it is found that around 67 % of the solid waste generated in the campus is organic in nature and is biodegradable.

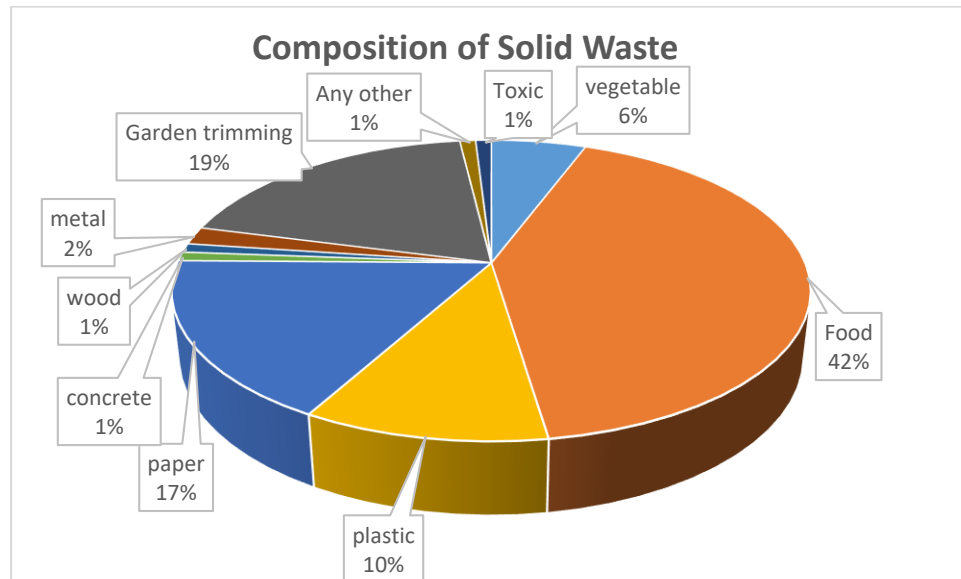


Figure 5: Composition of the solid waste in the campus.

Solid waste Audit Key Findings

1. All the materials are segregated at the source itself . In order to follow the major hatcheries of solid waste management, the materials that can be recycled plastic, paper, glass, metal is used to send for recycling and material that can be reused such as concrete, wood etc. is reused for making other products.
2. The waste concrete is reused for Pot development which is used inside the campus itself.
3. The materials such as Plastic, paper, glass, metal, wood and Card Board etc are disposed by selling it to the vendors.

4. Food waste generated in the canteen and mess are disposed by sending into pig farms as feeds for pigs
5. Wastewater and greywater from buildings such as sathom hostel, Amala hostel, and food court are connected with STP plant. The treated water is reused for recharging the ponds in the campus and for gardening purpose.
6. STP plant will have a capacity of and is treating wastewater
7. The sludge from the treatment plant is reused as organic fertilizer by aerobic composting carried out inhouse itself by the department of Civil Engineering and the details are provided **in section 3.**
8. The organic farming is carried out in the campus itself using these organic compost.
9. Concrete pots are made in the campus with recycled concrete and organic fertilizer made inside used as potting mixture.
10. Organic farming is carried out in the campus with inhouse organic fertilizer and is explained in section 4

Section 3. Composting Unit

The sludge generated from the STP is composted aerobically by the initiative of department of Civil Engineering. The composting is carried out by aerobic windrow composting by proportioning

the C:N ratio with the addition of different agricultural waste and yard wastes, garden trimming, animal manure, etc. which is generated within the campus. The windrows are turned every 14 days and temperature of a minimum of 55°C is maintained to ensure pathogen elimination by incorporating different microorganism.

Figure 6 shows the various stages of in-house composting carrying out.



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Figure 6: Various Stages of In-house composting

The quality of the organic manure is analysed and is followed as per the Indian specifications.

Figure 7 shows the organic fertilizer made inhouse.



Figure 7: Organic Fertilizer – product made from the STP sludge

The compost prepared is safe to use and quality tested to ensure it satisfies the FCO standards.

Table 2 specifies the product specifications.

Table 2: Product Specifications

	Parameter	Properties of Organic Fertilizer Packed	Specification as per FCO
1	Moisture, per cent by weight	20%	15.0-25.0
2	Colour	Dark Brown	Dark Brown to Black
3	Particle Size	92 %	Minimum 90% material should pass through 4.0 mm IS sieve
4	Bulk Density (g/ cc)	0.9	<1
5	Total organic carbon, per cent by weight	18	minimum 12
6	Total Nitrogen (as N), per cent by weight	0.9	minimum 0.8
7	Total Phosphates (as P ₂ O ₅), per cent by weight	0.62	minimum 0.4
8	Total Potash (as K ₂ O), per cent by weight	1.05	minimum 0.4
9	C:N ratio	19.7	<20
10	pH	6.70	6.5-7.5
11	Conductivity (as ds/m)	1.3	not more than 4.0

➤ **Section 4: Cultivation of Vegetables in the campus**

Campus also cultivates different types of the vegetables in the campus using organic fertilizers. Figure shows the pictures.



Figure 8. Vegetable Garden in the Campus

