CAMPUS SORTING GUIDE

— because careful sorting matters —

NUS National University of Singapore | University Campus Infrastructure

Developed by Sustainability Strategy Unit

University Campus Infrastructure, National University of Singapore
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1. AIM

The aim of this Campus Sorting Guide is to provide the NUS community with regularly updated information on campus recycling. It provides instructive information on:

1. NUS' decision to adopt a segregated mode of recycling instead of the commingled (or mixed) mode;
2. Types of segregated waste streams collected in NUS that are sent for recycling;
3. Where the recyclable materials are sent to for closed loop recycling to minimise environmental and social impacts; and
4. Common FAQs on campus recycling.

1.1 NUS practises segregated recycling collection

NUS adopts a segregated collection system on campus instead of the commingled (or mixed) recycling system to maximise recycling tonnage. This is because a commingled collection system often has high contamination rates[1] making the recycling process difficult and impractical and lowers the chances for our recyclables to be accepted for recycling.

In NUS, the *Recycle Right*[2] bins are placed across the campus to guide NUS staff and students to sort waste and recyclables carefully. A 2022 study conducted by NUS showed that the recycling contamination rate of the plastic PET♺ bottle recycling bins dropped from 60% to 27% with the introduction of the *Recycle Right* bins. A follow-up sample count by Ridge View Residential College students in 2025 revealed that the contamination rate in our *Recycle Right* bins remains low for plastics PET♺ bottles (22%), Cans (9%) and paper/cardboard (4%).

Recycle Right bins on campus are colour coded by streams for easy identification. From Left to right: General waste (grey), PET♺ plastic bottles (light green), HDPE♺ plastic containers (dark green), Cans (yellow), Notes & Cardboard (blue), Glass (orange)

[1] https://www.channelnewsasia.com/commentary/singapore-recycling-blue-bin-fines-incentives-contamination-rubbish-4453731

[2] https://www.nus.edu.sg/zerowaste/recycling-right-with-new-bin-design

NEXT: COMMON WASTE STREAMS →

In back-of-house operations, our cleaners and operators in food and beverage establishments are trained to segregate recyclables like cardboard and food waste. Sorting recyclables in clean and homogenous streams minimises contamination and maximises recycling tonnage.

This is unlike the public commingled recycling collection[3] system for the national household recycling programme with distinctive blue bins, with high contamination rate of 40%[4] and a low domestic recycling rate[5]. Contaminated recyclables are not accepted for recycling by local recycling vendors and are instead sent for incineration and the resultant incinerated ash sent for landfilling in Semakau Landfill.

Segregating clean and homogenous recycling streams is an essential first step to ensure that the recyclables get sent for recycling and that the collective recycling efforts are not wasted. Through day-to-day routines, we strive for a sorting culture in the NUS community.

[3] https://www.nea.gov.sg/our-services/waste-management/3r-programmes-and-resources/national-recycling-programme

[4] https://www.cgs.gov.sg/recycleright/know-your-contaminants/

[5] https://www.straitstimes.com/singapore/domestic-recycling-rate-stalls-at-12-despite-decline-in-household-waste

NEXT: COMMON WASTE STREAMS →

1.2 Sorting for segregated recycling

Collecting recyclables in clean and homogenous streams allows closed loop recycling, towards circularity (processing to a new product with recycled content without compromising material properties) which minimises waste generation and pollution to the environment.

NUS collects the following key recycling streams that are frequently generated by NUS community through day-to-day disposal needs and back-of-house operations. To ensure that our recyclables are processed, only materials that are clean and homogenous with downstream demand by the recycling industry partners are collected.

Types of Waste Streams Collected And Not Collected for Recycling on NUS campus

NEXT: COMMON WASTE STREAMS →

1.3 Responsible end-of-life management of plastic and food waste recycling streams

Going beyond campus grounds, NUS takes the extra step to ensure our recyclables are managed responsibly by established recycling contractors to minimise downstream negative environmental and social impact of their recycling operations.

Plastic materials (PET♳ and HDPE♳) collected for recycling consists of 5%[6] of total campus waste. Due to the initial difficulty in tracing where recyclables are sent to beyond Singapore, student representatives from the NUS Zero Waste Taskforce placed trackers in plastic bottles (PET♳ and HDPE♳) on Kent Ridge campus. They discovered that the plastic bottles were transported to an industrial area in Malacca, Malaysia. The Taskforce assessed that the bottles were likely processed in facilities with basic environmental controls. To improve the downstream management of PET♳ recyclables, the Taskforce diverted our PET♳ bottles to Hiroyuki Industries, an established recycling contractor, to be processed as rPET♳ resins, after visiting Hiroyuki's processing facilities in Johor Bahru, Malaysia to verify how PET♳ bottles go through a rigorous multi-step processing line (with certification such as Global Recycled Standard) to clean, sort, shred to make food grade rPET♳ resins to become new drink bottles again.

For other plastic types (HDPE♳, LDPE♳ & PP♳), we will be collaborating with industry and academic partners to test bituminous plastic mix for road paving on campus while ensuring the materials' structural integrity, safety and environmental performance.

Trackers placed in plastic bottles on campus travelled beyond Singapore and ended up in Malaysia.

[6] Based on waste composition studies conducted between 2022 and 2024 at student residences, canteens and administrative buildings.

NEXT: COMMON WASTE STREAMS →

Food waste collected from canteens, food courts and dining halls on campus is another key waste stream, consisting about 29%[6] of total campus waste. Food waste collected on campus is transported to three onsite aerobic digestors to be turned into compost for campus landscaping. Towards closing the food waste loop, we are working with Life Lab Resources to convert food waste into high calorific substrate through a food waste valorisation system that can be processed to make aquaculture feed.

NEXT: COMMON WASTE STREAMS →

2. COMMON WASTE STREAMS COLLECTED ON CAMPUS FOR RECYCLING

Click to find out more about each material and how it is recycled or reused.

2.1 PAPER

Flatten first to reduce volume

Collected

Cardboard boxes, printed documents, books, magazines and newspapers.

Why?

Paper recycling is a mature industry where paper mill recycling involves breaking down plant fibres, primarily cellulose, into pulp to form new paper products.

Not Collected

Dirty paper items contaminated with liquid or food stains e.g. used paper napkins, wet/oily cardboard, compound paper materials such as used beverage cartons (UBC), e.g. Tetra Pak.

Why not?

The oil and food stains can affect the chemical pulping process in the paper mill.

While Tetra Pak is technically recyclable, the volume is small on campus and requires recycling processing in dedicated facilities. Hence, UBC recycling is assessed as not viable for collection.

IF IN DOUBT, THROW AWAY

How is this material collected and recycled?

1. Collected at **Recycle Right bins** on campus before consolidation at bin centres for pick up by recycling vendor, Orange Enviro.

2. Transported to **Asia Recycling Resources** facility for further consolidation and baling before exporting overseas.

3. Recycled at **Muda Paper Mills** (Malaysia) to be processed into recycled paper products such as carton boxes, wrappers and paper bags.

← **BACK:** COMMON WASTE STREAMS

2.2 PLASTIC – PET♺

Polyethylene Terephthalate

Empty and rinse first to keep pest-free

Collected

Clean and rinsed beverage bottles, typically in 500ml or 1.5 litre size, with an imprinted PET♺ label.

Why?

Homogenous plastic type ensures consistency in material properties to meet the high standards of food grade rPET♺ processing.

PET♺ fruit packaging not collected due to variation in material grading.

Not Collected

All plastics items that are not bottles, including items with PET♺ labels.

IF IN DOUBT THROW AWAY

How is this material collected and recycled?

1. Collected at **Recycle Right bins** on campus before consolidation at bin centres for pick up by recycling vendor.

2. Transported to **Sembwaste** facility for consolidation and baling before exporting to Malaysia.

3. Arrive at **Hiroyuki Industries** (Johor Bahru, Malaysia) for multi steps processing including shredding, cleaning, melting, extruding, testing, to turn PET♺ bottles into food grade rPET♺ resins.

4. The rPET♺ resins are sent to **manufacturers** locally or overseas to make bottles for beverage companies.

← **BACK:** COMMON WASTE STREAMS

2.3 PLASTIC – HDPE♳

High-Density Polyethylene

Collected

Empty packaging for toiletries e.g. shampoo, soap, detergent with HDPE♳ label.

Why?

Homogenous plastic type ensures consistency in material properties in the composition of the bituminous mix produced for road paving.

Not Collected

All plastics items without HDPE♳ labels, and cosmetics containers with glass and/or plastic lids.

Why not?

Glass bottles should be sorted and placed in the glass recycling bin. Metallic looking caps are typically made of mixed plastics and should be placed in the waste bin.

IF IN DOUBT THROW AWAY

How is this material collected and recycled?

1. Collected at ***Recycle Right*** **bins at residential housing** before consolidation at bin centres for pick up by recycling vendor.

2. Transported to **Magorium** facility in Singapore to be shredded and processed into bituminous mix for road works.

3. Sent back to **campus** for scheduled road paving works.

What about other plastic types?

Besides HDPE♳ bottles, lab packaging and consumables made of LDPE♳ and PP♳ are collected and sent to Magorium to make bituminous mix for road paving. LDPE♳ (Low-Density Polyethylene) and PP♳ (Polypropylene) are not collected across the campus as these materials have low market demand or are often contaminated with food waste.

Clean lab packaging such as pipette containers and bubble wrap

← **BACK:** COMMON WASTE STREAMS

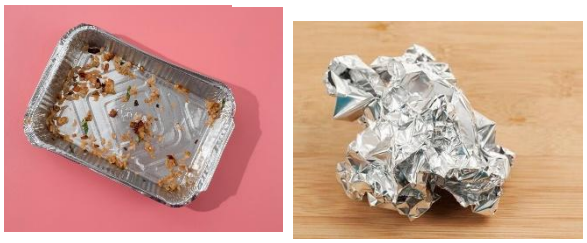
2.4 METAL

Collected

Clean and rinsed aluminium drink cans and tin drink or food cans.

Why?

Homogenous metal type to ensure consistency and purity for processing into ingots for manufacturing.



Not Collected

Aluminium food tray and foil that have been contaminated by food waste.

IF IN DOUBT THROW AWAY

How is this material collected and recycled?

1. Collected at ***Recycle Right* bins** on campus before consolidation at bin centres for pick up by recycling vendor.

2. Transported to **Asia Recycling Resources** facility for sorting to aluminium and tins, and further consolidation before baling for exporting overseas.

3. Exported to **countries such as Korea** to be melted and cast as ingots before being sold to manufacturers for automotive production, beverage cans, or construction materials.

← **BACK:** COMMON WASTE STREAMS

2.5 GLASS

Empty and rinse first to keep pest-free

Collected

Clean and rinsed glass bottles or containers typically used for food or cosmetics packaging, with lids and caps removed.

Why?

Metal caps and lids should be sorted and placed in the Cans bin instead.

Not Collected

Pyrex or Borosilicate glass which are used for kitchen / oven or laboratory / chemical use.

Why not?

These glass materials have additives to withstand extreme temperature changes and higher melting points, which are different from typical glass materials.

IF IN DOUBT THROW AWAY

How is this material collected and recycled?

1. Collected at ***Recycle Right bins*** **at residential housing** before consolidation at bin centres for pick up by recycling vendor.

2. Transported to **P&R Resource Management** facility in Singapore for consolidation before overseas export.

3. Exported to **Johor Bahru plant** to be crushed and melted in furnace to produce new glass items.

← **BACK:** COMMON WASTE STREAMS

2.6 TEXTILE

For reuse

Collected

Clean clothes, towels or bedsheets without tears or stains

Why?

The textiles are exported for reuse overseas. Worn or damaged textile will be disposed and not be processed further.

Not Collected

Household items such as floor mat, laundry basket and duvet are not collected as textile. If these items are in good condition, consider to gift or resell on uNivUS Marketplace, InfiniUse or other similar platforms.

IF IN DOUBT THROW AWAY

How is this material collected and processed?

1. Collected at **Cloop Bin** along UTR walkway at UTown.

2. Exported to **Life Line Clothing** facility (Malaysia) for further sorting and reuse or exported internationally.

During end-of-semester hostel checkout:

1. Collected at **Checkout Collection Drive** in all colleges, halls and Prince George's Park Residence.

2. Transported to **SNI Trading facility** in Singapore for further sorting and reuse domestically or export

← **BACK:** COMMON WASTE STREAMS

2.7 E-WASTE

Collected

Regulated e-waste which includes Laptop, Desktop PC, Mouse & Keyboard, household battery, lithium-ion battery

Why?

ALBA E-Waste Smart Recycling Pte Ltd, has been appointed by National Environment Agency (NEA) as the Producer Responsibility Scheme operator to collect regulated e-waste for proper treatment and recycling.

Not Collected

Non-regulated e-Waste which includes household appliances such as microwave, toaster, cleaning robot are not collected by ALBA E-Waste.

Reuse them if is still in working condition. Alternatively, refer to NEA E-waste page for other types of e-waste bins that accept household appliances.

E-waste should not be thrown into general waste or other recycling bins as they contain metals which are toxic to the environment.

IF IN DOUBT, CHECK WITH US

How is this material collected and recycled?

1. Collected through **ALBA STEP-UP app** (for departments) or at **ALBA E-waste Bin** located at:

- Faculty of Science (outside LT27)

- Central Library Forum and

- Along UTR walkway at UTown

-College of Design & Engineering (Blk E4, outside LT6)

2. Transported to **ALBA E-Waste Sorting & Logistic Hub** in Singapore to be categorised before redistribution to other local facilities to further sort and process.

3. Arrive at **local facilities like EWR2 in Tuas**, which takes apart components, harvest precious metals and recover non-renewable minerals such as Lithium, commonly found in batteries of electronic devices.

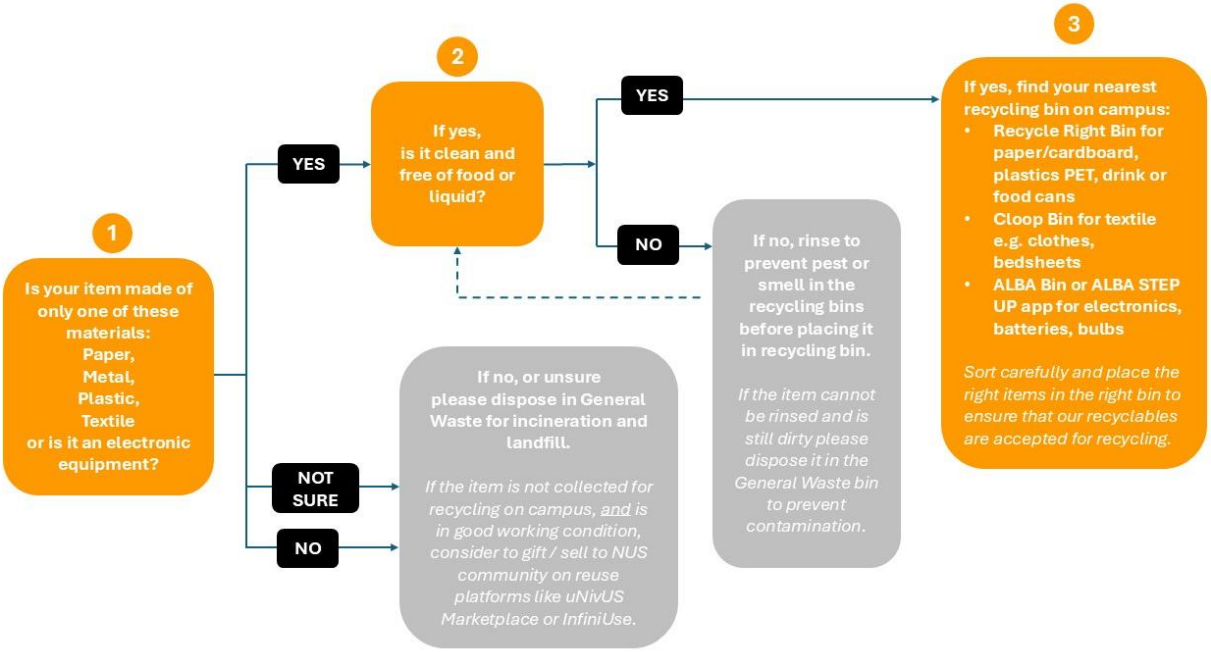
Prior to processing, hard disks and memory devices will go through a crusher that uses heat and friction to destroy stored data.

Want to find out more? Watch the e-waste recycling process filmed by The Straits Times here.

← **BACK:** COMMON WASTE STREAMS

3. FREQUENTLY ASKED QUESTIONS (FAQ)

Q1. I have an unwanted item but am not sure if it can be recycled.



Q2. Why are items such as Used Beverage Containers (e.g. Tetra Pak) not collected on campus?

There are several criteria we consider when deciding whether an item or material can be collected for recycling:

- **Quantity generated on campus:**
  Materials that are generated in large quantities on a frequent basis (e.g. paper, PET♺ bottles) are collected by appointed vendors for processing in local or overseas facilities. In comparison, UBC are generated in small quantities on campus thus logistically challenging to accumulate enough quantity or costly to transport small amounts for processing.
- **Whether it can be separated into homogenous materials:**
  Recycling requires single-stream collection for efficient processing. UBC consists of layers of paper, aluminium and plastics that are not easily separable thus can only be processed in specialised facilities, adding to the logistical challenge and cost for processing.
- **Whether by-product have market value and/or useful applications:**
  UBC has poor market value and is only collected by dedicated producer to downcycle into Polyal – a mixture of plastic and aluminium, with limited options for downstream manufacturers to make useful products.

Q3. Where do I find information on waste and recycling statistics?

In FY2023, we diverted 1,429 tonnes of recyclables and reusable materials from the general waste stream, including 138 tonnes of packaging materials (Paper/cardboard, Plastic bottles, Metal cans, Glass), 110 tonnes of food waste, 1,105 tonnes of horticulture waste, 65 tonnes of E-waste and 12 tonnes of textile waste.

More information is available on our Campus Sustainability Disclosure webpage.

Q4. My office generates large quantity of confidential papers and laptops to be decommissioned, where do I send them?

Departments can request for booking using ALBA Step-Up app for door step collection, you can refer to this user guide for the set up. Note the minimum quantity for the request:

- Confidential papers: At least 6 printing paper boxes worth of confidential papers
- E-waste: 20 pieces of info comms equipment (excluding accessories such as cables, mouse or keyboard). For more info, visit link.

There is no charge for NUS staff to utilise this service.

Q5. My office has unwanted furniture, where can I donate or dispose them?

If the furniture is in good condition, you may post on uNivUS Marketplace app to donate or sell to NUS colleagues or students. This platform is only accessible within NUS community.

For large items or furniture that are damaged and require disposal, please write to maintenance.nus.edu.sg for assistance.

If you have other queries on recycling on campus, please email zerowaste@nus.edu.sg