JG AFRIKA
EXPERIENCE QUALITY INTEGRITY

# STELLENBOSCH UNIVERSITY
# ZERO WASTE TO LANDFILL JOURNEY STRATEGY

## Addressing general waste and packaging materials

**November 2020**

UNIVERSITEIT
STELLENBOSCH
UNIVERSITY


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# 1 INTRODUCTION AND BACKGROUND

JG Afrika and Circular Vision have been appointed by Stellenbosch University (SU) to develop a Waste Management Strategy to assist the University achieve a zero waste to landfill target.

Stellenbosch University have developed Vision 2040 and a strategic Framework 2019 – 2024 which has the following core strategic themes:

- A thriving Stellenbosch University
- A Transformative Student Experience
- Purposeful Partnerships and Inclusive Networks
- Networked and Collaborative Teaching and Learning
- Research for Impact
- Employer of Choice

Stellenbosch University is committed to having a positive impact through outstanding environmentally sustainable performance and have developed an Environmental Sustainability Plan which details the ambitious aims in addressing this huge challenge.

The plan details the guiding principles, targets and priority actions for the period 2019–2024 and supports the SU's Vision 2040. To remain relevant in the dynamic global environmental arena, this plan acts to highlight SU's performance that can be benchmarked against peer institutions nationally and internationally.

In order to set a realistic target of when a zero to landfill target can be reached and what actions are required to achieve it, a Zero Waste Strategy is required.

The intention of the Waste Management Strategy is to address waste materials on campus as holistically as possible and from a circular perspective. The Strategy therefore includes a high-level overview and comment on waste management systems and logistics, potential costs of proposed solutions and interventions, as well as potential impacts of solutions, projects the University's efforts to address climate change by lowering their carbon and reducing their carbon footprint.

The University has acknowledged that improved material handling and operational systems will also result in a decrease in greenhouse gas emissions.

## 1.1 Purpose

The purpose of this report is to provide the overall strategy for the University, starting with general waste materials. It provides the guidelines, specifications and other requirements for general waste management on site.

It is important to include the users of the campus into the strategy, including:

- Students
- Staff
- Contractors
- Vendors and suppliers, and
- Tenants.

Stellenbosch University has a population of 35 219[1] (31 765 students and 3454 staff) spread across 3 campus', the main campus in Stellenbosch, Tygerberg, Bellville Park and Worcester.

The facility types on the main campus include administration buildings, academic buildings, sports facilities, women's residences, men's residences, mixed residences, university flats and houses, a cafeteria and cluster hubs. The Tygerberg campus houses SUN's Faculty of Medicine and Health Science and comprises academic buildings, sports and recreation facilities, a women's residence and mixed residences. The Bellville Park campus houses the SUN Business School.

## 2 WHAT IS SU DOING?

The following has been undertaken as part of the development of this Strategy:

- Baseline Assessment of waste generated on site and associated infrastructure (2019)
- Waste management survey
- Working with students, staff and suppliers to develop a Zero Waste to Landfill Strategy 2019-2020
- Working with the Neelsie and vendors to increase diversion rates.
- Implementation of the Zero waste to landfill strategy starting 2020.

Future initiatives:

- Construction and demolition waste
- Chemical / hazardous waste

Stellenbosch University aims to achieve the following waste targets within the next 5 years and continuously work towards Zero thereafter:

- 20% reduction of waste based on a 2018 baseline
- 80% diversion of general waste from landfill
- 95% diversion of food waste from landfill
- 100% sorting of general waste.

Zero waste systems prevent pollution and avoid costs associated with landfill disposal. It also reduces carbon emissions by diverting discarded materials from methane-generating landfills and avoiding carbon emissions associated with extracting, processing, and transporting raw materials and waste. By implementing a Zero Waste Campus approach, Stellenbosch University will significantly decrease the University's impact on environment.

[1] Statistics based on Stellenbosch University June 2018 Census data

## 3 TRAINING, CAPACITY BUILDING AND ONGOING COMMUNICATION

Successful implementation of a Zero Waste to Landfill Strategy will require training and capacity building of all users of the campus on an ongoing basis. New students and staff enter the campus every year, therefore an induction or starter pack including the requirements for the management of materials on site will be required.

The University does have a Sustainability Page on the Website; however, this page should be located on the landing page to gain more prominence. A student portal is also used extensively by students, referred to as "My SUN" and this is also an additional place to include valuable information about how the waste management system works on campus.

The first training / capacity building workshop took place in January 2020 and entailed the fundamentals of the intention of the Strategy, why it is important and what each person on campus can do to minimise their waste footprint. This document will form the basis of the training.

In parallel to the training, ongoing communication will be implemented in terms of signage, newsletters and social media in order to fulfil a consistent message.

## 4 REDUCE, REUSE, REFILL, REPAIR

The University understands that waste reduction will help preserve resources and that the implementation of circular economy thinking will have cascading benefits, both upstream and downstream, through the type of products chosen and the waste diverted.

To manage waste, SU currently follows the waste hierarchy of prevention, reduction/minimisation, reuse, recycling, beneficiation, and the least preferred option of responsible disposal.

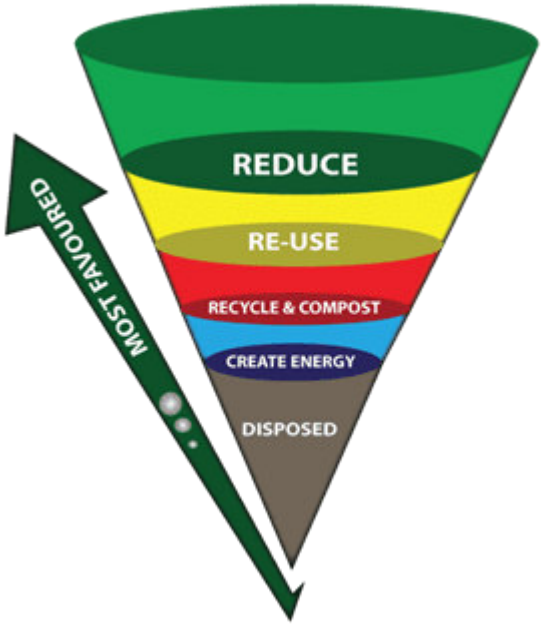


*Figure 1: "Traditional" Waste Management Hierarchy. Source: Department of Environmental Affairs, 2017*

However, the waste hierarchy is based on end-of-life options rather than the full environmental impacts considered across the life cycle, and often does not account for the context in which waste management decisions take place. For example, recycling cannot take place unless recycling schemes exist or the material is recyclable, and even then, it may not be possible if recycled materials are contaminated or materials are often downcycled/reduced in value or function.

Figure 2 from New Zealand's "*Rethinking Plastics in Aotearoa" Report* provides an updated and revised Waste Hierarchy with 6 R's which they refer to as **r**ethink, **r**efuse, **r**eplace, **r**educe, **r**euse and **r**ecycle as the framework to guide rethinking plastics and reducing waste generation in the first place. It focusses primarily on avoidance before it considers diversion. New Zealand is using this to challenge themselves to innovate, create new materials and new ways of using them, and develop new business models.

This is the approach that is recommended for SU in implementing their Zero Waste to Landfill journey.

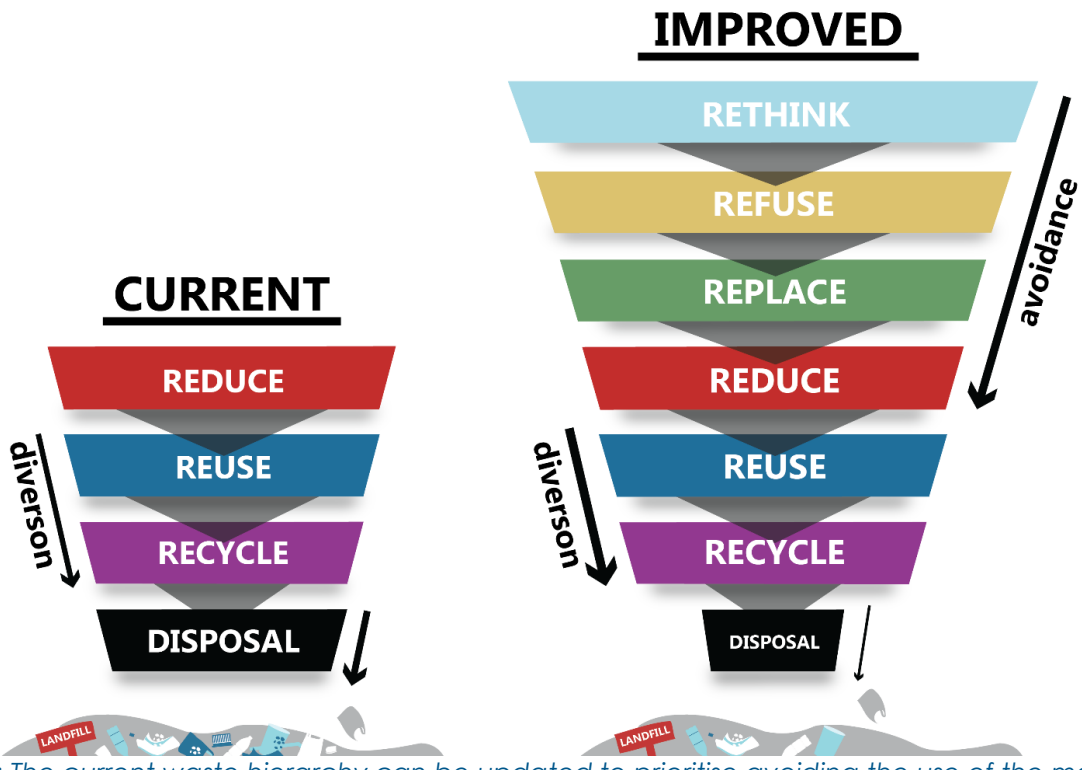


*Figure 2: The current waste hierarchy can be updated to prioritise avoiding the use of the material if feasible Source: Rethinking Plastics in Aotearoa, New Zealand, 2019*

## 4.1 Students and staff

Prioritise Reusables: Reusables are the environmentally preferable foodware and beverage option and each organization should start by carefully assessing the viability of reusables for their foodware and beverage needs. Transitioning to reusable options provides the opportunity to save money, reduce waste, limit impact on the environment and protect public health. The following reusable items are recommended:

- Bottles, bags, cups, cutlery, food container – throughout campus
- Water bottle refill stations: Refill stations are provided in all academic buildings across campus to make it easy for students and employees to refill reusable bottles.
- The provision of one functional tap in bathrooms to wash reusable items; or wash stations – within campus buildings and the Neelsie and other vending areas.

Single use items should be minimised as much as possible; however, there may be instances where this is not the best option, then alternatives should be on offer at an additional cost, including:

- Signage should state that no plastic straws are allowed on campus and should a drinking straws be sold that it can only be made of paper or bioplastic,[2] - Should a single use straw be requested, then a cost will be applied to purchase one. SU requires vendors and service providers to only procure paper straws; however, each of these will be for the users account and not supplied free of charge.
- Cutlery:
  - Reusable, washable conventional cutlery to be supplied.
  - Where not possible and disposable items are required, wooden disposable compostable cutlery is available at an additional charge to users across campus. Only wooden (compostable) cutlery may be used
- As with straws and cutlery above, using a disposable cup will be an additional charge.
- 2-sided printing: All centrally managed printers on campus are set to default to double-sided printing to reduce paper waste.

Future / phased in initiatives will include:

- Eco-Container: Reusable takeout containers will be phased in to encourage reuse as opposed to disposable takeout containers. Students can bring their own or purchase reusable containers from participating vendors.
- Reusable and returnable cup systems such as Recup[3]
- Reusable crockery and cutlery is preferred and students and staff are encouraged to sit-in and enjoy their meals.

## 4.2 On campus sharing platform

Further future initiatives will include alternative options for students based in residences in terms of:

- Moving in and moving out – system for students regarding renting / leasing appliances for the year / duration of their stay as opposed to purchasing new items and the associated waste (i.e. boxes, polystyrene, other packaging) etc
- Repair services linked to the rental / leasing options for appliances
- Storage services – including box rental for the moving in and out over holiday periods
- Surplus sales and Clothing exchange networks/platforms (online marketplace - "zero waste network exchange")

[2] *With the appropriate certification logo for the product - Choose BPI-Certified or DINCERTO compostable products that do NOT contain fluorinated additives. Confirm that these particular products will be accepted at the composting facility you are planning to use.*

[3] https://recup.co.za/

A smartphone application could be developed as a platform to allow the above to take place.

### 4.3 Specifications – procurement for suppliers / vendors

A Materials and Standards document has been developed that provides the specifications for the procurement of office suppliers and other consumables on campus.

Certain items will be banned including items that are difficult to reuse and recycle, e.g. polystyrene.

### 4.4 Specifications – Events / Conferences

A Materials and Standards document has been developed and provides the specifications as a guideline for Sporting facilities; Conferences and Events that will provide an easy reference for how to implement a zero waste event. In addition, the Municipality also have a municipal events guide which should be adhered to.

- The use of certain items will be discouraged/banned including items that are difficult to reuse and recycle, e.g. polystyrene.
- Reuse options will be preferred wherever possible or where they can be phased in.
- If compostables are offered these would need to have certification in terms of the claims being made and a confirmed off take for composting / processing
- Vendors need to abide by the specifications for their specific event
- Recycling Stations like those used on campus would be set up and provided
- Zero waste ambassadors – front of house (engagement with exhibitors as well as attendees) who can assist with waste disposal, and guidance etc. A list of frequently asked question can be developed.
- Sorters and data capturers – back of house to capture waste type and volume collected and where it will be recycled/composted.
- List of preferred off-takers for the materials (i.e. a waste management service provider or multiple service providers)
- Reporting of waste diversion should include $CO_2$ emissions equivalent reduction from this type of intervention

## 5 MATERIALS MANAGEMENT ON SITE

Materials will need to be managed on site in terms of collection, transportation, sorting and processing. There are various methods on site being practiced and standardisation is required, and additional monitoring protocols implemented.

**Bin numbering** is important to ensure that the bin sets are:

- geo-located,
- use and servicing can be monitored,
- complaints can be tracked and followed up, and
- additional bins allocated to or removed from an area.

Cleaning and servicing of the bins will need to be tracked which will require additional training of the cleaning and waste management staff and potentially additional hard and software implemented.

A bin numbering system has been proposed and in future, this could be linked to a Radio Frequency Identification (RFID) (or similar) and each time a bin is emptied, it would need to be logged which can then be monitored by a centralised system.

## 5.1 Internal bins

Internal bins refer to all receptacles used to collect materials within buildings on campus. A three-bin recycling station system is required, i.e.:

- Recyclable
- Food/Compost
- Landfill

### 5.1.1 Specification

- Powder-coated steel monochrome compartmentalised units (measure approx. 950mm long x 345mm wide x 800mm high); 85 litre capacity per compartment
- 1 x clear bag to be used in each compartment
- Number bins, e.g. I01; I02 ("I" for Internal + Number) for the whole unit.
- RFID tags to be implemented in future.
- Bins are to be clearly labelled and have associated posters above each compartment of the recycling station (see Figure 4)


*Figure 3: Internal bin units*


*Figure 4: Bin Posters / Signage* ***(note: To be finalised)***

### 5.1.2 Placement

- Internal waste bins must be grouped together into "recycling stations"
- Allowance must be made in the design for space in corridors, large teaching spaces and multiple occupancy offices for a recycling station.
- Desk side bins in offices should be removed and not be provided.
- Placement of containers in corridors and communal areas is encouraged, but fire escape routes and safety areas need to be taken in consideration.

*Table 1: Breakdown of bin placement per use/area*

| Occupancy Type | Bin arrangement | Total Capacity Required | Location Notes |
|---|---|---|---|
| Individual offices, small multiple occupancy offices, break out areas or meeting rooms | Recycling Station: monochrome steel 3 compartments:<br>• Recyclable<br>• Food/Compost<br>• Landfill | | To be placed in corridors outside of offices to serve multiple rooms. |
| Print rooms | Designated paper and cardboard container | 1 x 100 litre | To be placed within room, ideally adjacent to printer. |
| Staff kitchenettes and common rooms | Recycling Station: monochrome steel 3 compartments:<br>• Recyclable<br>• Food/Compost<br>• Landfill | Standard size<br>OR<br>30 litre container per material stream | To be placed within the kitchen / kitchenette. If the area is too small for the standard size, then smaller units can be used for the 3 material streams. |
| High traffic foyer areas (e.g. adjacent to large lecture theatres or cafes) | Recycling Station: monochrome steel 3 compartments:<br>• Recyclable<br>• Food/Compost<br>• Landfill | | |
| Catering – café; canteens etc (seating areas) | Recycling Station: monochrome steel 3 compartments:<br>• Recyclable<br>• Food/Compost<br>• Landfill | | |
| Residences (Main areas; common areas; dining halls and kitchenettes) | Recycling Station: monochrome steel 3 compartments:<br>• Recyclable<br>• Food/Compost<br>• Landfill | | Bins for kitchenettes to be placed within the kitchenette. If the area is too small for the standard size, then smaller units can be used for the 3 material streams. |
| Residences (student room) | | 1 x 50 litre recyclables bin<br>1 x 10 litre food waste bin | Recycling stations should be placed on each floor with access for students. If this is the case, maybe a food waste bin may not be necessary in the student rooms.<br>Good and ongoing communication will be required for this to be successful. |

| Occupancy Type | Bin arrangement | Total Capacity Required | Location Notes |
|---|---|---|---|
| Catering – food preparation areas | Recycling Station:<br>1 x 240 litre wheelie bin for recyclables<br>1 x 120 litre **BLUE** wheelie bin for food waste<br>1 x 120 litre wheelie for landfill | | Note: **Blue** food bin is an exception for back of house Neelsie food waste bins |

## 5.2 External bins

The external bins consist of a set of 3 individual concrete bins for each category of waste. When numbering these external bins, it may be necessary to number each bin associated with the category as there may be a need to have an additional bin category in certain areas of campus.

Number the bins, e.g.:

- E01R – External+Number+Category Recyclable
- E01F – External+Number+Category Food
- E01L – External+Number+Category Landfill


*Figure 5: External Bins*

*Figure 6: Examples of lids for the concrete bins*

## 5.3 Signage

The signage has been redesigned and developed with actual photographs for items for disposal, see Figure 4.

Signage will need to be reviewed and updated from time to time, if diversion and disposal options change. Some items have been included that may not necessarily be sold or available on campus but which may be brought on to campus by students, visitors or faculty members.

## 5.4 Cleaning company and services

A cleaning company is appointed to service the internal bins (i.e. bins within the buildings) and the appointed waste management company services the external bins on campus.

Internal bins are checked daily and if full are emptied. Materials are kept within their respective streams (i.e. recyclables, food waste and general (landfill) waste). The materials will then be taken to the refuse room and the recyclables further sorted by the waste management company into main streams:

- Plastic
- Paper
- Glass
- Metal

These materials are then transported to the City of Cape Town's Kraaifontein Materials Recovery Facility where they are further sorted, baled and sold to recyclers.

Food waste is temporarily stored in the refuse room and transported off site daily to treatment facilities including:

- The Stellenbosch University's compost facility, and / or
- Agriprotein

General waste is transported off site to the nearest landfill facility. As the Stellenbosch Municipality's landfill is full, the waste will be transported to the Vissershok Landfill site (City of Cape Town or Private Facility).

## 5.5 Waste management service provider

The Stellenbosch University appoints a general waste management service provider on a contract basis for 5 years. The current service provider is WastePlan.

WastePlan are required to:

- collect and transport waste on a daily basis
- monitor, record and provide accurate feedback in terms of the amount and type and safe disposal certificates for:
  - recyclables,
  - food waste, and
  - residual (general waste).
- Maintain the refuse rooms.

### 5.6 Composting facility

A long-term recommendation is that the SU composting facility should be upgraded. The facility is not effectively producing compost and the quality is uncertain due to the lengthy composting period. Currently there is no financial capacity to turn windrows more frequently and the compost is not being re-used on the University grounds. The University therefore buys compost for landscaping purposes. Future contracts with the landscaping contractor should stipulate composting expertise to take all organic matter collected on the grounds as a result of landscaping maintenance for composting. Alternatively, a separate contractor could be appointed to manage the composting area on behalf of SU.

### 5.7 Centralised Material Recovery Facility (MRF)

A centralised MRF should be implemented either in collaboration with the Stellenbosch Municipality or as a stand-alone operation for the University's use. This will ensure that recyclables are processed close to the university and lower the logistics / transport cost and the related Carbon Emissions. A full costing and regulatory assessment would need to be undertaken to assess the full feasibility of this option including the necessary infrastructure requirements to operate a MRF.

### 5.8 (Green/Sustainable) Procurement Policy

It is recommended that SU develop a Procurement Policy that addresses sustainability issues around all items purchased for use by SU.

> *Green procurement is defined as the selection of products and services that minimise environmental impacts throughout their life-cycle, from extraction of the raw materials, to the manufacturing of the product and its' packaging, to the distribution, use and disposal. The environmental considerations that need to be taken into account include, amongst other things, the reduction of pollution, improved energy and resource efficiency, reduction of waste and toxic and hazardous materials (United Nations Department of Economic and Social Affairs, 2008).*

Green Procurement aims to encourage:

- The use of alternatives and substitutes for hazardous and toxic products and/or ingredients.
- The replacement of products that result in problematic waste when their useful end of life is reached.
- Resource efficiency of:
    - raw materials,
    - energy and water consumption during the manufacturing process,
    - energy use during distribution,
    - energy and water use during the operations of the product.
- Minimising waste produced throughout the life-cycle.
- Locally produced and sourced items.

SU should revise their Procurement Policy to incorporate "green" or environmental criteria to guide their purchasing of stock items as well as other goods and services.

When evaluating new products and potentially changing others, the following generic green/sustainability procurement selection criteria could be considered:

- Reducing virgin material in products and specifically packaging;
- Ensuring the highest possible recycled material content of products and packaging;
- Minimising waste during the manufacturing process;
- Minimising energy consumption during manufacture and operation/use of the item (this could include an energy efficiency rating);
- Minimising and managing the greenhouse gas emissions created during manufacturing, delivery, operation and disposal;
- Minimising the use of hazardous substances;
- Encouraging the use of environmentally certified suppliers (e.g. ISO 14000, Forest Stewardship Council, Energy Star etc.);
- Encouraging the repairability and re-usability of items;
- Promoting recyclability;
- Promoting low maintenance requirements;
- Enquiring about take-back systems and product life-expectancy;
- Ensuring environmentally friendly and legal disposal methods;
- Source stock items locally (100km), then regionally (700km), nationally (2000km), or from elsewhere on the continent (3000km).

## 6 COMMUNICATION AND MEDIA

Communication and media cannot be understated in a strategy like this. Strong leadership will be required to assist with the behaviour change required. Apart from bold leadership from the university management; student leadership bodies will be called upon to support the strategy going forward.

A call for student action needs to inform the students how they can get involved and assist and the call needs to be diversified enough to ensure even those students that are not interested in environmental causes or waste minimisation, are part of the initiative.

Initiatives to get students and staff interested includes a campaign about "knowing where it goes". Many people are not aware of where waste goes, how it is treated and what the potential impacts are. Far from being a scare campaign, it would be aimed at informing and then providing alternatives.

The SU Website will need to provide additional links for more information as well as how to do things differently and also provide a dashboard for waste diversion and feedback on performance. A list of frequently asked questions (FAQs) would also provide the necessary information.

# 7 TIMEFRAMES

## 7.1 TARGETS included in the SU Sustainability Plan

01
80% GENERAL WASTE DIVERTED FROM LANDFILL

02
100% SORTING OF ALL GENERAL WASTE

03
95% FOOD WASTE DIVERSION FROM LANDFILL

04
20% REDUCTION IN WASTE COMPARED TO 2018 BASELINE

## ACTIONS

| Waste projects | | Year | | | | |
|---|---|---|---|---|---|---|
| | | 2019 | 2020 | 2021 | 2022 | 2023 |
| Develop a baseline and streamline data collection and technology to measure and report on waste | | | | | | |
| Q1 | Validate waste management system | X | X | | | |
| Q2 | Develop a waste reduction and recycling strategy and plan | X | X | | | |
| Infrastructure and investment projects | | | | | | |
| Q3 | Develop an efficient, integrated waste management and logistics system | X | X | | | |
| Q4 | Provide waste separation infrastructure in all required spaces | X | X | | | |
| Q5 | Develop a plan to optimise composting facilities | | X | | | |
| Q6 | Investigate sustainable dining options | | X | | | |
| Q7 | Develop a food waste programme | X | X | | | |
| Q8 | Develop a programme to reuse office furniture and other products | | X | | | |
| Q9 | Introduce a construction waste management plan | X | X | | | |
| Q10 | Divert hazardous, chemical, paper and e-waste streams | X | X | X | | |
| Q11 | Introduce a programme to eliminate single-use plastics | | X | X | X | X |
| | | | | | | |
| Skills development, training and awareness programmes | | | | | | |
| Q13 | Continue with awareness programmes | X | X | X | X | X |
| Q14 | Continue training of all stakeholders | X | X | X | X | X |
| Q15 | Implement zero-waste events process | | X | | | |
| Q16 | Engage with vendors and service providers to reduce waste | X | X | X | X | X |

Future actions that are recommended would include reuse systems on campus to replace takeaway systems and development of the procurement policy.