



Report on

**Waste Audit for**

**The Legislative Council Complex**



Prepared by  
Business Environment Council Limited

商界環保協會有限公司

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## 1. Background and Introduction

Commissioned by the Legislative Council Commission (“the Commission”), Business Environment Council Limited (“BEC”) has conducted a detailed study on the Municipal Solid Waste (“MSW”) generation and waste management practices by the Commission (“the Study”) in May and June 2019. The Study included both quantitative and qualitative analysis on MSW generated from the Legislative Council (“LegCo”) Complex at Tamar, Admiralty. The findings of the Study, particularly the results of on-site waste audits, are summarised in this report.

The key objectives of the Study are:

1. To determine the composition and quantities of waste (including recyclables) disposed of from the LegCo Complex;
2. To review the levels of correct segregation of waste;
3. To identify areas where waste reduction can be improved;
4. To characterise the waste discarded by users of the LegCo Complex and review the effectiveness of the current waste management strategies; and
5. To evaluate the financial implication of the municipal solid waste charging for the Commission.

## 2. Scope of Study

The scope of the Study covered each floor of the LegCo Complex, from LG/F to 10/F, excluding the LegCo Cafeteria. The details of locations included in scope are summarised in Table 1.

*Table 1 – List of each floor of the LegCo Complex included in the Study*

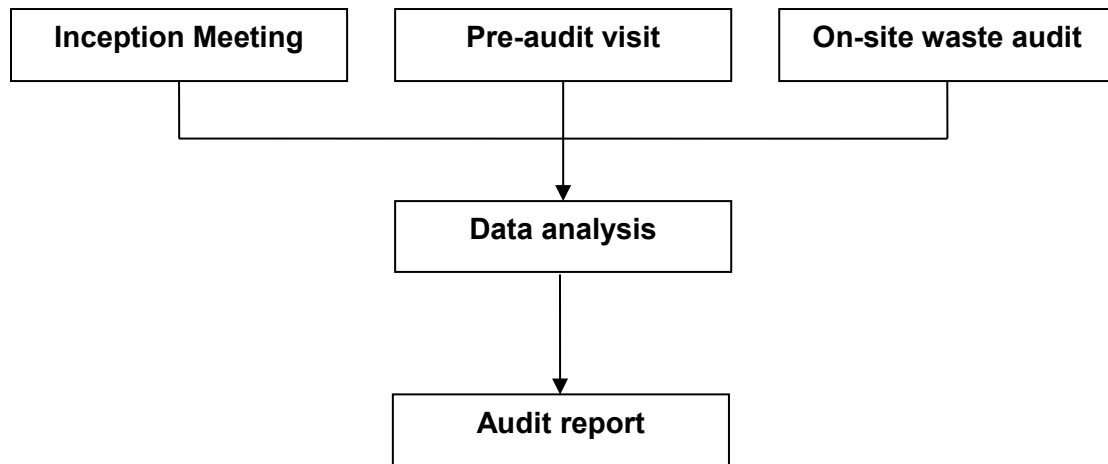
| <i>Location</i>   | <i>Floors</i>  | <i>Facilities</i>   |
|-------------------|----------------|---|
| The LegCo Complex | LG/F           | Car Park  |
|                   | G/F            | Lobby, LegCo Library, public education facilities, LegCo Secretariat's offices, etc.  |
|                   | GM/F           | LegCo Secretariat's offices, store rooms, etc.  |
|                   | 1/F, 1M/F, 2/F | LegCo Chamber, Ante-Chamber, Dining Hall, conference rooms, Technical Rooms, Press Rooms, LegCo Secretariat's offices, Simultaneous Interpretation rooms, Television / Radio rooms, Public Officers' Office, Public Galleries, etc. |
|                   | 3/F – 4/F      | Public Galleries, TV Production Room, Public education facilities, LegCo Secretariat's offices, etc.  |
|                   | 5/F            | Meeting rooms, Roof Garden, Coffee Corner, etc.   |
|                   | 6/F – 10/F     | LegCo Members' offices, meeting rooms, etc.   |

### 3. Methodology

#### 3.1 Study Approach

The approach of the waste audit covered 3 major stages as depicted in Figure 1 shown as below:

*Figure 1 - Approach of the waste audit*



At the outset of the waste audit, an inception meeting and pre-audit visit were arranged on 2 May 2019, for better understanding on the waste collection practices and waste management measures that carried out in the premises. Based on observation during pre-audit visit and discussion during the inception meeting, BEC developed a detailed audit plan agreed by the LegCo Secretariat (“the Secretariat”), to provide a total of 3 waste audit sessions on-site. Both qualitative and quantitative information on waste composition were collected during the on-site waste audit for data analysis and reporting.

### 3.2 Audit Schedule

Based on information provided by the Secretariat, the waste audit sessions for the LegCo Complex within the scope are diverted into 3 types of the premises capacity use, that are full capacity use, half capacity use and minimum capacity use of the LegCo Complex. Each type of the premises capacity use required 1 waste audit session. A total of 3 half-day on-site waste audit sessions were conducted at designated location provided by the Secretariat. The detailed audit schedule was shown in Table 2 below.

*Table 2 – Audit Schedule*

| <b>Date</b>    | <b>Genre of premises capacity use</b>   | <b>Source of waste</b>   | <b>Audit location</b>  |
|----------------|---|--|--|
| 22 May<br>2019 | Full capacity use<br>(Wednesday, with weekly<br>Legislative Council<br>meeting) | LG/F, G/F, GM/F, 1/F,<br>1M/F, 2/F – 10/F (total<br>14 floors) | - On-site waste audit: next to the<br>Refuse Collection Point of the<br>LegCo Complex  |
| 3 June<br>2019 | Half capacity use (Monday,<br>with some Committee<br>meetings)                  |  | - On-site spot check of recycling<br>facilities: G/F, 1/F, 1M/F, 2/F,<br>5/F, 6/F, 9/F |
| 6 June<br>2019 | Minimum capacity use<br>(Thursday, a Council<br>meeting from 9am to<br>2:45pm)  |  |  |

### 3.3 Waste Audit Team

The waste audit team comprised a supervisor (BEC staff) and 4 auditors (contractor employed by BEC) for conducting the field works. Under close on-site supervision of the supervisor, each auditor was assigned to identify, sort and collect his/ her responsible waste category(ies) throughout the audit periods. Adequate personal protective equipment (“PPE”) <sup>1</sup> and guidelines on handling special waste<sup>2</sup> were provided to the members of waste audit team for ensuring their occupational health and safety.



Audit location and waste samples were provided by the Secretariat



Waste audit team conducted waste audit at designated locations provided by the Secretariat

<sup>1</sup> PPE included safety goggles, face masks, gloves, long tongs and closed-toe shoes. First-aid kit was also prepared in case for emergency.

<sup>2</sup> Special waste included but not limited to clinical waste, chemical waste, grease trap waste and waste tyres.

### 3.4 Preparation

#### 3.4.1 Preparation by BEC

Prior to commencement of Study, BEC has conducted and completed the following preparation tasks:

1. Provision of designated labels for the Secretariat to mark and identify sources of waste to be audited. The designated labels contain information of which floor is the waste from;
2. Provision of PPE and required equipment for waste audit, and
3. Communications with the Secretariat and BEC's contractors to ensure smooth implementation of waste audit.



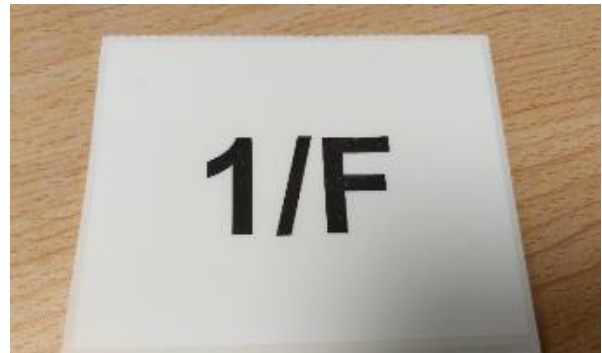
Personal protective equipment (PPE) provided to auditors



Handheld hanging scale and electronic balance used for weighing



Electronic scale used for weighing



Sample of label used in this Study



### 3.4.2 Preparation by the Legislative Council Secretariat

The Secretariat conducted and completed the following preparation tasks for the waste study:

1. Provision of building information for BEC's labels preparation;
2. Assistance of distribution of designated labels to frontline cleaning workers and briefing on how to use the labels on the audit days;
3. Provision of appropriate location for BEC and its contractors to conduct waste audit;
4. Provision of briefing to frontline cleaning workers to collect and send the waste to be audited to designated locations; and
5. Provision of logistic support and guide to BEC staff members and its contractor during waste audit.



Floor labels tagged on refuse bags by the frontline cleaning workers, indicating the floor information of waste for audit

### 3.5 Sampling and Audit Methodology

#### 3.5.1 MSW Weight Measurement and Sorting

Before each session of waste audit, the refuse bags were labelled by the frontline cleaning workers to indicate the floor information of waste. During waste audit, the refuse bags were weighed and recorded with their floor labels. These information were recorded on the Waste Weighing Record Form. Please refer to Appendix A for a sample of the Waste Weighing Record Form.

After measuring the total weight of refuse, refuse bags of the same floor were grouped together for sorting. To facilitate the understanding of waste composition of the LegCo Complex, the waste was sorted according to the waste category listed in Table 3. The sorted waste was then weighed and recorded with their floor labels. These information were recorded on the Waste Sorting Record Form. Please refer to Appendix A for a sample of the Waste Sorting Record Form.

*Table 3 – Waste categories for the on-site waste audit*

| <i>Code</i> | <i>Waste categories</i> | <i>Descriptions</i>  |
|-------------|-------------------------|--|
| R1          | Food waste              | Uncooked / cooked food, leftovers, food debris, etc.   |
| R2          | Paper                   | Newspapers, office paper, corrugated paper packaging, etc.   |
| R3          | Plastics                | Plastics bottles, bags, containers, etc.   |
| R4          | Metals                  | Aluminium can, metal wires, metal containers, etc.   |
| R5          | Glass bottles           | Glass bottles / glass containers   |
| R6          | Reusable items          | Stationery and consumables which can still function/ be used without any damage; clothes and textiles; furniture   |
| R7          | Other recyclables       | Rechargeable batteries, compact fluorescent tubes/ lamps (CFLs), printer toners/ ink cartridges, waste electrical and electronic equipment (WEEE), wood and pallets, yard waste  |
| W1          | Non-recyclable waste I  | Waste can be directly disposed of at landfills (e.g. Contaminated recyclables, broken items, polyfoam, tetra-packs, thermal paper, laminated materials, used tissue paper, used disposable items, non-recyclable batteries)* |
| W2          | Non-recyclable waste II | Waste cannot be directly disposed of at landfills (e.g. clinical waste, chemical waste, construction waste, etc.)**  |

\* During waste audit, once a garbage was identified to be generated from washroom, no sorting was conducted, and all contents within the bag was categorised as W1

\*\* During waste audit, type and weight of W2 identified were marked in detail as remarks

### 3.5.2 Spot Checks of Recycling Facilities

For each session of waste audit, there were also spot checks (inspection) of recycling facilities at selected floors. With the guide provided by the Secretariat, the waste audit team visited different locations of recycling facilities in the LegCo Complex. The recyclables in recycling bins were weighed and inspected, to see if there was any wrongly sorted or uncleaned recyclables inside the recycling bins. Wrongly sorted and unclean recyclables were then separately weighed and recorded. These information were recorded on the Inspection Form. Please refer to Appendix A for a sample of the Inspection Form.

Studied floors included G/F, 1/F, 1M/F, 2/F, 5/F, 6/F and 9/F.



Recycling facilities at the LegCo Complex



Weighing of collected recyclables with the handheld hanging scale

## 4. Results of Waste Audits and Analysis

### 4.1 Waste Performance of Legislative Council Complex in 2018/19

The MSW collected and recyclables collected at the LegCo Complex in 2018/19 is summarised at Table 4. Based on the data on estimated / actual quantity of waste and recyclables collected during the year (provided by the Secretariat), it is estimated that the LegCo Complex generated around 50,883.35 kg of MSW and recovered around 67,484.20 kg of recyclables, achieving a resource recovery rate of 57.01%.

The resource recovery rate was calculated as follows:

$$\text{Resource Recovery Rate} = \left( \frac{\text{Estimated weight of recyclables collected}}{\text{Sum of estimated weight of recyclables \& MSW collected}} \right) \times 100\%$$

The higher the resource recovery rate, the better the premises is performing on recycling and sustainability.

In addition, based on the data provided by the Secretariat, the LegCo Complex was found to generate more MSW during weekdays than during weekends and public holidays, with a ratio of 16:1. Likewise, more newspapers were collected during weekdays than during weekends and public holidays. Based on this data, paper was also found to be the most dominant source of recyclables, contributing to almost 99% of the recyclables recorded in 2018/19, as shown in Figure 2.

### 4.2 Overall Result of Waste Audit

The consolidated waste audit result obtained from the 3 half-day waste audit sessions conducted at the LegCo Complex are presented in Table 5. The results show that the LegCo Complex generated around 235.41 kg, 216.52 kg and 121.76 kg of MSW under the premises capacity use of full use, half use and minimum use, respectively. These indicated a linear trend that the higher the capacity use of the LegCo Complex, the more the MSW was generated.

Based on the waste audit result, an average of 33.95% of recyclables were found amongst the audited waste samples. This is a relatively high amount of recyclables being disposed to landfills. At ideal scenario, if there are good recycling practices practiced by users of the LegCo Complex, there should be a relatively low amount of recyclables able to be identified from the MSW. Therefore, the lower the percentage of recyclables being found in the refuse, the more preferable it is, in terms of resource recycling and sustainability performance. Furthermore, the low amount of recyclables identified in the MSW will also imply that the recyclables are being collected and sorted properly for recycling. Nevertheless, the audit result was only based on a limited sample size of 3 audit sessions, which might not truly reflect the real situation.

Table 4 – Summary of MSW collected and recyclables recovered at the LegCo Complex in 2018/19 (Based on Section 4.1)

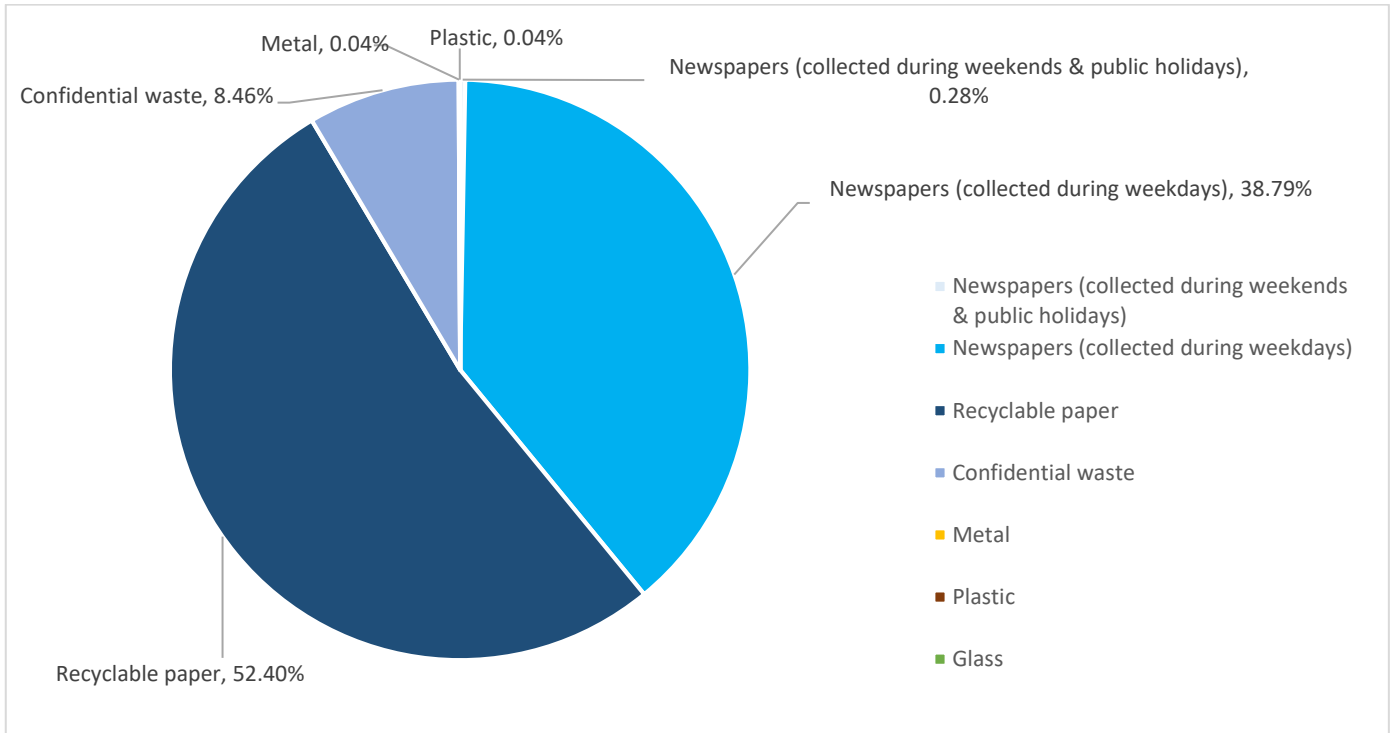
|                   | Month / Year  | Estimated quantity of MSW generated in 2018/19 (kg) [a]          |  | Estimated quantity of recyclables recovered in 2018/19 (kg) [b] |   |                       |                                      |            |              | Resource recovery rate<br>= [b] / [a] + [b] x 100% |            |
|-------------------|---------------|--|--|---|---|-----------------------|--------------------------------------|------------|--------------|--|------------|
|                   |               | General waste (collected during weekends & public holidays) (kg) | General waste (collected during weekdays) (kg) | Newspapers (collected during weekends & public holidays) (kg)   | Newspapers (collected during weekdays) (kg) | Recyclable paper (kg) | Confidential waste <sup>3</sup> (kg) | Metal (kg) | Plastic (kg) |  | Glass (kg) |
| The LegCo Complex | Apr / 2018    | -  | -  | -   | -   | 3,484.00              | -                                    | 12.00      | 6.00         | -  | 57.01%     |
|                   | May / 2018    | -  | -  | -   | -   | 2,591.00              | -                                    | 2.00       | 6.00         | -  |            |
|                   | Jun / 2018    | -  | -  | -   | -   | 2,676.00              | -                                    | 2.00       | 2.00         | -  |            |
|                   | Jul / 2018    | -  | -  | -   | -   | 4,103.00              | -                                    | 2.00       | -            | -  |            |
|                   | Aug / 2018    | -  | -  | -   | -   | 3,391.00              | -                                    | -          | -            | -  |            |
|                   | Sep / 2018    | -  | -  | -   | -   | 3,823.00              | -                                    | -          | -            | -  |            |
|                   | Oct / 2018    | -  | -  | -   | -   | 3,277.00              | -                                    | 6.00       | 2.00         | -  |            |
|                   | Nov / 2018    | -  | -  | -   | -   | 3,415.00              | -                                    | -          | -            | -  |            |
|                   | Dec / 2018    | -  | -  | -   | -   | 2,050.00              | -                                    | -          | -            | -  |            |
|                   | Jan / 2019    | -  | -  | -   | -   | 2,866.00              | -                                    | -          | -            | -  |            |
|                   | Feb / 2019    | -  | -  | -   | -   | 1,325.00              | -                                    | -          | 3.00         | -  |            |
|                   | Mar / 2019    | -  | -  | -   | -   | 2,359.00              | -                                    | 3.00       | 5.00         | -  |            |
|                   | Sub-total (1) |  | 2,973.60                                       | 47,909.75   | 188.40                                      | 26,175.80             | 35,360.00                            | 5,709.00   | 27.00        | 24.00  |            |
| Sub-total (2)     |               | 50,883.35  |  | 67,484.20   |   |                       |                                      |            |              |  |            |

Table 5 – Summary of MSW collected on the waste audit sessions of the LegCo Complex

| The Commission premises | Date of audit sessions | Capacity use | Quantity of non-recyclables in the refuse (kg) | Quantity of recyclables in the refuse (kg) | Sum (kg)            | Total (kg) |
|-------------------------|------------------------|--------------|--|--|---------------------|------------|
| The LegCo Complex       | 22 May 2019            | Full use     | 176.00<br>(74.76%)                             | 59.42<br>(25.24%)                          | 235.41<br>(100.00%) | 573.69     |
|                         | 3 June 2019            | Half use     | 135.30<br>(61.97%)                             | 81.22<br>(38.03%)                          | 216.52<br>(100.00%) |            |
|                         | 6 June 2019            | Minimum use  | 74.79<br>(61.42%)                              | 46.97<br>(38.58%)                          | 121.76<br>(100.00%) |            |

<sup>3</sup> Confidential waste is paper that treated separately with special care to avoid data disclosure.

Figure 2 - Estimated distribution of recyclables recovered in the LegCo Complex in 2018/19



### 4.3 The LegCo Complex at Full Capacity Use

On the waste audit day of the LegCo Complex at full capacity use, around 25.24% (59.42 kg) of recyclables were found in the audited waste samples. On the other hand, there were around 74.76% (176.00 kg) of non-recyclables found in the refuse. Breakdown of the audited waste of the LegCo Complex at full capacity use is described in Figure 3.

From the audited samples, all of the non-recyclable waste were categorised as non-recyclable waste I (W1) (176.00 kg), as no non-recyclable waste II (W2) was identified or collected from the refuse. Common examples of W1 observed during on-site waste audit included used or wet tissue, non-recyclable paper (e.g. laminated materials, receipts, wax paper, etc.) and non-recyclable plastics (e.g. nylon package wrap with an extensive amount of tape, etc.).

For recyclables, food waste (R1) was identified as the dominant source contributing to around 57.96% (34.44 kg) of the recyclables identified. Paper (R2) and plastics (R3) were the second and third highest amount of recyclables, accounting for around 19.15% (11.38 kg) and 10.84% (6.44 kg) of the recyclables, respectively. On the other hand, no glass bottle (R5) and reusable item (R6) were identified during the waste audit session. Distribution of recyclables identified in the audited waste of the LegCo Complex at full capacity use is illustrated in Figure 4.

From the audit result at full capacity use, it was observed that 8/F, 1/F and 10/F were the top 3 sources of waste during full capacity use of the LegCo Complex, generating around 42.72 kg, 24.34 kg and 24.28 kg of MSW on the audit day, respectively. These indicated that LegCo Members' offices, Dining Hall, Ante-Chamber, Press Room, Public Officers' Office, Technical Rooms, SI room, TVR room and Secretariat's offices were the potential top contributors of MSW during full use of capacity of the LegCo Complex. Summary of the waste audit result of the LegCo Complex at full capacity use is provided in Table 6.

During on-site spot checks of recycling facilities, a total of 58.86 kg of recyclables were found in the recycling bins. However, 0.15 kg and 0.35 kg of the recyclables were found being contaminated and wrongly sorted, respectively. Examples of contaminated recyclables found during spot checks include unwashed/unclean metal beverage cans, unwashed/uncleaned coffee cans and unwashed/uncleaned beverage plastic bottles. While, examples of wrongly sorted recyclables include paper cups, laminated materials, tissue paper and paper bags being placed in the paper recycling bin. Summary of the spot checks of recycling facilities of the LegCo Complex at full capacity use is presented in Table 7.

Table 6 – Summary of waste audit result of the LegCo Complex at full capacity use

|  | Floor         | Quantity of non-recyclables in the refuse (kg) [a] |                            | Quantity of recyclables in the refuse (kg) [b] |                  |                 |                  |                  |                   |                      | Total (kg)         | Potential resource recovery rate<br>= [b] / [a] + [b] x 100% |
|--|---------------|--|----------------------------|--|------------------|-----------------|------------------|------------------|-------------------|----------------------|--------------------|--|
|  |               | W1 Non-recyclable waste I                          | W2 Non-recyclable waste II | R1 Food waste                                  | R2 Paper         | R3 Plastics     | R4 Metals        | R5 Glass bottles | R6 Reusable items | R7 Other recyclables |                    |  |
| The LegCo Complex<br>(full capacity use) | LG/F          | 1.43<br>(40.14%)                                   | 0.00<br>(0.00%)            | 0.86<br>(24.16%)                               | 0.12<br>(3.37%)  | 0.00<br>(0.00%) | 0.03<br>(0.87%)  | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 1.12<br>(31.46%)     | 3.56<br>(100.00%)  | 25.24%   |
|  | G/F           | 8.01<br>(47.12%)                                   | 0.00<br>(0.00%)            | 3.86<br>(22.71%)                               | 2.16<br>(12.71%) | 0.30<br>(1.76%) | 2.28<br>(13.41%) | 0.00<br>(0.00%)  | 0.39<br>(2.29%)   | 0.00<br>(0.00%)      | 17.00<br>(100.00%) |  |
|  | GM/F          | 19.13<br>(79.65%)                                  | 0.00<br>(0.00%)            | 3.68<br>(15.32%)                               | 0.62<br>(2.58%)  | 0.44<br>(1.83%) | 0.01<br>(0.03%)  | 0.00<br>(0.00%)  | 0.14<br>(0.58%)   | 0.00<br>(0.00%)      | 24.02<br>(100.00%) |  |
|  | 1/F           | 14.38<br>(59.08%)                                  | 0.00<br>(0.00%)            | 5.72<br>(23.50%)                               | 2.08<br>(8.55%)  | 1.26<br>(5.18%) | 0.5<br>(2.05%)   | 0.40<br>(1.64%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 24.34<br>(100.00%) |  |
|  | 1M/F          | 12.23<br>(65.19%)                                  | 0.00<br>(0.00%)            | 4.34<br>(23.13%)                               | 1.50<br>(8.00%)  | 0.64<br>(3.41%) | 0.05<br>(0.27%)  | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 18.76<br>(100.00%) |  |
|  | 2/F           | 14.00<br>(77.61%)                                  | 0.00<br>(0.00%)            | 2.34<br>(12.97%)                               | 0.90<br>(4.99%)  | 0.62<br>(3.44%) | 0.18<br>(1.00%)  | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 18.04<br>(100.00%) |  |
|  | 3/F           | 8.22<br>(68.16%)                                   | 0.00<br>(0.00%)            | 1.46<br>(12.11%)                               | 0.74<br>(6.14%)  | 0.64<br>(5.31%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)  | 1.00<br>(8.29%)   | 0.00<br>(0.00%)      | 12.06<br>(100.00%) |  |
|  | 4/F           | 3.29<br>(57.43%)                                   | 0.00<br>(0.00%)            | 1.62<br>(28.32%)                               | 0.32<br>(5.59%)  | 0.48<br>(8.39%) | 0.02<br>(0.26%)  | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 5.73<br>(100.00%)  |  |
|  | 5/F           | 4.70<br>(53.65%)                                   | 0.00<br>(0.00%)            | 2.04<br>(23.29%)                               | 0.88<br>(10.05%) | 0.44<br>(5.02%) | 0.48<br>(5.48%)  | 0.22<br>(2.51%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 8.76<br>(100.00%)  |  |
|  | 6/F           | 6.40<br>(60.72%)                                   | 0.00<br>(0.00%)            | 3.74<br>(35.48%)                               | 0.00<br>(0.00%)  | 0.40<br>(3.80%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 10.54<br>(100.00%) |  |
|  | 7/F           | 16.22<br>(86.18%)                                  | 0.00<br>(0.00%)            | 1.54<br>(8.18%)                                | 0.86<br>(4.57%)  | 0.20<br>(1.06%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 18.82<br>(100.00%) |  |
|  | 8/F           | 40.64<br>(95.13%)                                  | 0.00<br>(0.00%)            | 0.64<br>(1.50%)                                | 0.84<br>(1.97%)  | 0.38<br>(0.89%) | 0.22<br>(0.51%)  | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 42.72<br>(100.00%) |  |
|  | 9/F           | 5.41<br>(79.65%)                                   | 0.00<br>(0.00%)            | 0.96<br>(14.14%)                               | 0.12<br>(1.77%)  | 0.26<br>(3.83%) | 0.04<br>(0.62%)  | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 6.79<br>(100.00%)  |  |
|  | 10/F          | 21.94<br>(90.36%)                                  | 0.00<br>(0.00%)            | 1.64<br>(6.75%)                                | 0.24<br>(0.99%)  | 0.38<br>(1.57%) | 0.08<br>(0.33%)  | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 24.28<br>(100.00%) |  |
|  |               | Sub-total (1)                                      | 176.00                     | 0.00   | 34.44            | 11.38           | 6.44             | 3.89             | 0.62              | 1.53                 | 1.12               |  |
|  | Sub-total (2) | 176.00   |                            | 59.42  |                  |                 |                  |                  |                   |                      | 235.42             |  |



Figure 3 – Breakdown of the audited waste of the LegCo Complex at full capacity use

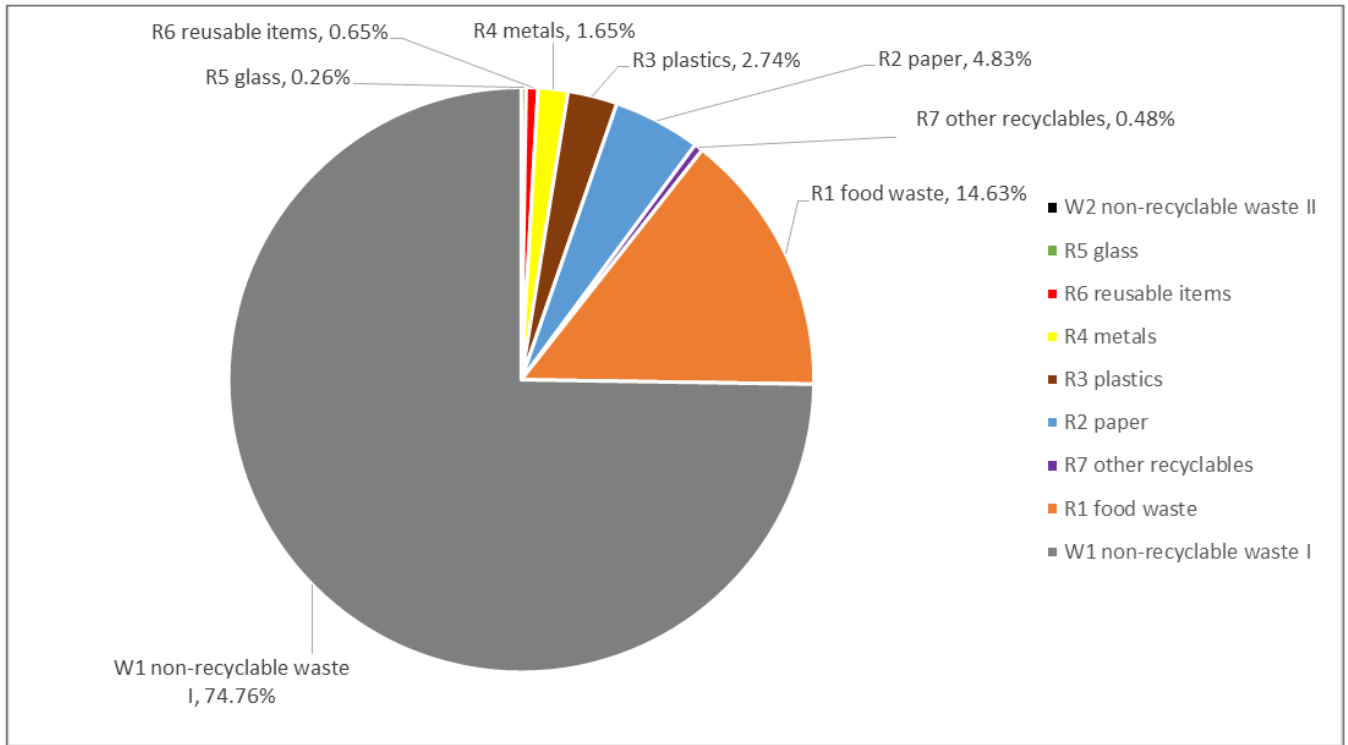
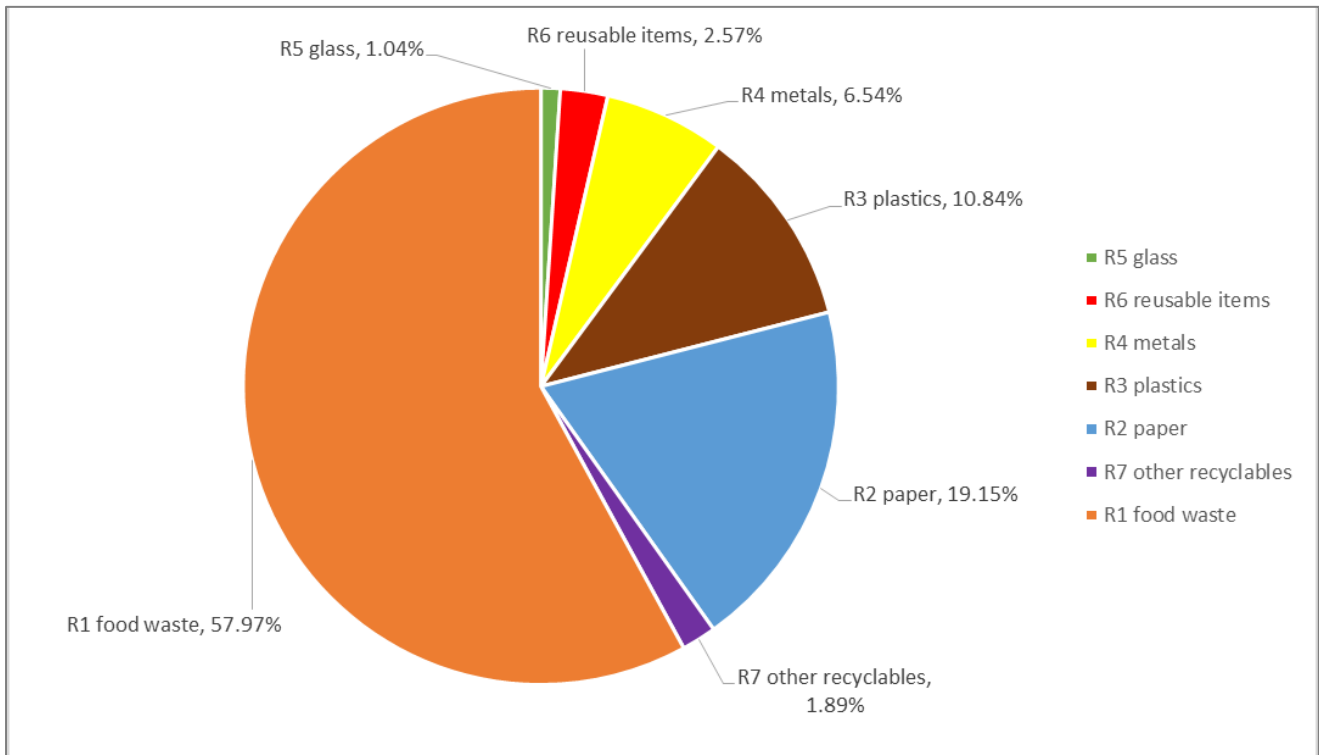


Figure 4 – Distribution of recyclables identified in the audited waste of the LegCo Complex at full capacity use



*Table 7 – Summary of recycling facilities spot checks (the LegCo Complex at full capacity use)*

| Recycling conditions  | Recycling bins |          |        |               |                       | Sum (kg) |
|-----------------------|----------------|----------|--------|---------------|-----------------------|----------|
|                       | Paper          | Plastics | Metals | Glass bottles | Others (e.g. battery) |          |
| Total weight (kg)     | 51.06          | 1.36     | 0.11   | 0.74          | 5.59                  | 58.86    |
| Contaminated (kg)     | 0.01           | 0.03     | 0.11   | 0.00          | 0.00                  | 0.15     |
| Wrongly sorted (kg)   | 0.23           | 0.11     | 0.00   | 0.01          | 0.00                  | 0.35     |
| Correctly sorted (kg) | 50.82          | 1.22     | 0.00   | 0.73          | 5.59                  | 58.36    |

Examples of waste audited of the LegCo Complex at full capacity use



Food waste (R1)



Plastics (R3)



Non-recyclable waste I (W1)



Metals (R4)



Other recyclables (R7)



Paper (R2)



Reusable items (R6)



Glass (R5)

#### 4.4 The LegCo Complex at Half Capacity Use

On the waste audit day of the LegCo Complex at half capacity use, around 38.03% (81.22 kg) of recyclables were found in the audited waste samples. On the other hand, there were around 61.97% (132.34 kg) of non-recyclables found in the refuse. Breakdown of the audited waste of the LegCo Complex at half capacity use is described in Figure 5.

From the audited samples, all of the non-recyclable waste were categorised as non-recyclable waste I (W1) (132.34 kg), as no non-recyclable waste II (W2) was identified or collected from the refuse. Common examples of W1 observed during on-site waste audit included used or wet tissue, used wooden chopsticks, mixed materials food package/cover (e.g. potato chips packages, lunchboxes cover that contain paper and plastics) and non-recyclable paper (e.g. laminated materials, receipts, wax paper, etc.).

For recyclables, food waste (R1) was identified as the dominant source contributing to around 65.63% (53.30 kg) of the recyclables identified. Paper (R2) and other recyclables (R7) were found to be the second and third largest contributors of the recyclables, accounting for around 13.30% (10.80 kg) and 10.27% (8.34 kg) of the recyclables, respectively. For other recyclables (R7), as based on the waste audit result, majority of them were yard waste which might be collected at the underbrush near the carpark areas at G/F. Other recyclables such as reusable towels, a handwriting pad and a cleaning mop were also categorised as other recyclable (R7). On the other hand, no glass bottle (R5) and reusable item (R6) were identified or collected during the waste audit session. Distribution of recyclables identified in the audited waste of the LegCo Complex at half capacity use (excluding recyclables at spot checks) is illustrated in Figure 6.

From the audit result at half capacity use, it was observed that 1/F, GM/F and 3/F were the top 3 sources of waste during half capacity use of the LegCo Complex, generating around 44.18 kg, 22.96 kg and 21.04 kg of MSW, respectively. These indicated that the Dining Hall, Ante-Chamber, Press Room, Public Officers' Office, Secretariat's office, TVR rooms, TV production Room and Public Galleries were potential top contributors of MSW during half use of capacity of the LegCo Complex. Summary of the waste audit result of the LegCo Complex at half capacity use is provided in Table 8.

During on-site spot checks of recycling facilities, a total of 245.52 kg of recyclables were recorded in the recycling bins. However, 1.61 kg and 0.73 kg of the recyclables were found being contaminated and wrongly sorted, respectively. Examples of contaminated recyclables found during spot checks included unwashed/unclean take-away plastic meal box and unwashed/uncleaned coffee cans. While, examples of wrongly sorted recyclables include beverage plastic bottles being placed in glass bottle recycling bins, beverage cartons and plastic bags being placed in metal recycling bins, and unrecyclable paper (e.g. receipts) and wet/used tissue being placed in the paper recycling bin. Summary of the spot checks of recycling facilities of the LegCo Complex at half capacity use is presented in Table 9.

Table 8 – Summary of waste audit result of the LegCo Complex at half capacity use

|                                       | Floor         | Quantity of non-recyclables in the refuse (kg) [a] |                            | Quantity of recyclables in the refuse (kg) [b] |                  |                  |                 |                  |                   |                      | Total (kg)         | Potential resource recovery rate<br>= [b] / [a] + [b] x 100% |
|---------------------------------------|---------------|--|----------------------------|--|------------------|------------------|-----------------|------------------|-------------------|----------------------|--------------------|--|
|                                       |               | W1 Non-recyclable waste I                          | W2 Non-recyclable waste II | R1 Food waste                                  | R2 Paper         | R3 Plastics      | R4 Metals       | R5 Glass bottles | R6 Reusable items | R7 Other recyclables |                    |  |
| The LegCo Complex (half capacity use) | LG/F          | 4.22<br>(20.79%)                                   | 0.00<br>(0.00%)            | 9.16<br>(45.12%)                               | 0.18<br>(0.89%)  | 0.70<br>(3.45%)  | 0.20<br>(0.99%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 5.84<br>(28.77%)     | 20.30<br>(100.00%) | 38.03%   |
|                                       | G/F           | 11.76<br>(81.22%)                                  | 0.00<br>(0.00%)            | 1.32<br>(9.12%)                                | 1.06<br>(7.32%)  | 0.34<br>(2.35%)  | 0.00<br>(0.00%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 14.48<br>(100.00%) |  |
|                                       | GM/F          | 21.30<br>(92.77%)                                  | 0.00<br>(0.00%)            | 0.94<br>(4.09%)                                | 0.44<br>(1.92%)  | 0.28<br>(1.22%)  | 0.00<br>(0.00%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 22.96<br>(100.00%) |  |
|                                       | 1/F           | 15.52<br>(35.13%)                                  | 0.00<br>(0.00%)            | 23.58<br>(53.37%)                              | 0.96<br>(2.17%)  | 2.10<br>(4.75%)  | 0.30<br>(0.68%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 1.72<br>(3.89%)      | 44.18<br>(100.00%) |  |
|                                       | 1M/F          | 7.04<br>(54.15%)                                   | 0.00<br>(0.00%)            | 3.68<br>(28.31%)                               | 1.90<br>(14.62%) | 0.38<br>(2.92%)  | 0.00<br>(0.00%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 13.00<br>(100.00%) |  |
|                                       | 2/F           | 11.75<br>(67.91%)                                  | 0.00<br>(0.00%)            | 3.34<br>(19.30%)                               | 1.74<br>(10.06%) | 0.40<br>(2.31%)  | 0.07<br>(0.42%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 17.30<br>(100.00%) |  |
|                                       | 3/F           | 18.98<br>(90.21%)                                  | 0.00<br>(0.00%)            | 0.86<br>(4.09%)                                | 0.50<br>(2.38%)  | 0.70<br>(3.33%)  | 0.00<br>(0.00%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 21.04<br>(100.00%) |  |
|                                       | 4/F           | 3.42<br>(45.38%)                                   | 0.00<br>(0.00%)            | 3.04<br>(40.34%)                               | 0.40<br>(5.31%)  | 0.66<br>(8.76%)  | 0.02<br>(0.21%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 7.54<br>(100.00%)  |  |
|                                       | 5/F           | 5.28<br>(77.42%)                                   | 0.00<br>(0.00%)            | 0.22<br>(3.23%)                                | 0.88<br>(12.90%) | 0.30<br>(4.40%)  | 0.14<br>(2.05%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 6.82<br>(100.00%)  |  |
|                                       | 6/F           | 1.54<br>(83.70%)                                   | 0.00<br>(0.00%)            | 0.00<br>(0.00%)                                | 0.00<br>(0.00%)  | 0.30<br>(16.30%) | 0.00<br>(0.00%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 1.84<br>(100.00%)  |  |
|                                       | 7/F           | 10.50<br>(68.36%)                                  | 0.00<br>(0.00%)            | 3.98<br>(25.91%)                               | 0.36<br>(2.34%)  | 0.52<br>(3.39%)  | 0.00<br>(0.00%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 15.36<br>(100.00%) |  |
|                                       | 8/F           | 8.99<br>(80.56%)                                   | 0.00<br>(0.00%)            | 0.00<br>(0.00%)                                | 1.04<br>(9.32%)  | 0.32<br>(2.87%)  | 0.03<br>(0.26%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.78<br>(6.99%)      | 11.16<br>(100.00%) |  |
|                                       | 9/F           | 4.88<br>(67.03%)                                   | 0.00<br>(0.00%)            | 1.60<br>(21.98%)                               | 0.36<br>(4.95%)  | 0.44<br>(6.04%)  | 0.00<br>(0.00%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 7.28<br>(100.00%)  |  |
|                                       | 10/F          | 7.16<br>(69.51%)                                   | 0.00<br>(0.00%)            | 1.58<br>(15.34%)                               | 0.98<br>(9.51%)  | 0.58<br>(5.63%)  | 0.00<br>(0.00%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 10.30<br>(100.00%) |  |
|                                       |               | Sub-total (1)                                      | 132.34                     | 0.00   | 53.30            | 10.80            | 8.02            | 0.76             | 0.00              | 0.00                 | 8.34               |  |
|                                       | Sub-total (2) | 132.34   |                            | 81.22  |                  |                  |                 |                  |                   |                      |                    |  |

Figure 5 – Breakdown of the audited waste of the LegCo Complex at half capacity use

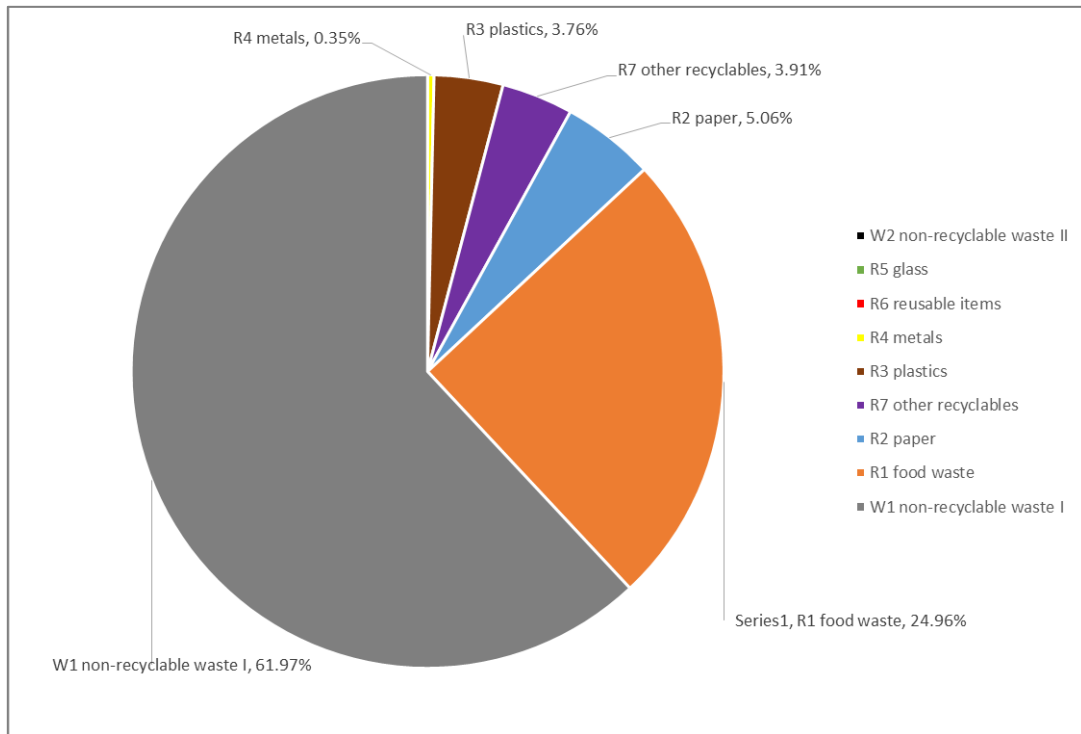
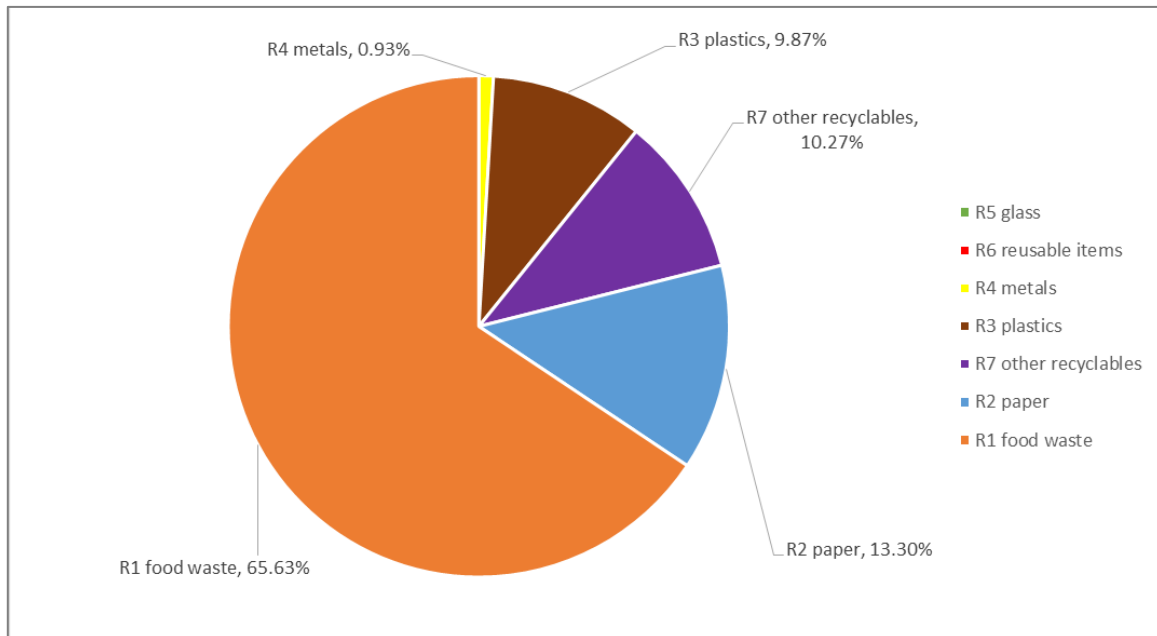


Figure 6 – Distribution of recyclables identified in the audited waste of the LegCo Complex at half capacity use



*Table 9 – Summary of recycling facilities spot checks (the LegCo Complex at half capacity use)*

| Recycling conditions  | Recycling bins |          |        |               |                       | Sum (kg) |
|-----------------------|----------------|----------|--------|---------------|-----------------------|----------|
|                       | Paper          | Plastics | Metals | Glass bottles | Others (e.g. battery) |          |
| Total weight (kg)     | 238.72         | 0.77     | 0.42   | 5.61          | 0.00                  | 245.52   |
| Contaminated (kg)     | 1.34           | 0.16     | 0.11   | 0.00          | 0.00                  | 1.61     |
| Wrongly sorted (kg)   | 0.53           | 0.02     | 0.00   | 0.18          | 0.00                  | 0.73     |
| Correctly sorted (kg) | 236.85         | 0.59     | 0.31   | 5.43          | 0.00                  | 247.86   |

Examples of waste identified at half capacity use of the LegCo Complex:



Non-recyclable waste I (W1)



Other recyclables (R7)



Food waste (R1)



Paper (R2)



Metals (R4)



Plastics (R3)



Reusable items (R6)



Food waste (R1)



#### 4.5 The LegCo Complex at Minimum Capacity Use

On the waste audit day of the LegCo Complex at minimum capacity use, around 38.58% (46.97 kg) of recyclables were found in the audited waste samples. On the other hand, there were around 61.42% (74.79 kg) of non-recyclables found in the refuse. Breakdown of the audited waste of the LegCo Complex at minimum capacity use are described in Figure 7.

From the audited samples, non-recyclable waste I (W1) was the dominant source, contributing to 100% (74.79 kg), of the non-recyclables identified. Common examples of W1 observed during on-site waste audit include used or wet tissue, used wooden chopsticks, mixed materials food package/cover (e.g. eggs protective packaging, beverage cartons, lunchboxes cover that contain paper and plastics, etc.), non-recyclable paper (e.g. laminated materials, receipts, wax paper, etc.) and non-recyclable plastics (e.g. trash foam boards, polystyrene lunchboxes, etc.).

For recyclables, food waste (R1) was identified as the dominant source contributing to around 56.93% (26.74 kg) of the recyclables identified. Regarding food waste, it is worth noticing that the waste audit day on 6 June 2019 was close to traditional Chinese festival day, the Dragon Boat Festival. A significant amount of festive food, such as rice dumpling and wrapping leaves, were found amongst the food waste. Paper (R2) and plastics (R3) were found to be the second and third largest contributors of the recyclables, accounting for around 21.25% (9.98 kg) and 19.33% (9.08 kg) of the recyclables, respectively. On the other hand, no glass bottle (R5) was identified or collected during the waste audit session. Yet, it is worth noticing that 0.01% (0.01 kg) of reusable items (R6) and 1.71% (0.80 kg) of other recyclables (R7) were found amongst the audited waste. Example of reusable items (R6) included an almost full-inked ball pen. While, examples of other recyclables (R7) included yard waste and rechargeable batteries. Based on the audit results, the source of yard waste collected at G/F might be the bush near the carpark at G/F. Distribution of recyclables identified in the audited waste of the LegCo Complex at minimum capacity use is illustrated in Figure 8.

From the audit result at minimum capacity use, it was also found that 7/F, 1M/F and 10/F were the top 3 sources of waste during minimum capacity use of the LegCo Complex, constituting to around 18.47 kg, 13.64 kg and 13.50 kg of MSW, respectively. These may indicate that the LegCo Members' offices, SI room, TVR rooms, Press Room and Secretariat's offices are potential top contributors of MSW during minimum use of capacity of the LegCo Complex. Summary of the waste audit result of the LegCo Complex at minimum capacity use is provided in Table 10.

During on-site spot checks of recycling facilities, total weight of 118.17 kg of recyclables were found in the recycling bins. However, 0.34 kg and 0.52 kg of the recyclables were found being contaminated and wrongly sorted, respectively. In other words, there were around 117.31 kg of recyclables being correctly sorted. Examples of contaminated recyclables found during spot checks include unwashed/unclean coffee cans. While, examples of wrongly sorted recyclables include wet/used tissue being placed in the paper recycling

bin. Overall, the majority of the recyclables found during on-site spot checks were paper, constituting of 97.56% of the recyclables found on the audit day. Summary of the spot checks of recycling facilities of the LegCo Complex at minimum capacity use is presented in Table 11.

Table 10 – Summary of waste audit result of the LegCo Complex at minimum capacity use

|   | Floor         | Quantity of non-recyclables in the refuse (kg) [a] |                            | Quantity of recyclables in the refuse (kg) [b] |                  |                  |                 |                  |                   |                      | Total (kg)         | Potential resource recovery rate = [b] / [a] + [b] x 100% |
|---|---------------|--|----------------------------|--|------------------|------------------|-----------------|------------------|-------------------|----------------------|--------------------|---|
|   |               | W1 Non-recyclable waste I                          | W2 Non-recyclable waste II | R1 Food waste                                  | R2 Paper         | R3 Plastics      | R4 Metals       | R5 Glass bottles | R6 Reusable items | R7 Other recyclables |                    |   |
| The LegCo Complex<br>(minimum capacity use) | LG/F          | 1.06<br>(34.42%)                                   | 0.00<br>(0.00%)            | 0.70<br>(22.73%)                               | 0.18<br>(5.84%)  | 0.36<br>(11.69%) | 0.00<br>(0.00%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.78<br>(25.32%)     | 3.08<br>(100.00%)  | 38.58%  |
|   | G/F           | 0.74<br>(22.29%)                                   | 0.00<br>(0.00%)            | 1.20<br>(36.14%)                               | 1.20<br>(36.14%) | 0.18<br>(5.42%)  | 0.00<br>(0.00%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 3.32<br>(100.00%)  |   |
|   | GM/F          | 7.90<br>(74.67%)                                   | 0.00<br>(0.00%)            | 1.04<br>(9.83%)                                | 0.74<br>(6.99%)  | 0.84<br>(7.94%)  | 0.06<br>(0.57%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 10.58<br>(100.00%) |   |
|   | 1/F           | 6.86<br>(62.36%)                                   | 0.00<br>(0.00%)            | 2.72<br>(24.73%)                               | 0.38<br>(3.45%)  | 0.96<br>(8.73%)  | 0.08<br>(0.73%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 11.00<br>(100.00%) |   |
|   | 1M/F          | 9.64<br>(70.70%)                                   | 0.00<br>(0.00%)            | 1.74<br>(12.76%)                               | 1.36<br>(9.97%)  | 0.86<br>(6.31%)  | 0.04<br>(0.26%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 13.64<br>(100.00%) |   |
|   | 2/F           | 8.20<br>(66.67%)                                   | 0.00<br>(0.00%)            | 2.86<br>(23.25%)                               | 0.62<br>(5.04%)  | 0.62<br>(5.04%)  | 0.00<br>(0.00%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 12.30<br>(100.00%) |   |
|   | 3/F           | 8.52<br>(69.49%)                                   | 0.00<br>(0.00%)            | 2.52<br>(20.55%)                               | 0.58<br>(4.73%)  | 0.58<br>(4.73%)  | 0.06<br>(0.49%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 12.26<br>(100.00%) |   |
|   | 4/F           | 2.56<br>(47.62%)                                   | 0.00<br>(0.00%)            | 1.64<br>(30.04%)                               | 0.26<br>(4.76%)  | 0.94<br>(17.22%) | 0.02<br>(0.37%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 5.42<br>(100.00%)  |   |
|   | 5/F           | 0.42<br>(16.65%)                                   | 0.00<br>(0.00%)            | 0.90<br>(35.67%)                               | 1.02<br>(40.43%) | 0.16<br>(6.34%)  | 0.00<br>(0.00%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.02<br>(0.91%)      | 2.52<br>(100.00%)  |   |
|   | 6/F           | 0.00<br>(0.00%)                                    | 0.00<br>(0.00%)            | 0.00<br>(0.00%)                                | 0.00<br>(0.00%)  | 0.00<br>(0.00%)  | 0.00<br>(0.00%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 0.00<br>(0.00%)    |   |
|   | 7/F           | 12.37<br>(67.00%)                                  | 0.00<br>(0.00%)            | 3.84<br>(20.80%)                               | 1.44<br>(7.80%)  | 0.78<br>(4.22%)  | 0.03<br>(0.15%) | 0.00<br>(0.00%)  | 0.01<br>(0.03%)   | 0.00<br>(0.00%)      | 18.47<br>(100.00%) |   |
|   | 8/F           | 4.94<br>(66.76%)                                   | 0.00<br>(0.00%)            | 1.00<br>(13.51%)                               | 0.68<br>(9.19%)  | 0.76<br>(10.27%) | 0.02<br>(0.27%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 7.40<br>(100.00%)  |   |
|   | 9/F           | 3.36<br>(40.81%)                                   | 0.00<br>(0.00%)            | 3.32<br>(40.32%)                               | 0.62<br>(7.53%)  | 0.92<br>(11.17%) | 0.01<br>(0.17%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 8.23<br>(100.00%)  |   |
|   | 10/F          | 8.18<br>(60.57%)                                   | 0.00<br>(0.00%)            | 3.26<br>(24.14%)                               | 0.90<br>(6.66%)  | 1.12<br>(8.29%)  | 0.04<br>(0.33%) | 0.00<br>(0.00%)  | 0.00<br>(0.00%)   | 0.00<br>(0.00%)      | 13.50<br>(100.00%) |   |
|   |               | Sub-total (1)                                      | 74.79                      | 0.00   | 26.74            | 9.98             | 9.08            | 0.36             | 0.00              | 0.01                 | 0.80               |   |
|   | Sub-total (2) | 74.79  |                            | 46.97  |                  |                  |                 |                  |                   |                      |                    |   |

Figure 7 – Breakdown of the audited waste of the LegCo Complex at minimum capacity use

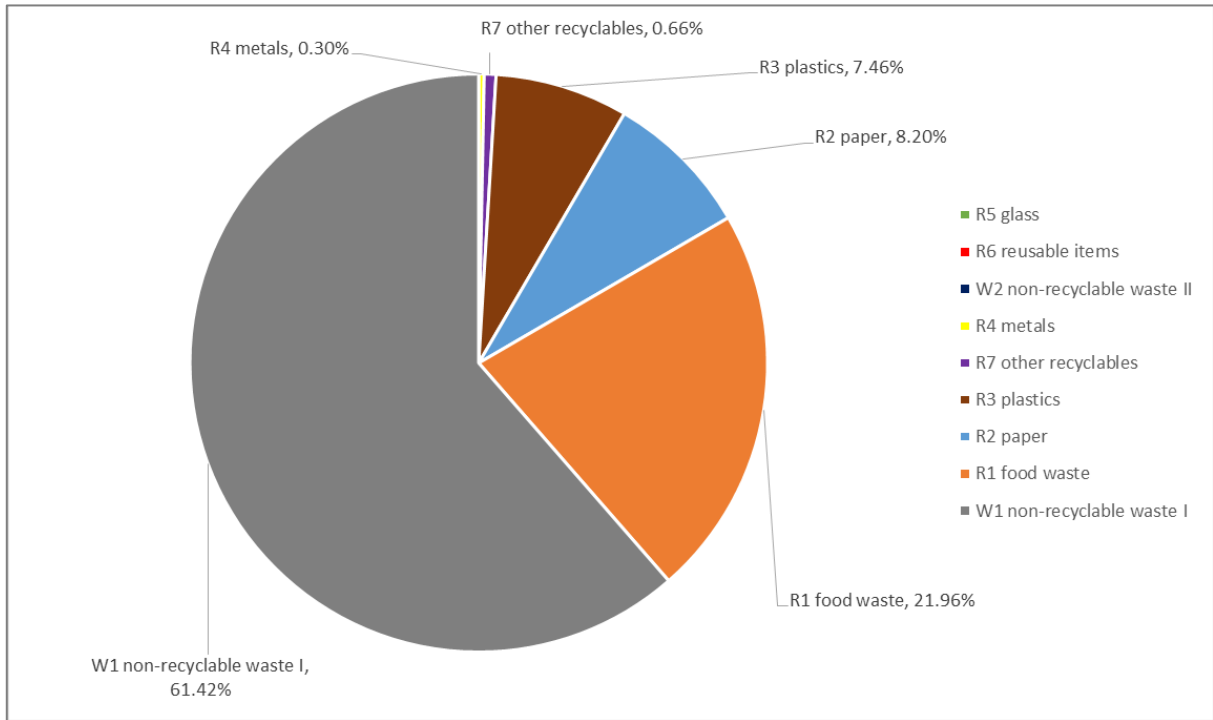
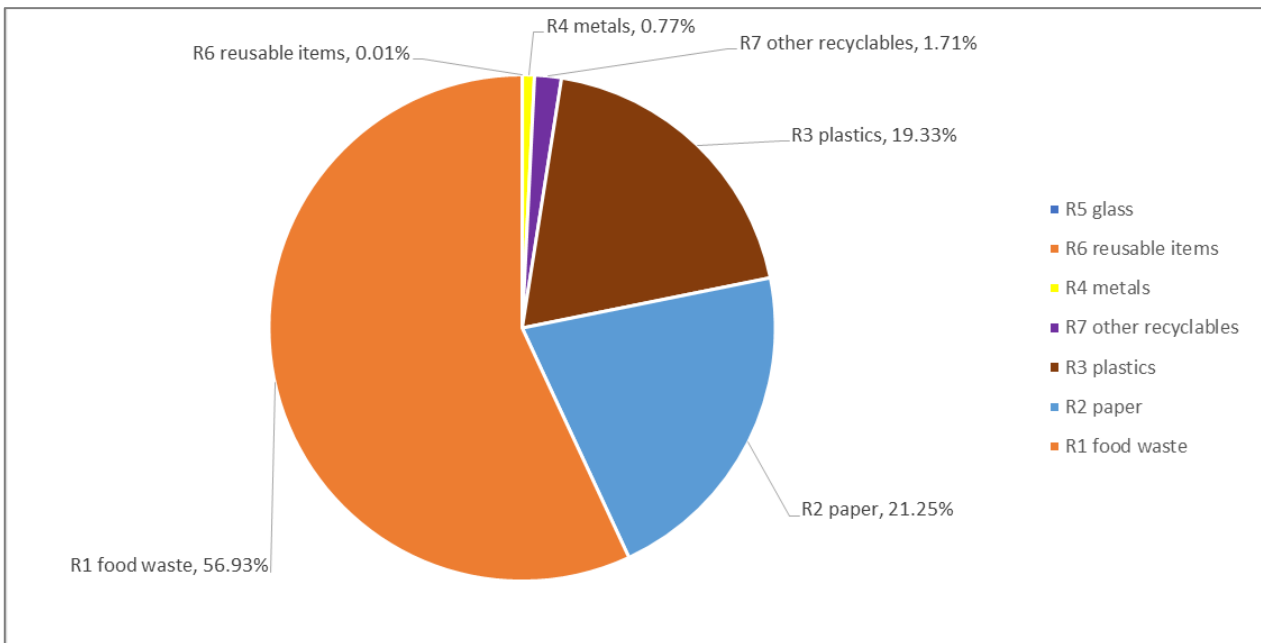


Figure 8 – Distribution of recyclables identified in the audited waste of the LegCo Complex at minimum capacity use



*Table 11 – Summary of recycling facilities spot checks (the LegCo Complex at minimum capacity use)*

| Recycling conditions  | Recycling bins |          |        |               |                       | Sum (kg) |
|-----------------------|----------------|----------|--------|---------------|-----------------------|----------|
|                       | Paper          | Plastics | Metals | Glass bottles | Others (e.g. battery) |          |
| Total weight (kg)     | 115.29         | 1.03     | 1.45   | 0.40          | 0.00                  | 118.17   |
| Contaminated (kg)     | 0.00           | 0.16     | 0.18   | 0.00          | 0.00                  | 0.34     |
| Wrongly sorted (kg)   | 0.08           | 0.14     | 0.12   | 0.18          | 0.00                  | 0.52     |
| Correctly sorted (kg) | 115.21         | 0.73     | 1.15   | 0.22          | 0.00                  | 117.31   |

Examples of waste identified at minimum capacity use of the LegCo Complex:



Non-recyclable waste I (W1)



Food waste (R1)



Food waste (R1)



Plastics (R3)



Metals (R4)



Reusable items (R6)



Other recyclables (R7)

#### 4.6 Waste Generated from Each Floor

Based on the waste audit result, a total amount of 573.69 kg of waste to landfills was generated on the 3 audit days. The floor summary of the waste quantity of each audit session conducted at the LegCo Complex is presented in Table 12.

*Table 12 – Floor summary of the waste quantity of each audit session conducted at the LegCo Complex*

| <i>Floor</i> | <i>Full capacity use<br/>(kg)</i> | <i>Half capacity use<br/>(kg)</i> | <i>Minimum capacity<br/>use (kg)</i> | <i>Total (kg)</i> |
|--------------|-----------------------------------|-----------------------------------|--------------------------------------|-------------------|
| LG/F         | 3.56                              | 20.30                             | 3.08                                 | 26.94             |
| G/F          | 17.00                             | 14.48                             | 3.32                                 | 34.80             |
| GM/F         | 24.02                             | 22.96                             | 10.58                                | 57.56             |
| 1/F          | 24.34                             | 44.18                             | 11.00                                | 79.52             |
| 1M/F         | 18.76                             | 13.00                             | 13.64                                | 45.40             |
| 2/F          | 18.04                             | 17.30                             | 12.30                                | 47.64             |
| 3/F          | 12.06                             | 21.04                             | 12.26                                | 45.36             |
| 4/F          | 5.72                              | 7.54                              | 5.46                                 | 18.72             |
| 5/F          | 8.76                              | 6.82                              | 2.52                                 | 18.10             |
| 6/F          | 10.54                             | 1.84                              | 0.00                                 | 12.38             |
| 7/F          | 18.82                             | 15.36                             | 18.46                                | 52.64             |
| 8/F          | 42.72                             | 11.16                             | 7.40                                 | 61.28             |
| 9/F          | 6.79                              | 7.28                              | 8.20                                 | 22.27             |
| 10/F         | 24.28                             | 10.30                             | 13.50                                | 48.08             |

As presented in Table 12, 1/F, 8/F, GM/F, 7/F and 10/F were the top 5 contributors of waste generation of the LegCo Complex. In other words, areas such as LegCo Members' offices, the Secretariat's offices, Press Room, Dining Hall, Ante-Chamber, Technical Rooms, Public Officers' Office, SI rooms and TVR rooms are potential function groups and facilities to be focused for future optimization of waste reduction. In addition, stakeholders such as staff members of the Secretariat's office and the LegCo Members' offices are target key stakeholders to get in touch with a higher priority, for waste reduction and enhancement of resource recovery.

## 5. Waste performance benchmarking

Considering the quantity of waste generated from the LegCo Complex, a simple, anonymous benchmarking between the LegCo Complex and 7 local office buildings studied in BEC previous projects is conducted.

According to BEC's past project experiences, the quantity of daily waste generated from local office buildings can range from around 65.80 kg / day to 1,748.33 kg / day. While based on the audit results, the LegCo Complex generated around 121.76 kg / day to 235.41 kg / day of waste, from minimum to full capacity use. In terms of quantity of waste generated per floor, the waste generated per day per floor at local office buildings (studied by BEC before) could range from 2.35 kg to 30.33 kg, with an average of 20.03 kg. While based on the audit results, the LegCo Complex generated around 8.70 kg to 16.82 kg of waste per day per floor, from minimum to full capacity use, with an average of 13.66 kg. Hence, these indicated that the LegCo Complex generated a relatively smaller quantity of waste when compared to other local office buildings, in general. Summary of benchmarking is tabulated in Table 13.

*Table 13 – Summary of benchmarking between the LegCo Complex and local office buildings*

|   | The LegCo Complex     | Local office buildings studied in BEC past projects |
|---|-----------------------|---|
| Quantity of waste generated per day (working day only)        | 121.76 kg – 235.41 kg | 65.80 kg – 1,748.33 kg                              |
| Quantity of waste generated per working day per floor         | 8.70 kg – 16.82 kg    | 2.35 kg – 30.33 kg                                  |
| Average quantity of waste generated per working day per floor | 13.66 kg              | 20.03 kg  |

## 6. Financial implication of the MSW charging

### 6.1 Background of the MSW charging scheme

In late October 2018, the Environment Bureau announced the implementation plan of MSW charging scheme in Hong Kong which will be in place by 2020 the earliest. Under the scheme, waste collected by Refuse Collection Vehicles ("RCVs") with compactors would be charged via prepaid designated bags, with a cost of HK\$0.11 / litre (bag-based charging). Meanwhile, waste collected by RCVs without compactors would be charged with a gate fee based on the weight measured at landfills / Refuse Transfer Stations ("RTSs"), with a cost of HK\$365 - 395 / tonne (weight-based charging)<sup>4</sup>.

<sup>4</sup> Environment Bureau revealed in March 2017 that charges for municipal solid waste would be imposed in the second half of 2019 at the earliest. Under this charging mode, MSW generator will be charged at the range of HK\$365 to 395 per tonne. (Ref: <http://www.info.gov.hk/gia/general/201703/20/P2017032000453.htm?fontSize=1>)



## 6.2 Bag-based charging – prepaid garbage bags of designated volume

Charging by “designated garbage bags” will be applicable to most residential buildings, commercial and industrial buildings, village houses, stress level shops and institutions. According to the announcement made by Environment Bureau, around 80% of Hong Kong waste is going to be charged via bag-based charging. As the LegCo Complex is a office-based I building, most probably charging by “designated garbage bags” will be adopted.

In terms of bag-based charging, each prepaid garbage bag type represents a designated volume and cost for disposal. There will be a total of 9 sizes designated garbage bags with cost HK\$0.11 per litre (i.e. 30L prepaid garbage bag costs HK\$3.3). Assuming the 30L prepaid garbage bags will be used, which is also the general practice, at the LegCo Complex, based on the waste audit sessions, the corresponding estimation on MSW charging of the LegCo Complex is calculated as shown in Table 14.

*Table 14 – Estimation on the MSW charging fee charged per year of the LegCo Complex*

| Premises          | Estimated number of prepaid garbage bags needed each day (based on waste audit sessions) | Designated volume of prepaid garbage bags | Estimated MSW charging fee charged per working day | Estimated MSW charging fee charged per year* |
|-------------------|--|---|--|--|
| The LegCo Complex | 40 - 62 <sup>5</sup>   | 30 litres                                 | HK\$132 to HK204.6                                 | HK\$32,340 to HK\$50,127                     |

\* Assuming no waste is disposed on weekends and during public holidays (total 120 days excluded)

<sup>5</sup> The estimated number of prepaid garbage bags needed each day is based on records of waste audit sessions: Day-1 62 bags collected, Day-2 62 bags collected, Day-3 40 bags collected.

## 7. Recommendation on Waste Management Practices

To have better preparation against the up-coming MSW waste charging scheme legislation, the Commission should develop a strategic sustainable governance, implement more green initiatives, organise programmes to raise stakeholders' environmental awareness (e.g. waste charging trial scheme) and engage key stakeholders to increase the effectiveness of waste recycling and reduction efforts in the LegCo Complex. In terms of waste generation, BEC has identified main areas of concerns and improvement to optimise waste reduction, and recommend pragmatic waste management practices for the LegCo Complex. Opportunities and recommendations for achieving continual waste reduction are discussed below.

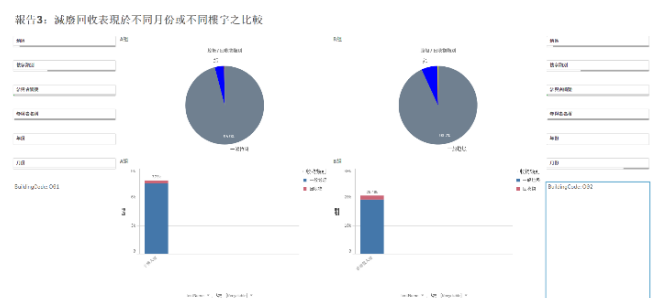
### 7.1 To establish a systematic waste monitoring and reporting system

For the purpose of continuous monitoring and reporting to the senior management on the Commission's waste management performance, it is necessary for the Secretariat to obtain more accurate information on waste and recyclables quantity generated at the LegCo Complex. Regarding this, the Commission is suggested to install the waste weighing system at the refuse collection point to record the waste quantity on a daily basis. The data collected will be useful for the LegCo Complex to benchmark its waste performance externally (e.g. with other Government facilities of similar scale and sizes) and internally (e.g. for self-auditing and recording of information, to compare and improve waste management performance over the years). This will also be an effective tool to evaluate the effectiveness of the waste management measures and facilitate decision making.

Furthermore, it is recommended that the Commission publicise the waste management performance internally to inform and engage key stakeholders (e.g. the LegCo Members, public citizens, the Secretariat offices, etc.) for demonstration of the Commission's commitment on waste management and sustainability performance. Besides, publication of such information externally may also help demonstrating and promoting of waste management to other Government facilities, and to act as example of waste management for other Government facilities.



Waste weighing system to record the daily waste quantity



Waste management reporting on the performance of resource recycling and waste reduction

## 7.2 To reduce paper consumption and paper generation

Based on the data of total quantity of recyclables provided by the Secretariat, it is revealed that paper contributed to the majority of recyclables recovered in 2018/19. Almost 99% of the recyclables recovered in 2018/19 were paper. Yet, although paper generated are currently recycled, waste reduction at source would still be a preferable approach in the hierarchy of waste management.

Based on the data provided, paper is divided into 3 types, namely newspapers, recyclable (office) paper and confidential waste. It is observed that newspapers and recyclable (office) paper were the 2 major contributors, constituting of around 26,364.20 kg and 35,360.00 kg of paper respectively. Therefore, these 2 types are also of at higher priority to be optimised in terms of paper reduction. To encourage paper reduction, the following improvement actions can be done by the Commission:

1. Adopt electronic channels for internal circulation or communications (e.g. emails, intranet, cloud platform);
2. Go for paperless meeting to encourage staff members using their laptops or tablets instead of printing large amount of paper for meetings;
3. Limit the printing of LegCo's documents and all related reports;
4. Practice phasing out of individual/local printers, especially those which do not possess duplex printing function, to lower the incentive of habit-printing;
5. Conduct paper audit to help tracking of paper consumption and procurement amount, which also enabled thoroughly understanding of staff members' habit/paper using behaviour; and
6. Set up a paper saving target at each of the offices, based on the genres and functionalities of the offices.

## 7.3 To reduce food waste generated at the LegCo Complex

Reducing food waste disposal at landfills is an important part of the Government's plan for waste management and the Government has adopted a multi-pronged approach to tackle Hong Kong's food waste problem, with main focus on avoidance of food waste generation and reduction at source.

To reduce food waste generation, the following improvement actions can be taken by the Commission:

1. To recommend catering contractor to offer portioned meals;
2. To cooperate with the catering contractor and provide incentives to customers who order a less portioned meal (e.g. HK\$1 rebate for "less-rice");
3. To post educational signage (e.g. poster / signage from the Campaign Food Wise Hong Kong) around offices and public areas to remind staff members and other stakeholders ordering meals with suitable portions;

4. To conduct periodical study (e.g. a 1-day to 3-day study every 9-12 months) for estimation of the genres and quantity of food, and to keep track record of food waste generation/reduction with evaluations;
5. To develop initiatives themes on food waste reduction amongst the functionalities of the LegCo Complex (e.g. the Secretariat’s offices, the LegCo Members’ offices, etc.), such as by providing food waste reduction guidelines; and
6. To monitor the situation on food waste generation regularly, and conduct spot checks occasionally at the LegCo Complex to encourage member staffs on reducing food waste.



Signage to encourage offering portioned meals



Signage to educate customer on ordering portioned meals



Food Wise Hong Kong – Food Wise Charter



Food Wise Hong Kong Campaign – Food Wise Eateries

#### 7.4 To facilitate food waste collection for resource recovery

As mentioned above, food waste constituted a relatively large proportion of the audited samples. Moreover, the amount of food waste disposed was also equivalent to around 56.93% to 65.63% of recyclables that were sorted from the audited waste. Therefore, to encourage food waste resource recovery, the following improvement actions can be done by the Commission:

1. To install a centralised food waste decomposer to encourage food waste recycling; and
2. To facilitate food waste collection of the LegCo Complex, for example, by providing small food waste collection bins at each floor pantry and scheduling of collection time by the cleaning contractor to bring the food waste collected to centralised food waste facility/decomposer(s).



Food waste decomposer



Small food waste collection bin at floor pantry

### 7.5 To enhance key stakeholders engagement and raise their environmental awareness on the importance of waste management and reduction

Based on the waste audit results, 573.69 kg of waste was generated, in which non-recyclable waste contributed up to 74.76% of the audited waste disposed at the LegCo Complex. As observed during on-site waste audits, a significant amount of non-recyclables such as single-use disposable items like straws, cutleries and non-recyclable containers for take-away meals were often found.

To reduce waste generation at source, the Commission may consider taking the following improvement actions targeting to raise stakeholders environmental awareness. Improvement actions as follows:

1. To launch waste reduction events and organise mini-games to educate stakeholders, including public citizens and staff members of the LegCo Complex, knowledges on waste management and waste reduction at sources;
2. To organise training workshops and programmes for staff members of the LegCo Complex to understand the up-coming MSW charging scheme legislation, as well as updating on global practices and trend of waste reduction;
3. To circulate the concept of Bring Your Own Box/Bottle (BYOB) through e-circulation;
4. To provide reusable food containers / cutleries at offices for staff members to take away meals; and
5. To practise the phasing out of individual trash bins, which would help encouraging the using of central waste management facilities and lowering the incentive of waste generation.



Green Living Fun Day launched at housing estates to educate public citizens knowledges on waste reduction



Providing reusable food container / utensils to reduce use of disposable item

### 7.6 To enhance recycling of recyclables through education and promotions

Based on the data of total quantity of recyclables provided by the Secretariat, it is revealed that metals, plastics and glass bottles contribute to around 1% of the recyclables recovered in 2018/19. In total, only 27.00 kg of metals, 24.00 kg of plastics and minimal glass were recovered in 2018/19, which were comparatively low against 67,433.20 kg of paper recovered.

Yet, based on the 3 waste audit sessions, 2.67% (5.00 kg) of metals, 12.55% (23.54 kg) of plastics and 0.33% (0.62 kg) of glass were sorted from the MSW to landfills. It is worth noticing that the sorted plastics amount in this Study were more than those recovered in 2018/19. Likewise, the sorted glass amount in this Study were more than those recovered in 2018/19. Hence, there are rooms of improvement to increasing resource recovery rate, especially for plastics and glass bottles. As to enhancing the recycling of recyclables, the following improvement actions can be done by the Commission:

1. Post conspicuous educational signage (e.g. poster) in offices and at public areas to remind conducting of clean and correct recycling;
2. Organise regular seminars and training workshops to educate staff members on proper recycling (e.g. tissue paper cannot be recycled), and update of global recycling trend;
3. Keep record of amount and types of recyclables recovered, and put up these records at eye-catching areas (e.g. pantry) to let different stakeholders of the LegCo Complex to understand their commitment on recycling; and
4. Promote recycling to staff members and other key stakeholders (e.g. LegCo Members) of the LegCo Complex through e-circular.

## 8. Conclusion

A total amount of 573.69 kg of waste to landfills was audited in the 3 waste audit sessions. Results indicate that the higher the capacity use of the LegCo Complex, the more the waste to be generated. Besides, based on the results, an approximate of around 25.24% to 38.58% of the waste identified were potential recyclables to be recovered. Though, a resource recovery rate of 57.01% was achieved in 2018/19, as according to the data provided by the Secretariat, there are still rooms for improvement to enhance the recycling and sustainability performances of the LegCo Complex.

Based on the results, around 56.93% to 65.63% of recyclables identified amongst the audited waste were food waste. Considering food waste as the dominant source of recyclables identified amongst the waste to landfills in this Study, the Commission should consider installing food waste recycling facilities, e.g. a centralised food waste decomposer, to encourage food waste recovery.

Paper is one of the major recyclables identified during spot checks as well as shown in data provided by the Secretariat. Although paper is currently recycled at the LegCo Complex, waste reduction at source would still be a more preferable approach in terms of the hierarchy of waste management. Hence, the Commission is recommended to encourage the practice of paper reduction, such as by setting up newspapers sharing corner(s), phasing out of individual/local printers, conducting paper audit to trace paper procurement and consumption amount, etc.

On the other hand, plastics, metals and glass bottles were merely recycled at the LegCo Complex, given that there are recycling bins of these recyclables. Both waste audit results and data provided by the Secretariat show that a relatively low amount of plastics, metals and glass bottles were recovered. Therefore, the Commission is recommended to encourage the resource recovery through education and promotion. Examples such as organising training workshops to educate staff members of proper recycling and update of global recycling trend are potential ways to start with and enhance further the effectiveness of waste recycling and reduction efforts.

Lastly, to respond and prepare for the upcoming MSW charging scheme, it is recommended that the Commission should develop strategic sustainable governance, through establishing a systematic waste monitoring and reporting system. These would help the Commission to obtain more accurate information on waste and recyclables quantity generated at the LegCo Complex. To comply, the Commission is advised to install the waste weighing system at the refuse collection point to record the waste quantity on a daily basis. The data collected will be useful for the LegCo Complex to benchmark its waste performances, as well as for evaluating the effectiveness of the waste management measures and facilitate decision making.

**Appendix A - Samples of waste composition record sheet**

**The LegCo Complex  
Waste Weighing Record Sheet**

|                                |                            |             |             |         |       |  |
|--------------------------------|----------------------------|-------------|-------------|---------|-------|--|
| <b>Name of auditor(s)</b>      |                            | <b>Date</b> |             |         |       |  |
| <b>Location of audit</b>       | The LegCo Complex Car Park |             | <b>Time</b> | (Start) | (End) |  |
| <b>Source of waste / floor</b> |                            |             |             |         |       |  |
| <b>Weight of waste (kg)</b>    |                            |             |             |         |       |  |
| <b>Source of waste / floor</b> |                            |             |             |         |       |  |
| <b>Weight of waste (kg)</b>    |                            |             |             |         |       |  |
| <b>Source of waste / floor</b> |                            |             |             |         |       |  |
| <b>Weight of waste (kg)</b>    |                            |             |             |         |       |  |
| <b>Source of waste / floor</b> |                            |             |             |         |       |  |
| <b>Weight of waste (kg)</b>    |                            |             |             |         |       |  |
| <b>Source of waste / floor</b> |                            |             |             |         |       |  |
| <b>Weight of waste (kg)</b>    |                            |             |             |         |       |  |
| <b>Remarks:</b>                |                            |             |             |         |       |  |

<sup>A</sup>The scope of study includes LG/F, G/F, GMF, 1/F, 1MF, 2/F – 10/F, total 14 floors, excluding the LegCo Cafeteria.

Verified by:  
On-site Supervisor: \_\_\_\_\_ / \_\_\_\_\_ (Signature / Date)

Name: \_\_\_\_\_



### The LegCo Complex Waste Composition Record Sheet

|                           |                            |             |         |       |
|---------------------------|----------------------------|-------------|---------|-------|
| <b>Name of auditor(s)</b> |                            | <b>Date</b> |         |       |
| <b>Location of audit</b>  | The LegCo Complex Car Park | <b>Time</b> | (Start) | (End) |

|  | Source of waste / floor   |  |  |  |  |  |  |
|--|---|--|--|--|--|--|--|
| <i>Recyclables (g)</i>   |   |  |  |  |  |  |  |
| R1   | Food waste  |  |  |  |  |  |  |
| R2   | Paper   |  |  |  |  |  |  |
| R3   | Plastics  |  |  |  |  |  |  |
| R4   | Metals  |  |  |  |  |  |  |
| R5   | Glass bottles   |  |  |  |  |  |  |
| R6   | Reusable items  |  |  |  |  |  |  |
| R7   | Other recyclables   |  |  |  |  |  |  |
| <i>Non-Recyclables (g)</i>   |   |  |  |  |  |  |  |
| W1   | Non-recyclable wastes I (to be directly disposed of at landfills)   |  |  |  |  |  |  |
| W2   | Non-recyclable wastes II (such as Chemical Waste, Clinical Waste and Construction Waste)<br>(NOT to be directly disposed of at landfills) |  |  |  |  |  |  |
| <i>Remarks:</i><br>(e.g. major types of R6, R7 and W2 discovered from the on-site waste audit) |   |  |  |  |  |  |  |

^ To the nearest 2 decimal places  
^ For toilet waste, categorize as W1 without sorting.

Verified by:  
On-site Supervisor: \_\_\_\_\_ / \_\_\_\_\_ (Signature / Date)

Name: \_\_\_\_\_

### The LegCo Complex Inspection Record Sheet

|   |   |  |  |             |         |       |  |
|---|---|--|--|-------------|---------|-------|--|
| <b>Name of auditor(s)</b>   |   |  |  | <b>Date</b> |         |       |  |
| <b>Location of audit</b>  | Recycling bins at G/F, 1/F, 1MF, 2/F, 5/F, 6/F and 9/F of the LegCo Complex |  |  | <b>Time</b> | (Start) | (End) |  |
| Recycling bin type:<br>A. Paper    B. Plastic    C. Metals    D. Glass Bottles    E. Others   |   |  |  |             |         |       |  |
| Floor   |   |  |  |             |         |       |  |
| Recycling bin type  |   |  |  |             |         |       |  |
| Total weight (g)  |   |  |  |             |         |       |  |
| Contaminated recyclables weight (g) (if any)  |   |  |  |             |         |       |  |
| Wrongly sorted recyclables / objects weight (g) (if any)  |   |  |  |             |         |       |  |
| Correctly sorted recyclables weight (g)   |   |  |  |             |         |       |  |
| Remarks<br><br>(e.g. 1 Non-recyclable paper – thermal paper being disposed in paper bin)<br><br>(e.g. 2 Plastic bottle with remaining liquid being disposed in plastic bin) |   |  |  |             |         |       |  |

^ To the nearest 2 decimal places

^ For toilet waste, categorize as W1 without sorting

Verified by:  
 On-site Supervisor: \_\_\_\_\_ / \_\_\_\_\_ (Signature / Date)

Name: \_\_\_\_\_

## Appendix B – Projection on general waste disposed and newspapers collected in 2018-2019 (data provided by the LegCo Secretariat)

### 1. Average amount of daily general waste and newspapers collected in 4 sample weeks

| Period   | General waste (kg)         |          | Newspapers (kg)            |          |
|--|----------------------------|----------|----------------------------|----------|
|  | Weekends & public holidays | Weekdays | Weekends & public holidays | Weekdays |
| 8-14 June 2018<br>- With one Council meeting<br>- 5 weekdays<br>- Saturday and Sunday                        | 15.85                      | 182.98   | 2.27                       | 83.02    |
| 22-28 September 2018<br>- Without Council meeting<br>- 4 weekdays<br>- 1 public holiday, Saturday and Sunday | 28.81                      | 130.17   | 4.02                       | 60.44    |
| 1-7 December 2018<br>- With one Council meeting<br>- 5 weekdays<br>Saturday & Sunday                         | 19.10                      | 159.45   | 0.00                       | 96.67    |
| March 2019<br>- With one Council meeting<br>- 5 weekdays<br>- Saturday & Sunday                              | 35.34                      | 309.61   | 0.00                       | 187.23   |
| Average amount   | 24.78                      | 195.55   | 1.57                       | 106.84   |

### 2. Number of weekdays, and weekends & public holidays

| Type                       | Number of days |
|----------------------------|----------------|
| Weekends & public holidays | 120            |
| Weekdays                   | 245            |

### 3. Projection on waste generated and newspapers recycled for the year 2018 - 2019

| Type                       | General waste (kg) | Newspapers (kg) |
|----------------------------|--------------------|-----------------|
| Weekends & public holidays | 2,973.60           | 188.40          |
| Weekdays                   | 47,909.75          | 26,175.80       |
| Total                      | 50,883.35          | 26,364.20       |