



THE ENVIRONMENTAL CAMPAIGN COMMITTEE (The ECC)

**Tender for the Supply of Food Waste Smart Bins to Facilitate Food Waste
Collection at Private Housing Estates**

PART 4 TECHNICAL SPECIFICATION

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1. INTRODUCTION

- 1.1 In 2023, about 3,200 tonnes of food waste were landfilled every day, of which around 63% were generated from domestic sources. In June 2024, the Environmental Protection Department (hereinafter referred to as "EPD") has installed food waste smart bins (FWSBs) in all 213 public rental housing (PRH) estates across the territory to collect domestic food waste. Apart from PRH estates, recognizing the significant number of private housing estates in Hong Kong, which accounts for more than 70% of households in Hong Kong, the government is eager to provide enhanced support to private housing by adopting smart technology for food waste collection in those estates.
- 1.2 The technology of smart food waste recycling bins has become more mature in recent years. Unlike traditional recycling bins, FWSBs are equipped with anti-overfill and deodorizing functions to reduce environmental hygiene problems caused by food waste. The deployed FWSBs are also coupled with the EPD's GREEN\$ electronic Participation Incentive Scheme ("GREEN\$ ePIS") to incentivize residents to recycle food waste. Each member of the GREEN\$ ePIS can participate in smart food waste recycling by using a smart card ("GREEN\$ Card") or the GREEN\$ ePIS Mobile App developed by the EPD in early 2022. With touchless scanning of the unique 10-digit membership number in form of QR code by a QR code scanner installed onto the FWSBs, details of food waste submitted (e.g., weight) and the respective electronic bonus points ("GREEN\$") can be automatically recorded in the EPD's cloud database. Similarly, with scanning of the QR code using the GREEN\$ ePIS Mobile App, members of the public can also earn GREEN\$ upon recycling and then redeem gifts using the earned GREEN\$ in the GREEN@COMMUNITY under the EPD's community recycling network.
- 1.3 To allow different brands of FWSBs to communicate with the EPD's cloud database system for the GREEN\$ ePIS, a Common Communication Platform is available to connect FWSBs with different features, configurations and Internet of Things (IoT) communication protocols in the market. In other words, when a transaction takes place in a FWSB, transaction data can be exchanged in real time between a big data platform and the EPD's Common Communication Platform through a standard application programming interface ("API") developed by the EPD's Platform Developer.
- 1.4 The Environmental Campaign Committee (ECC) has been cooperating with the EPD to launch the territory-wide "Promotion Programme on Source Separation of Waste" (hereinafter referred to as "Programme") by distributing waste separation bins on a free-of-charge basis to domestic housing and commercial and industrial premises since 2008. The objective of the Programme is to introduce a feasible way of implementing waste separation to property management companies. By providing waste separation bins, not only will the waste separation facilities of the buildings be improved, but the variety of recyclables that can be recovered will also be expanded.
- 1.5 In order to cooperate with the government's expansion of food waste recycling services, the EPD proposes to expand the existing "Programme" with food waste as a 24-month Trial Scheme, namely the "Pilot Scheme on Food Waste Smart Recycling Bins in Private Housing Estates" (hereinafter referred to as "Scheme"). The Scheme was launched on 29 December 2023 and it provides eligible large private housing estates with FWSBs, including installation and maintenance service, for a period of two years free of charge. The Scheme has received a very positive response among the private housing estates since its launch.
- 1.6 To secure an adequate amount of FWSBs to be provided under the Scheme, ECC is going to engage two contractors (the "Contractor") to supply a total of 330 FWSBs, with 165 FWSBs allocated to Contract (A) and 165 FWSBs allocated to Contract (B), along with their associated

big data platforms, a 12-month Warranty Period and a 12-month Maintenance Service.

2. GENERAL & ESSENTIAL REQUIREMENTS

- 2.1 This Specification shall be read in conjunction with the Conditions of Contract, the Drawings, the Appendices, and all other documents forming the Contract.
- 2.2 For the avoidance of doubt, nothing contained in this Specification shall in any way limit the obligations of the Operator under the Conditions of Contract.
- 2.3 A Tenderer shall comply with all the Essential Requirements stipulated in the Technical Specification below. If a Tenderer fails to do so, its Tender will not be considered further.

Essential Requirement 1

- It is an Essential Requirement that a Tenderer shall propose the FWSBs with a type of wireless scanning device to recognize the users' 10-digit GREEN\$ membership number in the form of QR code.
- A Tenderer shall complete and submit "Compliance Form of Essential Requirements", for "Essential Requirement 1: QR Code Reading Device" with necessary supporting documents/drawings to substantiate its claim for submission in the Technical Proposal.
- The ECC Representative may, at its absolute discretion, request the Tenderer to arrange demonstration on the proposed FWSBs in achieving the standard of function as stipulated in this Clause 2.3. All extra costs incurred shall NOT be borne by the ECC. Failing of the Tenderer to do so shall render the tender not to be considered further.

Essential Requirement 2

- It is an Essential Requirement that a Tenderer shall propose to provide a Big Data Platform that must be able to connect to the EPD's Common Communication Platform and transfer data/ information through a standard API and obtain a passed result of the Basic API Tests or Full API Tests, as set out in Appendix A to the Technical Specification.
- A Tenderer shall complete and submit "Compliance Form of Essential Requirements" for "Essential Requirement 2: Big Data Platform", with necessary supporting documents to substantiate its claim for submission in the Technical Proposal.
- A tender will not be considered further if the Tenderer fails to comply with the Essential Requirements stated above or the submitted documents, information or demonstration fail to substantiate that the Tenderer has the capability to meet the Essential Requirements as stated above.

3. SUPPLY OF GOODS

3.1 Total Quantities and Delivery

- 3.1.1 The quantities of Goods to be supplied by contractors under Contract (A) and Contract (B) are specified in the table below.

Contract	Quantity of FWSBs	Quantity of Food Waste Buckets	Estimated No. of Location(s) for Delivery
Contract (A)	165	24 000	40 private housing estates
Contract (B)	165	24 000	40 private housing estates

3.1.2 The final quantities of FWSBs and food waste buckets will be determined by the applications of the Scheme. During the Contract Period, ECC Representative reserves the right to request additional FWSBs and food waste buckets beyond the quantities specified in Clause 3.1.1. Such additional requests shall:

- (a) Be made in writing to the Contractor
- (b) Follow the same unit prices as specified in Items B1, B2 and B3 of the Price Proposal
- (c) Be subject to the same specifications, Warranty Service, and Maintenance Service requirements as the initial quantities, and
- (d) Be fulfilled within the same delivery and installation timeline as specified in Clause 3.2.

3.2 **Order and Delivery**

3.2.1 The ECC Representative will refer successful applications under the Scheme to Contractor (A) during the Contract Period, starting **1 month** after the contract commencement. Contractor (A) shall deliver the specified number of FWSBs and food waste buckets to the private housing estates approved under the Scheme (hereinafter referred to as “Designated Location(s)”) by the Deadline Delivery Date as requested by the ECC Representative. After Contractor (A) has been allocated their full quota of FWSBs, the ECC Representative will then begin referring subsequent successful applications of the Scheme to Contractor (B) during the Contract Period. Contractor (B) shall then deliver the specified number of FWSBs and food waste buckets to the Designated Location(s) by the Deadline Delivery Date as requested by the ECC Representative.

3.2.2 The list of Designated Location(s) will be provided to both Contractor (A) and Contractor (B) progressively as applications are approved. Unless otherwise specified, the term "The Contractor" in this document refers to both Contractor (A) and Contractor (B) in respect of their respective services under the Contracts.

3.2.3 The Contractor shall carry out on-site installation for all delivered FWSBs on the date as requested by the ECC Representative.

3.2.4 Prior to the delivery of the Goods, the Contractor shall liaise with relevant parties, including but not limited to, the ECC, EPD, venue managers of the Designated Locations and other relevant stakeholders for the set up and installation works of the FWSBs, covering installation locations, date and time, logistical arrangement, security and safety measures.

3.2.5 The Contractor shall provide all necessary peripherals, hardware, devices and protective materials for proper installation of the FWSBs, including but not limited to, extension cord, adaptors, water-proof enclosures and wooden planks. A water-proof power socket suitable for the FWSBs (i.e., 220V, single phase, 50Hz) will be made available by the venue managers (or persons in charge) of the Designated Locations within 10m of each installation location of FWSB.

- 3.2.6 The Contractor shall take all necessary precaution measures to minimize potential nuisance and disturbance to the public during installation work.
- 3.2.7 The Contractor shall prepare and provide the Big Data Platform, the QR Code Scanning Device and the User Interface Device for operating and connecting all FWSBs in accordance with Clauses 3.4 and 3.5 of Technical Specification.
- 3.2.8 The Contractor shall connect the FWSBs and the Big Data Platform to the EPD's Common Communication Platform and establish two-way data transfer through a standard API in accordance with Clause 3.4 of Technical Specification.
- 3.2.9 The Contractor shall prepare and conduct on-site testing and commissioning for all FWSBs, hardware, software and other related equipment to ensure compliance with the requirements as specified in Clause 3.7 of Technical Specification.
- 3.2.10 The Contractor shall ensure the setup, installation and operation of all hardware and software under this Contract comply with all relevant statutory requirements. The Contractor shall obtain and maintain all license(s) required for conducting the related works.
- 3.2.11 The Contractor shall be responsible for all manpower and costs related to the setup of FWSBs, including but not limited to, design, production, licenses, Full API Tests, connectivity tests, delivery to Designated Locations, installation, equipment, insurance, and any associated costs.
- 3.2.12 The Contractor shall prepare and submit the design of wrapping and user interface for endorsement by the ECC Representative within two (2) weeks after contract commencement, as specified in Clauses 3.3.2 and 3.5.6 of Technical Specification. The Contractor shall also source, provide and install the required accessories (e.g., holder for hand sanitiser, hook for attaching the public smart cards) on all FWSBs as instructed by the ECC before delivering to the Designated Locations. The design specification of wrapping and user interface is specified in Appendix C to Technical Specification for reference.
- 3.2.13 The Contractor shall prepare and conduct training for all relevant personnel related to the operation of the FWSBs and the Big Data Platform, including but not limited to, the staff at the Designated Locations (i.e., the staff of the property management and cleansing contractors of the estates) and the EPD's staff.

3.3 Food Waste Smart Bins

- 3.3.1 The Contractor shall provide FWSBs equipped with IoT functionality, including but not limited to, automatic weighting, self-diagnosis, fill level alerts, real-time transfer of transaction details through wireless 4G or 5G communication network. The FWSBs shall operate continuously (24 hours a day, 7 days a week, including Sundays, General Holidays and Public Holidays), unless otherwise advised by the ECC Representative. The power supply to support the operation of the FWSBs will be provided by the premises. The FWSBs, including hardware, software, the associated Big Data Platform and all necessary equipment shall fit for purpose, well managed, safe, efficient, effective and environmentally-friendly.

Hardware

- 3.3.2 The Contractor shall design, produce and adopt the wrapping design based on the design specification provided by the ECC Representative, including but not limited to, logos and text, for all FWSBs under the Contract. The wrapping design shall be prepared within two (2) weeks after contract commencement for endorsement by the ECC Representative before production. The design specification of wrapping design is specified in Appendix C for reference.

- 3.3.3 Each unit of FWSBs shall include an enclosed compartment sufficient to accommodate a 120-Litre mobile plastic waste container (120-L bin), with or without front foot-pedal, with dimensions specified as 550mm (L) × 480mm (W) × 940mm (H), conforming to European Standards (EN) 840-1:2012 or equivalent (See Appendix C, “inner food waste container”), as provided by the premises or the ECC Representative. The 120-L bin shall feature secure yet easily accessible retrieval and replacement mechanisms.
- 3.3.4 The FWSBs shall be used solely for food waste collection. The size of the FWSBs shall maintain compact dimensions with minimal void space between inner container and outer casing, and shall be easily accessible for disposal of food waste through a top opening lid at suitable height.
- 3.3.5 The FWSBs shall operate with power input of 220V, single phase, 50Hz. The FWSBs shall be equipped with a secure locking system (e.g., key pad lock) to avoid unauthorized removal of food waste from the FWSBs.
- 3.3.6 The Contractor shall ensure that each FWSB features a water-resistant or repellent body to prevent leakage from over-spilled food waste.
- 3.3.7 The FWSBs and all related equipment for performance of the Contract shall be water-proof and maintain satisfactory performance under ambient conditions and the worst conditions without undue deterioration.
- 3.3.8 Each FWSB shall be equipped with a level sensor to automatically send the signal of fill level of food waste of the inner food waste container to the Big Data Platform as specified in Clause 3.4 of Technical Specification. The FWSBs and the Big Data Platform shall automatically notify the venue managers of the fill level status of each FWSB (e.g., up to 70% full) for timely collection of food waste. Notifications shall be in the form of an instant SMS/WhatsApp messages. Email notifications shall also be provided if requested by the ECC Representative without extra charge. Replacement of empty inner food waste container will be arranged by the venue managers of the Designated Locations upon receipt of the notification of the fill level, thereby reducing the occurrence of overflow. The food waste shall then be collected by EPD’s contractor under a separate contract for sending to EPD’s food waste treatment facilities for recycling on a daily basis.
- 3.3.9 Each FWSB shall show different coloured lighting to indicate the bin status and fill level of the inner container on the exterior part of the FWSB to facilitate the change of bins loaded with food waste by the cleansing staff. The colours on respective fill level with different bin status (e.g., GREEN for below 70% full in normal operation, YELLOW for more than 70% full in normal operation and RED for 100% full bin in normal operation, malfunction, disconnection and out of service hours), and the logic of colour indications can be adjusted as instructed by the ECC Representative.
- 3.3.10 The FWSBs shall activate by using GREEN\$ cards or GREEN\$ App for food waste recycling and allow users to earn GREEN\$ electronic bonus points. A QR Code Scanning Device shall be used for logging in and a User Interface Device shall operate and control the FWSBs. The requirements of QR Code Scanning Device and User Interface Device are set out in Clause 3.5 of Technical Specification.
- 3.3.11 Each FWSB shall be equipped with at least one camera to record both the interior of the FWSB for monitoring collected food waste and fill level, and to capture users’ faces. When the top lid of the FWSB opens, the camera shall take consecutive photos at regular intervals (e.g. every 2 seconds) or shoot a short video until the transaction is completed and the top lid closes. The photos/videos shall be stored on the Big Data Platform and be available for downloading or exporting all or selected photos/videos by the ECC Representative.

- 3.3.12 Each FWSB shall be equipped with an automatic pest control system to prevent pest infestation caused by the collected food waste. The Contractor shall propose at least one effective method of pest control to monitor and control pests near FWSBs regularly.
- 3.3.13 Each FWSB shall be equipped with a functional system to automatically deodorise the interior of the FWSB at regular intervals to minimise odour generated from the collected food waste inside the bin. The requirements of automatic deodorisation are set out in Clause 3.6 of Technical Specification.

Software

- 3.3.14 The Contractor shall provide a robust 4G or 5G communication network at its own cost for smooth and immediate data communication and transmission of the FWSBs during the Warranty Period and Maintenance Period.
- 3.3.15 The Contractor shall provide FWSBs with functions including but not limited to, automatic weighing function, self-diagnostic function, fill level alert, and transfer of transaction details in real time through wireless 4G or 5G communication network.
- 3.3.16 After recognising the user's 10-digit GREEN\$ membership number, the FWSBs shall automatically open the top lid for user to pour waste into the inner food waste container. The food waste poured shall immediately enter the inner food waste container for real-time measurement and display of the food waste quantity. The top lid shall be equipped with an anti-pinch feature and provide a safe operation process. For improved safety and convenience of the recycling process, the top lid shall open and close automatically upon recognition of the membership or as instructed by the user.
- 3.3.17 The FWSBs shall automatically weigh food waste (from 0.1kg to 100kg) in each measurement. The FWSBs shall connect to the Big Data Platform as specified in Clause 3.4 of Technical Specification and automatically transfer all necessary transaction data/information in real time to the Big Data Platform. This is for record keeping and calculation of the respective GREEN\$ earned, and a subsequent data/information submission to the EPD's Common Communication Platform through the standard API as specified in Appendix A for data and record keeping. The standard API shall be updated in a timely manner to meet the operational needs. The Contractor is responsible for supporting the updates or amendments to the standard API as required by the ECC Representative or any authorized person.
- 3.3.18 The Contractor shall have a data logging system to completely record the data for every transaction. Items under the data logging system shall include, but not limited to, the information of user, login date and time, quantities of dropped-in food waste. All quantities weighed including the weight below 100g shall be recorded in the system even though the quantity is not enough to earn the GREEN\$.
- 3.3.19 The FWSBs shall have a self-diagnostic function, which shall automatically notify the Contractor, the venue management offices, and the ECC Representative to arrange maintenance when a fault occurs. Items under the self-diagnostic function shall include, but not be limited to, abnormal operation conditions and mechanical errors, e.g. power on failure, unsuccessful or incomplete door opening/closing, bin overflow, network failure or incomplete data logging, etc. The self-diagnostic function shall operate throughout the Warranty Period and Maintenance Period.
- 3.3.20 The Contractor shall establish an integrated notification system to expedite the process of bin replacement and maintenance, which can shorten the required response time and hence resume

the operation of FWSBs in a quick and effective manner. In case a notification, which has been triggered by an error or due to the full inner bin, remains unaddressed for more than 90 minutes, the FWSBs and the Big Data Platform shall automatically notify the venue managers, the cleansing staff, the ECC Representative and the Contractor to ensure timely responses. Notifications shall be in the form of instant SMS/WhatsApp messages. Email notifications, if requested by the ECC Representative, shall also be provided without extra charge. A monthly summary shall be prepared for record-keeping.

- 3.3.21 The FWSBs shall connect to the Big Data Platform as specified in Clause 3.4 of Technical Specification to allow remote monitoring of the FWSBs and real-time transmission of all necessary data and information, including but not limited to, the fill level of inner container, abnormality or malfunction alert, etc. from the FWSBs to the Big Data Platform for record and analysis.
- 3.3.22 The FWSBs shall be free from data/ information loss arising from any reasons such as network failure from delay or disconnection. Backup storage for all transaction data shall be secured in the event of network failure. The affected transaction data shall be automatically re-uploaded to the Big Data Platform and transmitted to the EPD's Common Communication Platform when the network is reconnected.
- 3.3.23 The Contractor shall be responsible for the insurance for the Goods, including but not limited to, general liability insurance. Insurance policies shall cover all risks which may be incurred in connection with the performance of this Contract or otherwise caused by the Goods, including death, personal injury, loss of or damage to property or any other loss to public, users and employee of the ECC Representative.

3.4 Big Data Platform

- 3.4.1 The FWSBs provided by the Contractor shall be connected to a Big Data Platform which shall be a central data management system consisting of one or more separated databases and a Data Management Interface, through 4G or 5G communication network, during the Warranty Period and Maintenance Period.
- 3.4.2 The Contractor shall connect its Big Data Platform to the EPD's Common Communication Platform and ensure successful, accurate and complete data/information transfer through a standard API, and obtain a passed result for its Full API Tests within two (2) weeks after the contract commencement, as set out in Appendix A. The Contractor shall also assist the EPD's Platform Developer to work out, develop, test and debug, and perform necessary modification to its own IoT devices, and its Big Data Platform, to enhance the function of the Common Communication Platform and the centralized database. The Contractor shall demonstrate a successful 2-way data communication from its IoT devices to the Common Communication Platform, including but not limited to, retrieving the accumulated GREEN\$ of GREEN\$ membership (from the Common Communication Platform), submitting the GREEN\$ earned in each transaction (to the Common Communication Platform).
- 3.4.3 The Contractor shall ensure that the Big Data Platform possesses all necessary data/information to communicate with the Common Communication Platform and maintain smooth operation of the FWSBs.
- 3.4.4 The Contractor shall ensure a reliable, safe, accurate, complete, traceable and successful data/information communication and transfer between its Big Data Platform and the Common Communication Platform. Data quality check shall be performed monthly to sustain the data quality in the aspects of accuracy, relevancy, completeness, reliability and consistency, and report the results in the quarterly report.

- 3.4.5 The Big Data Platform shall be free from data/information loss for any reasons such as network failure due to delay or disconnection. Backup storage for all transaction data shall be secured in the event of network failure. The affected transactions shall be automatically transmitted to the EPD's Common Communication Platform when the network is reconnected. All transactions of the FWSBs shall be transferred in real time from the Big Data Platform to the Common Communication Platform with a record.
- 3.4.6 The Contractor shall provide the access and administrative rights of the Data Management Interface of the Big Data Platform for the ECC Representative, other parties assigned by the ECC Representative and the Contractor to monitor the real-time condition of the FWSBs, as well as store and modify the data for future use. The data management interface of the Big Data Platform shall:
- (a) be easily accessible on a website or in other format as agreed with the ECC Representative;
 - (b) provide real-time and detailed individual transaction information for monitoring of the FWSBs, including but not limited to, membership ID, transaction time, rewarded GREEN\$ points, location, the quantity of food waste, fill level of the inner container of the FWSBs, usage by time of the FWSBs, abnormality or malfunction alert, etc.;
 - (c) allow transaction data/ information modification and update, including but not limited to, number of transaction of each member per day, food waste quantities, and provide a complete log to record all the modifications in a format as agreed by the ECC Representative;
 - (d) allow download or export all or selected types of data/ information in a format as agreed with the ECC Representative;
 - (e) allow management and configuration of the FWSBs, including but not limited to, setup the GREEN\$ reward mechanism with flexibility to accommodate different reward settings for special recycling campaigns or occasions, if required, as per instruction confirmed by the ECC Representative.
 - (f) display the relevant statistics and analysis of information collected, including but not limited to, user behaviour, participation rate, district distribution, time preference, etc. in a format as agreed with the Government Representative; and
 - (g) allow the ECC Representative to create user accounts, set different levels of control and access rights to the above functions.
- 3.4.7 The Contractor shall also include the following functions in the Big Data Platform:
- (a) Scheduled configuration of FWSBs if requested by the ECC Representative without extra charge, e.g., an updated GREEN\$ earning scale/arrangement with effective from a specific date and/or for a specific duration.
 - (b) Allowing bulk input to modify or update transaction records in a format as agreed with the ECC Representative.
 - (c) Automatic daily summary report to report any malfunctions of FWSB and where inner bins have not been replaced despite prolonged periods after a full bin alert notification has been issued.

- (d) Automatic fraud detection system to identify suspicious GREEN\$ earning patterns, including but not limited to:

- Abnormal frequency of transactions
- Unusual transaction amounts
- Multiple transactions from the same user at different locations within unreasonable timeframes
- Suspicious patterns of usage across different FWSBs
- Any other patterns that may indicate fraudulent activities

The system shall generate daily suspicious activities and provide details for investigation by the ECC Representative.

- 3.4.8 The Big Data Platform, with the data management interface fulfilling the requirements as specified in Clauses 3.4.2 to 3.4.7 above, shall be developed for endorsement by the ECC Representative within two (2) weeks after the Contract commences.

3.5 QR Code Scanning Device and User Interface Device

- 3.5.1 The Contractor shall provide a QR Code Scanning Device to operate each FWSB. The QR Code Scanning Device shall be a wireless device to recognise the user's 10-digit GREEN\$ membership number in the form of QR code, printed on the backside of existing GREEN\$ IC card or displayed on mobile devices with the GREEN\$ App developed by the EPD. The QR Code Scanning Device shall be water-proof and suitable for both indoor and outdoor use.

- 3.5.2 The Contractor shall provide a User Interface Device for each FWSB. The User Interface Device shall access the operating system of the FWSBs and display a complete in/out record of the information of usage of the FWSBs (e.g., login date and time, number of transaction per day, quantities of dropped-in food waste, accumulated GREEN\$, etc.).

- 3.5.3 The User Interface Device shall display messages in Traditional Chinese and English to guide FWSB users. Examples include:

- (a) ask the user to login with QR code of GREEN\$ membership;
- (b) the lid of the FWSBs will open for user to pour food waste;
- (c) ask the user to put food waste into the opened FWSBs;
- (d) the lid of the FWSBs will close; and
- (e) the weighing process will complete and transaction details will be provided, e.g., quantity of food waste recycled, and GREEN\$ earned in the transaction.

- 3.5.4 The User Interface Device shall also provide bin status for the public, including but not limited to, machine under maintenance, bin full, network disconnection and out of service hour.

- 3.5.5 The QR Code Scanning Device shall allow the user to login and logout with QR code of GREEN\$ membership, at the same time the top lid shall automatically close after sixty (60) second count down, or other duration as requested by the ECC Representative. The transaction would also be counted without scanning the QR code to logout account or touching any button on the FWSBs.

- 3.5.6 The Contractor shall design, rescale, adopt the design and logic flow of the user interface based on the design specification provided by the ECC Representative for the User Interface Device. The user interface design shall be prepared within two (2) weeks after the contract commencement and endorsed by the ECC Representative before publication. The design specification for the user interface is specified in Appendix C for reference.

3.6 Auto-deodorization

- 3.6.1 To minimise odour generated from the collected food waste inside the bin, each FWSB shall be equipped with both ozone generator and deodorizing sprayer to auto-deodorize regularly. During the Warranty Period and Maintenance Period, the frequency of auto-deodorization shall be at least once every 30 minutes, and the dosage of deodorizing agent for each auto-deodorization shall be at least 10 ml. The frequency and dosage of deodorization shall be adjustable upon request by the ECC Representative, during the Warranty Period and Maintenance Period.
- 3.6.2 The Contractor shall propose a suitable deodorizing agent for the ECC Representative's endorsement. A suitable deodorising agent shall be in compliance with all the following standards:
- (a) Liquid, water-based (i.e., totally miscible with water);
 - (b) With a neutral pH, slightly acidic, or slightly alkaline;
 - (c) Ready to use, with no preparation process required (such as dilution);
 - (d) Rated as "no hazard" for Fire Hazard, Reactivity, rated as "slightly hazard" or lower for Health Hazard, and with no Specific Hazard; according to the "US Hazardous Materials Identification System (HMIS) or equivalent";
 - (e) Does not substantially contribute to biochemical oxygen demand (BOD);
 - (f) Be able to maintain its quality when stored at temperature between 4°C and 40°C inclusive;
 - (g) With at least 30% odour reduction capability for odourous compounds, including but not limited to hydrogen sulphide;
 - (h) With proven effectiveness at municipal solid waste treatment facilities and/or sewage treatment works in Hong Kong or overseas; and
 - (i) Without reused water, foam and chlorine-containing chemicals.
- 3.6.3 For the avoidance of doubt, the Contractor shall ensure that there is an adequate amount of back-up deodorizing agent stored in the Designated Locations for refilling at all times throughout the Warranty Period and Maintenance Period. The Contractor shall provide and deliver the proposed deodorizing agent to the Designated Locations where necessary (or upon request by the ECC Representative) at its own cost throughout the Warranty Period and Maintenance Period. To avoid running out of deodorizing agent inside the FWSBs, the FWSBs and the Big Data Platform shall automatically notify the venue managers of the deodorizing agent storage status of each FWSB (e.g., only 10% left) for timely refilling by venue staffs. Notifications shall be in the form of an instant SMS/WhatsApp messages. Email notifications shall also be provided if requested by the ECC Representative without extra charge.

- 3.6.4 In the event of unsatisfactory deodorizing performance (i.e., substantial complaints received from residents or the venue manager) during the Warranty Period and Maintenance Period, the Contractor shall adjust the frequency of auto-deodorization or the dosage of deodorizing agent upon request of the ECC Representative. The ECC Representative also reserves the right to request a change of the current deodorizing agent. The Contractor shall propose another deodorizing agent for endorsement by the ECC Representative.

3.7 Testing and Commissioning

- 3.7.1 The Contractor shall conduct on-site testing and commissioning for the delivered and installed FWSBs, including all hardware and software related to the FWSBs.
- 3.7.2 Where the Contractor is not the manufacturer of the FWSBs, the Contractor shall obtain an operation manual for all the hardware and software from the manufacturer(s), prepare the method statement of testing, and the corresponding acceptance criteria for the testing and commissioning.
- 3.7.3 A Quality Control (QC) report shall be prepared for each FWSB at factory before delivery and installation at Designated Locations, confirming its technical compliance on hardware and necessary equipment. The QC report shall be submitted as a supporting document for the testing and commissioning report.
- 3.7.4 The Contractor shall submit a testing and commissioning plan covering the test items with details as specified in Appendix B for the approval of ECC Representative within two (2) weeks after commencing the Contract. The testing and commissioning plan shall include, but not limited to, the following:
- (a) Purpose of each test;
 - (b) Method statements of each test;
 - (c) Acceptance criteria of each test;
 - (d) Testing schedule and location; and
 - (e) Testing record sheet for each test
- 3.7.5 The Contractor shall conduct on-site testing and commissioning in accordance with the approved testing and commissioning plan. The Contractor shall arrange, prepare and provide all necessary materials, equipment and instruments for the testing and commissioning tests at its own cost. All testing and measuring equipment shall be calibrated by a competent calibration organization accredited by the Hong Kong Laboratory Accreditation Scheme (HOKLAS). All FWSBs shall be tested.
- 3.7.6 Subject to the comments of the ECC Representative on the testing and commissioning plan, the Contractor shall carry out additional tests at its own cost to verify the performance of the FWSBs. All testing and commissioning shall be conducted from Monday to Friday from 9:00am to 5:00pm, or at a specific time as agreed by the ECC Representative. The Contractor shall inform the ECC Representative of the details of the testing and commissioning, including the schedule and time, no less than forty-eight (48) hours in advance. The ECC Representative and/or its appointed staff shall be invited to witness the testing and commissioning if necessary.
- 3.7.7 The Contractor shall complete the testing and commissioning record sheet immediately after completion of tests. Testing record sheets and photo records shall be included in the testing and commissioning report. The Contractor shall prepare and provide a testing and commissioning report to record and summarize all the results in a format as agreed by the ECC Representative

within two (2) working days upon completion of the testing and commissioning.

3.7.8 The ECC Representative will issue the Acceptance Note only after all FWSBs have successfully passed the testing and commissioning, as documented in the testing and commissioning report.

3.7.9 The Contractor shall complete the testing and commissioning within two (2) weeks after the delivery and installation of individual FWSB, or by batches as agreed with the ECC Representative.

3.8 Warranty Period

The Warranty Period of the FWSBs shall be **twelve (12) months inclusive** from the Acceptance Date of the FWSBs.

3.9 Warranty Service

3.9.1 During the Warranty Period, the Contractor shall provide the standard maintenance and repair services with on-site assessment **within 24 hours** (from Monday to Sunday, including Public Holidays) starting from the time of receiving requests from the ECC Representative or the venue managers of the Designated Locations, or receiving signal of malfunction through the FWSBs.

3.9.2 The Contractor shall resume normal operation of the FWSBs **within 48 hours** from the initial notification time, or within a period as agreed with the ECC Representative. The Contractor shall notify the ECC Representative and the venue manager of the Designated Location within one (1) hour after completing the Warranty Service.

3.9.3 In the case when the operation of the malfunctioning FWSB cannot resume within 48 hours, the Contractor shall arrange a spare FWSB for replacement as an interim measure until the malfunctioning FWSB has resumed normal operation.

3.9.4 The Contractor shall provide and manage a hotline service from 9:00am to 9:00pm every day during the Warranty Period for technical support, receipt of the requests from and handling of enquiries lodged by the venue managers of the Designated Locations and the ECC Representative in relation to the operation of FWSBs. The Contractor shall properly record the information of the request/enquiries received, and follow-up actions taken/replies made and compilation of a database in a format as agreed with the ECC Representative.

3.9.5 The Contractor shall, at its own cost, maintain all necessary hardware, software and manpower for the purpose of discharging the Warranty Service, including but not limited to, maintaining sufficient spare parts or components, providing spare units for replacement, as well as providing the hotline service.

3.9.6 The Contractor shall obtain prior written approval from the ECC Representative for any scheduled interruption, maintenance and upgrade works during the Warranty Period.

3.9.7 The Contractor shall report the total out-of-service hours for all commissioned FWSBs in each month. Scheduled maintenance with prior written approval from the ECC Representative could be exempted from this calculation.

3.10 Maintenance Service

3.10.1 The Contractor shall provide Maintenance Service for each FWSB, starting from the date after

the expiry of Warranty Period of each FWSB, for a period of **twelve (12) months** (“Maintenance Period”).

- 3.10.2 During the Maintenance Period, the Contractor shall provide the standard maintenance and repair services with on-site assessment **within 24 hours** (from Monday to Sunday, including Public Holidays) starting from the time of receiving requests from the ECC Representative or the venue managers of the Designated Locations, or receiving signal of malfunction through the FWSBs.
- 3.10.3 The Contractor shall resume normal operation of the FWSBs **within 48 hours** from the initial notification time, or within a period as agreed with the ECC Representative. The Contractor shall notify the ECC Representative and the venue manager of the Designated Location within one (1) hour after completing the Maintenance Service.
- 3.10.4 In the case when the operation of the malfunctioning FWSB cannot resume within 48 hours, the Contractor shall arrange a spare FWSB for replacement as an interim measure until the malfunctioning FWSB has resumed normal operation.
- 3.10.5 The Contractor shall provide and manage a hotline service from 9:00am to 9:00pm every day during the Maintenance Period for technical support, receipt of the requests from and handling of enquiries lodged by the venue managers of the Designated Locations and the ECC Representative in relation to the operation of FWSBs. The Contractor shall properly record the information of the request/enquiries received, and follow-up actions taken/replies made and compilation of a database in a format as agreed with the ECC Representative.
- 3.10.6 The Contractor shall, at its own cost, maintain all necessary hardware, software and manpower for the purpose of discharging the Maintenance Service, including but not limited to, maintaining sufficient spare parts or components, providing spare units for replacement, as well as providing the hotline service.
- 3.10.7 The Contractor shall obtain prior written approval from the ECC Representative for any scheduled interruption, maintenance and upgrade works during the Maintenance Period.
- 3.10.8 The Contractor shall report the total out-of-service hours for all commissioned FWSBs in each month. Scheduled maintenance with prior written approval from the ECC Representative could be exempted from this calculation.

3.11 Food Waste Buckets

- 3.11.1 The Contractor shall provide food waste buckets, each being a 7-litre container with an inner filtration layer made from polypropylene. The design of the food waste buckets shall follow the technical specification provided by the ECC Representative and specified in Appendix E.
- 3.11.2 The Contractor shall submit a pre-production sample of the food waste bucket for endorsement by the ECC Representative within two (2) weeks after the Contract commencement, before mass production begins.
- 3.11.3 The Contractor shall deliver the exact number of food waste buckets to the Designated Location(s) by the Deadline Delivery Date, as requested by the ECC Representative. The Contractor shall liaise with the venue managers of the Designated Locations for the delivery date, delivery time and drop-off locations.

3.12 Additional FWSBs, Maintenance Service and Food Waste Buckets

- 3.12.1 In addition to the quantity of FWSBs as specified in Clause 3.1.1, the Contractor may be required to supply additional FWSBs, with the associated Warranty Service and Maintenance Service, to any locations following the requirements as stated in Clauses 3.2 to 3.10, as additional goods based on the unit price proposed in the Price Proposal. The ECC Representative shall have absolute discretion to adjust the quantity of additional FWSBs.
- 3.12.2 In addition to the quantity of food waste bucket as specified in Clause 3.1.1, the Contractor may be requested to supply additional food waste buckets to any locations as additional goods based on the unit price proposed in the Price Proposal. The ECC Representative shall have absolute discretion to adjust the quantity of additional food waste bucket.

3.13 Deliverables and Attendance of Meetings/Site Visits

- 3.13.1 The Contractor shall provide the respective submissions on time with details as specified in Clause 5 of the Technical Specification for endorsement by the ECC Representative.
- 3.13.2 The Contractor shall attend a kick-off meeting within ten (10) calendar days after the date of award of this Contract or on a date as agreed by the ECC Representative.
- 3.13.3 The Contractor shall attend physical/on-line meetings upon request of the ECC Representative. The Contractor shall prepare notes of meeting and submit them to the ECC Representative for consideration within seven (7) days of the meeting date, if needed.
- 3.13.4 The Contractor shall visit the Designated Locations or other relevant locations if needed prior to delivery and installation.

4. CONTRACT PERIOD

Subject to any extension or early termination as provided for in the Contract, this Contract shall commence from the date of award of this Contract and end on expiry date of the Maintenance Period for the Goods, both dates inclusive.

5. DELIVERABLES

- 5.1 The Contractor shall submit the following deliverables according to the submission schedule or other dates as agreed by the ECC Representative for approval:

Deliverable	Submission Schedule
<i>Before the Acceptance of FWSBs</i>	
5.1.1 Sample of Food Waste Bucket - to provide a pre-production sample of food waste bucket to demonstrate the compliance in accordance with all the mandatory features as specified in the Technical Specification (Appendix E)	Within 2 weeks after the Contract commences
5.1.2 Operation manuals - to provide detailed information and guidelines on the contact of hotline services, operation of the FWSBs,	Within 2 weeks after the Contract commences

Deliverable	Submission Schedule
including but not limited to, operation details, maintenance suggestions and troubleshooting guide - to provide access information and guidelines of the Data Management Interface of Big Data Platform	
5.1.3 Full API Tests result - to provide a certified passed result of the Full API Tests to demonstrate the compliance in accordance with the requirements as set out in Clause 3.4 in Technical Specification	Within 2 weeks after the Contract commences
5.1.4 Big Data Platform and Data Management Interface - to provide access and administrative rights of the Data Management Interface demonstrating the compliance with the requirements as set out in Clauses 3.4.2 to 3.4.7 in Technical Specification	Within 2 weeks after the Contract commences
5.1.5 Design of wrapping and user interfaces - to provide the design of wrapping and user interface in accordance with the requirements as set out in Clauses 3.2.12 and 3.5.6 in Technical Specification	Within 2 weeks after the Contract commences
5.1.6 Testing and commissioning plan - to devise the testing and commissioning methodology and acceptance criteria in accordance with Appendix B before the delivery and installation of the 1 st batch of FWSBs	Within 2 weeks after the Contract commences
5.1.7 Testing and commissioning report* - to record, summarise and report the testing and commissioning results - to submit the QC report	Within 2 working days upon completion of the testing and commissioning
Warranty and Maintenance Period	
5.1.8 Quarterly report - to summarise all the relevant data in each housing estate within that Quarter, including but not limited to, the number of completed installation, total service time for each FWSB, food waste collected at each Designated Location, record and result of data quality check, record of requests/enquiries received and follow-up action/replies made each quarter, and other information as requested by the ECC Representative	Every 3 months after the Contract commences
5.1.9 Final report - to summarise the overall performance of the Warranty Service and Maintenance Service, including details of statistics and analysis, maintenance and system enhancement such as summary of food waste collected at each Designated Location, summary of error log and	Within 1 month after the Contract Period

Deliverable	Submission Schedule
response action; and results and evaluation of the FWSBs	

**The Contractor shall prepare 1 set for every successful applicant (i.e., each housing estate) under the Scheme*

- 5.2 The Contractor shall provide all data and information collected under the Contract (including operating data for instance date, time, location and quantity of food waste collected in relation to the operation of the FWSBs) during both Warranty Period and Maintenance Period, and thereafter in such a format as agreed by the ECC Representative.
- 5.3 Upon receiving comments from the ECC Representative on the deliverables above, the Contractor shall revise and re-submit them to the ECC Representative within two (2) weeks.
- 5.4 For the avoidance of doubt, all deliverables shall be submitted in soft copy format via email to the ECC Representative. The Contractor shall also provide printed copies upon request by the ECC Representative.

6. PAYMENT TIMETABLE

- 6.1 Payment shall be made to the Contractor on a quarterly basis, subject to acceptance of Goods, satisfactory completion of Warranty Service and satisfactory completion of Maintenance Service in accordance with the Technical Specification, as well as the acceptance by the ECC Representative of the Quarterly Report specified in Clause 5.1.8 of Technical Specification.
- 6.2 The Contractor shall be paid based on the actual delivery and installation of FWSBs completed, the actual number of FWSBs with satisfactory completion of Warranty Service, the actual number of FWSBs with satisfactory completion of Maintenance Service and the actual number of Food waste buckets delivered to the Designated Location(s) in that quarter. The cut-off date for payment shall be the last date of each quarter, unless otherwise specified by the ECC Representative.
- 6.3 Payment for delivery and installation of FWSBs as specified in Clause 3.2 of Technical Specification shall be made to the Contractor on a quarterly basis, i.e., upon satisfactory completion of the following requirements:
- Upon the ECC Representative's acceptance on work programme and the testing and commissioning plan as required in Clause 5.1.6 of Technical Specification.
 - Upon the ECC Representative's issuance of Acceptance Note for FWSBs following completion of delivery, installation and testing and commissioning of FWSBs at Designated Locations as required in Clauses 3.2 and 3.7 of Technical Specification.

Each quarterly payment shall be made in accordance with the following formula:

$$\begin{aligned}
 \text{Quarterly payment for installation} &= \text{Quantity of FWSBs installed} \times \left(\text{Unit rate as specified in Item A1 of Price Proposal} + \text{Unit rate as specified in Item A2 of Price Proposal} \right) \times 30\% + \\
 &\quad \text{Quantity of Additional FWSBs installed (if applicable)} \times \left(\text{Unit rate as specified in Item B1 of Price Proposal} + \text{Unit rate as specified in Item B2 of Price Proposal} \right) \times 30\%
 \end{aligned}$$

- 6.4 Payment for Warranty Service of FWSBs as specified in Clause 3.9 of Technical Specification shall be made to the Contractor on a quarterly basis upon satisfactory completion of every 3 months of the Warranty Period. Each quarterly payment shall be made in accordance with the following formula:

$$\begin{aligned}
 \text{Quarterly payment for Warranty Service} = & \left(\begin{array}{l} \text{Quantity of FWSBs completing their 1st/2nd/3rd/4th 3-month Warranty Period} \\ \times \left(\begin{array}{l} \text{Unit rate as specified in Item A1 of Price Proposal} \\ + \end{array} \right. \right. \\ & \left. \left. \begin{array}{l} \text{Unit rate as specified in Item A2 of Price Proposal} \end{array} \right) \times 8.75\% \right. \\ & + \\ & \left(\begin{array}{l} \text{Quantity of Additional FWSBs completing their 1st/2nd/3rd/4th 3-month Warranty Period (if applicable)} \\ \times \left(\begin{array}{l} \text{Unit rate as specified in Item B1 of Price Proposal} \\ + \end{array} \right. \right. \\ & \left. \left. \begin{array}{l} \text{Unit rate as specified in Item B2 of Price Proposal} \end{array} \right) \times 8.75\% \end{array} \right)
 \end{aligned}$$

- 6.5 Payment for Maintenance Service of FWSBs as specified in Clause 3.10 of Technical Specification shall be made to the Contractor on a quarterly basis upon satisfactory completion of every 3 months of the Maintenance Period. Each quarterly payment shall be made in accordance with the following formula:

$$\begin{aligned}
 \text{Quarterly payment for Maintenance Service} = & \left(\begin{array}{l} \text{Quantity of FWSBs completing their 1st/2nd/3rd/4th 3-month Maintenance Period} \\ \times \left(\begin{array}{l} \text{Unit rate as specified in Item A1 of Price Proposal} \\ + \end{array} \right. \right. \\ & \left. \left. \begin{array}{l} \text{Unit rate as specified in Item A2 of Price Proposal} \end{array} \right) \times 8.75\% \right. \\ & + \\ & \left(\begin{array}{l} \text{Quantity of Additional FWSBs completing their 1st/2nd/3rd/4th 3-month Maintenance Period (if applicable)} \\ \times \left(\begin{array}{l} \text{Unit rate as specified in Item B1 of Price Proposal} \\ + \end{array} \right. \right. \\ & \left. \left. \begin{array}{l} \text{Unit rate as specified in Item B2 of Price Proposal} \end{array} \right) \times 8.75\% \end{array} \right)
 \end{aligned}$$

- 6.6 Payment for the delivery of food waste buckets as specified in Clause 3.11 of Technical Specification shall be made to the Contractor on a quarterly basis. Each quarterly payment shall be made in accordance with the following formula: -

$$\begin{aligned}
 \text{Quarterly payment for Food waste buckets} = & \left(\begin{array}{l} \text{Quantity of Food waste buckets delivered} \\ \times \left(\begin{array}{l} \text{Unit rate as specified in Item A3 of Price Proposal} \\ + \end{array} \right. \right. \\ & \left. \left. \begin{array}{l} \text{Quantity of Additional Food waste buckets delivered (if applicable)} \\ \times \left(\begin{array}{l} \text{Unit rate as specified in Item B3 of Price Proposal} \end{array} \right) \end{array} \right)
 \end{aligned}$$

- 6.7 All deliverables shall be delivered to the satisfaction of the ECC Representative. The ECC Representative reserves the rights to reject the deliverables or to require amendment(s) to the deliverables that the quality of the deliverables is found to be substandard. The Contractor shall submit sound justifications in writing for the approval by the ECC Representative when there is any alteration to the deliverables under Clause 5 of Technical Specification.

7. ACCEPTANCE AND GOVERNMENT REPRESENTATIVE

- 7.1 The Contractor shall provide all the data and information collected under the Contract (including operating data in relation to the operation of the FWSBs) throughout the Warranty Period and thereafter in such a format as agreed by the ECC Representative together with the Final Report.
- 7.2 If the Contractor is dissatisfied with a decision or instruction of such officer, the matter shall be referred to the ECC Representative for a ruling. The ECC Representative may delegate any of the powers and functions vested in him/her to other officers.
- 7.3 The Contractor shall report directly to the ECC Representative and shall attend working meetings as required by the ECC Representative to discuss matters related to the Goods. The meetings will be held when necessary to assist the supply of the Goods and at times required by the Contractor or by the ECC Representative or his staff. The time and travelling costs of the Contractor are deemed to be covered by the contract price.

8. THE CONTRACTOR'S TEAM

- 8.1 The Contractor will be supervised by the ECC Representative. In the course of the Goods, the Contractor shall fully cooperate with the ECC Representative and shall comply with all instructions of the ECC Representative.
- 8.2 The Contractor shall maintain for the duration of this Contract an office in Hong Kong under the control of a Project Director of the Contractor who shall be responsible for the Goods. The Contractor shall have adequate authority and sufficient professional, technical and administrative support staff in all relevant disciplines to ensure progress to the satisfaction of the ECC Representative.
- 8.3 The Contractor shall be responsible for all costs associated with the supply of the Goods and the Warranty Service. No additional fees or expenses shall be payable by the ECC except as otherwise provided for in the Contract Schedule.
- 8.4 The Contractor shall, if reasonably possible, attend or be represented at all meetings convened by the ECC Representative to which they may be summoned and shall advise and assist the ECC Representative on all matters relating to the Goods when requested by the ECC Representative. Regular and ad-hoc meetings may be convened by the ECC Representative to monitor progress, provide guidance and review warranty performance. The meetings shall be attended by the Project Director and other appropriate representatives of the Contractor.