Swanscombe Solar Panel Recycling Facility

Sampling & Inspection Plan

For

UBH Group
Solar Recycling Solutions
Unit B3
Manor Way business Park
Manor Way
Swanscombe
DA10 0PP

V.1 – April 2025

Table of Revisions & Reviews – Environmental Management System

Review Date	Revision Number	Date Of Issue	Reason for Review	Reviewed by:	Approved by:
04/2025	V.1	04/2025	Initial S&IP for Incorporation into AATF Registration Documents	MRT	
07/2025	V.2	07/2025	Revised S&IP for inclusion in EMS as Operating Technique		
			Annual Review of Previous Version		
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			Annual Review of Previous Version		
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			Annual Review of Previous Version		

Document to be reviewed (and amended as necessary) as part of any upgrading or change of plant and/or in light of any incident or accident investigation.

Notwithstanding the above, this document will be reviewed annually as a minimum.

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1.0 Preface

These documents have been prepared with all reasonable care, skill & diligence by Mike Thompson Associates Ltd (MTP) and associated consultants as necessary.

Information contained herein is based on the interpretation of data collected from various sources which has been accepted in good faith as being accurate and valid.

These documents are for the exclusive use of the client named in the document header and only for the project also detailed in the header.

No warranties are expressed or should be inferred by any third parties. These documents should not be relied upon by other parties without written consent from MTP.

MTP disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the works.

Evaluations and conclusions detailed herein do not preclude the presence of other issues on site, which could not be reasonably have been revealed by these reports or any assessments detailed herein.

2.0 Introduction & Non-Technical Summary – SRS Swanscombe

2.1. The Site

The SRS Swanscombe solar panel recycling site is located at Solar Recycling Solutions, Unit B3, Manor Way business Park, Manor Way, Swanscombe DA10 0PP.
The site lies just north of the A226 road and just west of the main London to Ashford rail line.

The immediate area around the site comprises a large industrial estate with various industrial units housing mainly vehicle maintenance works, vehicle breakers yards, etc.
Within 200m of the site lie a number of the elements of the Swanscombe Peninsula SSSI.

The site comprises 3 bays of a row of brick and steel clad enclosed industrial/warehousing units, each bay measuring approximately 16m x 38m.
There is an unloading area in front of the buildings, to the north, and hardstanding areas to the west and south.
The site is supplied with mains electricity, drainage and gas.
Main entrance for the site is on the north side of the building, alongside the unloading area.

All the buildings have a sealed, concrete floor and the unloading area to the north also has a sealed concrete floor.

2.2. The Technology

SRS Swanscombe uses technology new to the UK to receive and recycle end-of-life solar panels.
As solar installations in the UK begin to age and the efficiency and output of new panels improves, many sites are looking to either repower to increase output, replace end-of-life inefficient panels and/or replace panels damaged during storms.
No other waste type is received on site.
SRS Swanscombe processes solar panels in bulk, specialising in receiving large shipments of end-of-life panels from re-powering or panel replacement projects undertaken on operating solar farms.
Typical projects and associated recycling contracts involve the replacement of thousands of panels per site, all of which are sent for recycling here under single contracts. Therefore SRS Swanscombe has to operate quickly and efficiently.
All incoming WEEE panels are rapidly reduced to their constituent factions by an automated process line and the recycled factions are sold to onwards processors for re-use within the marketplace.
No panels are refurbished or released for re-use by SRS Swanscombe.

The site process is as follows:

2.2.1. Load Booking

Loads are all prebooked by SRS/UBH Admin, following negotiations by the company sales staff.
As the incoming panels tend to be in large numbers from individual sites that are either re-powering or replacing damaged units, all loads can be booked in to optimise on -site storage.
Loads are all from single sites. No mixed loads are received for processing.
Only a single customer's WEEE is processed at any one time. This greatly simplifies the tracking process and ensures that incoming WEEE can be tied directly to exported recycled products, simplifying certification.
As part of the booking in procedure, the consignee will confirm the make, model number and year of manufacture of the panels.
SRS will use this data to obtain the specifications, reference sheets and component/constituent details for the panels being sent to Swanscombe to ensure no hazardous or leachable material is contained within the panels.

2.2.2. Load Reception & Inspection

Loads are received and unloaded in the loading/unloading area immediately outside the front of the process buildings.
5 panels are weighed from each load to give an average panel weight for the load. This is then multiplied by the number of panels in the load to give an accurate overall weight.
Incoming panels are inspected for signs of contamination with other wastes.
Contaminated panels are rejected if they are not processable.
Such rejection is rare but is recorded as required and the client informed before alternative disposal is arranged.

2.2.3. Offloading & Storage
The panels come palletised and are offloaded by forklift.
All incoming panels are stored in a secure location whilst awaiting processing.
The panels are stored with the top panel glass down (if not stored undercover) and on an impermeable surface.
If possible, frames and junction boxes are removed prior to storage (S.2.2.4 & 2.2.5).

2.2.4. Panel Inspection & Loading Into Plant
Incoming panels are again inspected prior to processing.
The junction boxes are removed manually and the panels placed onto the end of the stripping line, being inspected as they are loaded.
The number of panels processed is recorded to ensure compliance with the relevant Waste Transfer duty of Care documentation and allow accurate Certification of Recycling to be undertaken for each load/client.

2.2.5. Junction Box & Frame Removal
The panels first have the junction/inverter boxes removed from the rear manually.
Once on the process line, the aluminium frame is pulled off the panel as a first operation.
The junction boxes are granulated to recover copper, metals and plastics.
The aluminium frame pieces are placed in a skip for despatch off site & onwards processing at a smelter.

2.2.6. Glass Removal
The panel is placed glass-down on the deglazing unit and the glass is removed from the cells underneath through the use of a milling line to take the glass off the silicone cell backing.
Once the glass is removed, it is ground to a fine (c.2mm) powder to allow further removal of any tramp material prior to being stored in bulk 1 tonne bags for onwards sale, despatch and re-use – directly to a glass factory as raw materials for their processing.

2.2.7. Copper/Silicone/Plastics Sorting
The cells of the panel are destroyed through shredding.
The materials are reduced to powder form and then separated using a proprietary technology unique to this plant line.
This produces copper, silver, lead, silicone and plastics as finely divided separated products or a purity suitable for onwards re-use.
Again, these are stored in bulk 1 tonne bags for onwards sale, despatch & re-use.
Copper cables and the junction boxes are granulated separately to produce copper and plastic granules.

2.2.8. Product Sampling
Products are sampled from the bulk bags as they are produced.
The sampling regime and specification for each product is set by the end user and the quality of the product determines the price.
As all the recycling products are generated through a defined system with tight quality control standards and are produced to comply with set quality standards that allow their use in place of virgin resources, SRS Swanscombe will be categorising these materials as End of Waste under the bespoke Permit – application currently under preparation.

2.2.9. Product Storage
All recycling products are stored within the building on a sealed surface.

The products are either stored in sealed bulk bags (granulated materials) or skips (aluminium framing).
Secure storage is needed as the products have a high resale value.

2.2.10. Product Sale & Removal
Granulated products are sold in bagged form for onwards re-use.
Bags are loaded using the site fork lift.
Each bag is weighed before loading to ensure accurate correlation between the weight of the incoming WEEE waste stream and the outgoing products.
Aluminium is despatched in large skips, removed and sent to the smelter. The weight of aluminium despatched is confirmed by the smelter using their weighbridge system.

2.3. Site Permitting

SRS Swanscombe currently operates under a T11 Exemption while the operation and process plant are proved. The operations under this Exemption being approved by the E.A. in October 2023. The T11 will also allow the plant to operate whilst the Permit Application is prepared, submitted and approved.

Initial discussions with the E.A. are already underway with a view to applying for a bespoke Permit in the near future.

The site is also in the process of registering as an AATF and is joining the Beyondly PCS scheme to cover the WEEE re-use/recycling obligations imposed by current legislation.

As part of the bespoke Permit documentation, a full EMS for the site will be produced, incorporating this Sampling & Inspection Plan as an Operating Technique.

All the End-of-Waste systems will also be incorporated into the EMS as Operating Techniques.

3.0 Sampling & Inspection Plan Requirements

3.1. The AATF Application Form sets out a number of requirements for the Sampling & Inspection Plan and associated documentation.
These are set out below:

Applicants for AATF approval must include a sampling and inspection plan with the completed application e-form. Your regulator can provide you with best practice templates to assist you. In the plan you must provide us with details of how you determine:

- *the weight of the WEEE that arrives at your site*
- *that the WEEE you receive has arisen in the UK*
- *the source of the WEEE*
- *whether the WEEE you receive is obligated or non-obligated (you cannot issue evidence notes on non-obligated WEEE)*
- *the correct category for the WEEE you receive – see Schedule 1 of the Regulations*
- *whether the WEEE you receive is household (B2C) or non-household (B2B)*
- *the quantity in tonnes and category of any WEEE which is reused, either at your site or any other site(s) – if you issue reuse evidence on their behalf.*

Confirm if you are using the following:
- *LDA Protocol*
- *SMW Protocol*
- *Site Specific Protocol*
- *Reuse Network Product Weight Protocol*
- *Light iron Protocol.*

You must also include the following related information with your application:
- *You must refer to any local (site-based) or nationally agreed protocols you use and you must describe the audit systems you use to ensure that evidence notes are issued correctly*
- *If you are accepting WEEE that is self-clearing from an LADCF you will need to tell us which LA DCFs it is, and the collection streams that you will be accepting from it*
- *You must provide information on how you, or the downstream sites you send WEEE to, are able to achieve the recovery and recycling targets set out in the WEEE Regulations*
- *Provide details on how you are able to avoid double counting of WEEE; i.e. that evidence is not issued on the same WEEE twice*
- *Confirm whether any WEEE is sent for energy recovery.*

3.2. The relevant points raised above are covered in Section 4, with any remaining points being dealt with in Section 5.

4.0 Sampling & Inspection Plan

4.1. Waste Types & Tonnages to be processed

SRS Swanscombe will only receive and process solar panels – Category 14 WEEE.

The EWC waste code for this stream is below:

Waste Code	Description
16	WASTES NOT OTHERWISE SPECIFIED IN THE LIST
16 02	wastes from electrical and electronic equipment
16 02 14	discarded equipment other than those mentioned in 16 02 09 to 16 02 13

For the sake of explanation of 16 02 14, EWC codes 16 02 09 to 16 02 13 are listed below but are not accepted at the site:

16 02 09	*transformers and capacitors containing PCBs*
16 02 10	*discarded equipment containing or contaminated by PCBs other than those mentioned in 16 02 09*
16 02 11	*discarded equipment containing chlorofluorocarbons, HCFC, HFC*
16 02 12	*discarded equipment containing free asbestos*
16 02 13	*discarded equipment containing hazardous components other than those mentioned in 16 02 09 to 16 02 12*

SRS Swanscombe currently has a single operational solar panel processing line, capable of handling c.200,000 panels per annum.

A second line is being commissioned, capable of doubling the site's throughput to c.400,000 panels per annum.

A solar panel weighs, on average, c.20kg per panel, so the approximate throughput of the site, when working at full capacity, will be around 85,000tonnes per annum.

To cover any variation of the panel weights, the Permit will be written to cover a throughput of 90,000 tonnes per annum.

4.2. Sampling & Inspection Regime

As the site receives and recycles by destruction all incoming WEEE and only deals with solar panels delivered in bulk by palletised loads on articulated trucks, the sampling & inspection regime is geared towards maintaining the efficient, rapid processing of the WEEE whilst maintaining traceability for the incoming batches of end-of-life panels en masse.

There are no inspections of individual panels as this is not required – no panels are refurbished or returned to market and the plant is easily able to process physically broken units without issue.

The Sampling & Inspection Regime has 5 distinct phases and generates the following document trail for each contract batch:

4.2.1. Contract Confirmation – Recycling Contract Document

Initial enquiries are handled by the company sales team.

Successful contracts for the recycling by destruction of end-of-life solar panels will generate a contract document detailing the following information:

- Source of WEEE (site name and address within UK)
- Number of panels to be recycled
- Packaging method (usually palletised for removal by articulated truck)
- Panel manufacturer, model number & year of construction
- Panel specifications, technical details & component/constituent list

- Panel characteristics (size, weight, type, age, details of any damage, etc)
- Overall weight of end-of-life panels included in contract (number of panels x individual weight)
- Confirmation of EWC Code
- Collection point (includes collection method, loading point & any site-specific access issues)
- Client/WEEE producer (address, contact details, SIC code)
- Date of panel uplift from site
- Details of waste carrier registration (usually UBH/SRS)

These details allow the block booking of transport for the panels and also programming the reception, storage and processing of the panels at SRS Swanscombe.

The contract documents are held at SRS Swanscombe and the relevant Waste Transfer Notes for the incoming loads are attached to the contract documentation so that an accurate check on the number & weight of panels recycled under the contract can be maintained.

4.2.2. Waste Delivery – Waste Transfer Duty of Care Note

The incoming loads under contract will each have a Waste Transfer Note as required under the Duty of Care Regulations.

As a minimum, the Waste Transfer Notes will contain the following information:

- Individual, traceable Waste Transfer Note number
- Source of WEEE (collection site name and address within UK)
- Number of panels within load
- Packaging method (usually palletised)
- Waste Description
- Overall weight of load (number of panels x individual weight)
- Confirmation of EWC Code
- Confirmation of Client SIC Code
- Client/WEEE producer (address, contact details, SIC code)
- Date of panel uplift from site
- Date of panel delivery to SRS Swanscombe
- Details of waste carrier registration (usually UBH/SRS – including company address)
- Registration number of delivery vehicle
- Signatures and names of driver & receiving member of SRS staff
- Confirmation of Permit/Exemption number & address for SRS Swanscombe

A sample Waste Transfer Note is included in the Appendices.

A copy of the signed, completed WTN will be held at SRS Swanscombe attached to the original Contract Document.

A copy will also be given to the driver, if the haulier is not SRS/UBH.

A third copy will be retained until the end of the contract and sent, on completion of the contract, as part of the overall contract/invoicing pack to the client/waste producer.

4.2.3. Waste Processing – Operational Recording

As part of the day to day operational information gathering for the site, the following information will be entered into the site diary:

- Start time for processing plant
- End time for processing plant
- Details of any process interruptions

- Details of any incoming WEEE loads
- Panel count for each operational period
- Contract & WTN number for panel batches processed during operational period
- Estimate of weight of products generated during each operational period (to be confirmed on weighing and despatch)
- Bag numbers for any filled bulk bags removed from plant during operational period
- Sample numbers & bag numbers for any product samples taken during operational period for compliance with End-of-Waste Quality control system
- Details of any products despatched from site with bag numbers where available (aluminium is not bagged)
- Names of operators
- Site Foreman signature

The above information will be retained in the Site Diary and ensures complete traceability from the initial contract, through delivery, processing & final product despatch for each batch of end-of-life solar panels covered by a recycling contract.

A copy of the processing information relevant to each contracted batch will be attached to the original Contract Document along with the WTNs and this will be retained at SRS Swanscombe

A copy of the processing information relevant to each contracted batch will be retained until the end of the contract and sent, on completion of the contract, as part of the overall contract/invoicing pack to the client/waste producer.

4.2.4. Waste Recycling – Recycling Certificate

If required, a summary of the overall recycling information for each contracted batch of end-of-life panels can be supplied to a client/waste producer at the end of the contract.

This document will contain the following information:

- Client Company Name
- Source of WEEE (site name only)
- Contract Number
- Start & End Date of Recycling/Deconstruction Contract
- Number of Panels Recycled
- Overall weight of Panels Recycled Under Contract (number of panels x individual weight)
- Breakdown of Material Recycling Volumes

The information may be anonymised (removal of the site & contract details) if the client requires the Certificate for PR purposes.

Any information required for PCS/Warranty purposes will be available in the separate end of Contract Pack.

If generated, a copy of the Recycling Certificate will be retained with the relevant Contract Pack at SRS Swanscombe.

An example of a Recycling Certificate is included in the Appendices.

4.2.5. Product Sampling & Analysis Procedures

All granulated bulk bagged products will be sampled in line with end-user and the company End of Waste systems' requirements.

For each sample, a Sample Record & Dispatch Sheet will be completed. This document will contain the following information:

- Date of Sample
- Individual Sample Number
- Description of Product Being Sampled
- Bulk Bag Number for Sampled Product
- Approximate Weight of Sample
- Analysis Required
- Address of Sample Analysis Laboratory
- Identification Number for Laboratory Sample Acceptance Paperwork (copy of Laboratory SAP to be attached to Sample Record & Dispatch Sheet)
- Date of despatch to Laboratory

Results of sample analysis will be attached to the Sample Record & Despatch Sheet and retained at SRS Swanscombe.

The client will receive confirmation of the tonnages of recycled product generated from the end-of-life solar panels as part of the Contract Pack issued on the closure of the disposal contract.

5.0 Relevant Protocols & Other AATF Application Requirements

5.1. The AATF Application asks for information on the following points either not relevant to the operations at SRS Swanscombe or answerable in short form.
This information is provided below:

Confirm if you are using the following:

- *LDA Protocol*
- *SMW Protocol*
- *Site Specific Protocol*
- *Reuse Network Product Weight Protocol*
- *Light iron Protocol.*

A site-specific protocol for the determination of weights of the incoming WEEE & outgoing recycled products is used.
Details of this are included in Section 2.1 & 4.

You must also include the following related information with your application:

- *You must refer to any local (site-based) or nationally agreed protocols you use and you must describe the audit systems you use to ensure that evidence notes are issued correctly*

The audit system used is administered by the Beyondly PCS (Approval No: WEE/UP3538PY/SCH).
All incoming WEEE is recycled through reduction to component factions.
No incoming WEEE is reused.
All Certificates of Recycling and Duty of Care documentation comply with current regulatory requirements.

- *If you are accepting WEEE that is self-clearing from an LADCF you will need to tell us which LA DCFs it is, and the collection streams that you will be accepting from it*

SRS Swanscombe does not accept WEE from LADCFs.

- *You must provide information on how you, or the downstream sites you send WEEE to, are able to achieve the recovery and recycling targets set out in the WEEE Regulations*

As the incoming WEEE comprises only end-of-life solar panels that are reduced to constituent factions for sale as recycled products to end-users, the percentage of received waste recycled is c.99%.
Only plastics are sent for heat recovery instead of recycling. This is to ensure that, in the highly unlikely event that POPS are present within the plastics in any form, they are incinerated and not re-used, in accordance with legislation.
This is demonstrated through the relevant Duty of Care documentation, Recycling Certificates and PCS documentation.

- *Provide details on how you are able to avoid double counting of WEEE; i.e. that evidence is not issued on the same WEEE twice*

All loads are tracked through the system and destroyed for recycling in order of delivery.
As the site is small, there is minimal on-site storage of incoming WEEE.
As all clients require copies of all relevant Duty of Care documentation and Recycling Certificates to prove destruction, each incoming load is tracked to ensure there are no discrepancies between incoming waste weights and outgoing recycled product weights.

- *Confirm whether any WEEE is sent for energy recovery.*

No WEEE is sent for energy recovery from SRS Swanscombe.
However, while all factions are produced to a quality suitable for recycling, the recycled plastics are sent for energy recovery to ensure that, in the unlikely event of POPs being present in the plastics, these are incinerated in accordance with legislation.
This is a precaution and, to date, no POPs have been encountered.
The weight of plastic sent for incineration is recorded as part of the contract documentation.

6.0 Records Keeping, Reporting & Administration

6.1. Administration & Records Keeping

All administration required by the operation of SRS Swanscombe is undertaken within the site office.

All records pertaining to the acceptance of waste are retained here, as are records of all relevant client and onwards disposal site Permits.

Copies of all Duty of Care documents, Waste Transfer Notes, Consignment Notes and Recycling Certificates are retained here for a minimum of 5 years.

These documents are also retained in electronic form as part of the company's data backup systems.

6.1.1. All incoming waste loads are pre-booked through either SRS or UBH Admin Office and this is then confirmed to site staff on a weekly basis so they are aware and prepared for loads as they arrive. This speeds up the unloading and inspection process and also optimises on site storage of panels awaiting processing.

6.1.2. All outgoing product and waste movements are also organised through the Admin Office, prebooking each in liaison with site staff.

This ensures all movements are carried out in a controlled fashion and all the required documentation is generated and retained as necessary.

This also ensures that the site's storage capacities for recycling products are not exceeded.

6.2. Reporting

6.2.1. Waste Reporting

All reporting as required under the various operating Permit, Exemption & AATF/PCS requirements will be undertaken by the Admin Office as part of the overall administration and document control required for the compliant operation of the site.

These reports include:

- Quarterly Returns
- Client Reporting
- Confirmation of Destruction
- Consignee Returns
- Waste Operator Returns
- AATF Returns
- PCS Returns
- Duty of Care Waste Transfer Notes
- Hazardous Waste Consignment Notes

Further reports may be generated as required by clients, stakeholders and/or regulatory bodies.

6.2.2. Additional Reporting Requirements

Any additional reporting requirements under the various operating permissions/registrations will be undertaken by the site and the records retained as required. This will also be undertaken by the Admin Office.

These may include:

- Water Consumption
- Emissions to Air
- Ambient monitoring of particulate Emissions
- Energy Usage
- Raw Material Consumption

6.3. Duty of Care Documentation

6.3.1. Waste Transfer Note

Inbound vehicles are recorded, along with details of carrier and source of shipment.

The driver of the load will verify delivery detail by signing a copy of the Waste Transfer Note (if non-hazardous), which designates official transfer of waste solar panels to SRS.
One hardcopy of the signed-off waste transfer note will be given to the driver / haulier if a third party waste carrier is used.

6.3.2. Hazardous Waste Consignment Note

Inbound waste will not contain hazardous materials as the site will only be processing end-of-life solar panels.
Should out-going maintenance waste or residues contain hazardous materials, the relevant consignment note system shall be set up by the registered waste disposal firm used to deal with this material.
If, in the future, incoming panels do start to contain hazardous waste, then consignment notes will be generated as required.

6.3.3. Recording Weight of Incoming Waste

The weight of incoming waste is calculated on a per-contract basis.
The calculation is simple – the panels under a contract will all have a known weight and the number of panels will be known prior to contract commencement.
Total weight of incoming waste under the contract is a simple matter of multiplying individual panel weight by the number of panels.
The total weight is then notes on the Contract Document.
Shound there be any variation in the number of panels, this will be noted asa variation to the Contract Document.
Copies of all Waste Transfer Notes pertaining to an individual contract will be retained by SRS Swanscombe, attached to the original Contract Document.
At the end of the contract, the number of panels processed are agreed with the client and the contract is closed.
The client will also be supplied with a full Contract Pack, including the Contract Document and copies of all Waste Transfer Notes, Operational Records, Sampling Records and a Recycling Certificate (if required) pertinent to the deconstruction and recycling of the end-of-life solar panels covered by the contract.

6.3.4. Recording Weight of Outgoing Recycled Products

All outgoing recycled products are weighed.
This is either undertaken on site prior to loading (bulk bagged products) or, in the case of aluminium exported in scrap skips, by the smelter on delivery of the product.

Appendices

A.1 Waste Transfer Note Example

A.2 Certificate of Recycling Example

A.3 SRS Brochure

A.4 UBH Group Environmental Policy

A.5 Health and Safety Policy UBH and SRS Jan 25

A.1 Waste Transfer Note Example

Attached as File UBH-SRS Waste Transfer Note Example.pdf

A.2 Certificate of Recycling Example

Attached as File UBH-SRS Certificate of Recycling Example.pdf

A.3 SRS Brochure

Attached as File SRS-Brochure-2025.pdf

A.4 UBH Group Environmental Policy

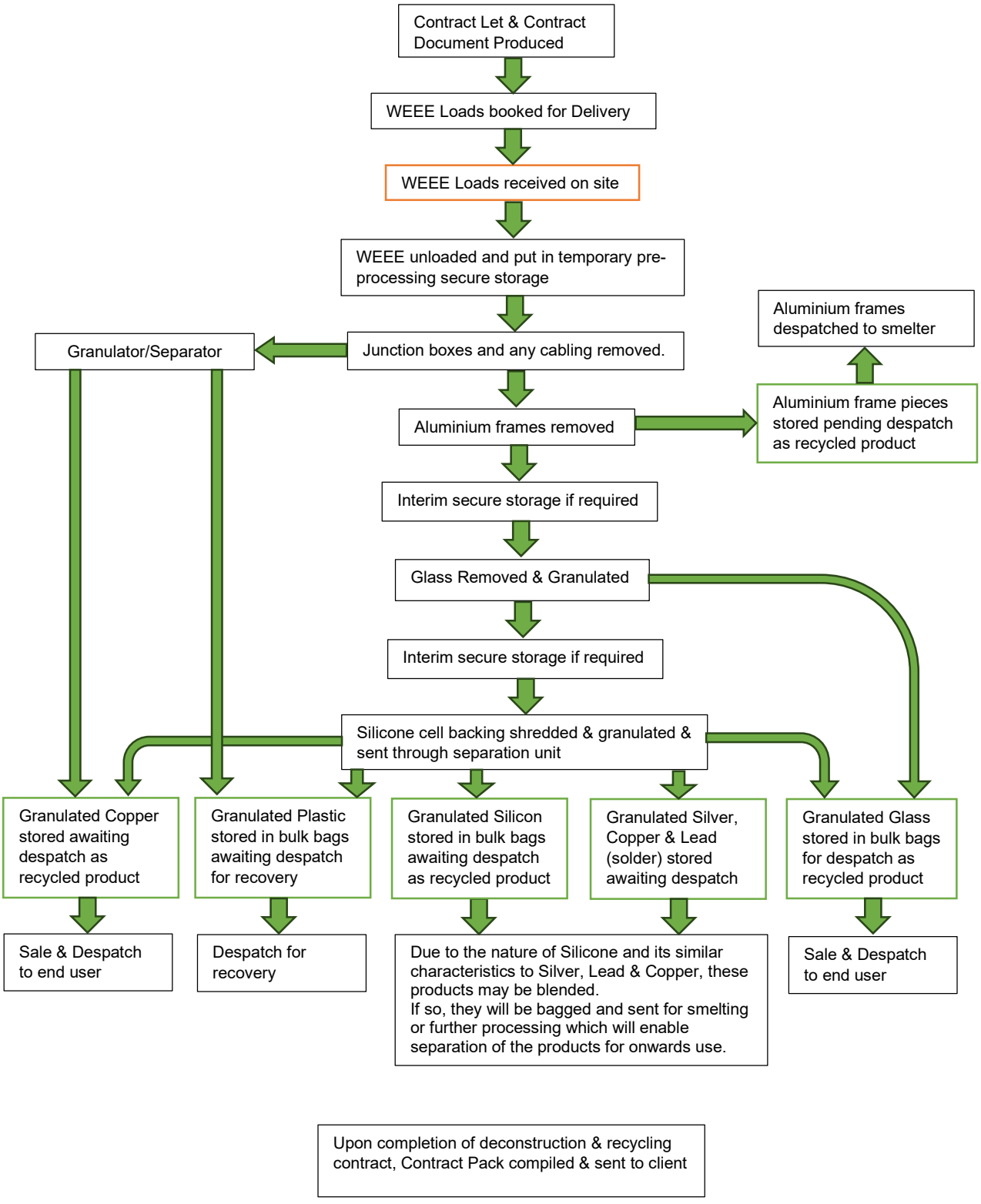
Attached as File UBH Group Environmental Policy-2024.pdf

A.5 Health and Safety Policy UBH and SRS Jan 25

Attached as File Health and Safety Policy UBH and SRS Jan 25.pdf

Drawings & Figures

D.1 Process Flow Chart – SRS Swanscombe



D.2 Site Plan – SRS Swanscombe