Executive Summary

The bulking of waste materials and resources at a central location within a Public Sector Organisation, such as a college or university, can identify the opportunity for potential cost savings and wider environmental benefits. These can be achieved by providing an alternative to a large number of collections from multi-sites within an organisation's property or estates portfolio.

Materials for an organisation to consider are the key materials identified in the Waste (Scotland) Regulations 2012; paper and card, plastic, glass, metal and food waste, as well as other waste streams including Waste Electrical and Electronic Equipment (WEEE), batteries and furniture.

There are many reasons why an organisation may consider establishing a materials bulking service:

- Lack of a local service for a material stream (for example, food waste, or some types of dry recyclables);
- Recyclable or recoverable materials that are presently being disposed of in the residual waste (landfill) stream can now be segregated and stored separately following the introduction of new waste management arrangements, for example the introduction of recycling containers in offices, residences, other buildings, etc.;
- Potential to segregate some streams for re-use, e.g. computer equipment, furniture etc;
- Potential value to be derived from source segregating materials and having them collected separately; and
- Potential to create sufficient quantity of material to make collection viable.

This guide outlines for organisations the key factors to be reviewed when considering the introduction of a materials bulking service and provides information on the steps involved in service development. The steps are provided in a logical sequence; however many of the decisions to be made will be co-dependent on other ‘steps’. It is therefore recommended that the whole document is read in order to understand these co-dependencies, although some readers may want to focus on specific sections only.

Information within the guide is also illustrated with a number of ‘case studies’ which highlight practical ideas, tips and hints from organisations that presently operate a materials bulking service and which is relevant to the issues being discussed at that point.
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Heriot-Watt University

Scotland’s Rural College (SRUC)

University of St Andrews
1 About this guide ...

The key aim is support the improvement of segregated collection schemes for key waste streams and also those required by the Waste (Scotland) Regulations 2012. This guide is intended to assist public sector organisations in Scotland with advice on the introduction of a bulking of waste and recyclable materials service at a central location within their establishment. However, it is primarily focussed towards Further Education (FE) and Higher Education (HE) establishments.

Through the bulking of waste materials at a single site, an organisation may be able to realise potential cost savings and wider environmental benefits from the recovery of the key materials identified in the Waste (Scotland) Regulations 2012; paper and card, plastic, glass, metal and food waste, as well as other waste streams including Waste Electrical and Electronic Equipment (WEEE), batteries and furniture.

This guide aims to provide you with knowledge and details of good practice that can help to inform your decision making in the provision and implementation of bulking facilities. A number of FE and HE institutions have been contacted throughout the development of this guide and their feedback has been incorporated throughout. The guide also contains a series of case study extracts, illustrating the approaches adopted by relevant institutions. These can provide an insight into the development and operation of bulking activities.

Wherever possible we have also included images of plant, equipment and vehicles in use at the FE/HEs that are represented in the case studies.

Figure 1: Key Steps
2 Why introduce bulking operations?

There are a number of drivers for why you may wish to consider bulking waste and recyclable materials; these include:

- Policy and strategy, this includes the Zero Waste Plan, but also any policy and strategy specific to the institution;
- Legislation, including the Waste Management Licensing Regulations and the Waste Scotland Regulations;
- Finance, including direct costs to the waste contractor as well as internal costs for staff time, vehicle requirements;
- Environment, for example a reduction in collection frequency and associated benefits in terms of vehicle emissions; and
- Operational efficiencies, for example reduced contract management time.

2.1 Policy and strategy drivers

The Scottish Government published its Zero Waste Plan in June 2010. This Plan sets out the strategic direction for waste policy in Scotland over the next decade and is intended to be both an economic strategy and a resource strategy, not simply a waste strategy. It sets out the Scottish Government's vision for achieving a zero waste society:

"where waste is seen as a valuable resource, valuable materials are not disposed of in landfills, and most waste is sorted for recycling, leaving only limited amounts to be treated" (Scottish Government, 2010)¹.

The Plan has set a 70% recycling and composting target for all waste by 2020. To achieve this, recycling of all materials will need to be maximised, with provision of recycling facilities playing a key part in reaching this target.

2.2 Legislative drivers

The Waste Framework Directive (WFD) is an EU-wide directive that aims to reduce the amount of waste across Europe and increase recycling and reuse. In Scotland, the WFD has been translated into national law by Waste (Scotland) Regulations 2011 and Waste (Scotland) Regulations 2012.

The WFD has been revised several times since it was first introduced in the 1970s. The most recent version introduced a revised waste hierarchy, which prioritises different waste management options based on their environmental impact (see Error! Reference source not found.).

The hierarchy is a key consideration for policy and service decisions, both nationally and locally. All organisations now have a legal duty to consider it when disposing of their waste. This means that when addressing waste disposal you should aim to deal with waste as far up the hierarchy as possible. You will also be required to provide evidence of this approach in your waste transfer notes.

To deliver some of the requirements of the revised Waste Framework Directive, and key actions set out in the Zero Waste Plan, the Waste (Scotland) Regulations 2012\(^2\) have been introduced. The regulations aim to:

- Maximise the quantity and quality of materials available for recycling;
- Move residual waste management up the waste hierarchy;
- Drive operational and cultural shifts in how waste is managed; and
- Create the market certainty needed to support infrastructure investment.

The requirements of these regulations are:

- Businesses to present metal, plastic, glass, paper and card for separate collection from 1 January 2014.
- Food businesses (except in rural areas) which produce over 50 kg of food waste per week to present that food waste for separate collection from 1 January 2014.
- Food businesses (except in rural areas) which produce over 5 kg of food waste per week to present that food waste for separate collection from 1 January 2016.
- A ban on food waste macerator usage in non-domestic properties.
- Local authorities to provide householders with a collection service for dry recyclables (end of 2013) and food waste (end of 2015); waste contractors to provide collection and treatment services which deliver high quality recycling.
- A ban on any metal, plastic, glass, paper, card and food collected separately for recycling from going to incineration or landfill from 1 January 2014.
- All new incinerators must ensure that metals and dense plastics have been removed from residual municipal waste prior to incineration.
- A ban on biodegradable municipal waste going to landfill from 1 January 2021.

Hence, part of the requirement will be to provide suitable storage space for recyclable materials to be collected in separate containers and to provide facilities for the separate collection of food waste. For many organisations, the ability to comply with the new regulations may be restricted by the level and types of waste collection services available to individual locations within their sites.

2.3 Financial drivers

In order to be able to present segregated dry recyclables and food waste for collection by an authorised waste carrier, an organisation may have no option other than to consolidate these materials at a central point where they can be bulked up prior to collection.

In the current economic climate, budgets are becoming tighter, and the ability to consolidate materials at a single site may enable you to realise cost savings.

Collection frequency

Reduced costs due to a decrease in transportation costs from the waste contractor can be achieved if less frequent collections are required. For example, a 1100 litre wheeled bin for residual waste costs approximately £12 each time it is emptied; whilst a 6.1m$^3$ front end loader (FEL) typically costs £60 each time it is emptied. Therefore, if a 6.1m$^3$ front end loader (FEL) is used instead of six 1100 litre wheeled bins, this represents a saving of approximately £12 for each collection. If collections took place on a weekly basis, this is an annual saving of £624. There are other factors to consider in relation to switching container types, including:

- Can your current contractor provide and service a larger container?
- Do you have available space for storing and servicing a larger container? The footprint for an FEL is smaller than that for six 1100 litre wheeled bins, however vehicles will need access to the container for loading unlike for 1100 wheeled bins which can be moved to the vehicle for emptying.

Bulking of single stream materials

Bulking of waste streams, particularly more niche materials, may result in the collection of those waste streams becoming viable, for example mattresses may be being disposed of via the general waste stream to landfill, but bulking may enable a greater quantity to be stored making a separate collection for the recycling of this stream viable.

Similarly, where cardboard is collected as part of a commingled recycling scheme, often there will be a charge associated with collections of this type. However, if sufficient quantities are available for the baling of cardboard, it is possible to gain an income for this waste stream which can often offset the costs of baling and other waste management services. The income gained from cardboard does vary depending on commodity prices but can be up £40 per tonne.
2.4 Environmental drivers

We are entering an era of resource scarcity. The extraction and processing of raw materials to manufacture new products is becoming more and more challenging. If we can capture and manage waste further up the waste hierarchy, by preventing its generation or through recycling and re-use, we can help to protect the environment by relieving the pressure on natural resources, reducing the need for mining, quarrying, logging, refining and processing, all of which damage natural habitats and create both air and water pollution. By providing facilities to enable staff and students to re-use and recycle, we can close the loop on materials otherwise destined for final disposal. What’s more, using recycled materials in the manufacturing process requires considerably less energy than that needed to create new products from scratch. Re-use has has the potential for even greater environmental benefits, as items may be used with little or no further processing.

The management of waste higher up the waste hierarchy helps to:

- conserve resources;
- protect the environment;
- reduce landfill; and
- save energy.

Increased public awareness means increased staff and student awareness and many FHE institutions have started introducing recycling schemes, but there is also an opportunity for you to consider bulking these waste streams for re-use and recycling to realise operational efficiencies and financial savings, as well as considering a wider range of waste streams such as WEEE, mattresses, and furniture.

2.5 Organisational drivers

Being resource-efficient helps you to cut the costs associated with waste disposal. In reviewing the waste management practices carried out at your institution to establish whether bulking of some waste streams is a viable option, it is important to have a basic understanding of the type and quantities of waste generated. In addition to finance, the key organizational drivers are space availability and its utilisation and any resource requirements, namely staff time and the need for vehicles or equipment.

The use of bulking facilities may mean that space can be used more efficiently, as the use of larger waste containers will have a smaller overall footprint than a number of small containers housed across the site, or through the use of baling and compacting for some waste streams such as cardboard, plastic film etc. Where bulking facilities are being shared by two or more organisations then the space savings are considerably higher. The use of bulking can make the collection of material for re-use and recycling viable, particularly for some streams, and hence can provide a ‘feel good’ factor for people at work.

Bulking waste can also allow common approaches for the management of waste across a site, enabling the waste/ estates team to more easily and efficiently manage waste, thus potentially benefitting from closer control on budgets, legislative compliance, and monitoring.
3 How to identify potential materials for bulking

The need to keep materials separate is one of the central points of the Waste (Scotland) Regulations. The Scottish Government believes that source segregation at the point of collection is the most efficient way of minimising contamination, and maximising the value that can be recovered from each waste stream. However, the Government recognises that comingling or mixing streams of recyclables may be acceptable. Further guidance on this is available from: http://www.zerowastescotland.org.uk/RegulationsFAQS

To understand the potential for bulking waste produced on a site, and the increased potential for segregation and bulking of dry recyclables, food waste and other materials such as furniture, WEEE and mattresses, the first step will be to conduct a waste mapping exercise, which will identify:

- The type and quantity of waste or recyclable material produced at each campus site or location,
- Current and future costs associated with the present waste management arrangements, e.g. taking into account expected increases in landfill tax.
- The disposal/ treatment/processing routes for each material type, e.g. prevention, re-use, recycling, composting, landfill, etc.
- Current infrastructure available at the site e.g. is a baler / compactor available at any location which may contribute to a bulking operation.
- Any existing ‘Recycling on the Go’ activity that involves the collection of segregated recyclables in place.
- Current monitoring systems in place for waste arrangements, in order to evaluate the reliability of existing data but also to assess how existing arrangements may be used to inform future service development.
- Contract(s) in place for waste management, including whether any penalties may be incurred due to the change to bulking or separate collection arrangements for selected waste streams.

The first step is to review existing waste transfer notes, consignment notes (special / hazardous waste) and purchasing records to establish what waste is being disposed of. For example, purchase orders may highlight how many mattresses are produced each year, which suggests that the same amount is being disposed of (unless a new development has been undertaken), and waste transfer notes will record the type and quantity of each waste stream disposed of. The management route for each waste stream will be required (i.e. landfill, recycling, re-use), as well as direct costs associated with the management of each stream is also required.

If the type and quantity of waste or recyclable material produced at each location is not known, then information on container volumes/numbers of sacks and their collection frequencies can be used to estimate waste quantities based on standard material density conversion factors.3

Use of these standard conversion factors enable volumes of waste to be converted to weights is a simple process, and very simply the weight of a waste stream can be calculated using the formula below.

\[
\text{Weight} = \text{Volume of Waste} \times \text{Conversion Factor}
\]

Where the units are:

- Weight (kg)
- Volume (m$^3$)
- Conversion factor (kg/m$^3$)

For example, where newspaper and magazines is collected in three 1100 litre wheeled bins (or 1.1 m$^3$) over the course of one week. The weight of newspapers and magazines can be calculated as set out below using the conversion factor of 305 kg per cubic metre.

\[
\text{Weight} = (3 \times 1.1) \times 305 = 1006.5 \text{ kg}
\]

That is, 1006.5 kilograms or 1.0 tonnes.

In addition, you may wish to complete a simple compositional analysis on the residual waste stream, which involves assessing the contents of the residual waste streams produced by the organisation at one or more of its sites. The analysis could be a visual assessment based simply on looking at the types and quantities of different material streams in the bins. A range of support and online training is available from Zero Waste Scotland covering waste prevention, reuse and recycling (see [http://sometraining.zerowastescotland.org.uk/](http://sometraining.zerowastescotland.org.uk/)).

From this initial review you will have a list of different materials and the quantities of waste generated over a given time period, which you will be able to use with the information gathered throughout this guide, to determine whether a bulking operation is appropriate for your organisation.
4 Infrastructure requirements

4.1 Site selection

There are a number of operational requirements to be considered to assess the suitability of a site as a potential location for a bulking centre. In simple terms there may be an increase in vehicle movements and the introduction of vehicles, plant and equipment to manage the unloading, handling, storage, bulking up and exporting of waste materials identified as being potentially recoverable for re-use and/ or recycling.

As part of any review of waste services to determine the requirements for a bulking up location, an organisation will need to consider:

- Location and site requirements;
- Site access;
- Storage at source;
- Loading/ unloading arrangements;
- Materials transfer at source;
- Central storage requirements; and
- Health and safety.

These are discussed further below.

4.1.1 Location and site requirements

The location of a potential central bulking facility and its accessibility /proximity to the sources of materials will be a key consideration. It must satisfy the internal traffic movement requirements and any restrictions associated with the site and also be readily accessible from the local road network to facilitate the movement of bulked materials off site.

If possible, the site selected for the bulking operation should be a level site with a hard impermeable surface and suitable drainage for both environmental purposes as well as ease of the operation.

A key consideration will be security because of the potential presence of any plant or equipment that may present a danger to any untrained or unskilled site users and also risk of theft as certain materials (such as metals and textiles) are a target for thieves wishing to capitalise on the high material prices.

Typically there should be a two-metre high fence and a lockable gate around the site perimeter, and any buildings or storage units must also be secure. The site, and its entrance, should be large enough to allow collection vehicles access to the site, thereby minimising the impact on the road network (whether internal or external).
Table 1 illustrates the dimensions for a range of containers and skips that will assist you in determining the area required for storage at the site. The key dimensions you should use are the Footprint and the Service Bay Dimensions. It also includes typical dimension and weight ranges (for floor loading considerations) for a cardboard baler that will produce a ‘mill size’ bale (generally a rectangular bale of 450 – 650kgs and 800 – 1100mm in size depending on the material it contains).

<table>
<thead>
<tr>
<th>Container</th>
<th>Dimensions</th>
<th>Footprint</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-litre Dustbin</td>
<td>Diameter 640mm Height 700mm</td>
<td>900mm x 900mm</td>
</tr>
<tr>
<td>55-litre Recycling Box</td>
<td>Width 400mm Length 610mm Height 390mm</td>
<td>500 x 710mm</td>
</tr>
<tr>
<td>140-litre Wheeled Bin</td>
<td>Width 480mm Length 550mm Height 1070mm</td>
<td>680 x 750mm</td>
</tr>
<tr>
<td>240-litre Wheeled Bin</td>
<td>Width 585mm Length 740mm Height 1100mm</td>
<td>785 x 940mm</td>
</tr>
<tr>
<td>360-litre Wheeled Bin</td>
<td>Width 660mm Length 880mm Height 1100mm</td>
<td>860 x 1080mm</td>
</tr>
<tr>
<td>720-litre Bulk Container</td>
<td>Width 820mm Length 1100mm Height 1430mm</td>
<td>1020 x 1300mm</td>
</tr>
<tr>
<td>940-litre Bulk Container</td>
<td>Width 1100mm Height 1430mm</td>
<td>1300 x 1300mm</td>
</tr>
<tr>
<td>660-litre Wheeled Bin</td>
<td>Width 820mm (with lid open) Length 1265mm Height 1320mm</td>
<td>1020 x 1465mm</td>
</tr>
<tr>
<td>1100-litre Wheeled Bin</td>
<td>Width 1260mm (with lid open) Length 1370mm Height 1380mm</td>
<td>1460 x 1570mm</td>
</tr>
<tr>
<td>Roll Cage Container (Medium)</td>
<td>Width 715mm Height 1520mm</td>
<td>815 x 900mm</td>
</tr>
<tr>
<td>Roll Cage Container (Large)</td>
<td>Width 715mm Height 1700mm</td>
<td>815 x 900mm</td>
</tr>
</tbody>
</table>

Table 1: Illustrative container dimensions

4.1.2 Site access

Restrictions on opening hours, security arrangements, planning and permitting requirements, etc. will influence both the internal collection arrangements where materials are remotely collected for transfer to a central bulking point.

4.1.3 Storage at source

Available storage areas for materials (internally and externally) at locations across your site must be identified and the potential for developing or expanding these investigated. Once segregation of materials at their point of origin is introduced there will be a need to utilise separate material storage containers.
Centralised bulking of waste materials

These may include a range of different size wheeled bins, a cage unit for flattened cardboard, sacks and dustbins for food waste etc. This may not be appropriate in some cases, such as for waste streams that may be taken directly to the bulking store once it is no longer required, for example, WEEE that has become redundant.

The size and type of container to use for material storage will be determined by the following factors:

- Available storage space;
- Frequency of internal collection for transfer to a central bulking point;
- The type of material and any need to prevent weather damage, animal nuisance or specific storage requirements, for example, food waste, spent cooking oil, WEEE, batteries etc.; and
- The width of any doorways or passages where internal storage is provided. This must be wide enough to ensure that any container can be transferred from the storage area to the transfer vehicle without any impediment to its movement or damage to internal structures.

In addition, an important aspect to consider is the means of transportation of materials from the point where they arise or the interim waste storage point, as appropriate, to the bulking point. This transportation is dependent on a number of factors such as distance to transport, access requirements and availability of staff. Options include the use of trolleys, all terrain vehicles with trailers, or standard commercial vehicles.

4.1.4 Loading and unloading arrangements

Depending on the choice of containers and the vehicles to be used to transfer materials from their source to a central bulking point there may be a need for handling plant and equipment. In simple systems waste transfer can be effected by using tail lift vehicles or trailer units. Once any processing of materials takes place, for example the baling of cardboard, then there will be a requirement for pallet trucks and/or forklift trucks to stack and store bales and load them onto a vehicle for removal.

4.1.5 Material transfer arrangements

The approach to transferring materials to the central store will need to be considered, and the approach may differ depending on the type of material and the vehicles and equipment to be used in the transfer operation:

- A container exchange system - where the source container is replaced with an empty container previously stored in the bulking area, e.g. where recyclables are collected in a 1100 litre wheeled bin they may be transferred within the wheeled bin to the bulking area and an empty 1100 litre wheeled bin left in its place. This approach is used at St Andrews University, where tail-lift vehicles are used.
- An container exchange system can also be used for smaller items such as as batteries, lights, small WEEE etc. where boxes or crates are often used.
- Use of trailer units located at strategic locations / consolidation - these are exchanged using a vehicle fitted with a towbar. Heriot Watt use a vehicle that allows two trailer units to be towed around the campus.
Emptying of the unit/bin - where the contents of the bin are placed into the collection vehicle and then transferred to the bulking point. For example, dry recyclables collected via a RotG scheme may be collected in a unit lined with bags, enabling staff to remove the bag from the unit and place into the collection vehicle.

Direct transfer - some waste streams may be collected from their point of use and taken directly to the bulking point, for example redundant fridges/freezers, mattresses and furniture may be taken directly to a container/storage unit at the bulking point. This approach is used by the SRUC where redundant IT equipment is returned to the bulking point by IT staff after they have installed the replacement equipment.

Exchangeable Storage Crates for lights and tubes – University of St. Andrews

Ad hoc collections of any materials that have been identified as a ‘Maintenance Request’ are delivered electronically to the University’s Recycling Team. These are collated at least twice daily and collections scheduled according to priority and any need to co-ordinate with Janitorial or other staff at individual establishments. The Recycling Team provide an ‘on demand’ container exchange/collection service for batteries, light fittings, tubes etc. These, and any requests to collect furniture, WEEE, etc. can be accommodated within their daily routine collections.

4.1.6 Central storage arrangements

A range of storage methods may be required at the bulking point, depending on the materials collected. The type of containers may include:

- Enclosed containers for large WEEE, furniture, mattresses etc.;
- Secure containers for hazardous waste such as asbestos;
- Stillage containers for lamps, small WEEE, etc.;
- External storage bays for some streams such as fridges and freezers;
- Skips or roll on – roll off (RoRo) containers for scrap metal, rubble etc.;
- Large wheeled bins, front end loaders (FEL) or rear end loaders (REL) for residual waste, dry recyclables etc.; and
- A hard standing area (preferably under cover) for the storage of baled cardboard (where carried out).

The type and size of the container will ultimately be dependent on the volume of the waste stream generated, the space available for storage at the bulking point as well as the collection frequency. Therefore it is suggested that you obtain prices for servicing a range of containers from a minimum of three waste contractors to select the most appropriate for your organisation.
It is vital that the price obtained from each waste contractor is consistent, and aspects to consider include:

- Rental costs for the container;
- Fee for emptying the container including any associated transport costs;
- Any administrative charge(s); and
- Any rebate for recyclable materials.

Some bulking operations may involve a form of physical treatment of the material, such as baling, compacting, or shredding. Shredding of green waste is only likely to take place if the material is being composted on the site, as it is unlikely to be viable to do this prior to treatment elsewhere. Baling and compacting are, however, common place, and the decision to undertake these operations is dependent on the quantity of material produced, and availability of staff to manage the process. In order to determine whether baling / compacting are a viable option, it is suggested that you consider the cost for the service if the material is not baled or compacted and compare this to the costs and potential income benefits where the material is baled or compacted.

Aspects to consider in terms of baling and compactor costs are:

- **Compactor:**
  - Expected compaction ratio and the resultant impact on container weight, for example where cardboard boxes are collected, the use of a compactor enables boxes to be crushed, thus increasing the weight of cardboard contained within the compactor. The increase in weight is ultimately dependent on practices, for example where cardboard is flatpacked before being placed in the container, the increase in weight will be less than where any cardboard that has not been broken down or flattened is commonly placed in the container.
  - Rental and installation costs for the compactor or alternatively the depreciation cost if you are considering purchasing a compactor. Note that you will need to consider that some waste management companies may not provide a service if the compactor is not leased through them.
  - Power costs.
  - Labour costs for staff to place material into the compactor.
  - Costs / income received for emptying the compactor.

- **Baling:**
  - Expected weight of the bales produced.
  - Rental and installation costs for the baler or alternatively the depreciation cost if you wish to purchase a baler.
  - Costs for ancillary equipment – baling wire etc.
  - Power costs.
- Labour costs for staff to place material into the compactor.
- Management of the baled material – e.g. stacking of bales.
- Costs / income received for the collection of the bales, including any rebate for the material.

Table 2 provides dimensions and service bay requirements for two typical types of skip and demountable container. It also gives details for compactor units that could be used with these where large quantities of materials make on-site compaction viable.

<table>
<thead>
<tr>
<th>Skip Type</th>
<th>Dimensions</th>
<th>Service Bay Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Skip (10.5m³)</td>
<td>Width 1800mm</td>
<td>Width 4500mm</td>
</tr>
<tr>
<td></td>
<td>Length 3700mm</td>
<td>Length 5800mm</td>
</tr>
<tr>
<td></td>
<td>Height 2430mm</td>
<td>Height 4900mm</td>
</tr>
<tr>
<td>Static Compactor (for a 10.5m³ Skip)</td>
<td>Width 1800mm</td>
<td>Width 4500mm</td>
</tr>
<tr>
<td></td>
<td>Length 6600mm</td>
<td>Length 8000mm</td>
</tr>
<tr>
<td></td>
<td>Height 2400mm</td>
<td>Height 4900mm</td>
</tr>
<tr>
<td>Roll-on/Roll-off Container (27m³)</td>
<td>Width 2500mm</td>
<td>Width 5000mm</td>
</tr>
<tr>
<td></td>
<td>Length 6200mm</td>
<td>Length 8200mm</td>
</tr>
<tr>
<td></td>
<td>Height 2800mm</td>
<td>Height 6000mm</td>
</tr>
<tr>
<td>Static Compactor (for a 27m³ roll-on/roll-off)</td>
<td>Width 2500mm</td>
<td>Width 5000mm</td>
</tr>
<tr>
<td></td>
<td>Length 10200mm</td>
<td>Length 12200mm</td>
</tr>
<tr>
<td></td>
<td>Height 2800mm</td>
<td>Height 6000mm</td>
</tr>
<tr>
<td>Cardboard Baler</td>
<td>Width 1200-2000mm</td>
<td>Dependent on Baler Size</td>
</tr>
<tr>
<td></td>
<td>Depth 800-1500mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Height 3350-3650mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weight 1200-2500kgs</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Illustrative Skip and Compactor Dimensions

It may be possible for you to utilise an existing transport fleet to collect materials for depositing waste/ recyclables at the bulking point. For example the facilities management/ estates staff may have routine inspections scheduled across the site or sites, and these could be utilised to transport materials back to the site. At SRUC, the IT team bring redundant IT equipment back to a bulking point at the Edinburgh campus once they have installed new equipment.
Recovery of IT equipment – Scotland’s Rural College (SRUC)

At SRUC, IT and telecoms equipment is returned to a central bulking point from its network of sites across Scotland by the IT team. Essentially when new pieces of equipment are taken to a site by the IT team for installation (printers, computers etc), the old items are taken back to the central bulking point at the Edinburgh campus by the same team. Similarly, where new mobile phones are despatched to individuals they are asked to return their old items to the Edinburgh campus.

Waste Cooking Oil Collection – University of St. Andrews

The University has a take back arrangement with their cooking oil supplier to collect waste cooking oil from bunded storage points at the University’s catering facilities.

4.1.7 Health and Safety

Health and safety (H&S) is an important aspect to consider in the development and implementation of a bulking operation at your organisation. Each operation will need to consider its own individual circumstances, and conduct a risk assessment to assess the risks and develop control measures to mitigate that risk. The two major risks associated with bulking facilities relate to the use of vehicles and the manual handling of waste/recycling containers. You can find further information on these in the following guidance documents:

- The Health and Safety Executive (HSE) provides guidance on H&S issues around the use of vehicles in on-street waste and recycling collections. Much of this guidance will also be relevant to the transfer of waste from their source to the bulking point. This is available from: [www.hse.gov.uk/pubns/waste04.pdf](http://www.hse.gov.uk/pubns/waste04.pdf)

- Guidance is available on reducing the risks associated with manual handling, including staff training, and determining the appropriate collection frequency. Further information is available from: [www.hse.gov.uk/research/hsl_pdf/2006/hsl0625.pdf](http://www.hse.gov.uk/research/hsl_pdf/2006/hsl0625.pdf)

- The Waste Industry Safety and Health (WISH) Forum and HSE provide guidance on the safe collection of waste and recycling. Although this is focused on domestic kerbside collections, the recommendations are relevant to other types of services. This is available from: [www.hse.gov.uk/pubns/waste23.pdf](http://www.hse.gov.uk/pubns/waste23.pdf)

Other key H&S considerations include:

- Is there potential for unauthorized staff/ students to access the bulking point and cause or suffer injury from the containers or materials stored?

- Is there sufficient space available to access the bulking point safely?

- Is there sufficient space available to access the containers/ storage areas safely to deposit waste?

- Is there sufficient space available to safely enable the collection of the waste by your waste contractor/ internal collection staff?

- Housekeeping at the bulking point is vitally important to ensure that the site is kept in a clean manner and any spillages are contained.
Table 3 sets out the key health and safety requirements to complete before rolling out your new scheme, as well as recommended actions.

<table>
<thead>
<tr>
<th>Aspect / Issue</th>
<th>What to do ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has a Risk Assessment been completed for the bulking operation?</td>
<td>Consult HSE guidance on conducting Risk Assessments: <a href="http://www.hse.gov.uk/risk/fivesteps.htm">www.hse.gov.uk/risk/fivesteps.htm</a></td>
</tr>
<tr>
<td>Does the Risk Assessment consider the aspects outlined in this Section?</td>
<td>Consult with your organisation’s H&amp;S Officer and any operational staff for their input into the Risk Assessment.</td>
</tr>
<tr>
<td>Have standard operating procedures or method statements been prepared, based on the findings of the Risk Assessment?</td>
<td>If no standard operating procedures or method statements are in place, draft a simple procedure or flowchart outlining the steps to be taken to conduct activities safely. An audit template and timetable should also be developed to regularly review site operations and assess compliance with procedures. The results of the audit should be fed back to staff, and the risk assessment and procedures updated if appropriate.</td>
</tr>
</tbody>
</table>

**Table 3: Considering Health and Safety Requirements**

### 4.2 Vehicle, Plant and Equipment

It is possible that existing vehicles, plant and equipment within a transport fleet can be used to service a bulking operation. There is no requirement for specialised collection vehicles and infrastructure if the operation is based on the simple transfer of sacks or containers of recyclable materials from the point of origin to a designated sorting point.

Existing vehicles within your fleet may be suitable to be used for the introduction of waste transfer operations. In the simplest terms this can be a transfer of materials in sacks and / or bundles of cardboard. Similarly the availability of vehicles with tail-lifts or tow bars will allow for a container exchange or trailer unit service to be implemented.

**Vehicles – University of St. Andrews**

The Recycling Team at St. Andrews University utilise a Van and a Caged Vehicle fitted with tail-lifts that allow them to haul sacks, wheeled bins, furniture, bulky refuse etc. A wheeled bin exchange is used to collect materials from identified ‘consolidation points’ across the University.

The University’s Recycling Team also provides an ‘on demand’ collection service for other materials and these are incorporated into the daily collection routine when requested. The team collect and deliver the following materials to a central bulking point:

- Office paper
- Food waste
- Large and small WEEE
- IT equipment
- Textiles
- Furniture
- Cardboard
- Confidential waste
- Fluorescent tubes / lamps
- Scrap metal
- Timber including pallets
- Abandoned bicycles
At Heriot Watt University, Edinburgh caged trailer / trolley units are located at various locations across the campus for the temporary storage of flattened cardboard and paper in sacks. These materials are delivered to the caged units by janitorial / other staff and students. Full caged units are exchanged by the Recycling Team and taken to a central bulking point.

**Vehicles – Heriot-Watt University**

A Kubota 4 x 4 vehicle is used for towing the caged trailer / trolley units that are stored at various locations across the campus for storing flattened cardboard and sacks of paper. These are brought back to a central waste compound for bulking and further processing (for example, cardboard is baled using a baling machine). Two members of the Recycling Team carry out a continuous circuit of the University and exchange the full units as necessary.
5 Staffing requirements

In your organisation, implementing a bulking operation may require additional effort by internal staff. This additional time requirement is likely to be related to:

- Collection of materials from their source and transport to the bulking point;
- Handling of materials at the bulking point (including any baled material);
- Operation of any compaction/ baling equipment at the bulking point;
- Record keeping and monitoring and evaluation requirements you may wish to implement; and
- Housekeeping and maintenance requirement.

Therefore it is vital the internal costs associated with a bulking operation are considered. To calculate these costs the requirement for additional staff will need to be considered in relation to the aspects set out above as well as any current spare capacity available in staff time. In addition, you will need to consider whether the bulking operation will require changes to job descriptions and whether additional training will be required.

Staff training is an important tool in supporting the development of staff involved in a bulking operation and any training schedule that is produced must cover:

- health & safety, risk assessments, manual handling, safe working practices and uses of mechanical plant (for example, any baler or static compactor), especially with regard to bulky and special (hazardous) wastes;
- driver and / or operator training for any new vehicle, plant or equipment;
- understanding of the importance or recovering value from materials;
- recognition of material types and potential contaminants for each material stream; and
- customer care appropriate to day to day site operations.
6 Communication

If your bulking activity will result in new materials being segregated for re-use and recycling it is vital that this information is communicated to staff and students. Where the activity is a new management approach for materials already segregated, it is still worthwhile incorporating this information into your communications campaign so that staff and students are informed of what happens to the materials they segregate.

For example:

- New scheme – consider a generic message on the availability of a new scheme within your organisation’s premises or locations, e.g. You can now recycle your drinks cans, bottles and paper!

- Existing scheme with new recycling facilities – consider directional messaging to ensure consumers are aware of new facilities, and to encourage continued use of the service, e.g. Recycle your end of life electrical equipment, cans, bottles and paper at our recycling points.

- Established scheme – consider additional motivational messaging, such as facts on how recycled materials are handled at the site, e.g. baled, and then transformed to new products by a re-processor, to inform consumers of the benefits of recycling, e.g. Our old drinks cans become new ones in just six weeks!

Effective communication is a key issue as waste minimisation and recycling schemes alone do not deliver increased recycling nor do they reduce waste - people recycle and people reduce waste by changing their behaviour. The key to success of any scheme is to provide people with easy to understand communications explaining and encouraging correct use every time.

A consistent set of colours and iconography associated with each type of bin in which each material is collected, will give strong visual cues to the user rather than using signage containing only words. For more specific areas such as offices or delivery areas, where the types of recycling may be restricted to mostly paper, or packaging, a greater emphasis on information and training may help to increase the amount of material collected for recycling rather than relying on the information provided on the bins themselves.

Zero Waste Scotland recommends that providers use the Recycle Now (Recycle for Scotland) branding, which is widely recognised and carried by most bin manufacturers and used for on-pack recycling labels. The iconography also meets current Disability Discrimination Act guidance. The Zero Waste Scotland website has an ‘Iconography for Material Streams’ guidance document⁴, which has been developed specifically for the national ‘Recycle for Scotland’ brand to ensure a consistent use of icons in signage and other communications media. Complete guidance on how and where to use the brand, including icons, can be found in the Recycle for Scotland Brand Guidelines⁵.

⁴ See http://www.zerowastescotland.org.uk/content/partners. There is a requirement to register before documents can be accessed and downloaded. Once registered, Zero Waste Scotland will provide a link to access the documents. Please note: any new materials that are produced bearing the Recycle for Scotland logo and brand must be sent to Zero Waste Scotland in advance for sign off.

⁵ If an organisation requires portrait and / or landscape PDF versions of the material stream artwork then Zero Waste Scotland use ‘DropBox’, an online file sharing system to share folders containing artwork which they can be given access to. Zero Waste Scotland also have material stream photos, food waste images and images with and without key lines.
Here are some of the benefits of the Recycle for Scotland brand:

- The brand and its activities are extensively tested on the public and evaluated.
- In March 2011, 55% of people in Scotland recognised the Recycle for Scotland brand.
- The Recycle Now logo and iconography is in widespread use by some of the UK’s biggest retailers and is being used by an ever-increasing range of other organisations to communicate recycling messages.
- The Recycle for Scotland brand has an extensive range of free, evidenced-based, consumer-tested resources which can be tailored to support your recycling scheme.

www.recycleforscotland.org.uk

Figure 3: Examples of promotional and in-situ templates
7 Impacts on new and existing waste contracts

You should commence negotiations or discussions with existing service providers within existing waste contracts to determine what financial savings may be derived from bulking operations. As a minimum the current waste provider should be able to give an overview of the locally available processing market for materials such as cardboard, glass, plastics, paper and food waste. Ultimately, you will need to establish whether any change would need to be agreed via a contract variation, or will your current contract cover the new bulking activities.

7.1 Service contracts – things to consider

7.1.1 Varying existing contracts (Service Level Agreements)

You may be able to change the service requirements agreed in writing at the start of a contract to incorporate servicing of new or expanding recycling facilities.

Be sure to build in annual reviews to make the re-negotiation process easier and the contract more flexible. Variations to service can be a costly addition to an existing contract, so consider what compromises can be made. If you are introducing new recycling units, can you remove or replace some existing residual waste units?

7.1.2 Procuring a new service

The best type of contract will be one that provides a value-for-money service which ensures you meet legal requirements and maximise environmental performance. We would recommend that you discuss procurement requirements with your in-house team to understand what your organisation’s procedures are.

7.1.3 Developing your specification

If you need to procure a new service for the bulking operation, you will need to develop a specification. A specification is a detailed guide that explains exactly what service(s) you require, how the service(s) should be delivered, and what infrastructure or resources you will provide as part of the service(s). Consider who will perform the following services and how frequently they should be undertaken:

- Cleansing
- Emptying
- Maintenance
- Promotion
- Purchase
- Storage

7.1.4 Collection frequency

The required collection frequency can be estimated based on the data on waste arisings gathered during the initial waste mapping study, and then using this information coupled with bin/container volumes to assess the required collection frequency.
**Before you start ...**

<table>
<thead>
<tr>
<th><strong>Objectives</strong></th>
<th>What objectives do you have for the service?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>How will bidders demonstrate they can meet these objectives? (Think about your evaluation criteria for the contract.)</td>
</tr>
<tr>
<td></td>
<td>Do you want your contractor to continually improve the efficiency and environmental performance of your premises? Be aware that enhanced performance may incur additional costs.</td>
</tr>
<tr>
<td></td>
<td>The Waste (Scotland) Regulations 2012 will require businesses to comply with a new range of legal requirements from the end of 2013. Is this factored into your objectives?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Scope</strong></th>
<th>What's the scope of the service you want to procure, and what services do you have available in-house?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recycling collection only?</td>
</tr>
<tr>
<td></td>
<td>Waste and recycling collection?</td>
</tr>
<tr>
<td></td>
<td>Service (emptying), maintenance and cleansing of infrastructure, e.g. bins, balers etc.?</td>
</tr>
<tr>
<td></td>
<td>Provision of infrastructure and any auxiliary items needed, e.g. the provision of wire for the baler. Provision of signage and associated communications material?</td>
</tr>
<tr>
<td></td>
<td>You may be able to make things easier by procuring services together. This, however, may not provide you with the value for money that you need. Speak to contractors about what they could provide.</td>
</tr>
<tr>
<td></td>
<td>Depending on arrangements with contractors, baling and bulking material on site or at a transfer station may attract a better price and help generate revenue. But remember that some contractors prefer to receive loose material so that it can be sorted and baled to market standards.</td>
</tr>
<tr>
<td></td>
<td>Are there any additional requirements that need to be included in terms of security, for example, access to the site and units?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Cost</strong></th>
<th>What will give you value for money, in the context of legal requirements on handling and management of waste and recycling?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The services required may change over the contract term. You may decide to remove some existing residual waste containers and replace them with additional containers for dry recyclable streams as the amount of recycling you do on site increases.</td>
</tr>
<tr>
<td></td>
<td>Will you be looking for a ‘pay-by-weight of material collected’ arrangement, or a pay-by-lift approach? For a bulking operation a ‘pay-by-weight’ approach for the collection of material is a standard approach and should not cost you more.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Length of contract</strong></th>
<th>How long does the contract need to be in place?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Will you need an extension?</td>
</tr>
<tr>
<td></td>
<td>What flexibility will be incorporated? Will there be regular review points?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Monitoring</strong></th>
<th>How will your objectives be measured and performance monitored? Consider how you want the contractor to provide information regarding the operation of the service to help you monitor performance.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>How will they provide a system for data collection – by recording and monitoring of weight, or number of bales collected?</td>
</tr>
</tbody>
</table>

Table 4: Key points to consider when procuring a new service
7.1.5 Obtaining data

To measure the success of your scheme, it will be important to keep track of the weight of material collected. Sometimes, contractors make collections as part of a standard collection round. This can mean that the weight of waste and recycling collected at each location cannot be separated.

Where possible, request that your contractor to provide weight data for all materials collected. Even just a simple sheet that records the number and fullness of bulk bins/containers collected can help you identify if changes need to be made. This will enable you to identify patterns and seasonal trends. For example, collection crews complete a log sheet estimating fullness for each unit they empty. This gives a rough and ready method for estimating tonnage based on the size of the container. This system allows them to monitor performance and make changes to underperforming sites.

7.1.6 Key considerations

This section has detailed key aspects to consider which are summarized below.

<table>
<thead>
<tr>
<th>Aspect / Issue</th>
<th>What to consider …</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you analysed your contractual arrangements before planning a service?</td>
<td>When does your current waste contract end? When will you potentially incur any penalties if you make changes to your existing service before the end of the contract?</td>
</tr>
<tr>
<td>What objectives do you have for the recycling service?</td>
<td>Your objectives may include: - Increasing the recycling rate - Maximising the re-use of materials - To realise cost savings</td>
</tr>
<tr>
<td>How can your existing service be adapted to incorporate recycling?</td>
<td>Is it possible to reduce residual waste collections and add new services for recycling without incurring any penalties?</td>
</tr>
<tr>
<td>Do you conduct regular performance reviews with your waste contractor?</td>
<td>Carry out annual contract reviews to enable greater contract flexibility. This review can cover a range of aspects including changes to recycling rate but also other aspects such as missed collections, agreement of changes to services over the next 12 months, etc.</td>
</tr>
<tr>
<td>What is the predicted cost for changing your current operation?</td>
<td>This will be based on changes to container volume, collection frequency but also internal costs such as staff time, internal transport.</td>
</tr>
<tr>
<td>Consider how best to get value for money in the context of legal requirements</td>
<td>The Waste (Scotland) requirements set out requirements to separately collect food, metal, plastic, glass, paper and card as set out in Section 2.2. You should review various options for these streams. It may be more cost effective for streams where little material is produced to have multiple collection points as opposed to a bulking approach to collection.</td>
</tr>
<tr>
<td>Consider what you would like to provide and who should deliver the individual elements</td>
<td>Is there potential for getting your waste contractor to provide support in relation to communications etc.?</td>
</tr>
<tr>
<td>Talk to the key contractors and see who is potentially available.</td>
<td>Discuss your plans with your waste contractor; they may have opportunities for the segregation of additional waste streams that you have not considered.</td>
</tr>
</tbody>
</table>

Table 5: Key questions to ask as you progress
8 Regulatory requirements

8.1 Waste Management Licensing

8.1.1 Bulking of waste at the site where it is produced

The storage of waste at the site where it is produced is done in accordance with a Paragraph 41 exemption of the Waste Management Licensing Regulations, ‘temporary storage of waste at the place of production’. This exemption does not require registration with SEPA, but any organisation should comply with its requirements.

Further information on this exemption is available from:

[www.sepa.org.uk/waste/waste_regulation/application_forms/exempt_activities/paragraph_41.aspx](http://www.sepa.org.uk/waste/waste_regulation/application_forms/exempt_activities/paragraph_41.aspx)

Where it is proposed that waste will be baled, sorted or shredded, another exemption will be required. Paragraph 11, ‘Baling, sorting, shredding etc. of specified wastes’ allows the following activities to take place up to the specified threshold, as long as the material is destined for recovery or re-use.

<table>
<thead>
<tr>
<th>Type of waste</th>
<th>Activities</th>
<th>Maximum total quantity (tonnes/week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste paper or cardboard</td>
<td>Baling, storing or shredding</td>
<td>3,000</td>
</tr>
<tr>
<td>Waste textiles</td>
<td>Baling, sorting or shredding</td>
<td>100</td>
</tr>
<tr>
<td>Waste plastic</td>
<td>Baling, sorting, shredding, densifying or washing</td>
<td>100</td>
</tr>
<tr>
<td>Waste glass</td>
<td>Sorting, crushing or washing</td>
<td>1,000</td>
</tr>
<tr>
<td>Waste cans (steel, aluminium)</td>
<td>Sorting, crushing, pulverising, shredding, compacting or baling</td>
<td>100</td>
</tr>
<tr>
<td>Waste food, drink cartons</td>
<td>Sorting, crushing, pulverising, shredding, compacting or baling</td>
<td>100</td>
</tr>
<tr>
<td>Waste tyres</td>
<td>Baling, sorting or shredding</td>
<td>10</td>
</tr>
<tr>
<td>Waste wood</td>
<td>Baling, compacting, sorting or shredding</td>
<td>1,000</td>
</tr>
<tr>
<td>Waste paint</td>
<td>Sorting, bulking or mixing</td>
<td>100</td>
</tr>
<tr>
<td>Waste batteries (incl. special waste)</td>
<td>Sorting (incl. special waste)</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 6: Wastes accepted under a Paragraph 11 exemption

This exemption does not require registration from SEPA; further guidance is available from:

8.1.2 Bulking of waste from other sites

Where waste is to be taken back to a site from other locations under your control, you will need to satisfy the requirements for other exemptions.

Under Paragraph 40, ‘Secure storage of non-liquid waste other than at the place of production’, you are able to store non-liquid waste, including WEEE from other premises, at your site as long as the amount of waste stored does not exceed 50m$^3$ at any one time, it is stored for a maximum of three months, and it is stored with a view to being disposed of or recovered elsewhere. This exemption does not require registration with SEPA, and further guidance is available from: www.sepa.org.uk/waste/waste_regulation/application_forms/exempt_activities/paragraph_40.aspx

Should you require additional storage capacity, then the following exemptions may apply:

- **Paragraph 17**, ‘Storage of specified wastes in a secure place’, allows for reasonably large quantities of waste materials to be stored on site for up to 12 months. Further guidance is available from: www.sepa.org.uk/waste/waste_regulation/application_forms/exempt_activities/paragraph_17.aspx

- **Paragraph 48**, ‘The storage of WEEE pending recovery elsewhere’, up to 80m$^3$ of WEEE can be stored for up to three months subject to the requirements of the exemption. Further guidance is available from: www.sepa.org.uk/waste/waste_regulation/application_forms/exempt_activities/paragraph_48.asp

8.1.3 Accepting waste from other organisations

Waste can be accepted from other organisations subject to you adhering to the appropriate regulatory requirements, as set out in Section 8.1.2. However, there are a number of aspects to consider should you wish to accept waste from other organisations.

One important factor is that you will essentially become the owner of the waste once it is present on your site, and thus you will be responsible for:

- Preventing the escape of waste;

- Ensuring that the waste is transferred to an authorised person, i.e. a registered waste carrier or taken to a site with an appropriate waste management licence or exemption; and

- Providing a description of the waste on the duty of care waste transfer note.
In addition to the legal aspects set out above, other aspects that need to be considered include:

- Will you require a payment from the other organisation to cover any charges incurred, e.g. baling costs?
- Will you share any income received from bulked materials? If so, how will this be split?

### 8.2 Duty of Care

If you are working with a contractor organisation that exports (outside of the UK) the material collected from your site, your Duty of Care requirements extend to ensuring that this export is compliant with the appropriate legislation. Further guidance on the Trans-frontier Shipment of Waste Regulations (TFS) which regulates the export of waste is available from [www.sepa.org.uk/waste/waste_regulation/transfrontier_shipment.aspx](http://www.sepa.org.uk/waste/waste_regulation/transfrontier_shipment.aspx).

Table 7 outlines the aspects you need to consider in order to ensure compliance with the requirements of Duty of Care.

<table>
<thead>
<tr>
<th>Aspect / Issue</th>
<th>What to do …</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Is the waste stored securely?</strong></td>
<td>Check that waste receptacles (individual receptacles as well as any bulking containers) are secured (e.g. locked) to minimise opportunity for entry. Take reasonable precautions to ensure that receptacles are not left to become overfull and spill out. Check that vehicles used in the collection service provide a secure means of containing and transporting the material(s) during collections.</td>
</tr>
<tr>
<td><strong>Is the transporter of the material authorised to carry the waste?</strong></td>
<td>Check with SEPA: <a href="http://www.sepa.org.uk/waste/waste_regulation/waste_carriers_and_brokers/who_is_registered.aspx">www.sepa.org.uk/waste/waste_regulation/waste_carriers_and_brokers/who_is_registered.aspx</a> Further guidance on how to become an authorised waste carrier is also available.</td>
</tr>
<tr>
<td><strong>Is the site receiving the material authorised to accept it?</strong></td>
<td>Check that the receiving site holds a waste management licence or exemption which allows them to accept the material. It is recommended that copies of these are obtained from the receiving sites on an annual basis. SEPA can also advise on this.</td>
</tr>
<tr>
<td><strong>Is the transfer of material accompanied by a waste transfer note (or a consignment note, for special waste)?</strong></td>
<td>Check that waste transfer notes have been provided for the movement of all waste, and are retained for the minimum period of two year. Note that waste transfer notes are not necessarily required for every movement, as ‘season tickets’ can be used for regular transfers of the same quantity and type of material. Consignment notes must be kept for a minimum of three years and a separate note must be issued for each movement of waste.</td>
</tr>
</tbody>
</table>

Table 7: Complying with Duty of Care requirements
Waste transfer notes and consignment notes, which form part of the Duty of Care requirement, must include the following information:

- written description of the waste (e.g. paper, commingled plastic bottles and cans);
- any process that the waste has been through (e.g. compaction of cardboard);
- how the waste is contained or packaged (e.g. bags, plastic drums, skip);
- the quantity of the waste (weight or volume) (e.g. 2 x 60 litre bags of waste, 1 x 9 cubic yard skip);
- the appropriate European Waste Catalogue (EWC) code for the waste – guidance on EWC codes is available from www.sepa.org.uk/waste/waste_data/reporting_definitions_and_term/coding_systems.aspx#EWC2002;
- the place, date and time of transfer;
- the name and address of both parties involved in the transfer (i.e. the waste producer and waste contractor);
- details of the permit, licence or exemption of the person receiving the waste (i.e. the waste contractor);
- declaration that the waste hierarchy has been considered before disposing of the waste; and
- Standard Industrial Classification (SIC) 2007 code of the person holding the waste – these are available from www.sepa.org.uk/waste/waste_data/reporting_definitions_and_term/coding_systems.aspx#UKSIC.
9 Developing the high-level business case

Now that you have had an opportunity to consider each of the aspects below, the next step will be to develop a business case to assess the viability of introducing or increasing bulking operations at your organisation.

It is vital that a high level business case is developed which pulls together each of the different aspects that need to be considered, to assess whether a bulking operation is viable for your organisation. This is important in order to determine whether you can justify the bulking operation in terms of time, money and performance. Your business case will need to consider each of the range of options you wish to consider for bulking, as well as a ‘do nothing’ scenario where the operation continues in the same way as the current operation. It is vital that the costs used look at the waste management costs as well as the following:

- Capital investment costs;
- Operating costs – power, maintenance etc;
- Labour costs; and
- Changes to costs over time - landfill tax, increases in costs from waste management contractors (e.g. some contracts stipulate an annual increase).

This will then enable the costs associated with each option to be considered and evaluated against the available budget. But it is not just a case of on-going costs and payback periods, other factors will also need to be considered:

- Legal compliance, e.g. Waste (Scotland) Regulations 2012; and
- Fit with your organisation’s waste strategy/ targets.

**Figure 4: Key Steps**
10 Monitoring post-implementation success

10.1 What to monitor

The first stage in deciding what you should monitor is to look at the aims and objectives that have been set for the service, campaign or activity you are measuring.

Remember, any objectives you set should be SMART:

- Specific;
- Measurable;
- Achievable;
- Relevant; and
- Time-Bound.

One of the most important performance measures is the extent and effectiveness with which recycling facilities are being used. This is important in terms of cost efficiency and service planning. Key performance indicators for you to consider include:

- the amount of the target material collected (tonnage);
- capture rate for each target material as a proportion of that which is generated;
- the quality of the material collected (e.g. is contamination an issue, are the wrong materials being placed in the recycling unit/ container?); and
- awareness and understanding of the service by potential users.

‘Capture’ refers to the quantity of a particular target material that is ‘captured’ by the recycling service designed to accept that material. ‘Capture rate’ therefore refers to the proportion (as a percentage) of a targeted material that has been collected relative to the total quantity of that material arising (i.e. including both the residual waste and material recycled). Understanding capture rate will highlight whether you need to focus on attracting a particular material.

An example that could be used to monitor waste based on data provided by your waste management contractor is provided below. Further guidance on waste monitoring is available from the Zero Waste Scotland publication, ‘Measuring to Manage Resources and Waste’, which is available from: http://www.zerowastescotland.org.uk/content/measuring-manage-resources-and-wastes. This guidance also provides information on the conversion of volumes to weights, if this information is not provided by your contractor.

<table>
<thead>
<tr>
<th>Week Commencing</th>
<th>Residual Waste</th>
<th>Weight of material collected (tonnes)</th>
<th>Recycling Rate (%)</th>
<th>Re-use Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>04/02/13</td>
<td>8.00</td>
<td>Cardboard  3.5</td>
<td>Paper  2.25</td>
<td>Plastic 1.0</td>
</tr>
</tbody>
</table>
10.2 When to monitor

You should compare the performance of the scheme to the previous operation before the bulking activity was implemented. This enables the performance of the scheme to be compared to previous activity. It may not be possible to compare all aspects as changes may have occurred to the collection methods, e.g. a switch from commingled to source segregated collections. However it will be possible to compare metrics at a high level, for example:

- Dry recycling rate;
- Re-use rate;
- Composting/anaerobic digestion rate;
- Total waste generation;
- Proportion of waste sent to landfill; and
- Total costs – which where possible should include the cost of the waste contract as well as any internal costs (e.g. staff time) for waste management.

Monitoring and evaluation should be conducted after your scheme is established, for example after the launch and at various points afterwards, as well as after specific campaigns, such as new signage, etc. It is recommended that you collect periodic tonnage (estimated or actual) and contamination data from the start of the scheme and on an ongoing basis thereafter.

Also bear in mind that any new scheme will go through a ‘bedding in’ period, so when evaluating results, consider whether the collection frequency needs to change during the monitoring period. If your site has regular visitors, try looking at the results gained from three-to-six months onwards to see whether visitor numbers and unit usage are increasing (and total material collected is increasing as a consequence).

If you are conducting any communications campaigns, you should monitor scheme performance before any activity is undertaken (to establish a baseline), and then one month after promotions end.

10.3 Tonnage data

You can obtain tonnage data from your waste management contractor via records such as weighbridge tickets. However, this is only possible if the material from your bins/containers are collected separately from other collection rounds. If tonnage data is needed, it may be advisable to include this data requirement in contract conditions, service level agreements or memorandums of understandings, specifying the data that are required and how frequently they are needed.
10.4 Quality of collected material

The most effective way to assess the quality of material collection is via a waste composition analysis. This will help to identify levels of the target materials and levels of contamination. A waste composition analysis of residual waste will also help you assess the additional proportion of material that has the potential to be captured by the recycling units (capture rate), but that is currently being disposed of within the residual waste bin. However, this approach can be time-consuming and costly.

An alternative is to visually check contamination in your recycling units and assess the type and nature of contaminants that are visible on the surface of the deposited material. Are the contaminants non-target materials? Or is food and drink residue reducing the quality of the collected materials to such an extent that they cannot be recycled? These checks will enable you to estimate the proportion of contaminated recycling units.

You may also be able to establish types of main contaminant and the proportion of overall contamination. This is particularly useful for identifying whether certain types of non-target materials are frequently being deposited in recycling units. For example, users may misinterpret the information and signage on units, and assume that glass bottles can be deposited for recycling when it is plastic bottles that are being targeted.

10.5 Evaluation

Evaluating performance helps to identify those activities that provide the biggest increase in recycling rates from a given financial investment.

You should plan a monitoring schedule at the outset of the scheme and not as an add-on. One of the best ways to determine whether positive change is being made is to establish benchmarks at the beginning of the roll-out, so you can measure such things as the proportion of residual waste reduced over time or the increased recycling increase you achieve. Conducting monitoring before and after broader communication activity will help you to determine not only the effectiveness of individual communication events, but also its cost-effectiveness.