Demonstration trial report assessing the use of Flexible Intermediate Bulk Containers (FIBCs) to source segregate and preserve recyclable, non-inert construction waste materials.
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Written by: Hurleypalmerflatt Ltd and edited by WSP Environmental Ltd

Front cover photography: FIBC bag in use to segregate packaging waste on interior fit-out site

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<tr>
<td>CDEW</td>
<td>Construction, Demolition and Excavation Waste</td>
</tr>
<tr>
<td>FIBC</td>
<td>Flexible Intermediate Bulk Container</td>
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<td>MRF</td>
<td>Materials Recovery Facility</td>
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1.0 Introduction

The Materials Recycling Programme, initiated by WRAP (Waste & Resources Action Programme), aims to increase the quality of materials recovered from UK businesses for recycling. A key element of the programme is to focus on construction, demolition and excavation waste (CDEW) in order to support WRAP’s wider construction sector work, which aims to help the industry as a whole to achieve the objectives set out by the government: The Construction Commitments: Halving Waste to Landfill.

WSP Environmental Ltd. was commissioned by WRAP to review current container options and techniques used for the collection and transport of Construction, Demolition and Excavation Waste (CDEW) off site for further treatment and recycling. The research was to focus on the non-inert fraction of waste materials for which collections and recycling systems are currently under developed.

The materials to be considered during the research were the suite of typical non-inert waste materials generated on site including: packaging, wood pallets, timber, plastics, cardboard, tins, metals, plaster, plasterboard, insulation and ceramic materials.

A number of case study reports were to be produced, investigating innovative or lesser known techniques for collecting waste materials on site, in order to understand the best and most practical methods available, keeping in perspective the need to collect high volumes of material for recycling whilst maintaining the best possible material quality for recycling.

During the study, the use of Flexible Intermediate Bulk Containers (FIBCs) - also known as Builder’s Bags or one tonne bags - were investigated as an option for managing waste on site. Although the bags are currently widely used for material handling on construction sites, limited research has been conducted into the various options for using the bags specifically for waste segregation and the resulting impact on waste handling efficiencies and material recovery rates.

The following report reviews a demonstration trial using FIBCs to manage non-inert waste, enabling segregated waste streams to be collected in the same load as mixed waste with the aim of not compromising material quality.

This demonstration trial report is intended to inform the industry of an alternative waste collection option currently available to the UK market; WRAP does not endorse any specific products discussed in this document.
2.0 Context for Demonstration Trial

Specialist construction waste Material Recovery Facilities (MRFs) have been designed to receive and sort waste materials generated from construction projects. Materials recovered at the MRF are segregated and prepared for sale to end-user processors for reuse or recycling. In order to gain the best market value for recovered materials, the waste streams must be of a high quality and free of contaminants. Materials arriving at the MRF in mixed loads are vulnerable to contamination and damage, resulting in lower recovery rates and a lower quality, less valuable output material for resale.

Traditionally, waste sorting at MRFs has involved the manual picking and segregation of large recyclables and contaminants, followed by the bulk processing of the remaining waste stream. The waste is screened to remove fines and may undergo further processing using mechanical sorting technologies to recover specific waste streams. Such technologies include overband magnets and eddy current separators to remove ferrous and non-ferrous metals respectively, and ‘air-knives’ or blowers to remove lighter fractions such as plastic. More sophisticated MRFs will use washing flotation bands and other techniques to systematically remove contaminants. Much of the potentially ‘high value, low volume’ waste streams are degraded when processed alongside mixed materials and should be removed at the front-end where possible.

Depending on the degree of processing at the MRF, the material outputs produced will either be sold for low-grade use or for further processing. Additional processing can produce good quality materials for recycling, although inevitably lead to increased labour and/or capital costs. In order to support this level of intensive waste processing, gate fees at the MRF often need to be at the higher end of the scale.

It is important to recognise that while some elements of the waste streams can be cost-effectively separated at the MRF, others present operational difficulties and require considerable investment. By considering alternative on site waste management practices and collection techniques, the benefits of source segregating waste at construction sites could be retained throughout the waste handling and recovery process. This project intends to explore a low-cost means to achieve this objective, preserving the segregation and material quality of waste streams from site to MRF.

2.1 Demonstration Trial Concept

Generally, the waste streams produced by different trades and during different phases of the construction process naturally arise as segregated waste streams, only being collected together and mixed as part of the on site waste collection and consignment process. This is often due to the convenience of waste handling on site and due to space restrictions, limiting the use of multiple waste collection containers.

The aim of the demonstration trial was to investigate the use of FIBCs to segregate non-inert construction waste materials at source, enabling them to be co-consigned for transport to the MRF. The segregated materials, protected from contamination by the use of FIBCs, could then be easily recovered at the construction MRF for recycling. By managing waste in this way, there was potential to improve waste sorting efficiencies at the MRF and improve material qualities for recycling without significantly changing on site waste management practices.

The FIBCs could be used to segregate the higher value recyclable materials, including PVC, film plastics and cardboard, non-ferrous metals or Corex (polypropylene protective packaging). Conversely, the FIBCs could be used to isolate particular contaminants, such as plasterboard off-cuts and composite boards including plastic-faced shuttering. Segregation of contaminants may be more difficult to regulate, particularly if the waste collection vehicle services several sites.

Initial discussions with MRF operators and construction contractors suggested that the trial concept could prove successful, offering the potential to significantly improve the quality and percentage of material recovered.

2.2 Demonstration Trial FIBC Specifications

FIBCs used for the demonstration trial should:

- enable the contents to be securely closed for transport, preserving materials from contamination;
- complement current site waste handling arrangements; and
- offer the potential for segregated materials to be collected in a compactor without being destroyed.
FIBCs selected for the trial were durable, 90 x 90 x 90 cm skirt top bags made from woven polypropylene. Waste could be secured by closing the skirt across the top of the materials and tying using the fastening cords. The bags had four corner loops to aid handling and were supplied with a factor of safety of 5:1, meaning that the bags had the potential to withstand lifting loads up to 5 times the recommended load of 1 tonne prior to failure.

2.3 Health and Safety

In order to mitigate the risks posed by manual handling of the bags, a number of options were considered for managing the FIBCs on site:

- Constructing a frame to hold FIBCs open, with full bags being lifted off the frame using a forklift truck.
- Resting FIBCs on pallets with or without a frame to hold them open. Bags could then be transported to waste storage area on pallets using a forklift or manual pallet trolley and loader crane.
- FIBCs mounted in wheeled bins, held open by folding the bag around the lip of the bin. The bags could then be closed and tipped into the waste collection vehicle using the vehicle’s bin lift.

The final option was selected due to the availability of wheeled containers on site, leading to minimal changes in on site waste management practices. The technique would also enable easy transport of segregated waste on site without the need for a forklift truck and allows simple loading of full FIBCs into the waste collection vehicle using the vehicle’s bin lift.
3.0 Demonstration Trial Preparation

3.1 Site & Contractor Details

The demonstration trial was conducted at the Standard Bank site, Gresham Street London. The project works, conducted by ISG InteriorExterior plc, involved the interior refurbishment of the ground, first and second floors of the building. Access to the floors was by way of lift and stairs, with site material storage in open areas on each floor.

Liaison with site staff and the licensed waste contractor prior to introduction of the trial enabled an assessment of the on site waste management facilities and identification of key issues. This information was used to tailor the trial towards the site needs.

3.2 Site Waste Management Facilities

Waste materials were segregated at source in labelled, 660 litre wheeled bins before being moved to the goods area on each floor (Fig. 3.1). Waste materials were then transported to the main site waste storage area, situated on the ground floor of the building, via the lift.

Figure 3.1 Temporary storage of full 660 litre waste containers at a goods area near lift.

The majority of segregated materials were stored in the 660 litre wheeled bins until collection, although an additional 35 cu yd skip with central divider was used for the bulk collection of segregated timber and metal waste. The main waste streams generated on the site are listed below:

- Mixed Timbers
- Clean Timbers
- Metals (Ferrous)
- Metals (Non Ferrous)
- Mixed plastics
- Clean Plastics
- Packaging (Cardboard, plastics)
- Plasterboard
- Pallets
- Woodboards
- Hardcore
- Fines
- General Waste

Waste was collected from site by the licensed waste contractor, MSK Waste Management and Recycling Ltd, by arrangement, enabling collections to be scheduled to meet the differing levels of waste produced at various stages of the project. All compactable waste stored in wheeled bins on site was collected using the same rear end loading compactor, mixing the waste streams. Although the material was taken to MSK’s construction waste MRF
in Barking for segregation and recycling, managing waste in this way negated the benefit of segregating waste at source, as the waste became mixed and vulnerable to contamination. This reduced the material quality and resulting value as a recyclable material. In addition, there seemed little point in encouraging site operatives to segregate materials to such a degree when the benefits were not carried forward at later stages in the waste management chain.

**Figure 3.2** Packaging waste being loaded into waste collection compactor.

[Image]

It was not considered practical, financially viable or sustainable to arrange separate collections for each waste stream generated on site. As a consequence, consideration was given to preserving segregated materials from mixing and contamination between the time they left the site and arrived at the MRF. The trial use of FIBCs to preserve segregated materials during waste collection and transport could improve the management of waste further down the chain.

For the demonstration trial, it was necessary to select an appropriate waste stream to target for collection in the FIBCs. Mixed packaging materials, including cardboard and plastic wrapping, were selected for collection in the FIBCs due to the availability of packaging waste bins on site, the compressibility of the material for collection in a compactor and the potential to deliver a higher value output material and positive recycling rates if the waste could be preserved from contamination using the bags.
4.0 Demonstration Trial Review

4.1 Demonstration Trial Key Facts

- **Site Location:** Standard Bank, 20 Gresham Street, London, EC2V 7JE
- **Demonstration Trial Overview:** The on site segregation of packaging waste materials, including cardboard and plastic wrapping, using FIBCs to ease material segregation at MRFs.
- **Timescale:** 4 week trial during March 2009
- **Main Contractor:** ISG InteriorExterior plc
- **Waste Sub-contractor:** MSK Waste Management and Recycling Ltd.
- **Demonstration Trial Project Management:** Hurleypalmerflatt

4.2 Waste Material Segregation Using FIBCs on Site

4.2.1 Initial Deployment

FIBCs procured for use on the trial were of a suitable size to fit within the 660 litre bins, although were slightly too small and inflexible, meaning that they could not stretch around the lip of the bin to keep the FIBC supported for filling. It was found that the FIBCs fell inside the bin, especially when empty, becoming impractical to use. There were also difficulties encountered with waste slipping down between the side of the bag and the bin.

To overcome this problem, site operatives attempted to tape the top of the bag to the outside of the bin. This was not a satisfactory solution, as the tape did not hold when waste materials were collected and due to the smaller size of the bag, gaps remained between the bag and the bin.

Another solution attempted was using lengths of wood off-cuts to make a rigid frame to lie across the top of the bin. FIBCs were then placed inside the bin and held open by being screwed to the wooden frame. This option caused minor damage to the fabric of the bags, and the additional time needed to construct the frame and fit the bags introduced additional work and reduced efficiencies.

The working solution was to pass lengths of wood through the corner loops of the bag and then rest the wood across the top of the bin (Fig 4.1). This compromise enabled the bags to be held open and supported, and reduced labour required for preparing the FIBCs compared to alternatives. The preparation of FIBCs for use within the wheeled bins would need further investigation to minimise labour requirements and identify a means to prevent waste from slipping between the bag and the bin, but this is not foreseen as an issue.

*Figure 4.1* FIBC mounted in wheeled bin for segregating packaging waste on site.
4.2.2 Labour Requirements

Feedback from site operatives during the trial indicated that initially significant time was taken simply fitting the bags to the wheeled bins, reducing waste collection efficiencies. Once the final fitting procedure had been adopted and practiced, the time taken to mount the FIBCs was significantly reduced.

4.2.3 Site Operative Training

Site operatives were instructed to insert the FIBC liner prior to collecting packaging waste. Due to the trial nature of the scheme and involvement of site operatives in finding a practical solution for fitting the bags, little additional training was required to inform site operatives of FIBC preparation for use in the wheeled bins.

In terms of material segregation on site, the training requirements were found to be negligible as the main contractor, ISG InteriorExterior, had already put in place the necessary site procedures requiring the use of labelled bins for the segregation of waste streams on site. Labelled 660 litre wheeled bins were used for collecting packaging waste during the trial (Fig. 4.2).

Figure 4.2 Wheeled bins were labelled with waste segregation signage.

4.2.4 Securing Bags

Prior to waste collection, the bags were to be secured by closing the FIBC skirt across the top of the waste and tying the fastening cords (Fig. 4.3). When the bags were filled to approximately two thirds full, however, site operatives had difficulty closing and tying the FIBC skirt across the top of the waste securely. Large cable ties were purchased to close the bags by tying together the main carrying loops, corner to corner. With some adjustment of waste packing however, it was found that the ties that closed the bag skirts were adequate to hold the bags closed, negating the need for further fasteners.
4.2.5 FIBC Waste Storage Capacity

By using the wheeled bin and FIBC combination, a greater number of waste containers were required on site in the first instance. In addition, the capacity of the FIBCs, which needed to be closed prior to transport, was less than the capacity of the 660 litre wheeled bins normally used on site. This introduced a number of issues regarding the waste container efficiencies. As the waste container capacity was reduced compared to using standard wheeled bins on site, either more wheeled bins would be required on site or the frequency of waste collections increased for the same amount of waste normally generated.

In addition, by reducing the volume of waste able to be collected in a standard wheeled bin, it was found that FIBCs were frequently overfilled and could not be closed (Fig. 4.4).

As no explicit instructions had been given not to over-fill the bags, some bins were filled with materials that were significantly larger than the capacity of the bags (Fig. 4.5).
4.2.6 Depletion of FIBC Stock on Site

During the trial, it was discovered that FIBCs intended for use as waste receptacles on site were utilised for other purposes by site operatives. As a result, stocks of the FIBCs were depleted through operatives taking the bags without notice.

One hundred FIBCs were supplied for the demonstration trial. The project ran out of bags in the fourth week of the trial due to both usage and unauthorised depletion of stocks. Only 30 FIBCs were received at the MRF, with 21 of these being original to the project, indicating the significant need to manage unauthorised depletion of stock on site.

4.3 Waste Material Collection and Transport

Waste was collected from site by the licensed waste contractor, MSK Waste Management and Recycling Ltd., as required. Packaging waste segregated using FIBCs during the trial were collected along with other compactable waste in the same rear end loading compactor (Fig. 4.6) for transport to MSK’s construction waste MRF in Barking.

Figure 4.6 FIBCs were collected in a compactor with other, mixed compactable waste.
4.4 Waste Material Reception at MRF

Separate areas were designated within the MRF for different waste streams. Segregated waste streams were picked for contamination before the recyclable materials could be sent on to reprocessors. Mixed loads were tipped in the reception area (Fig. 4.7) to enable sorting and recovery of materials. Mixed loads would normally undergo several manual and mechanical processing techniques to separate materials and remove contamination. The quality of recyclable materials collected in mixed loads is usually much lower than for segregated waste streams, having been subjected to significant levels of contamination.

Figure 4.7 MRF picking area for mixed waste

A small, co-mingled waste load of approximately 3 tonnes containing FIBCs from the demonstration trial was held for observers to assess at the MRF. The load was tipped in the reception area so that the bags could be retrieved and examined (Fig. 4.8). Six FIBCs had been consigned and all were recovered after sorting through the load (Fig. 4.9).

Figure 4.8 Tipping a waste consignment at the MRF
4.4.1 FIBC Tracking During Trial

- One hundred FIBCs were delivered to site for use in the trial.
- 30 bags were retrieved at the MRF, with 21 of these being from the original stock of one hundred.
- Twelve undamaged FIBCs were recovered at the MRF.
- Nine damaged although usable FIBCs were recovered at the MRF.
- The remaining nine FIBCs were damaged beyond reuse.
- Of the remaining stock of one hundred, the FIBCs were unidentifiable once emptied at the MRF or lost due to unauthorised depletion of stock on site.

One of the issues encountered with the waste transport method from site to the MRF was the high proportion of bags damaged during compaction. A large proportion of the bags were irretrievably damaged as they were emptier or subjected to several compaction cycles causing the bags to split. This exposed the contents to contamination. Some bags were so damaged that they were difficult to identify at the MRF.

FIBCs recovered from the examined load were relatively undamaged (Fig. 4.10). This may be due to several factors, including the comparatively light compactor load size of approximately 3 tonnes and the fact that the
Flexible Intermediate Bulk Containers for Managing Construction Waste

FIBCs were collected during the final stop of the vehicle’s round. If the FIBCs had been collected earlier in the round they would have been subjected to a greater number of compaction cycles, increasing the probability of damage. FIBCs loaded at the end of the vehicle’s round were also easier to identify when being tipped at the MRF, increasing their likelihood for recovery during the trial.

Although the FIBC shown in Fig. 4.10 was relatively undamaged itself, the bag had still opened during transport, exposing the contained material to contamination.

**Figure 4.11** Severe damage to FIBCs during compaction exposed materials to contamination and made the FIBC difficult to identify.

Overall, 30 bags were returned to the site from the MRF for reuse during the trial as a waste receptacle, including the 21 undamaged and slightly damaged bags from the original trial stock. The additional FIBCs returned had been from different projects on the site.

**Figure 4.12** Undamaged FIBCs were recovered and returned to site for reuse as a waste receptacle.

### 4.4.2 Contamination of FIBC Segregated Waste Streams

Most of the materials segregated using the FIBCs during the trial were contaminated on arrival at the MRF. FIBCs that were damaged in the compactor resulted in the segregated packaging materials coming into contact with other waste streams, including some liquids and inappropriately consigned food waste (Fig. 4.13).
Some of the contamination was also attributed to the materials collected within the FIBCs. It should be noted, however, that this may not have been due to poor waste segregation on site. The containers were labelled for the collection of packaging waste, although some packaging waste includes polystyrene, especially during the fit out phases of projects (Fig. 4.14). Polystyrene is not currently recyclable at the MRF, which recovers polythene and cardboard packaging waste. As a result, polystyrene materials collected would be classed as contamination, even though correctly segregated on site. A bin that is marked for ‘packaging waste’ will still have polystyrene consigned to it unless further training is provided or alternative signage used.
4.5 Review of FIBC Use on Site for the Collection of Packaging Waste

**Figure 4.15** FIBC collection system demonstration trial review.

<table>
<thead>
<tr>
<th>Trial Observations</th>
<th>Discussion and Options for Improvement</th>
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<tbody>
<tr>
<td>- Initial difficulty devising an appropriate way to mount FIBCs in wheeled bins.</td>
<td>- Site operatives devised a simple system to support the bags. - Minimal additional labour requirements for mounting FIBCs in wheeled bin. - Still some chance that waste material could slip between FIBC and wheeled bin.</td>
</tr>
<tr>
<td>- Overfilling of FIBCs.</td>
<td>- Requires management of use to ensure that operatives do not overfill the FIBCs. - Difficulty encountered with oversized packaging materials.</td>
</tr>
<tr>
<td>- FIBCs difficult to close and secure.</td>
<td>- Ensure FIBCs are not overfilled. - May require some repacking of waste materials.</td>
</tr>
<tr>
<td>- Simple source segregation.</td>
<td>- Operatives were already trained in segregating materials effectively on site according to waste container signage, so no additional management practices were required, with the exception of informing operatives of undesirable materials, such as polystyrene (specific to the MRF). - Little change necessary in existing on site waste management practices.</td>
</tr>
<tr>
<td>- Increased waste container requirements although reduced waste storage capacities.</td>
<td>- Use of the FIBCs reduced the capacity of the wheeled bins, having a negative impact of waste collection efficiencies. - FIBCs could be handled using a pallet truck instead, although on site practicalities would have to be assessed. - Once full, FIBCs could be transferred to a skip and stored together prior to compactor loading. This potentially introduces additional container costs.</td>
</tr>
<tr>
<td>- Depletion of stock.</td>
<td>- Monitoring of stock needs to be undertaken to minimise unauthorised depletion of bags.</td>
</tr>
<tr>
<td>- Simple material loading into compactor.</td>
<td>- Use of the wheeled bins enabled bin lift equipment on the compactor to be used, ensuring material loading was simple.</td>
</tr>
<tr>
<td>- FIBCs were not sufficiently durable to withstand several compaction cycles with CDEW.</td>
<td>- A lighter vehicle without a compactor could avoid the problem with FIBCs splitting during transport, although the volumes of waste collected would be reduced, having a negative impact on waste transport efficiencies.</td>
</tr>
<tr>
<td>- Severe damage to majority of FIBCs.</td>
<td>- Segregated materials were exposed to contamination. - Reduced scope for FIBC reuse. - Difficult to assess the quantity of waste segregated as FIBCs had split. - Damage to FIBCs could be reduced by considering an alternative waste transport method.</td>
</tr>
<tr>
<td>- Undamaged bags were recovered.</td>
<td>- It is possible to return undamaged bags for reuse on site as a waste receptacle. Liaison with the waste contractor is necessary to ensure bags are returned. - Care must be taken to ensure that reused FIBCs are used as waste receptacles only. The FIBC may have been weakened during previous transport in a compactor so it is essential that reused FIBCs are not used for any significant load bearing applications.</td>
</tr>
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4.6 Possibilities for Further Investigation

There were a number of difficulties encountered during the demonstration trial that may be rectified if the exercise were to be repeated with some adjustments to the selected methodology and on site waste management practices.

Using wheeled bins provided some advantages on site, including the easy transport of waste and straightforward loading of full FIBCs into the compactor. However, this technique increased the number of waste collection containers required and reduced the capacity of the wheeled bins due to the smaller FIBC dimensions. Different methods for collecting waste using the FIBCs could be explored, including the use of FIBCs mounted on individual pallets or the use of FIBCs with forklift channels.

If it is deemed that wheeled bins would be a more practical option for handling the waste on site, it would be beneficial to investigate the availability of alternative sizes of FIBCs that could be used as closable wheeled bin liners, retaining waste segregation during transport to the MRF in a mixed load.

The trial was significantly hampered by damage to the FIBCs during transport in the compactor, particularly when subjected to several compaction cycles. By utilising a non compaction container this would allow the FIBCs to be collected with mixed materials reducing the volume of contamination experienced during the trial and increase the recovery of recyclable materials.

The benefits of using FIBCs in this way may emerge during a trial using alternative transport options, such as:

- **Lighter Vehicle**: The 7 ½ tonne ‘Wait and Load’ vehicle (Fig. 4.16) carries a rear lift stage and could be used for the uplift of several waste streams segregated using FIBCs. The vehicle does not compact the material meaning that the FIBCs would be less vulnerable to damage during transport. As a result, contamination would be minimised, preserving material quality for recycling. This option could also be suitable for city centre sites. These benefits, however, would have to be considered in relation to the additional waste transport costs and vehicle emissions resulting from more frequent collections by a lower capacity waste collection vehicle.

![Figure 4.16 Tail lift ‘Wait and Load’ vehicle could provide a suitable alternative to a compactor.](image)

- **Traditional Skip**: FIBCs offer significant potential to preserve the source segregation of recyclable materials in a mixed load during transport to a MRF in a traditional skip. This option, however, may not be feasible for sites with restricted space, such as city centre developments.

- **Milk round**: A compactor vehicle, similar to that used in the trial, could undertake a ‘milk round’, collecting single waste streams segregated using FIBCs from several sites and delivering them to a MRF.
5.0 Conclusions

The use of FIBCs on site enabled simple source segregation of materials requiring minimal changes to on site waste management practices. However, a number of issues were encountered during the trial that would need to be addressed before such a scheme could be implemented. Issues identified included:

- overfilling of FIBCs on site;
- damage to FIBCs during transport to the MRF in the compactor; and
- contamination of recyclable materials.

Overfilling of the FIBCs could be reduced by introducing toolbox talks and monitoring waste management on site. Damage to the FIBCs during transport to the MRF could be overcome by selecting a more appropriate waste collection and transport method, including ‘Wait and Load’ systems, traditional skips or a milk round scheme for single segregated streams. This would reduce the risk of contamination resulting from the FIBCs splitting during transport.

To successfully implement such a scheme and encourage participation, a proposed solution would be to share a proportion of the financial benefits resulting from preserving the material quality with contractors taking part. This could be achieved through appropriate waste collection, transport and MRF gate fee arrangements with the waste management contractor.

Some undamaged FIBCs were recovered during the trial and returned to the site for reuse. Stringent monitoring of the reused bags on site would be necessary to ensure that they were only used as waste receptacles. This would help to reduce health and safety risks associated with the use of any potentially damaged bags.

Although some difficulties were encountered during the trial, some amendments to the selected methodology and on site waste management practices could enable the benefits of segregating materials using FIBCs and collecting them in a mixed load to be seen. Possibilities for further investigation include:

- mounting the FIBCs on pallets or using a forklift to transport the bags (rather than using a wheeled bin);
- using alternative sizes of FIBC, to enable a more adequate fit to the wheeled bins;
- trialling FIBCs on sites where a compactor operates a milk round, collecting FIBCs containing the same material from several sites; or
- trialling FIBCs on sites where a compactor waste collection vehicle is not used, for example on sites where traditional skips are used or wait and load vehicles, enabling mixed waste collections.
6.0 Further Information

WRAP

WRAP’s vision is a world without waste, where resources are used sustainably.

WRAP works with businesses and individuals to help them reap the benefits of reducing waste, develop sustainable products and use resources in an efficient way.

Find out more at www.wrap.org.uk

This study applies to two key work areas covered by WRAP:

Construction - Helping the construction industry cut costs and increase efficiency through the better use of materials.

Recycling Industry - Providing practical help and support to enable a sustainable and profitable industry.

Main Contractor: ISG InteriorExterior plc

ISG InteriorExterior plc deliver new build, refurbishment and fit out services for owners and occupiers throughout the City and Greater London.

Further information can be found on their website: http://www.isgplc.com/OurBusiness/ISGInteriorExterior/

Waste Management Sub-Contractor: MSK Waste Management and Recycling Ltd.

Multi-Services Kent provide bespoke logistics, strip-out, access control and waste services predominantly for the construction industry.

Further information can be found on their website: http://www.multiserviceskent.co.uk/
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