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# Executive summary

This report describes the results of the survey conducted as part of the *WAS721- The impact of delivering good practice Site Waste Management Plans project*. The case studies developed as part of this project are summarised in a separate report (WRAP, 2009). The focus of the survey was to identify the environmental and economic costs and benefits generated by using a SWMP to implement good practice. An online survey was developed asking questions relating to the general approach and experience of the respondents to SWMPs and asking for more detailed data about a specific project. The survey was sent to over 800 contractors and clients. There were 53 respondents to the survey, 67% of respondents were principal contractors and 18% were clients. The majority of the respondents based their answers to this survey on large projects (between £500k and £5m) and a large number (24%) were from the education sector. The survey was intended to provide in depth details about how SWMPs are implemented on construction projects and was therefore extensive in its approach. Whilst the level of detail may have contributed to the low response rate, it did mean that further analysis of the data could be made.

This report describes the background to the survey, existing studies on SWMP impacts and the methodology used. It then summarises the results and draws a number of conclusions and recommendations from these. In general the survey findings are supported by the conclusions of the other studies and surveys on SWMPs that were reviewed. The information gathered helped to identify elements of good practice in SWMPs and the economic and environmental benefits these produced.

The importance of initiating the SWMP in the design and planning stage is illustrated by the results of the survey. Sixty five percent of respondents identified designing out waste as the action which results in the most cost savings and none of projects where the SWMP was initiated at the design stage reported an increase in costs as a result of preparing and implementing the SWMP. Projects where there was client involvement in the SWMP also tended to generate greater savings with 71% of the 7 projects which had client involvement producing a greater than £1,001 reduction in cost. Early contractor involvement also appeared to have a positive effect with 76% of respondents that said the contractors were involved before mobilisation and construction reporting cost savings or no increase in cost. The appointment of a waste champion and setting waste targets appeared to have a less clear relationship with cost reduction. Specific actions such as waste segregation and reuse of materials on site also had a less clear impact on overall cost savings.

Around 65% of respondents reported that implementing a SWMP improved resource efficiency for all projects. Twenty percent of respondents reported that completing the SWMP had highlighted additional resource efficiencies and 53% reported an increase in the use of recycled materials. Over half of the respondents reported that they experienced reduced costs as a result of implementing the SWMP, with 19% of respondents reporting a saving of £10,000 or more. The majority of participants (70%) reported that they had found benefits other than financial associated with the implementation of the SWMP. These included improved site management and data recording, better procurement planning, improved project planning, better compliance with Duty of Care regulations, reduced storage, and an increased awareness among staff regarding the value of resource efficiency as well as other policies such as carbon footprinting. Overall 76% of respondents stated that the benefits of implementing a SWMP outweigh the costs and only 8% thought that the costs outweighed the benefits. Completing a SWMP will not by itself generate cost savings and reductions in waste; it is necessary for all stakeholders to buy into the process to realise the benefits.

A point mentioned in previous studies was the lack of enforcement of the SWMP Regulations. In this survey, 18% of respondents (of 50) stated that their SWMP was inspected; 6% by the LA as part of the planning application, 4% by the LA for another reason and 8% by the Environment Agency. This is slightly more than the SECBE survey found (9%), but still a very low proportion. In addition, 84% of planning permissions did not require a SWMP.

As the SWMP Regulations came into force only a year ago many of the projects were not complete and so final figures and lessons learnt were not available. Consequently only a small data set of completed projects was available for analysis therefore these results show trends rather than statistically significant figures. However, overall the survey has shown that most organisations are seeing financial and environmental benefits from the use of SWMP and have improved their waste management practices as a result. It appears that many clients are leaving the responsibility for SWMP to the principal contractor, and a need for training for clients in their responsibilities was identified. This would also help to ensure that SWMP were started earlier in the project cycle,

so that savings from design decisions could be identified and included in the process, and volumes of waste reduced further as a result.

The top actions identified in the SWMP were waste segregation (83%), recycling of waste produced (70%) and reuse of materials on site. Most (71%) said over 75% of the actions identified in the SWMP were implemented.

Designing out waste was selected by 65% of respondents as the activity which generated the most cost savings, however actions to design out waste were only included in 33% of the SWMPs. This could be a result of many SWMPs only being prepared before construction instead of during the planning and design stage.

The evidence suggests that using a SWMP is beneficial to the majority of organisations and most achieve significant cost savings through implementing them. Those that are achieving significant cost savings display common actions which enable the user to develop an informed plan to reduce, reuse and recover their waste. Starting the SWMP in the early stages of a construction project appears to be vital in using the process effectively and avoiding incurring additional costs. Also the planning process to segregate, reuse and recycle waste is implemented by the majority of projects that achieved cost savings through implementing the plan. Simply completing the plan is not sufficient to ensure economic and environmental benefits and training is an important factor in implementing a plan effectively. SWMP projects should also be reviewed regularly and this is an action carried out by the majority of users. The time spent on the SWMP, however, should be proportionate to the size and scope of the project.

There are also further advantages that can be gained from the use of SWMPs and moving the process further up the supply chain. Currently principal contractors are the most engaged in the process and whilst designing out waste is identified as the action that creates the most benefits it has not been implemented on the majority of projects. Identifying the actions that clients and designers can implement in this process will be instrumental in moving the industry to good practice use of SWMP.

The following recommendations came out of the results of the survey.

- There needs to be more training aimed at clients (particularly public sector) on their responsibilities according to the SWMP Regulations. They need to understand the importance of considering waste early on in the planning and design stage of a project. They should be encouraged to set targets in conjunction with their principal contractors and to review the SWMP during the project.
- There needs to be greater enforcement of the SWMPs by the Environment Agency and LA. A SWMP should be necessary for obtaining planning permission.
- There needs to be greater training for LAs in their role as enforcers of the SWMP Regulations. This survey and the other studies suggest that LAs are not enforcing SWMPs and the tEC report suggests that many LAs are unclear of their role.
- If SWMPs are used properly there can be significant benefits in terms of economic savings and project planning. If they are viewed as a paper exercise these benefits are not achieved. This needs to be communicated to the industry. (to some extent this is being done by the case studies in this project)
- Training should focus on how to get the best out of SWMPs, rather than a particular SWMP template which may not be widely used. This could make use of case studies to highlight good practice.
- Better data is required for waste forecasting. This could be achieved by setting up a central database of wastage rates that is widely available to all in the industry.
- There are still gaps in understanding the impacts SWMPs are having on the industry, particularly when it comes to defining the exact cost and waste savings generated. A repeat of this survey focusing on obtaining this information once there are more completed projects with SWMPs would be useful.

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## 1.0 Introduction

This report summarises the information on the survey conducted as part of the project *WAS721- The impact of delivering good practice Site Waste Management Plans*, which WRAP commissioned TRL to undertake in March 2009 under Framework FRA0034. The aim of the survey was to gather information on the environmental and economic impacts of implementing Site Waste Management Plans (SWMPs) in the construction industry and identify good practice. This report describes the survey methodology and analysis of the results. It summarises the positive and negative impacts of SWMPs and provides recommendations on how the cost of implementing them can be minimised and the benefits maximised.

## 2.0 Background to SWMPs

SWMPs have been used in the construction industry to plan, monitor and implement actions to manage waste in different forms for several years, particularly since the launch of the DTI voluntary Code of Practice in 2004. In April 2008 Site Waste Management Plans (SWMPs) became a legal requirement for construction and demolition projects over £300,000 (exc VAT) in England (Defra, 2008). The regional assemblies for Scotland, Wales and Northern Ireland are also currently developing their own legislation. The regulations in England apply to all projects commenced after 1<sup>st</sup> July 2008. Projects over £500,000 exc VAT require a more detailed SWMP. The regulations set out the details that must legally be recorded in the SWMP. At the same time the Department of Environment, Food and Rural Affairs (Defra) published an accompanying guidance document; *Non-statutory guidance for site waste management plans* (Defra, 2008b). There are also a variety of tools, guidance and training programmes which have been produced by a range of organisations to aid the preparation of a SWMP, including a template produced by WRAP. Before the legislation came into force SWMPs were recommended, but not compulsory. A code of practice for their preparation was published by the Department of Trade and Industry (now Department for Business, Innovation and Skills (BIS)) (DTI, 2004). However, uptake tended to be only by the larger companies. Research commissioned by WRAP in early 2006 (WRAP, 2006) found that only 11% of the top 800 construction companies used SWMPs, and only 3% were following the DTI's 2004 guidelines for implementing SWMPs. A consultation by the Environmental Centre (tEC, 2009) found that 24% of respondents said they used SWMPs before the regulations.

The stated aims of Defra when introducing the SWMP Regulations were to:

- increase the amount of construction waste that is recovered, re-used and recycled and improve materials resource efficiency; and
- prevent illegal waste activity by requiring that waste is disposed of appropriately, in accordance with the waste Duty of Care provisions.

Alongside the environmental benefits which the aims above hope to achieve, there are also associated economic benefits for companies in reducing waste with the aid of SWMPs. Before introducing the regulations, Defra carried out a cost benefit analysis on the use of SWMPs (Defra, 2008c). This study compared the costs involved in preparing, implementing and updating a SWMP with the reduction in costs from landfill charges and resource efficiency. They found clear economic benefits particularly for larger projects from the use of SWMPs which informed the regulatory thresholds. Defra also carried out a consultation on the introduction of the regulations from April to July 2007. In general the legislation was supported by industry.

## 3.0 Existing information

Although it is generally accepted within the construction industry that the use of SWMPs has a number of environmental and economic benefits, finding specific data on the impacts that SWMPs have had on the industry and how effectively they have been implemented is not easy. Before SWMPs were mandatory their use was not widespread, making it difficult to gather information on their impacts. The legislation making SWMPs compulsory for projects over £300,000 in England came into force a year ago and to date there has not been a comprehensive review of the impact this has had on construction waste management. However, there have been a limited number of reports, surveys and case studies carried out and these were reviewed prior to carrying out the present survey. The reports were identified by means of contacts provided by WRAP, the Environment Agency, web searches and literature reviews.

The main sources of information for this review were:

- the Defra cost benefit study mentioned above (Defra, 2008c);
- a report summarising the findings of a survey carried out by AEA for Defra on the experiences of companies who were voluntarily using SWMP before the regulations (AEA, 2007);

- a report summarising a survey by the South East Centre of the Built Environment (SECBE) and its partners carried out six months after the regulations came into force (SECBE, 2008); and
- a report by the Environment Centre for the Environment Agency (tEC, 2009) on the findings of a consultation to investigate the level of compliance with the SWMP legislation in Hampshire and West Sussex.

Other information was gathered from a more limited survey carried out by NetRegs through the Federation of Master Builders at a similar time to the SECBE survey (NetRegs, 2008) and a number of case studies describing the benefits that can be obtained with SWMPs.

SWMPs became compulsory in April 2008 and in the year that has passed a number of case studies have been produced describing the benefits that can be generated by their use. However, there have been no detailed studies on the overall impact of the legislation on the industry and the success of SWMPs. This review identified three surveys carried out around six months after the legislation came into force (SECBE, 2008, NetRegs, 2008 and tEC, 2009). These indicated that there is still confusion over when SWMPs are mandatory, at what stage of the project they need to be prepared and who is responsible at each stage. The three surveys all found that less than half of the respondents knew the project value threshold at which the regulations apply to a project. However, all the surveys found that those using SWMPs had found that they have produced both environmental and economic benefits. These surveys do not go into any depth as to what these benefits are or how they have been achieved through using the SWMP.

Prior to the introduction of the legislation, there was a survey (AEA, 2007) of companies voluntarily using SWMPs. This survey also showed that the industry appreciated the financial and environmental benefits that SWMPs could bring, but had difficulty in pinning down exactly what savings had been made in terms of both waste and cost.

The purpose of this review was to inform the development of the WRAP survey questionnaire ensuring that the questions asked related to the current awareness of SWMPs and was not duplicating work that had already been conducted. This project was task with identifying good practice in the industry. The previous studies had concentrated on whether a plan had been implemented and had only asked general questions about whether organisations thought they were beneficial either environmentally or economically. A clear need was identified to find out what those benefits were and how the SWMP was used to achieve those results.

This study therefore targeted organisations who were more likely to be implementing good practice such as signatories to the “Halving Waste to Landfill Commitment” and attendees at workshops relating to waste reduction and recovery and SWMPs. The questionnaire would then need to assess in depth the benefits of implementing a SWMP and what process was undertaken.

The full review is available in Appendix A.

## 4.0 Survey objectives

The survey will be used to evaluate the impact that using SWMPs are having on creating good practice on construction projects. To achieve this information is required on how they are implemented and the benefits that can be achieved. This survey was designed to gather this information from representatives of the construction industry. Data was collected on how the respondents implemented SWMPs on their projects and their experiences of the benefits and costs associated with their preparation and implementation. The online questionnaire was structured into the following sections:

- A. Project description
- B. Developing the SWMP
- C. Planning using the SWMP
- D. Implementing the SWMP
- E. Reviewing the SWMP
- F. Overall experience of SWMPs
- G. Contact information

Sections A to E were completed on a specific project and section F was on the respondents general experiences and views of SWMPs. Not all respondents completed every question in the survey. A full copy of the survey questions is included in Appendix C.

## 5.0 Methodology

### 5.1 Obtaining contacts for the survey

The survey was conducted over four weeks between mid May and mid June 2009. The survey was targeted at medium to large organisations involved in the construction industry. An initial contact list of SWMP users was provided by WRAP which included Halving Waste to Landfill Signatories, contacts from previous SWMP events and workshops organised by WRAP. Additional contacts were obtained from various organisations' websites over the internet. Overall, just over 800 contacts were obtained.

### 5.2 Creating the online questionnaire

A list of questions relating to SWMP was created based on findings from the literature review (Stage 1) conducted in February 2009 and input provided by WRAP. The questions mostly comprised of multiple choice answers but some were open questions. Once the questionnaire had been finalised, it was reviewed by WRAP. Three people from WRAP and two people from TRL then piloted the questionnaire and it was amended accordingly.

An Adobe Flash Software was used to create the online version of the questionnaire. Once this was completed, the questionnaire was launched online, via the TRL website to allow any respondents to participate in the survey.

### 5.3 Conducting the survey

There were various different methods of engagement used to conduct the survey. These are detailed below.

#### 5.3.1 Email survey

As an initial contact, an invitation email to participate in the survey with a link to the questionnaire was sent to 800+ email contacts from the list in May 2009. An example of the email sent to the various contacts is in Appendix AB. An invitation email was also sent to contacts from:

- The Improvement and Efficiency South East (IESE) framework;
- The Civil Engineering Contractors Association (CECA); and
- The Construction Industry Environmental Forum (CIEF).

Participants were asked to fill in the questionnaire by 5<sup>th</sup> June 2009.

#### 5.3.2 Telephone survey

To maximise response rate, a telephone survey was also conducted. The project team contacted over 200 organisations by phone with the intention of conducting the survey online. All of the organisations contacted preferred to complete the questionnaire online rather than over the phone and therefore invitation emails were re-sent to those who requested it.

## 5.4 Analysis of the survey results

The results from the online questionnaires were automatically collated and sent to the project team in an Excel format. Response rates for each question were calculated and compared to the previous literature review. Comparisons between different levels of projects and organisations (e.g. cost of project, location of project) were made.

## 6.0 Survey findings and analysis

### 6.1 Respondents

In total, 53 respondents completed the survey. 49 respondents provided details regarding their organisation's role on each project, they can be broken down as follows; 18% were clients or the project owner, 2% design consultants, 67% the principal contractor, 2% a sub-contractor and 10% were others, including waste management contractors, waste facilitators, consultants etc. The results show that only one design consultant completed the survey.

### 6.2 Nature of participated projects

51 respondents replied to the question on the size of the projects. Figure 1 shows that the largest proportion of projects fell between £500k and £5m. Overall the majority of projects reported are at the larger end of the scale, with 53% being £5m or over.

**Figure 1** Size of projects

Size of project	Proportion of projects
Below £100k	0%
Between £100k to £299k	6%
Between £300k and £499k	6%
Between £500k and £5m	35%
Between £5m and £10m	16%
Between £10m and £50m	21%
Over £50m	16%

For all responses within the remainder of this section, 50 participants provided information. Sixty two percent of the projects were public sector, 38% private sector. Looking at project category, 46% were new build, 32% were refurbishments or repair and maintenance, 4% demolition and 18% demolition and construction. The most frequent construction type was education, making up 24% of the projects, followed by infrastructure (18%), multiple dwelling residential (18%), bespoke (12%), offices (10%), health (8%), retail (6%) and detached or terraced houses (4%). Over half of the projects were located within an urban area (52%), 40% within urban fringe and 8% in rural areas.

Thirty eight percent (19) of the construction projects used in this survey were complete while 62% were in progress.

### 6.3 Awareness and understanding of the regulations

According to the SWMP regulations, 'any client who intends to carry out a project on any one construction site with an estimated cost greater than £300,000 excluding VAT must prepare a site waste management plan conforming to these Regulations before construction work begins'. As such, it is the client that is required to initiate the SWMP. Of the 48 respondents that provided information regarding who initiated the SWMP, only 15% reported that the client had done this. In 77% of cases, the principal contractor had initiated the SWMP, while a design consultant had taken this role on 2% of the projects<sup>1</sup>, and 6% of respondents reported that another party had done so. The SECBE survey (2008) identified that only 45% of clients understood that they were responsible for the initial development of the SWMP.

<sup>1</sup> It should be noted that only 1 design consultant responded to the survey.

In this current survey, nearly half of the 49 respondents that gave details regarding the timing of the SWMP initiation reported that preparation of the SWMP began at the start of work. Twenty two percent said this happened at the planning stage, 14% during the design whilst 14% answered 'other'; these answers included 'at the tender stage' and 'pre-construction'.

It is expected that after the SWMP has been initiated by the client, it will be passed to the principal contractor for the duration of the construction works.

Figure 2 shows at what stages the responsibility for the SWMP was passed to the principal contractor and the proportion of respondents who selected each stage.

**Figure 2** Different staged respondents passed responsibility to the principal contractor

<b>At what stage was responsibility for the SWMP passed to the principal contractor?</b>	<b>Proportion that selected each category</b>
During mobilisation and construction	60%
During the detailed design and procurement stage	17%
At the project inception	10%
During the scheme proposal	6%
At the feasibility stage	2%
The control remained with the client throughout the project	4%

60% of the 48 respondents reported that the SWMP was passed to the principal contractor during mobilisation and construction, whereas 4% of cases stated that the control remained with the client throughout the project.

75% of respondents (of 52) reported that their organisation had already been involved in implementing SWMPs prior to the Regulations coming into force in England. In all, the majority of respondents (86% of 51) reported that they were confident in preparing, or contributing to the preparation of the SWMP and complying with the SWMP Regulations. The remaining respondents, who stated that they were not confident in preparing or contributing to the preparation of the SWMP (14%), provided various reasons which included "Very difficult to estimate volumes of waste to be produced", "Too late for any design input – Planning had been granted" and "Difficult to get good estimates of waste volumes...do not fully understand how doing this helps to reduce waste volumes". Over three quarters (76% of 46) felt that preparing and implementing SWMPs became easier and more cost effective with experience. Those that did not agree cited a variety of reasons, with many feeling that more time was required to provide a true assessment.

## 6.4 Training and guidance

The questionnaire was sent out to over 750 people who attended WRAP events. Respondents to the survey had received a variety of SWMP training, with 74% completing in-house training, 50% having undertaken the WRAP training, 20% Envirowise and 10% another form of training such as academic or institute courses (please note that respondents were asked to 'select all that apply' and so the proportions total more than 100%).

60% of respondents (of 50) made use of guidance or tools to assist with the development of their SWMP. Of these, 34% used the WRAP guidance and tools, 14% used NetRegs, 12% used Envirowise and 8% used Defra. A further 24% make use of other guidance such as BRE SmartWaste or in-house guidance. In total, 30% of respondents did not use any guidance or tools as they have a competent in-house person, 6% thought there is no guidance available or that it is too complicated to follow, whilst the remaining 4% use an industry model already in existence and delegated the responsibility to their principal contractor.

Over half of the respondents (55% of 40) reported that training would help to improve their use of SWMPs and over 50% also felt that they would benefit from further guidance. Over a quarter reported that demonstrations would improve their use. Respondents who provided comments outlined that they would benefit from seminars and case studies, an in-house workshop and training on how to get the best out of a SWMP, rather than simply how to complete a specific template.

## 6.5 Preparing and implementing SWMPs

### 6.5.1 Using a SWMP template

A template was used to produce the SWMP by the majority of respondents (96% of 50). Of these, most used an in-house template (66%). Other templates used were the BRE Smartwaste template (14%), the WRAP SWMP template v1.1 (6%), the Envirowise template (2%) and 'other' (8%).

Of those that have made use of a template, 69% (of 36) found that it made preparing the SWMP easier and more efficient. A quarter reported that it helped but was not the key to the process, 3% felt it didn't help but was as good as any other way, whilst the remaining 3% felt it had made the process more complicated. Fourteen respondents provided suggestions or detailed modifications to improve the templates they had used. Suggested improvements included providing templates for different sizes of development and providing a full contract checklist with the template, with a single person championing the SWMP. Few (4 respondents) reported that templates had been modified to be compatible with in-house systems, or that they were improved with use and experience.

### 6.5.2 Targets and activities

Half of respondents (50% of 46) had set targets within the SWMP to reduce waste. Examples of the kind of targets set included diverting 65% waste from landfill, a 5% reduction for all material types, or a fixed target such as finding alternative options for 70,000 m<sup>3</sup> of subsoil originally intended for landfill. Almost half of respondents (48% of 44) reported having targets within the SWMP for waste recovery, such as to recycle at least 70% of non-excavation waste, aiming at a minimum of recycling 80% of waste, or the segregation of wastes on site and in a local compound. In three quarters of the cases (75% of 28) where waste targets had been set, they were done so by the principal contractor, whilst in 18% of cases this was a joint decision and for 7% this was done so by the client.

In a more general reflection upon the use of SWMPs, of the 37 principal contractors that responded to the survey, 63% (of 35) felt that their clients were not setting realistic targets within the SWMP. From the comments made, and supported by the previous statistic that in 75% of cases it is the principal contractor who sets any targets, it appears that clients rarely become involved with the SWMP during the initial stages. Remarks include 'Clients appear blissfully unaware of site waste management plans' and 'The majority of clients do not provide any SWMP information. If this were better regulated it would improve' summarise the general opinion presented.

Almost three quarters of respondents (71% of 45) report that they used their own experience to forecast the quantities of waste that would be produced by the project. Eighteen percent used the WRAP Net Waste Tool, while 13% used other forecasting tools such as SMARTWaste or in-house forecasting tools. Thirty three percent also reported using other information, such as discussions with specialist subcontractors, consultation with construction teams and contract documentation. Respondents were asked to 'select all that apply' and the percentages total well over 100%, suggesting that a number of sources are used to forecast waste quantities.

Respondents were asked to select which categories they used to record the types and amounts of materials, the responses are summarised within Figure 3.

**Figure 3** Which categories are used to record types and amounts of materials

Recording categories	Proportion that use each category
Reused on site	66%
Reused off site	46%
Recycled on site	40%
Recycled off site	78%
Sent to another recovery on site	14%
Sent to another form of recovery off site	56%
Sent to landfill	74%
Sent to other forms of disposal	30%

When asked for information regarding the selection of waste management options, again respondents were asked to select all that apply. As outlined in figure 4, using a regular contractor was the most frequently selected by the 46 respondents to this question. For those who responded 'other', selection procedures included undertaking an investigation of providers in the local area, using their specialist buying department to procure waste management operators, and using contractor information.

**Figure 4** How waste management options are selected

	<b>Proportion that use each option</b>
Use a regular contractor	57%
Use a waste broker	22%
Use on-line directories	11%
Framework contract	11%
Use local directory	9%
Specified by client	9%
Other	22%

As a result of preparing a SWMP, respondents planned to implement or increase a variety of activities. As can be seen in Figure 5 the most frequently reported intention was to segregate waste (83% of 43), followed by the recycling of any waste produced (70%).

**Figure 5** Planned activities as a result of preparing a SWMP

<b>Activity</b>	<b>Proportion planning to implement or increase</b>
Waste segregation	83%
Recycling of waste produced	70%
Reuse of materials on site	60%
Improved storage of materials	53%
Reduce over ordering	49%
Prevent waste through design	33%
Use of materials with a high recycled content	33%
Other	7%

Respondents were asked what proportion of activities identified in the SWMP planning stage were implemented. Thirty two percent (of 44) reported 100%, 39% said that 75%, 16% reported half, 7% said 25%, whilst 7% said none had been implemented.

Focussing on waste segregation, 60% (of 53) respondents stated that they segregated waste whereas 40% (18) said they did not. Forty percent of the projects are located within urban fringe and 52% are located in urban areas where segregation is not always possible due to a limitation of space. In urban areas, a co-mingled waste collection system is normally in place. Wastes are segregated in a Material Recycling Facility (MRF).

Figure 6 shows that for projects up to £50m the number of projects where waste was segregated is similar to those where it was not segregated. For projects over £50m, waste was segregated in almost all cases; of the 8 projects in this category, waste was segregated in 7.

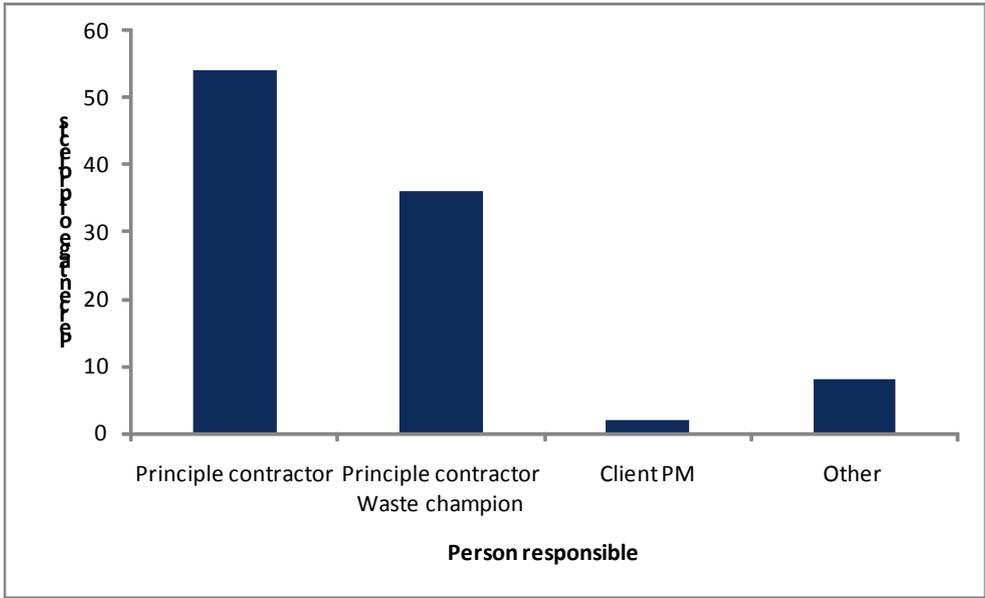
**Figure 6** Segregation of waste by project size

Project Size	Did you segregate waste as result of preparing the SWMP?		
	No	Yes	TOTAL
£100k to £299k	1	2	3
£300k to £499k	2	1	3
£500k to £5m	6	8	14
£5m to £10m	2	4	6
£10m to £50m	6	5	11
Over £50m	1	7	8
<b>Total</b>	<b>18</b>	<b>26</b>	<b>44</b>

**6.5.3 Use and review of SWMP**

Once work commenced, the person responsible for the SWMP documentation was the principal contractor site manager in over half of the cases (54% of 50). Only 2% stated that the client project manager was the person responsible for the SWMP documentation (see Figure 7).

**Figure 7** Person/controller responsible for the SWMP documentation



Forty four percent of respondents (of 50) indicated that the SWMP was updated monthly, 12% weekly, 14% every 3 months, 2% every six month and 2% 'other'. Sixteen percent reported that the SWMP was updated for each waste removal.

Figure 8 shows the different phases when organisations update their SWMP and how much money they stated they saved due to the implementation of the SWMP. Most projects which reported savings stated that they were in the range of £1,000 to £10,000, which is big enough to be significant and noticeable. These projects updated their SWMPs at least monthly, and in a number of cases for each waste removal. However, some projects which updated their SWMPs after each waste removal also recorded increased costs, neutral or savings of less than £100, so there does not seem to be an automatic link between frequency of updating and savings.

**Figure 8** Periods of updating the SWMP by money saved

Money saved	How often is the SWMP updated?						TOTAL
	For each waste removal	Weekly	Monthly	Every 3 months	Every 6 months	Others	
Increased costs	2	-	4	2	-	2	<b>10</b>
Neutral	1	1	3	1	-	1	<b>7</b>
£100 or less	1	-	-	-	-	-	<b>1</b>
£101 to £1000	-	1	4	-	-	-	<b>5</b>
£1001 to £10,000	3	2	3	1	-	1	<b>10</b>
£10,001 to £50,000	-	1	2	1	-	-	<b>4</b>
£50,001 to £500,000	-	-	2	-	1	-	<b>3</b>
More than £500,000	-	-	1	-	-	-	<b>1</b>
<b>Total</b>	<b>7</b>	<b>5</b>	<b>19</b>	<b>5</b>	<b>1</b>	<b>4</b>	<b>41</b>

18% of respondents (of 50) stated that their SWMP was inspected; 6% by the LA as part of the planning application, 4% by the LA for another reason and 8% by the Environment Agency. Just under half of respondents (45% of 51) reported that the client reviewed the SWMP during construction, 30% reported that they did not, whilst 25% did not know. For 17% of reported projects (of 53) the SWMP was never reviewed by the project team, however for 77% it was reviewed at management or project meetings. As shown in Figure 9 the majority of those who reviewed the SWMP at project or management meetings generally made savings of £1001 to £10,000. However, a significant proportion (7 organisations, 18%) that reviewed the SWMP at project or management meetings reported an increase in their project costs. Overall there does not seem to be any correlation between how the SWMP was reviewed and cost savings.

**Figure 9** Stages the SWMP was reviewed by money saved

Money saved	When was the SWMP reviewed by the project team?				TOTAL
	Never	Project Meetings	Management Meetings	Weekly meetings	
Increased costs	2	3	4	-	<b>9</b>
Neutral	2	2	2	-	<b>6</b>
£100 or less	-	1	-	-	<b>1</b>
£101 to £1000	-	2	2	1	<b>5</b>
£1001 to £10,000	3	2	5	-	<b>8</b>
£10,001 to £50,000	-	3	1	-	<b>4</b>
£50,001 to £500,000	-	1	2	-	<b>3</b>
More than £500,000	-	1	-	-	<b>1</b>
<b>Total</b>	<b>7</b>	<b>15</b>	<b>16</b>	<b>1</b>	<b>39</b>

Considering only the 19 completed construction projects, the SWMP was reviewed after project completion in 18 cases. In 32% of these cases, this was reviewed by the client, in 32% by the principal contractor, in 26% by all

members of the project team, in 21% by the environmental department or manager and in 11% by the principal contractor waste champion. As respondents were requested to 'select all that apply', it is clear than for many projects the SWMP is reviewed after completion by a number of different individuals.

A total of 34 respondents provided information as to the details of reviewing the SWMP. 79% of these stated that the review included confirmation that the plan has been monitored on a regular basis, 68% reported that the review included the comparison of estimated quantities of each waste, 44% included explanations of any deviation from plan, whilst 41% stated that it includes estimation of cost savings that have been achieved (please note that respondents were asked to 'select all that apply' and so the percentages here total more than 100%).

Overall, 59% (of 37) of the respondents felt lessons had been learnt from implementing the SWMP. These included focussing the construction team on recycling materials on site, the importance of early involvement, and the cost savings that can come about from resource efficiency. Such lessons were shared via communication throughout organisations to client teams, project teams, contract managers and in some case all relevant staff.

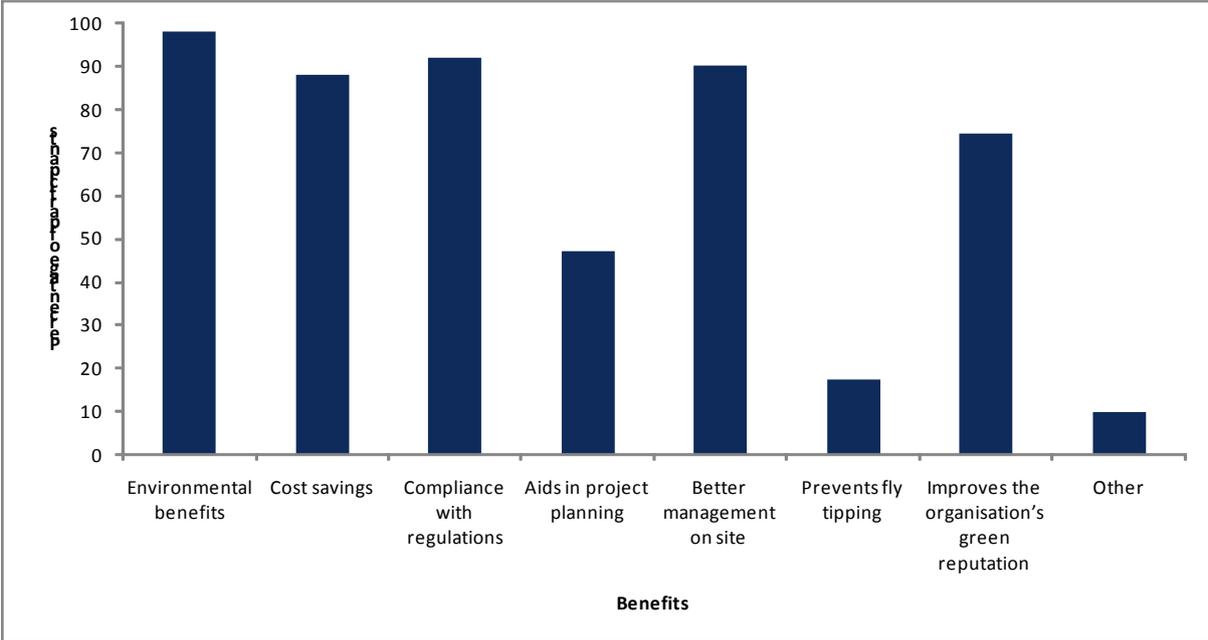
**6.5.4 Targets**

Over a third of respondents reported that the targets set within the SWMP had been exceeded (36% of 34) whilst 42% had achieved their targets. Twenty two percent stated that they had not met their targets, the reasons given being that the estimates had not been accurate, that the contractor was responsible for setting the targets and because it is an on-going project. In a more general reflection of the use of SWMPs, over half of respondents (54% of 50) state that if waste targets are set in a SWMP they are met either most of the time or always.

**6.6 Benefits of using a SWMP**

Respondents were asked to rank the top five benefits of using SWMP. 51 respondents selected the top five of the 8 main benefits associated with implementing SWMPs. Overall, the majority (98%) selected environmental benefits, a large proportion selected cost savings (88%) and 90% selected better management on site (see Figure 10).

**Figure 10** Overall top benefits chosen by participants



Those who selected 'other' specified the following benefits:

- Reduction in carbon footprint
- more acceptance/understanding of quality protocol / exempt recycling site use by clients
- Increased efficiency

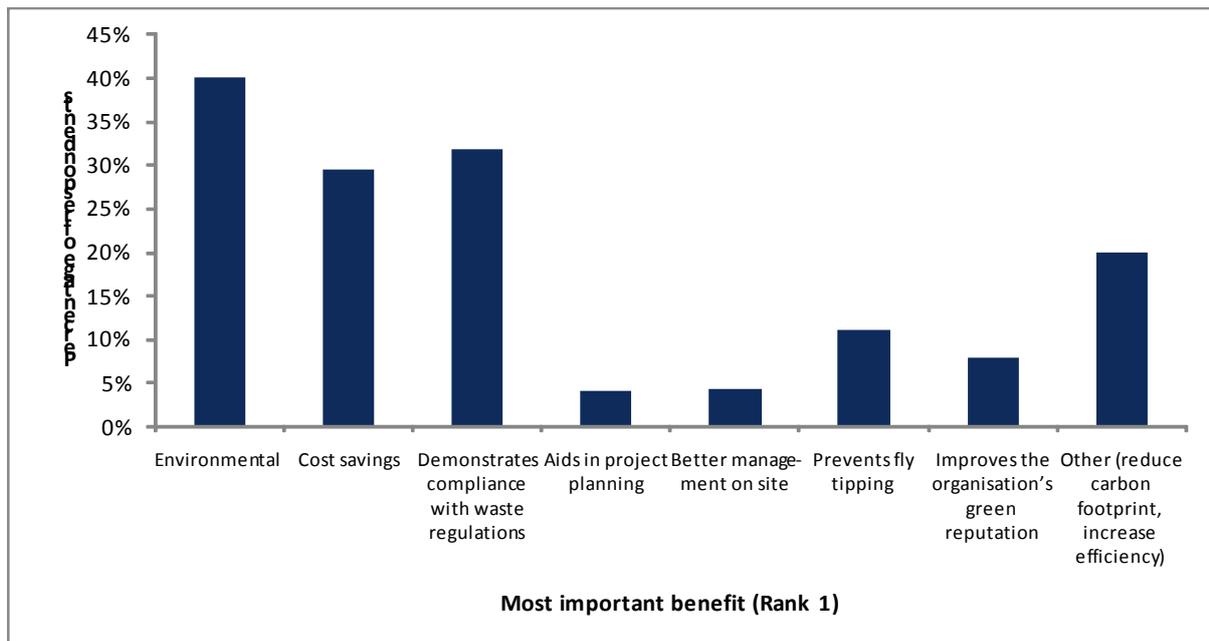
The Figure 11 shows the ranking of how significant the perceived benefits of implementing a SWMP were.

**Figure 11** The significance of the perceived benefits of SWMP

Benefits	Environmental	Cost savings	Demonstrates compliance with waste regulations	Aids in project planning	Better management on site	Prevents fly tipping	Improves the organisation's green reputation	Other (reduce carbon footprint, increase efficiency)
(N)	50	45	47	24	46	9	38	5
1	40%	30%	32%	4%	4%	11%	8%	20%
2	24%	14%	19%	21%	20%	11%	26%	20%
3	14%	25%	19%	21%	17%	22%	11%	40%
4	8%	20%	15%	21%	37%	-	16%	-
5	14%	11%	15%	17%	22%	56%	29%	20%

Forty percent of the respondents ranked Environmental benefits as the most important whereas only 8% stated that the most important benefit is the improvement of the organisations' green reputation (see Figure 11).

**Figure 12** Percentages of benefits stated by respondents as the most important



The SECBE survey reports similar results; environmental and financial benefits were found to be the most important outcome of the SWMP with 26% and 22% of the SECBE respondents respectively choosing this as the most important benefit. However, respondents in the SECBE study did not perceive SWMP as having an impact on fly tipping (only 1.5% saw a correlation between the two), whereas over 11% of the respondents in the current study found this to be an important factor.

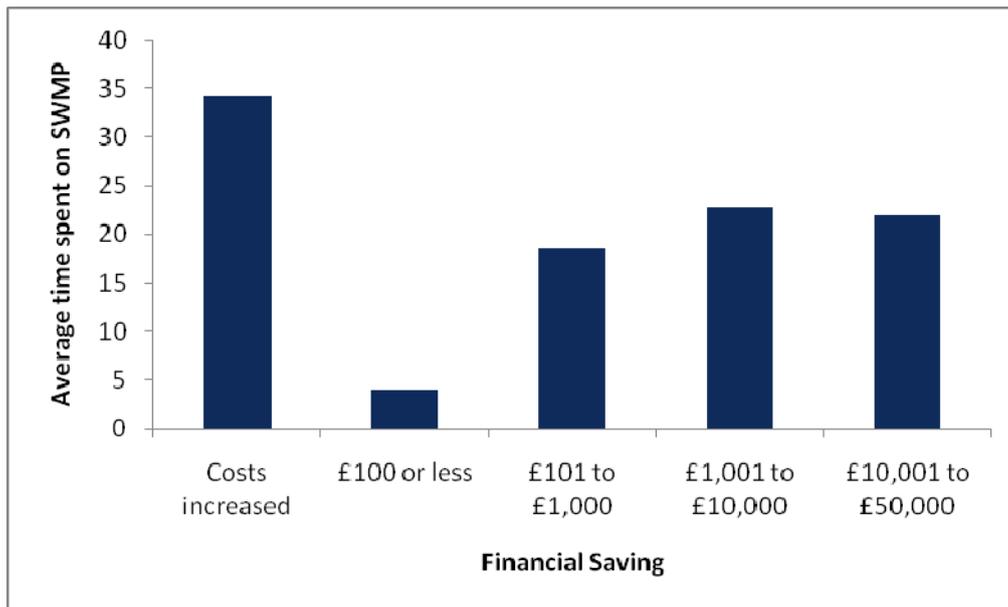
### 6.6.1 Costs benefits ratio

In total, 76% of respondents (of 51) stated that the benefits of implementing a SWMP outweigh the costs, 39% reporting that it does so significantly. Sixteen percent felt that the cost and benefits balance out, whilst only 8% said that the costs outweigh the benefits. One comment from a respondent who felt that the costs outweighed the benefits stated 'The completion report serves no purpose. Enforcement of SWMPs has increased internal

training and audit costs. The SWMP Regulations have not changed anything for those already complying with legislation and good practice'. However the majority stated that even if they were already carrying out waste reduction actions, this had increased with the SWMP.

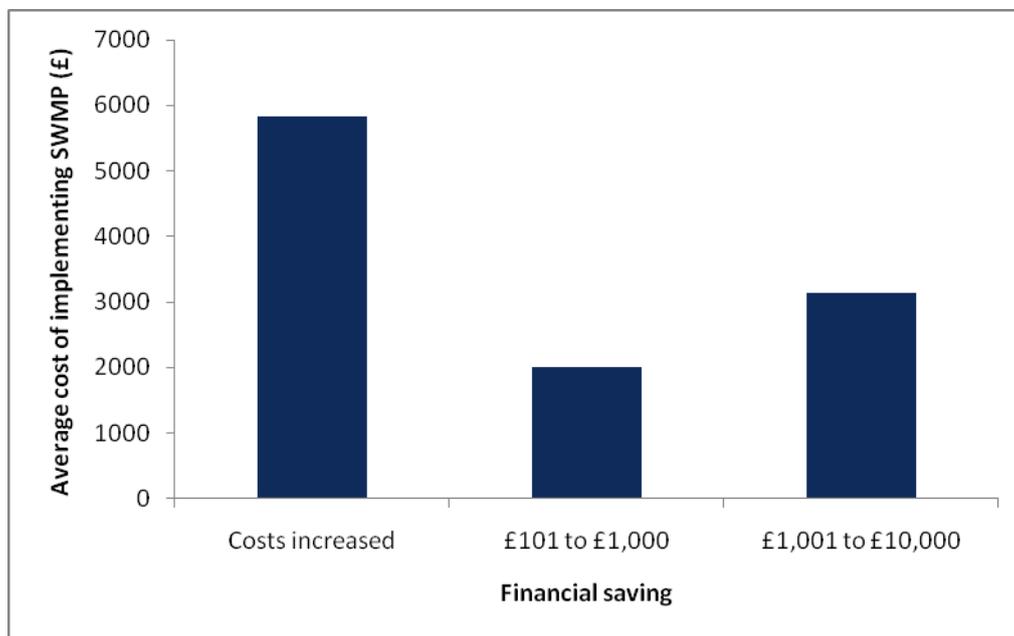
Figure 13 below outlines the average time spent implementing the SWMP against the resulting financial savings for completed projects. Although there are too few cases to make convincing conclusions, the graph suggests that spending from 15 up to around 22 hours on the SWMP results in significant financial savings. However after this point, it appears that an increased number of hours is associated with the SWMP resulting in increased cost, with those who report increased costs spending 34 hours on the SWMP on average. Those who spent less than 5 hours on the SWMP reported only small savings. These issues are explored in more detail in 6.6.3.

**Figure 13** Financial benefit against time spent on SWMP



The financial savings made on completed projects against the cost of implementing the SWMP are investigated in Figure 14. Unfortunately only nine of the completed projects provided both financial cost and savings information, and as such the graph is an indicator only. As is intuitive, the projects which reported the highest cost in implementing the SWMP also report costs increasing overall.

**Figure 14** Financial benefit against cost of implementing the SWMP



### 6.6.2 Environmental benefits

Twenty percent of respondents (of 46) reported that completing the SWMP had highlighted additional resource efficiencies. Examples included using an on-line directory to identify recycling options for materials that had not originally been intended for recycling and giving away materials such as racking and carpet tiles to local stores and charities.

Using the SWMP increased the use of recycled materials by their organisation according to over half of the respondent (53% of 49), with 6% reportedly moving from very little to a lot. Thirty one percent felt they were already using recycled materials wherever possible. Only 16% reported no improvement in the use of recycled materials, with one respondent stating that this was due to the lack of influence on the design process.

SWMPs also appear to have a positive impact on waste reduction activities, with 60% (of 50) reporting that although they were already active they had seen some improvements, while 14% stated they had done few waste reduction activities prior to the SWMP implementation, and that this had improved since. Of the remaining respondents, 16% saw no increase but this was because they were already very active in reducing waste, whilst 10% simply saw no improvement.

Overall, 65% (of 51) of respondents reported that implementing a SWMP improved resource efficiency for all projects. Eighteen percent felt there were improvements, but only for larger projects. Eighteen percent stated that there were no improvements; however these were mainly organisations that were already active in waste reduction and recycling activities. These are organisations that had implemented SWMPs before the regulations came into force.

The communication of material resource efficiency on site has also improved for many organisations as a result of implementing SWMPs. Fifty two percent (of 50) report that although they already had communication in place, it has improved due to the SWMP implementation. Furthermore, resource efficiency was not something previously communicated according to 18% of respondents, and this has improved with the use of SWMPs. Of the 30% who reported no improvement, two thirds stated that this was because an effective communication programme had already been in place.

Data summarising the amount of waste prevented as a result of implementing the SWMP was provided about completed projects (19). As shown on the list below, the amount of waste prevented varies from 0.1 tonne to 4,100 tonnes depending on the size of project.

Typical example figures of waste prevented and cost savings provided by some of the survey respondents are listed below. Each example was provided by a different company.

### Refurbishment projects

- Project value between 100 to 299k (Retail) - The amount of waste prevented was 50m<sup>3</sup> and the savings were between £100 to £1001;
- Project value between 100 to 299k (Infrastructure) - The amount of waste prevented was 300m<sup>3</sup> and the savings were between £1001 to £10,000;
- Project value between £500k to 5m (Office – commercial) – The amount of waste prevented was 12 tonnes and the savings were between £1001 to £10,000;
- Project value between £500k to 5m (Infrastructure)– The amount of waste prevented was 4,100 tonnes and the savings were between £10,001 to £50,000;
- Project value between £500k to 5m (Residential-multiple dwelling) – The amount of waste prevented was 0.1 tonne and there was a reported increased in cost;
- Project value between £5m to £10m (Education)– The amount of waste prevented was 50 tonnes and there was reported increased in cost; and
- Project value between £5m to £10m (Residential – multiple dwelling)– The amount of waste prevented was 240m<sup>3</sup> and the reported savings were between £1001 to £10,000.

### New Build

- Project value between 100 to 299k (Bespoke – fit out project) - The amount of waste prevented was 12.3 tonnes and the savings were between £1001 to £10,000; and
- Project value between £500k to 5m (Residential – multiple dwelling) – The amount of waste prevented was 10 tonnes and the savings were between £100 to £1001.

### Demolition

- Project value between £300 to 499k (Health - Hospital) - The amount of waste prevented was 120m<sup>3</sup> and the savings were between £1001 to £10,000.

One respondent reported that due to the amount of inert material reused or recycled a carbon footprint reduction of 328t CO<sub>2</sub> was achieved on their particular project.

### 6.6.3 Financial benefits

Over half of the respondents report that some money was saved as a result of using the SWMP. As outlined in Figure 15, 19% of respondents (of 41) reported a saving of £10,000 or more. Forty one percent stated that the SWMPs had no effect on cost and 24% reported an increase in costs as a result of implementing the SWMP.

**Figure 15** Financial costs / benefits

Amount	Proportion of projects
Greater than £500,000	2%
Between £50,001 and £500,000	7%
Between £10,001 and £50,000	10%
Between £1,001 and £10,000	24%
Between £101 and £1000	12%
Less than £100	2%
Cost neutral	17%
Increase in costs	24%

Designing out waste was selected by 65% (of 49) of respondents as the activity which generated the most cost savings. Fourteen percent selected recycling, 10% reusing waste and 8% highlighted measures to reduce wastage rates as the activity resulting in most savings. Meanwhile, 2% of respondents felt that there was insufficient data to provide information on which particular action had generated cost savings. The result confirmed the WRAP study findings<sup>2</sup> that designing out waste generates the greatest cost savings.

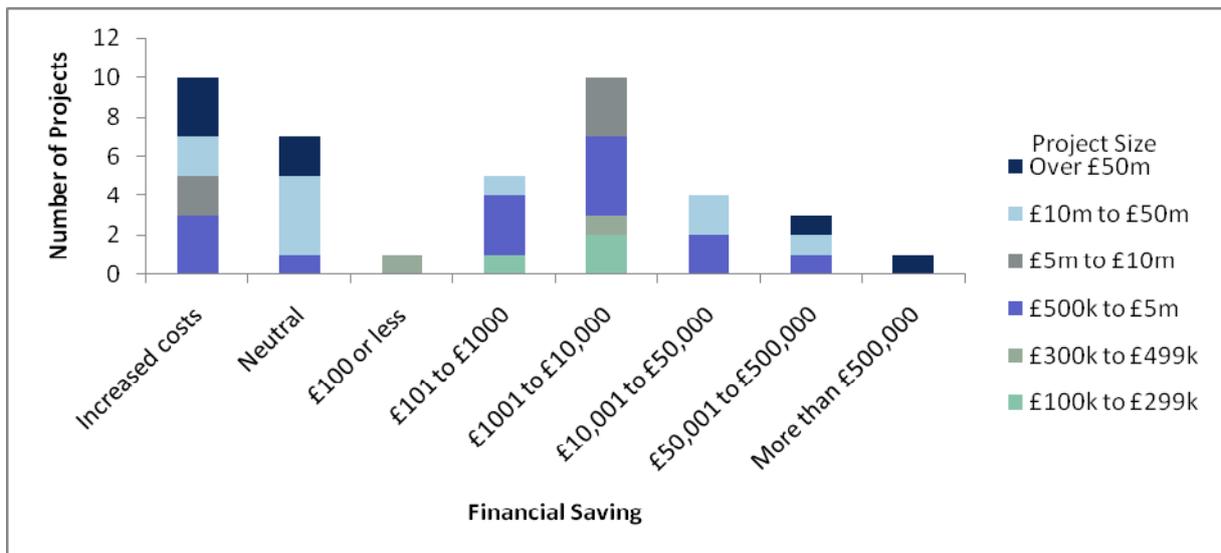
For those who segregated waste, 22% stated that waste segregation had resulted in a 0.1 to 10% reduction in waste disposal costs. This is equivalent to between 0.005% to nearly 1% of project value. Sixteen percent reported that the cost was neutral. The disposal cost as a percentage of the overall project value of projects where waste segregation is cost neutral is between 0.05% and 2%. Only 11% said the disposal cost had increased. One participant stated that a 20% increase in disposal cost was experienced due to the implementation of waste segregation as a result of the SWMP.

Respondents were asked with which materials the most cost savings were made. Forty percent (of 47) selected aggregates, far more than any other material. Plasterboard was identified by more than a quarter of respondents (28%), metals by 17% and wood by 4%. The remaining respondents were unable to provide information regarding which material resulted in the most saving as they held insufficient data. It is important to note that cost savings are dependent upon the type of project. For infrastructure projects such as roads, aggregates will be the materials where most savings can be made. If the project is housing, it could be wood or plasterboard and again depends upon the type of housing, therefore making it very difficult to compare.

The size of the project does not seem to have a straight forward relationship with the financial saving resulting from implementing a SWMP.

Figure 16 shows that the largest saving was made by one of the largest projects (over £50m), however those projects that reportedly incurred increased costs are also made up of larger projects, with 7 out of 10 being over £5m.

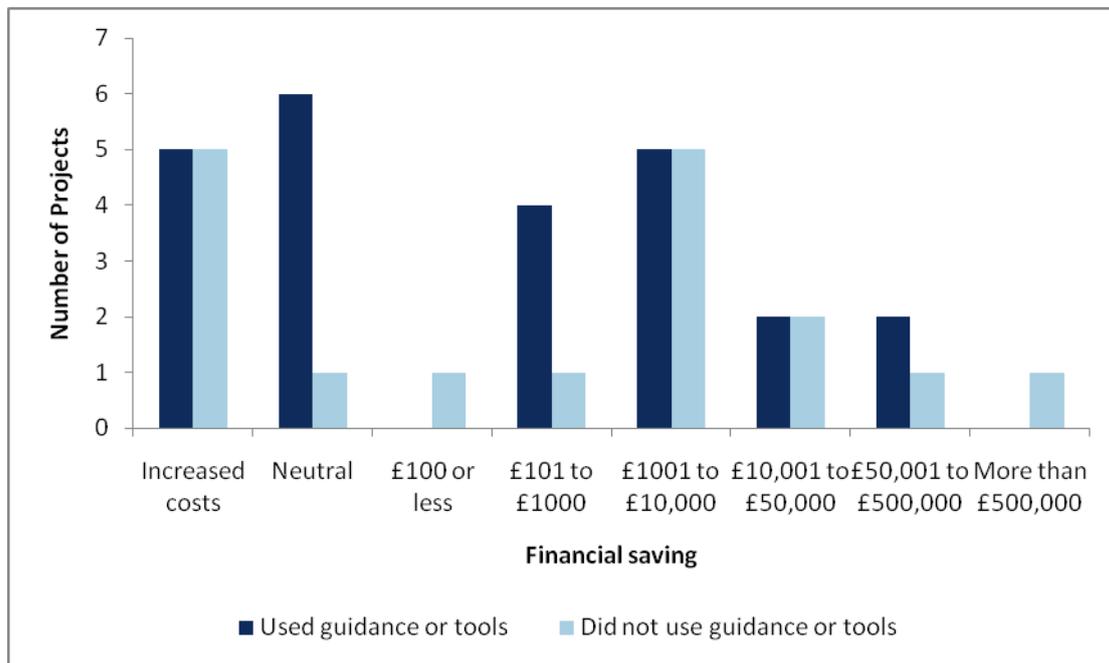
**Figure 16** Financial saving by project size



<sup>2</sup> Designing out waste: A Design Team Guide for Buildings, WRAP, February 2009

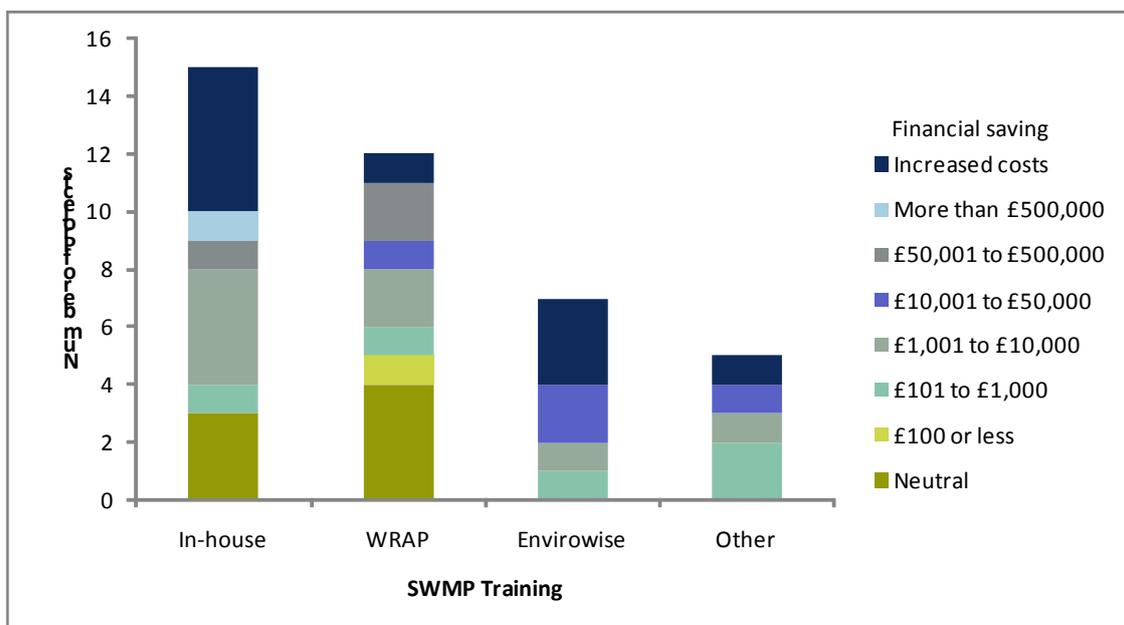
Figure 17 comparing those projects that made use of guidance or tools when preparing their SWMP to those that did not.

**Figure 17** Financial saving by use of guidance or tools



Different organisations have used different training to prepare staff for implementing SWMPs. As illustrated within Figure 18, those using 'other' training contain the highest proportion of projects that have made a financial saving, however due to the small number of cases this may not be representative. The largest number of projects that experienced increased costs comes from organisations that have used in-house training, however again this finding is limited.

**Figure 18** Financial saving by type of SWMP training



37% (of 41) of respondents reported that the actual waste and cost savings usually met the forecasts. For those that stated this wasn't so, the majority had only just started collecting data due to the implementation of SWMPs,

and so did not have information on which to base their forecast quantities. Other reasons included changes to design during construction.

Estimations of the time and cost spent on the SWMP at various project stages are outlined in Figure 19 and Figure 20 below. The ranges indicate that there are large differences in both time spent on the SWMP and the cost associated with implementing it across different projects. Some of the reported figures seem unrealistic, such as the reported 100 hours spent updating a SWMP on project of £300k to £499k value, and material savings of £50k on a project of £500k to £5m. However, we have no way of questioning these figures without going directly to the respondents.

**Figure 19** Time spent on SWMP at various project stages

Project Category	Time (hours)														
	Preparation					Updating					Reviewing				
Project Size	£100 to 299k	£300 to 499k	£500k to 5m	£5m to 10m	Over 50m	£100 to 299k	£300 to 499k	£500k to 5m	£5m to 10m	Over 50m	£100 to 299k	£300 to 499k	£500k to 5m	£5m to 10m	Over 50m
New build (21%)	4	x	2 - 8	x	x	4	x	4 - 8	x	x	2	x	2 - 4	x	x
Refurbishment (52%)	10	4	3 - 8	3 - 10	x	15	x	6 - 24	20 - 50	x	8	x	2 - 8	1 - 30	x
Demolition (10%)	x	4	x	x	x	X	4	x	x	x	x	x	x	x	x
Dem. & Con. (15%)	x	5	1	x	20	x	100	21	x	x	x	x	x	x	x

Figure 20 Financial cost of SWMP at various stages

Project Category	Time (£)																			
	Cost of implementing activities					Increase / decrease of waste disposal cost					Additional staff training					Increase / decrease material purchase				
Project Size	£100 to 299k	£300 to 499k	£500k to 5m	£5m to 10m	>50m	£100 to 299k	£300 to 499k	£500k to 5m	£5m to 10m	>50m	£100 to 299k	£300 to 499k	£500k to 5m	£5m to 10m	>50m	£100 to 299k	£300 to 499k	£500k to 5m	£5m to 10m	>50m
New build (21%)	x	x	x	x	x	-2500	x	x	x	x	x	x	1000	x	x	x	x	x	x	x
Refurbishment (52%)	500	x	500 - 800	8,000	x	1000 - 5000	x	-50,000	1,600 - 2,000	x	500	x	5,000	10	x	2000	x	-50,000	400	x
Demolition (10%)	x	x	x	x	500	x	x	x	x	1200	x	x	x	x	300	x	x	x	x	2,400
Dem. & Con. (15%)	x	x	x	x	x	x	x	x	x	x	x	300	1,500	x	x	x	x	1	x	x

(- is a decrease in costs)

### 6.6.4 Other benefits

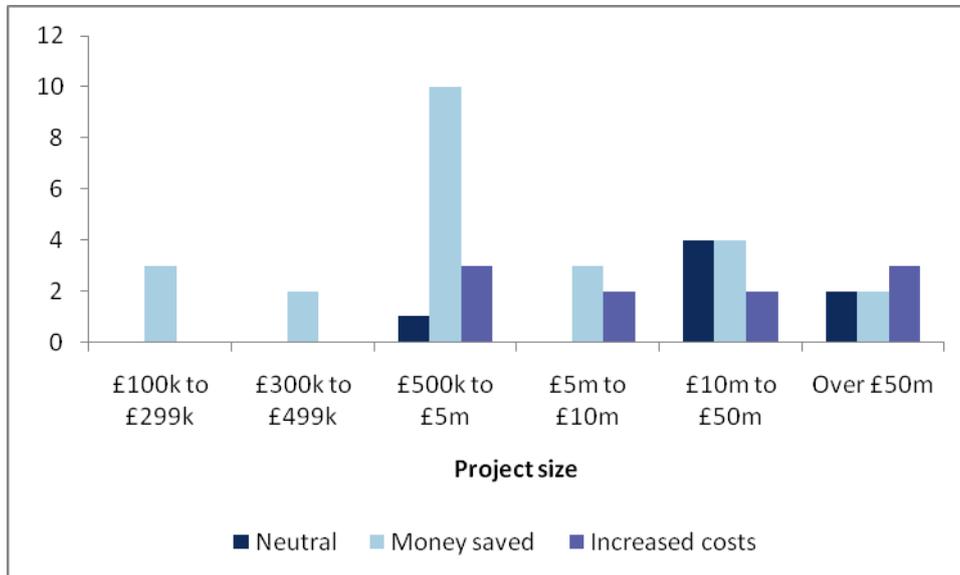
The majority of participants (70% of 44) reported that they had found benefits other than those financial associated with the implementation of the SWMP. These include improved site management and data recording, better procurement planning, improved project planning, better compliance with Duty of Care regulations, reduced storage, and an increased awareness among staff regarding the value of resource efficiency as well as other policies such as carbon footprinting.

### 6.7 Identifying differences in projects with increased costs

Twenty four percent of the projects reported increased costs as a result of implementing a SWMP. In order to identify potential reasons for these particular projects to have incurred costs where others had made financial savings, a comparison was carried out between those that had reported increased costs and those which made financial savings or were cost neutral.

First looking at project size Figure 21 a direct comparison illustrates there is no real discernible pattern with regards to financial savings. However, as seen earlier in the report, those projects which incurred costs fall at the larger end of the scale, with 7 out of 10 being over 5 million.

**Figure 21** Project size by costs incurred



The stage at which the SWMP was initiated may have some influence on the overall financial benefits. As can be seen in Figure 22, those projects that incurred additional costs report having initiated the SWMP no earlier than the start of work. Although around half of the projects that made savings or were cost neutral also did not initiate the SWMP until the start of work, it is still relevant that none of those that reported increased costs had initiated the SWMP during the planning and design stages.

**Figure 22** Stage of SWMP initiation by costs incurred

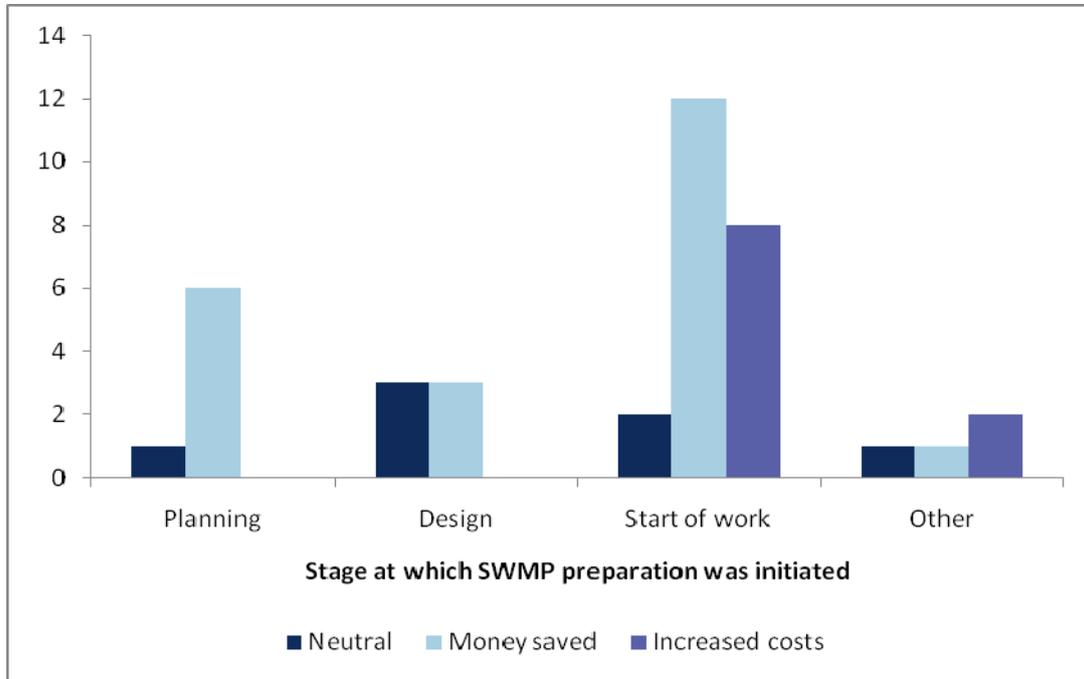
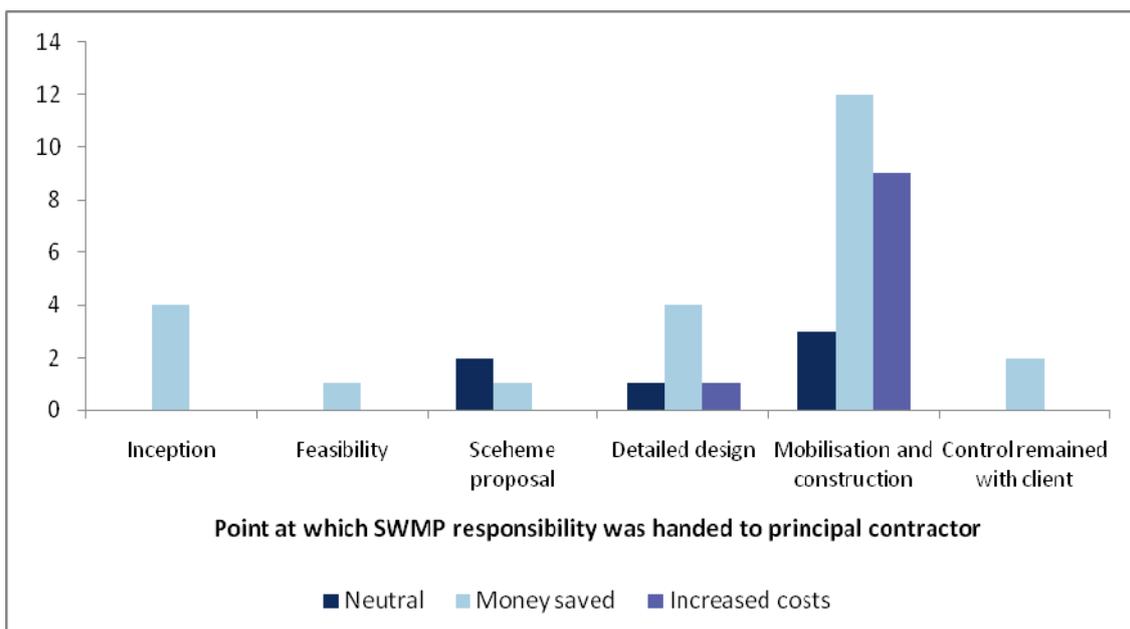


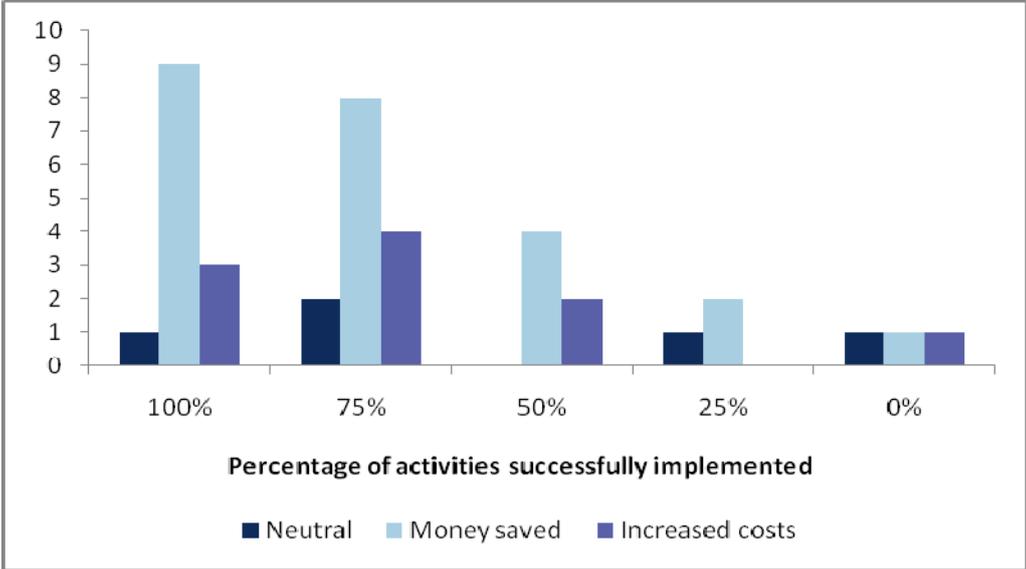
Figure 23 details the point within the project that the responsibility for the SWMP was handed to the principal contractor. Similarly to the point of SWMP initiation, in the majority of projects that reported increased cost as a result of implementing a SWMP, the responsibility was not handed to the principal contractor until the mobilisation and construction phase. Again, the largest proportion of projects that made savings or were cost neutral fall into the same category; however as before it is interesting to note that none of those projects that involved the principal contractor early on reported increased financial costs.

**Figure 23** Point which responsibility was handed to principal contractor by costs incurred



The role of target setting was also examined, however very little difference was found between the two groups with regards to setting targets for waste reduction or recovery. Similarly, when reviewing the percentage of planned activities that were successfully implemented in Figure 24, no clues as to the reason for increasing costs are seen.

**Figure 24** Activities successfully implemented by costs incurred



Due to the small sample size, it is not possible to conclusively state which actions may result in increased costs when implementing a SWMP. However, the findings here suggest that early initiation of the SWMP, as well as involvement of the principal contractor may contribute to a successful SWMP. This may be particularly important for large projects, where in order to account for the larger amount of potential waste, better planning is required from the offset.

**6.8 Key challenges in implementing a SWMPs**

A wide variety of challenges and barriers were encountered by many respondents, with 70% (of 47) reporting difficulties when preparing and implementing the SWMP. Many of the comments made by respondents can be related to awareness or understanding, with challenges arising due to a lack of client knowledge or management buy-in, as well as a lack of consideration during the design process. The related issue of training was also raised by a number of respondents, who stated they felt this area needed to be improved. Other barriers include the time and cost involved with preparing, updating and reviewing the SWMP, with it being described as an "administration burden" by one. The final main problem that was raised is practical in nature, with a lack of resources and space on the construction site cited by numerous respondents as an issue. The majority of construction projects are located in urban or urban-fringe areas and so contractors report a lack of space for waste segregation.

**7.0 Discussion**

**7.1 Legal compliance and responsibilities**

Legal compliance within the industry as a whole is difficult to judge using surveys as it is likely that companies not complying will not complete the survey. Studies have suggested that smaller companies, with only a few projects requiring SWMPs are less likely to be aware of their responsibilities under the SWMP Regulations. The findings from this project and the other studies reviewed show that SWMPs are prepared for most projects, but that the quality varies considerably. This reflects the range in attitude, experience and awareness of the benefits of SWMPs, illustrated by some respondents regarding SWMPs as a useful tool for reducing costs and improving planning and others as an administrative burden necessary to comply with legislation.

From this study it appears that principal contractors are most likely to initiate the preparation of SWMP. This is contrary to the Regulations which state that this should be carried out by the client. Many clients seem to have little involvement in the SWMP, with no involvement in their preparation, setting targets or reviewing them during

or after construction. There are exceptions and some clients jointly set targets and prepared the SWMP with their contractors. Several principal contractors commented that clients and designers do not appear to be aware of the issues involved and by the time their input was sought, planning permission had been granted or design decisions had been made. This delay in preparing the SWMP can result in lost opportunities to design out waste and failure to maximise cost reductions. The economic advantages to starting the SWMP earlier on in the project process are illustrated by figure 22, when the SWMP is started before the start of work the cost was at least neutral and in the majority of cases showed significant savings. This is supported by figure 23 which shows that those respondents who engaged the principal contractor at inception and feasibility all showed significant savings from the use of SWMPs.

Without enforcement, compliance with the Regulations relies on recognition of the benefits of SWMPs. In general there is recognition of the potential cost savings and other benefits resulting from SWMPs and several respondents mentioned that attitudes are changing with training and experience. However, for universal compliance across the industry better enforcement is required and many contractors would welcome this.

Although compliance with legislation was a strong driver for many respondents, a number of respondents had been involved in SWMPs before the regulations came into force. This was either because they recognised the financial benefits, the client requested it or as part of EMS 14001.

## 7.2 Good Practice

The elements of good practice that can be identified from the survey are described in the two tables below. The first table shows results from all respondents regardless of whether their project was completed. The second table shows only the results from the 19 organisations that stated that their projects were fully completed.

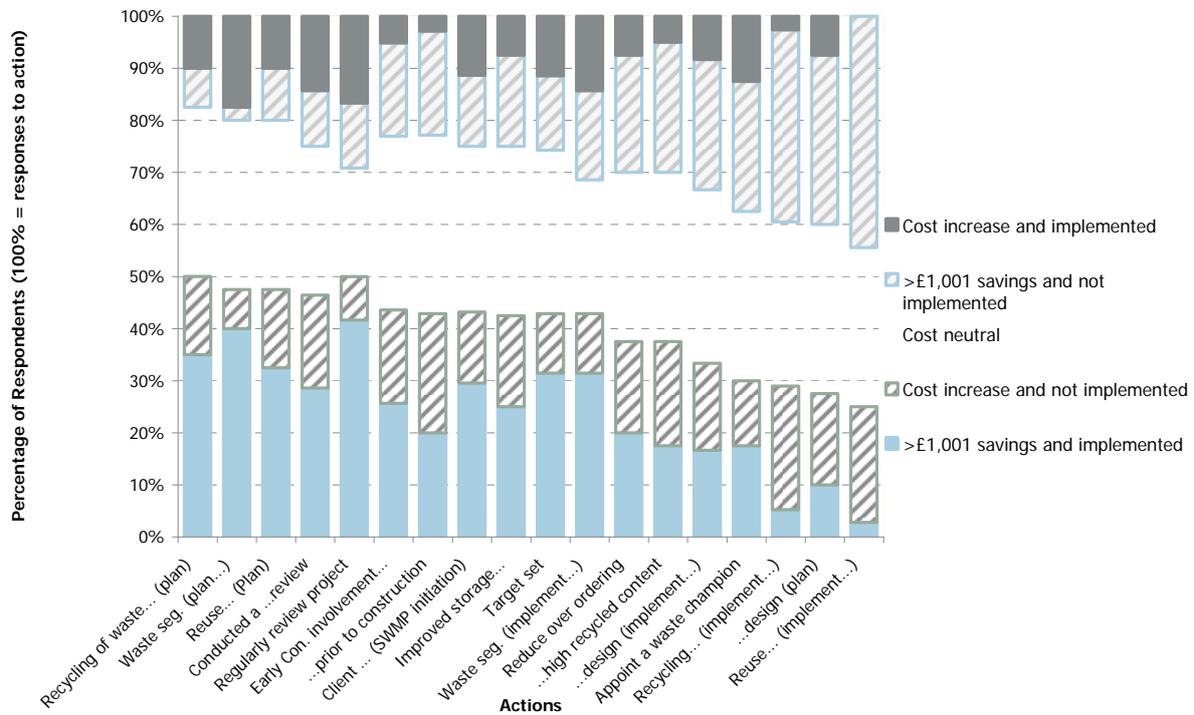
**Figure 25** Elements of good practice

Practice	Number of projects												TOTAL
	£1,001 - £500,000		Cost neutral - £1,000				Cost increase						
	Yes	No	Yes	No	Yes	No	Yes	No					
	N*	%	N*	%	N*	%	N*	%	N*	%	N*	%	
Regularly review project	10	42%	3	13%	3	13%	2	8%	4	17%	2	8%	24
Recycling of waste produced (plan)	14	35%	3	8%	6	15%	7	18%	4	10%	6	15%	40
Waste segregation (planning stage)	16	40%	1	3%	7	18%	6	15%	7	18%	3	8%	40
Reuse of materials on site	13	33%	4	10%	5	13%	8	20%	4	10%	6	15%	40
Conducted a post project review	8	29%	3	11%	4	14%	4	14%	4	14%	5	18%	28
Early contractor involvement (prior to mobilisation and construction)	10	26%	7	18%	6	15%	7	18%	2	5%	7	18%	39
Client involvement (SWMP initiation)	13	30%	6	14%	5	11%	9	20%	5	11%	6	14%	44
SWMP started prior to construction	7	20%	7	20%	5	14%	7	20%	1	3%	8	23%	35
Waste segregation (implementation stage)	11	31%	6	17%	3	9%	6	17%	5	14%	4	11%	35
Target set	11	31%	5	14%	2	6%	9	26%	4	11%	4	11%	35
Improved storage of materials	10	25%	7	18%	5	13%	8	20%	3	8%	7	18%	40
Reduce over ordering	8	20%	9	23%	6	15%	7	18%	3	8%	7	18%	40
Use of materials with a high recycled content	7	18%	10	25%	4	10%	9	23%	2	5%	8	20%	40
Prevent waste through design (implementation stage)	4	17%	6	25%	4	17%	4	17%	2	8%	4	17%	24
Appoint a waste champion	7	18%	10	25%	1	3%	12	30%	5	13%	5	13%	40
Recycling of waste produced (implementation stage)	2	5%	14	37%	0	0%	12	32%	1	3%	9	24%	38
Prevent waste through design (planning stage)	4	10%	13	33%	5	13%	8	20%	3	8%	7	18%	40
Reuse of materials on site (implementation stage)	1	3%	16	44%	0	0%	11	31%	0	0%	8	22%	36

N\* = number of projects

The information which is presented in Figure 25 is also illustrated in the graph below.

**Figure 26** Elements of good practice

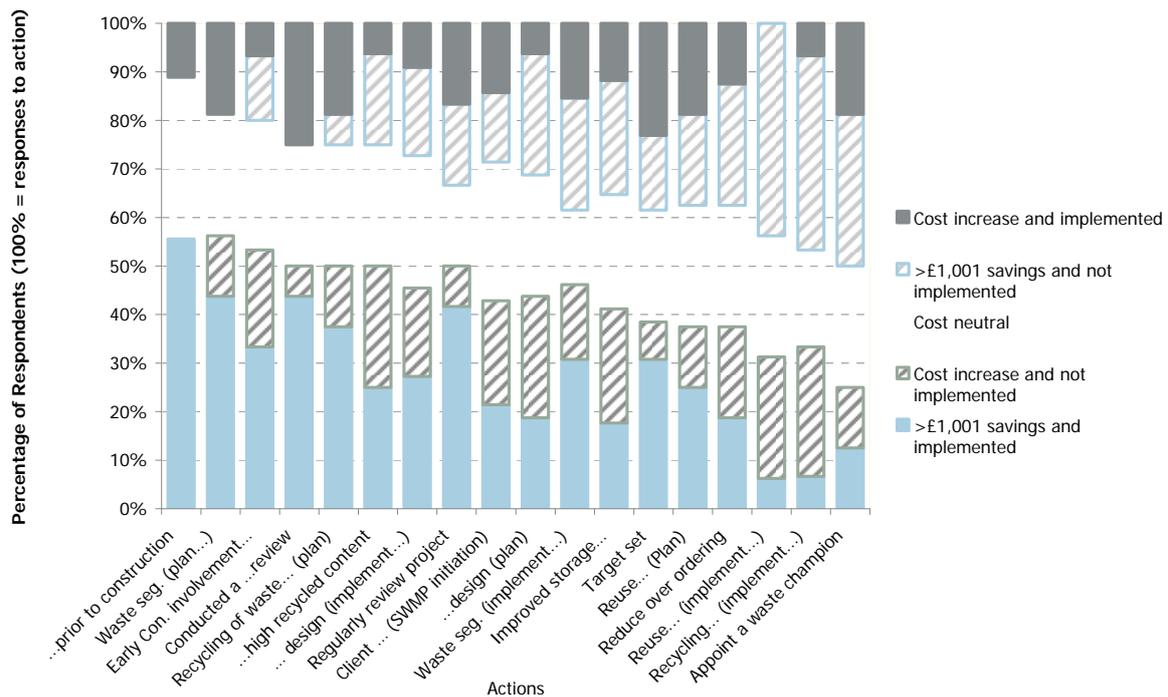


**Figure 27** Elements of good practice (based on 19 completed projects)

Practice	Number of projects												TOTAL
	£1,001 - £500,000				Cost neutral - £1,000				Cost increase				
	N*	%	N*	%	N*	%	N*	%	N*	%	N*	%	
Waste segregation (planning stage)	7	43.75%	0	0.00%	1	6.25%	3	18.75%	3	18.75%	2	12.50%	16
SWMP started prior to construction	5	55.56%	0	0.00%	0	0.00%	3	33.33%	1	11.11%	0	0.00%	9
Early contractor involvement (prior to mobilisation and construction)	5	33.33%	2	13.33%	1	6.67%	3	20.00%	1	6.67%	3	20.00%	15
Recycling of waste produced (plan)	6	37.50%	1	6.25%	2	12.50%	2	12.50%	3	18.75%	2	12.50%	16
Use of materials with a high recycled content	4	25.00%	3	18.75%	0	0.00%	4	25.00%	1	6.25%	4	25.00%	16
Regularly review project	5	41.67%	2	16.67%	1	8.33%	1	8.33%	2	16.67%	1	8.33%	12
Conducted a post project review	7	43.75%	0	0.00%	4	25.00%	0	0.00%	4	25.00%	1	6.25%	16
Waste segregation (implementation stage)	4	30.77%	3	23.08%	0	0.00%	2	15.38%	2	15.38%	2	15.38%	13
Prevent waste through design (implementation stage)	3	27.27%	2	18.18%	1	9.09%	2	18.18%	1	9.09%	2	18.18%	11
Prevent waste through design (planning stage)	3	18.75%	4	25.00%	1	6.25%	3	18.75%	1	6.25%	4	25.00%	16
Client involvement (SWMP initiation)	3	21.43%	2	14.29%	1	7.14%	3	21.43%	2	14.29%	3	21.43%	14
Improved storage of materials	3	17.65%	4	23.53%	1	5.88%	3	17.65%	2	11.76%	4	23.53%	17
Target set	4	30.77%	2	15.38%	0	0.00%	3	23.08%	3	23.08%	1	7.69%	13
Reuse of materials on site (Plan)	4	25.00%	3	18.75%	2	12.50%	2	12.50%	3	18.75%	2	12.50%	16
Reduce over ordering	3	18.75%	4	25.00%	2	12.50%	2	12.50%	2	12.50%	3	18.75%	16
Recycling of waste produced (implementation stage)	1	6.67%	6	40.00%	0	0.00%	3	20.00%	1	6.67%	4	26.67%	15
Reuse of materials on site (implementation stage)	1	6.25%	7	43.75%	0	0.00%	4	25.00%	0	0.00%	4	25.00%	16
Appoint a waste champion	2	12.50%	5	31.25%	0	0.00%	4	25.00%	3	18.75%	2	12.50%	16

The information which is presented in Figure 28 is also illustrated in the graph below.

**Figure 28** Elements of good practice (based on 19 completed projects)



Figures 25 to 28 provide an indication of the actions implemented and not implemented by projects that said they achieved significant cost reductions, were cost neutral or have shown cost increases. Overall the survey was mainly completed by principal contractors and this appears to be reflected in the actions identified, e.g. low numbers of responses for designing out waste, even though this is seen as one of the actions that can have the most impact.

Figure 26 and Figure 28 show the percentage of the projects that implemented (full colour) or did not implement actions (diagonal line) and how they said the SWMP effected costs (blue reduce, grey increase). These figures identify those actions that have an effect on reducing costs on a project. A good action would be implemented by a large number of projects that identify significant cost savings and were not implemented on projects that incurred costs. The projects where the action has not been implemented on the project have been included on the graph because if a large number of projects implemented an action but a greater number of projects did not then the result is less conclusive.

The results are split in two. On the bottom are projects that significantly reduced costs and implemented the action, or increased cost and did not implement the action; the larger these bars are, the more beneficial the action appears to be. On the top are those that implemented the action but incurred a cost or did not implement the action but significantly reduced cost; the larger these bars are, the less effective the action appears to be. The gap in the middle is the percentage of cost neutral projects. The figures display, in descending order, the difference between the top bar and the bottom bar. The actions on the left, if implemented, are therefore likely to lead to reduced cost. Moving to the right, the actions are implemented by fewer projects that significantly reduced cost; however they are also implemented by fewer projects overall. There is therefore a higher degree of certainty that the projects actions on the left will reduce costs. The actions on the right may also reduce costs (particularly as they are still implemented on projects that achieved savings), but there is a lower degree of certainty as fewer projects implemented them overall.

Figure 28 details those actions that have been implemented by completed projects. Due to the timing of the regulations and the survey it is likely that the completed projects were either started before the regulations came into force, with implications for the level of reporting, or were completed over a short timescale (which could affect the size and the actions possible). This again is reflected in the results with low numbers appointing waste champions and reusing material (an action generally associated with larger projects).

Starting the SWMP prior to construction (56% implemented action and achieved significant cost savings and 0% did not implement action and identified a cost increase), waste segregation at the planning stage (44% implemented action and achieved significant cost savings and 13% did not implement action and identified a cost increase) and early contractor involvement (33% implemented action and achieved significant cost savings and 20% did not implement action and identified a cost increase) were the top three actions that were implemented by cost saving projects and not implemented by cost increase projects. This would suggest that these actions, if implemented, are likely to help to reduce costs on projects .

However, there is a difference between the numbers of respondents that said they planned for waste segregation and those that said they actually implemented it (31% of projects reporting significant cost savings and 16% not implemented by projects reporting a cost increase). This could be because these projects may be small in size or timeframe. However, it could suggest that planning for waste segregation provides an opportunity to review waste cost, but that it may not always be the best option when you get to site. This could be because the waste contractor may not be able to supply segregated skips, they may have been more expensive for the type and amounts of waste generated or there was simply a lack of space. Planning waste segregation, starting the SWMP early and early contractor involvement all suggest that gathering the options early and making an informed decision will have a positive impact on the use of SWMPs.

Regularly reviewing the project (42%) and conducting a post project review (44%) were also implemented by a significant proportion of projects that showed significant savings. These actions were however implemented by the majority of projects and as such this suggests that achieving cost savings depends on how these actions are implemented.

69% of completed projects planned for the recycling of waste on-site and only 13% actually implemented it. The questionnaire was not designed to provide a reason for this and it is difficult to identify its effect on cost from the results as only a small number of respondents actually implemented the action.

There are some significant differences between the completed projects and the full data set. Significantly the top four are, regularly review the project and, planning for recycling, waste segregation and reuse. These do not relate directly to the corresponding implementing stage actions and may reflect that these projects are not yet complete or have not got to this stage. It could also suggest that a considered approach to implementing these actions is required to realise cost savings.

Across the projects the indication is that those which achieved cost savings have also implemented actions that provide information to make an informed assessment of waste management options and actions. Simply implementing these actions however will not realise cost savings on their own as in each category there are still respondents that have not saved costs. Using the actions in a considered and effective way is important in delivering good practice. These actions are also those associated with the tasks of a principal contractor, reflecting the breakdown of the responses received. This is particularly evident from a greater number of projects preventing waste through design at the implementation stage than the planning stage.

Very few projects appointed a waste champion and it is difficult to review their effect from this study.

### *7.2.1 Implementing Good Practice*

Four similar questions were asked in the survey, in section C (Planning stage) and section D (implementation stage). The purpose was to find out whether planned actions were implemented and to identify if there are any common barriers preventing implementation. These related to the following:

- Waste segregation
- Recycling of waste produced
- Reuse of materials
- Prevent waste through design

In waste segregation, 75% (30 out of 40) respondents stated during the planning stage that they were going to segregate their waste. On the implementation stage, 54% (19 out of 35) stated they segregate waste and provided details on cost savings. Thus, in this survey, only 63% (19 out of 30) of organisations who have the intention to segregate waste actually do it. Waste segregation is not always possible in urban areas where space is very limited. This result may reflect the fact that the majority of the projects, 52% (26 out of 50) are located in urban area.

In recycling of waste on-site, 60% (24 out of 40) respondents stated an intention to recycle the waste they produced but only 8% (3 out of 38) actually implemented it and also provided figures on financial savings. The proportion doing what they planned was 12% compared to 63% for waste segregation.

In reusing of waste on site, 55% (22 out of 40) stated an intention to reuse waste on site during planning stage but only 3% (1 out of 36) actually implemented it and provided figures on financial savings of £1001 to £500,000. The proportion doing what they planned was 4% compared to 12% for recycling of waste and 63% for waste segregation.

In terms of preventing waste through design, 30% (12 out of 40) of the respondents stated an intention to prevent waste through design and 41% (10 out of 24) actually implemented it. In this survey, 83% of organisations who showed an intention to prevent waste through design actually implement it. This is a very positive result. It complements with the result of the study conducted by WRAP that designing out waste is the action that can provide the most cost savings on a project.

### *7.2.2 SWMP preparation*

The survey results suggest that by starting a SWMP early in the construction process and involving the principal contractor significant savings are able to be made. Initiating a SWMP early on enables the project team to reap the full benefits. Once planning and design decisions have been made it can be too late to consider some waste reduction actions. This means clients and designers have to play a part in the preparation of the SWMP, as laid out in the SWMP Regulations for England. The aspects of good practice mentioned in the survey include both client and contractor jointly initiating the SWMP and setting waste targets, the client setting out the requirements for a SWMP in the tender specification, the contractor describing their SWMP in their submitted tender and the client's design team being briefed to include waste reduction in project design.

### *7.2.3 Implementing the SWMP*

The site manager is normally responsible for implementing the SWMP during construction although a significant proportion (36%) had an appointed waste champion who was responsible. Several respondents suggested that appointing one person to champion waste reduction was a key part of the successful implementation of the SWMP. However, waste champions were appointed on projects that made significant savings and where they increased costs. How the waste champion implements the plan will be important in delivering cost and waste savings. Some companies also have environmental managers to support site managers and to spread good practice throughout the business.

Most respondents are using company templates, as many general templates are seen as too complex especially for small projects. Companies have also integrated SWMPs into their existing environmental management systems, which is often easier with bespoke templates. Whilst projects have used a range of templates it is difficult to identify the effect they have had on waste arisings and cost savings from the results of the survey. Several respondents have suggested that templates require greater flexibility for different types and sizes of projects.

Most SWMPs are reviewed at least monthly, well within the six month legal limit. This suggests that SWMPs are being used as a live document and are discussed at project meetings throughout construction. Review of the SWMP after project completion appears to be more problematic as often the team is busy on another project. When reviews are carried out, lessons learnt are normally distributed widely across the company and project team.

### *7.2.4 Overcoming challenges*

Forecasting the amount of waste was identified as a common challenge in preparing SWMPs. Many companies appear to be addressing this internally by collating data from projects in order to improve forecasting. This data combined with experience should improve forecasting in the future.

36% (12 out of 33) respondents identified a change in culture and buy-in from workers on site and the entire supply chain as a barrier to implementation. Positively, 45% ( 18 out of 40) respondents indicated that they thought this was changing and 20% that training was addressing this issue. Most cited that increasing the awareness of the drivers behind the SWMP, including the cost of waste and legislative requirements was an important part of changing attitudes. Most respondents had undergone some kind of training on SWMPs. WRAP training and tools were being used by many of the respondents although the target audience was organisations that are currently engaged with WRAP and might be expected to use WRAP tools.

There are also practical challenges, specific to each project. A common problem is a lack of space on site for waste segregation. This is normally addressed by sending waste to a waste contractor for offsite segregation and recycling. One of the advantages of using a SWMP which is often referenced in guidance is being able to weigh up these options and choose the most effective solution for the site.

### 7.3 Benefits and costs of SWMPs

The impact of SWMPs on the industry appears to be largely beneficial. A large majority (76%) of respondents said the benefits of having a SWMP outweighed the costs. Even those who said they did not find any reduction in costs recognised other benefits such as improved project planning and site management. Only a tiny minority (8%) thought that the costs involved outweighed the benefits.

In this survey, information was collected on the impact SWMPs can have on project cost, waste reduction and other aspects of a project. These are discussed below.

#### 7.3.1 *Economic impact*

The economic savings resulting from a SWMP appear to vary widely. It is difficult to know how respondents quantified the costs to compare the results. It appears that the size of cost savings is not just related to project size, but is dependent on many factors. It is difficult to ascertain from the data available exactly why some respondents have achieved savings and some have not. However, we can see some trends in the data and it is worth noting that none of the projects which initiated the SWMP at the design stage or had early principal contractor involvement in preparing the SWMP generated an increase in cost. Actions that inform the user early on in the project of ways to deal with waste such as planning for waste segregation, reuse and recycling were also implemented by a large proportion of those projects that identified significant cost savings. Reviewing the SWMP on a regular basis was also implemented by a significant proportion of these projects suggesting that informing the project team up front and keeping them informed of waste is important in delivering an effect SWMP.

However, simply informing the team of the SWMP will not by itself create the desired economic and environmental improvements. The quality of training may also play a role, as the proportion of respondents who underwent WRAP training reporting increased costs was lower than that for those who attended in-house training. Previous studies suggest that attitude is important, and companies which are prepared to send staff on external course may be more committed to reducing waste. The respondents that said costs had increased also said no lessons had been learnt from the SWMP suggesting a lack of engagement in the process.

The time and money spent on the SWMP varies considerably and does not necessarily relate to the project size. From 15 up to around 22 hours the time spent appears to pay off, with significant financial savings. Above this it appears to have no additional benefit. The money spent implementing the SWMP does not appear to relate to cost savings.

#### 7.3.2 *Environmental impacts*

The implementation of SWMPs appears to be having a positive environmental impact, with the majority saying this benefit was felt for all projects not just larger ones. Use of recycled materials and waste reduction were felt to be improved by the majority of respondents, even those already carrying out waste management actions. The SWMP was felt to be a useful tool to spread awareness of waste management issues and to focus efforts. The amount of waste saved varied enormously between projects. There was not enough data to identify if a particular type of project generated more waste savings.

#### 7.3.3 *Other impacts*

Many respondents experienced other benefits from preparing a SWMP, such as improved project planning and site management. Even those respondents who did not experience any reduction in costs identified these as important benefits arising from the SWMP. These benefits are difficult to quantify, but may in turn contribute to waste reduction through better awareness of material volumes and improved procurement, planning and reducing over ordering.

### 7.4 Gaps in survey data

A great deal of useful information was collected during this survey. This both supports the findings of existing studies and has generated a greater understanding of the experiences of the industry in implementing SWMPs. Obtaining reliable figures for cost and waste savings is problematic. This is partly as many larger projects started

after the Regulations came into force are not completed, so the data is not yet available. Also it is difficult to quantify cost savings, if a contractor is already carrying out waste reduction actions they may or may not include this as a saving as a result of the SWMP. It is not possible to identify exactly why some respondents report large cost savings, while others report none or even an increase in cost using the limited data available.

Other areas where more detail would have been beneficial include which actions generate the most benefits. This can be quite difficult to identify as actions are often project specific. Case studies may be a better way of illustrating this.

The coverage of different types of project was affected by the economic conditions at the time of the study, with very few responses for housing projects. Most projects were also in the public sector, particularly in education, where funding levels have held up better than in some other areas. A broader range of project types would have been helpful. The response rate was very low, with only 53 returned questionnaires from over 800 invitations; this gives a response rate of less than 7%. This may be due to a combination of factors, including:

- A number of other surveys, by WRAP and others, being carried out at about the same time;
- The survey was designed to collect a range of quite detailed information in order to carry out an in-depth evaluation. The length and complexity of the questionnaire, which took around 15 minutes to complete and required a lot of information on the project, some of which might not readily be available may have decreased the response rate;
- The difficult economic conditions may make it harder for individuals to find time to complete non-essential activities such as completing the questionnaire.

## 8.0 Conclusions and recommendations

### 8.1 Survey information

There were 53 respondents to the survey; the majority of these were principal contractors. The respondents provided a useful range of information on their experiences with SWMPs and were asked to select one project to provide data in more detail. Most respondents (88%) selected a large project of above £500,000 that required a more detailed SWMP. This suggests that the respondents were mostly from large companies. The projects selected were from a range of sectors, although there was a large proportion (24%) from education. This is probably a reflection of the ongoing national building schools for the future programme. The majority of projects (62%) were in the public sector; this could be due to the impact of the current economic crisis on the private sector. Most projects were new build or refurbishment, very few demolition projects were chosen. This is unfortunate as the Defra cost benefit study suggested demolition projects could produce the most savings with a SWMP. Sixty two percent of the projects were not yet completed, so final waste and cost data was not available. The Regulations were introduced relatively recently and large projects tend to last several years.

It is likely that those that replied to the survey were those most interested in SWMP. Also the majority of respondents were from larger companies. This may mean the survey is not representative of the construction industry as a whole.

### 8.2 Compliance with legislation

The SECBE and NetRegs surveys found that a large number of contractors were not aware of the requirements of the SWMP Regulations. This survey's findings were more in-line with the tEC's more positive findings, although as mentioned above it is likely that the survey respondents have a greater awareness and understanding of the SWMP regulations than the industry in general. Most contractors did appear to have a SWMP, although from the SWMPs reviewed, it seems that the standard and level of detail varies considerably. This supports the tEC consultation findings.

Interestingly this survey found that 75% of respondents had experience of implementing SWMPs before the Regulations came into force, this is much higher than the 24% found in the tEC consultation.

#### 8.2.1 Roles and responsibilities

The principal contractors appear to be most aware of their responsibilities under the SWMP Regulations, although the quality of the SWMPs produced and attitudes towards them varies. In general they appear to be positive towards the use of SWMPs and recognise the benefits they can bring.

There appears to be a tendency for clients to leave SWMPs solely up to the principal contractor with clients initiating the SWMP in only 15% of cases. The majority of the time (77%) it was the principal contractor who initiated the SWMP and therefore it was carried out at the mobilisation and construction stage of the project

rather than the design and planning stage (37%). Once the SWMP commenced the person responsible for SWMP documentation was the principal contractor's site manager in over half of the cases. These findings correspond to the findings of the SECBE survey which found that the majority of clients did not understand their responsibilities in regard to SWMPs. Only 45% of clients inspected the SWMP during construction and only 15% of them set waste targets.

### 8.2.2 Enforcement

A point mentioned in previous studies was the lack of enforcement of the SWMP Regulations. In this survey only 18% of respondents said the SWMP was inspected by the Environment Agency or LA. This is slightly more than the SECBE survey found (9%), but still a very low proportion. In addition, 84% of planning permissions did not require a SWMP.

### 8.2.3 Training

The majority of companies appear to provide SWMP training for their employees, the majority in-house (74%), but also by attending WRAP and Envirowise workshops. Half of the respondents had received WRAP training on SWMPs and 18% had used the WRAP Net Waste Tool. Around half thought they would benefit from additional training and guidance. Culture change and training were identified as challenges in implementing the SWMP.

## 8.3 Preparing a SWMP

The majority of respondents (66%) used an in-house template for preparing SWMPs. Many respondents found that the general templates produced were too complicated. Companies also integrate SWMPs into their existing environmental management systems, so may find it easier to use their own templates.

Half of the respondents had set waste reduction targets in the SWMP. These are normally (75%) set by the principal contractors themselves rather than the clients. Targets include percentage diverted from landfill, amount recycled and targets for specific materials. They stated that the targets set are normally exceeded or met (78%).

Forecasting waste appears to be one of the challenges of preparing a SWMP, with many respondents mentioning it as a problem and 66% saying that the actual amount of waste did not match the forecast. Most respondents used their own experience to forecast waste, although some did use tools such as Netwaste to help them. Many companies are collecting their own data to improve forecasting, it is expected accuracy will improve with experience. 76% of respondents said preparing SWMPs gets easier with practice.

## 8.4 Benefits and costs of SWMP

The vast majority (76%) of respondents believe that the benefits of SWMPs outweigh the costs. The top benefit identified was reducing environmental impact. Respondents said preparing a SWMP had increased their use of recycled materials, increased waste reduction activities and 22% said it had highlighted additional resource efficiencies.

Economic savings were also highlighted as a benefit with 59% of respondents saying some money was saved. 44% said this was over £1000. This is slightly higher than the SECBE survey which found 44% saved more than £500. The materials which were said to generate the most cost savings were aggregates (40%) and plasterboard (28%). An average of eight hours was spent preparing a SWMP, but this varies considerably.

Other benefits identified were improved site management, communication of resource efficiency on site and collection of data for environmental performance monitoring. Around 59% of respondents said lessons had been learnt from the SWMP.

The tEC consultation seemed to suggest the companies that bought into SWMPs got the most out of them and those that considered them an administrative burden did not use them as a tool to reduce waste and therefore received no benefits in cost reduction.

## 8.5 Key actions to reduce waste

The top actions identified in the SWMP were waste segregation (83%), recycling of waste produced (70%) and reuse of materials on site. Most (71%) said over 75% of the actions identified in the SWMP were implemented.

Designing out waste was selected by 65% of respondents as the activity which generated the most cost savings, however actions to design out waste were only included in 33% of the SWMPs. This could be a result of many SWMPs only being prepared before construction instead of during the planning and design stage.

## 8.6 Summary

The evidence suggests that using a SWMP is beneficial to the majority of organisations and most achieve significant cost savings through implementing them. Those that are achieving significant cost savings display common actions which enable the user to develop an informed plan to reduce, reuse and recover their waste. Starting the SWMP early in the construction process appears to be vital in using the process effectively and avoiding incurring additional costs. Also the planning process to segregate, reuse and recycle waste is implemented by the majority of projects that achieved cost savings through implementing the plan. Simply completing the plan is not sufficient to ensure economic and environmental benefits and training is an important factor in implementing a plan effectively. SWMP projects should also be reviewed regularly and this is an action carried out by the majority of users. The time spent on the SWMP should also be proportionate to the size and scope of the project.

There are also further advantages that can be gained from the use of SWMPs and moving the process further up the supply chain. Currently principal contractors are the most engaged in the process and whilst designing out waste is identified as the action that creates the most benefits it has not been implemented on the majority of projects. Identifying the actions that clients and designers can implement in this process will be instrumental in moving the industry to good practice use of SWMP.

## 9.0 Recommendations

The following recommendations came out of the results of the survey.

- There needs to be more training aimed at clients (particularly public sector) on their responsibilities according to the SWMP Regulations. They need to understand the importance of considering waste early on in the planning and design stage of a project. They should be encouraged to set targets in conjunction with their principal contractors and to review the SWMP during the project.
- There needs to be greater enforcement of the SWMPs by the Environment Agency and LA. A SWMP should be necessary for obtaining planning permission.
- There needs to be greater training for LAs in their role as enforcers of the SWMP Regulations. This survey and the other studies suggest that LAs are not enforcing SWMPs and the tEC report suggests that many LAs are unclear of their role.
- If SWMPs are used properly there can be significant benefits in terms of economic savings and project planning. If they are viewed as a paper exercise these benefits are not achieved. This needs to be communicated to the industry. (to some extent this is being done by the case studies in this project)
- Training should focus on how to get the best out of SWMPs, rather than a particular SWMP template which may not be widely used. This could make use of case studies to highlight good practice.
- Better data is required for waste forecasting. This could be achieved by setting up a central database of wastage rates that is widely available to all in the industry.
- There are still gaps in understanding the impacts SWMPs are having on the industry, particularly when it comes to defining the exact cost and waste savings generated. A data collection survey focusing on obtaining these once there are more completed projects with SWMPs would be useful.

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# Appendix A- Existing information

## 1. Awareness and understanding of the regulations

Since the introduction of the SWMP Regulations there have been a limited number of studies to discover the level of awareness and understanding of SWMPs that exists in the construction industry. These include surveys conducted by SECBE and NetRegs and a consultation undertaken by tEC. Responses to the consultation by Defra and the survey conducted by AEA provide some indication of the views of industry bodies before the SWMP Regulations came into force.

### 1.1. Requirement for a SWMP

The SECBE and NetRegs surveys found that six months after the SWMP Regulations came into force there was still confusion within the industry about the Regulations. The NetRegs survey found that 51% of the construction companies they spoke to were unaware that SWMPs were mandatory for projects over £300,000. The SECBE survey found that over 20% of contractors were unaware that a SWMP is required on all projects over £300,000 and that 43% of local authorities (LA) did not understand when a SWMP was required at all. Clients appeared to be more informed with only 14% not knowing when a SWMP should be in place, although some believed it was only necessary if they were a requirement of a planning application. However, less than half knew SWMPs should be in place before work begins on site. The tEC consultation found a more positive picture; with the majority of companies they questioned preparing a SWMP for projects over £300,000. However, this may be because only those complying with the legislation agreed to participate in the consultation. Also the respondents to the NetRegs survey were mainly SMEs as the survey was carried out in conjunction with the Federation of Master Builders. The tEC report stated that SMEs are often less aware than larger companies, as they may only occasionally work on a project above the threshold. The tEC consultation found that 58% of respondents thought that the regulations had been adequately publicised.

### 1.2. Responsibilities

The SECBE survey also uncovered confusion over who was responsible for the preparation and implementation of the SWMP. Only 45% of clients understood that they were responsible for the initial preparation of the SWMP; 83% of contractors thought it was their responsibility to start the preparation. The tEC consultation found similar results with the majority of SWMPs (57%) prepared at the beginning of construction by the principal contractor, although some were prepared at the design and pre-design phases (23% and 13% respectively). The majority of the SECBE survey respondents understood that the principal contractor was responsible for implementing the plan but people were unclear over the responsibilities of the client and designer in implementation. This confusion over responsibilities means the industry (particularly clients and designers) are not wholly confident that they are complying with the regulations. The results of the SECBE survey indicate that:

- 54% of clients were confident they fully understood their responsibilities and were complying with the regulations;
- 45% of designers were confident with their responsibilities;
- 66% of contractors were confident with their responsibilities; and
- 72% of sub-contractors were confident that they could meet their requirements.

### 1.3. Training and guidance

The tEC consultation found that the people onsite generally knew where the SWMP was kept (normally online in the site office), but that sub-contractors often had little interest in it. Perhaps, this is because only a small number of respondents used specific clauses in contracts with sub-contractors to reduce the amount of waste. The majority (83%) of respondents said that waste segregation was included as part of an onsite health and safety induction and only a few (17%) held specific toolbox talks on the SWMP. In the SECBE survey 17% of respondents expressed a need for more guidance and training and one of the report recommendations was the need for more training at site level. The tEC consultation found that 58% of people thought there was sufficient guidance and training available.

### 1.4. Enforcement

The majority of the tEC respondents were unaware of any enforcement of the regulations taking place. This is supported by the findings of the SECBE survey which found that only 9% of respondents had ever been asked to

produce a SWMP by an enforcement officer. The authors of the report felt that this statistic was likely to take account of the 11% of participants that were required to produce a SWMP for submission with a planning application. Although the majority of respondents did have SWMPs for their projects, 21% of clients and 19% of contractors admitted these did not comply with the regulations. This is supported by the findings of the tEC consultation which found that although the majority of companies they questioned had a SWMP for projects over £300,000, the quality and effectiveness of the SWMP varied. Respondents to the SECBE survey and the tEC consultees felt that the lack of enforcement undermined the effectiveness of the regulations. One company felt that SWMPs should be regarded similarly to the health and safety plan in that work is not allowed to commence without it.

The SECBE survey found that it was unclear to many Local Authorities that they were able to enforce the regulations and they felt only the Environment Agency had the power to do this. LAs were requesting SWMPs as part of the planning process, but none of those who responded to the questionnaire were aware of their role outside this as enforcers of the regulations. It would appear that there has been very little investment in training for LA staff and a recommendation for enforcement training for LA staff was one of the recommendations of the SECBE report. As part of the tEC project, LAs were contacted through their front desk and asked about SWMPs. Only one was able to put the caller through to the correct department. They found LAs were unclear which department was responsible for enforcement of SWMPs and felt there was a need for more training in this area.

## 2. Preparing and implementing SWMPs

### 2.1. *SWMP templates*

There is a range of guidance and templates available to aid in the preparation and implementation of SWMPs. However, the SECBE survey found that many people found the standard templates too complicated and unwieldy. When preparing their SWMP 54% of the respondents used their own template either on an ad hoc basis or developed their own bespoke systems. Of the standard templates the most commonly used was the Envirowise template (used by 15% of respondents) then the BRE and EA templates (8% each). The WRAP SWMP template v1.1<sup>3</sup> was used by 7% of respondents. The tEC consultation found similar results with 54% using their own template or no template, 16% the BRE template, 11% the WRAP SWMP template v1.1 and 3% the Envirowise template.

### 2.2. *Quality of SWMPs*

The only study to review the quality of SWMPs was the tEC consultation, which was focused on compliance with the legislation. They examined 30 SWMPs and found a large range in quality although the majority complied with legislation. All the SWMPs they assessed identified inert, non-hazardous and hazardous waste streams, 93% of these broke these down into different types of waste and 83% were able to estimate the amount of waste in each waste stream, although a number of respondents said they had difficulty estimating waste quantities. The majority of consultees (83%) regularly reviewed the estimates throughout construction, with updates ranging from daily to monthly. However, only 40% of people were able to review the SWMP at the end of the project and identify lessons learnt.

TEC found attitudes to the SWMP also varied. Some companies viewed them as a positive tool to reduce waste and save money, whereas others regarded them as an administrative burden with little benefit. The authors felt that education and training of the latter group was necessary, as those who embraced the concepts in the SWMPs demonstrated that there were clear cost and environmental benefits.

### 2.3. *Challenges in implementing SWMPs*

The SECBE survey respondents identified the main challenges to implementing SWMPs as:

- Obtaining “buy-in” on site and resistance to a change in culture (37%)
- Lack of incentives or benefits (16%)
- Lack of training (17% - particularly LA staff)
- Difficulties in quantifying supplies and excesses leading to inaccurate forecasts
- Restricted space on-site preventing effective segregation of waste

<sup>3</sup> Since conducting the survey a new version of the WRAP Template has been published WRAP SWMP Template Version 2.0

Respondents to the AEA survey similarly listed the following as the “most onerous” parts of implementing a SWMP:

- Culture change
- Training and awareness
- Cost / administration / time
- Lack of space

The “least onerous” tasks were identified as managing LA planning/development control and client expectations.

The tEC consultation identified the following difficulties in implementing SWMPs:

- Architects and designers are focused on aesthetics rather than reducing waste
- Involving sub-contractors in the SWMP
- Making initial estimates of waste
- Number of organisations involved leading to confusion
- Insufficient room on site for waste segregation
- Time and resources for additional admin and training
- Over ordering as suppliers charge more for part deliveries
- Confusion over the definition of waste in waste regulations

All these studies agree that there are practical difficulties in implementing a SWMP such as lack of space, but that the majority of challenges centre around obtaining buy-in from all parties including designers and sub-contractors and finding the money and resources to prepare and implement the plan.

### 3. Benefits of using a SWMP

The benefits of using a SWMP most often quoted by respondents are improvements in waste reduction and resource efficiency and cost savings for the companies involved. Despite being a stated aim in introducing the legislation, little evidence of a reduction in fly tipping was found in this review. Respondents in the SECBE survey did not perceive SWMPs as having an impact on fly tipping, only 1.5% saw a correlation between the two and views were divided as to whether the Regulations would increase or decrease incidents. The tEC consultation also suggested little impact on fly tipping. This agrees with the prediction of respondents to the Defra consultation which suggested that as the regulations do not apply to smaller projects and as these are the most common culprits of fly tipping the regulations would have no effect (Defra, 2007).

#### 3.1. *Economic savings*

In this report economic savings are the identified cost savings that the respondents have attributed to the use of the SWMP.

The use of SWMPs is normally encouraged by focusing on the economic benefits to the companies involved. These will increase as landfill tax increases annually. The SECBE survey found that 30% of respondents had made savings of more than £5,000 on projects, 45% said that they had made savings below this threshold and 25% said they had not experienced any benefits. Only a minority said that the effort outweighed any savings generated. The NetRegs survey found that 45% of the companies using SWMPs had made financial savings and that 25% had used SWMPs to win new business by promoting their environmental credentials. Forty two percent of respondents in the tEC consultation said implementing a SWMP saved them money.

Other benefits of SWMPs include helping to comply with legislation and contractual requirements, improving practices on site and contributing to a company's Corporate and Social Responsibility. In the SECBE survey the benefits of using a SWMP listed by respondents were:

- Environmental benefits (26%)
- Financial benefits from better management of raw materials and waste (22%)
- Financial benefits from less waste to landfill (19%)

- As a management tool to improve forward planning or improve resourcing, logistics, better segregation etc. and to mitigate risks and ensure compliance with contractual obligations and environmental regulations (16%).

Only 7.5% of respondents thought that there were unlikely to be substantial savings versus effort.

Of the respondents to the AEA survey, most did not know the average waste reduction or the cost savings per project. This may be because it varies so much between projects or because, despite having SWMPs, this information is not recorded. This may differ since the introduction of the regulations and as it has become more common for waste targets to be set. Only 30% thought that the cost reductions corresponded to waste reduction, 30% thought it did not and 40% said they did not know. Despite this, they listed the main benefits of a SWMP as:

- Financial
- Waste reduction
- Sustainability and CSR
- Practice for the forthcoming legislation

The least beneficial element was identified as 'helping with contractual arrangements'. Encouragingly, only 35% of respondents could not identify a least beneficial element.

### 3.2. Cost/ benefit ratio

The SECBE survey showed that only 7.5% of respondents thought that the effort required to prepare and implement a SWMP outweighed the benefits. The cost-benefit study from Defra supports this view, demonstrating that significant cost savings can be made on larger projects. The threshold at which a SWMP becomes cost effective depends on the sector and type of project. The authors of the Defra report estimated costs as follows:

SWMP preparation – Cost was based on estimated hours for compiling a basic SWMP and detailed SWMP. The times used were different for each sector and project value. The time estimates are based on surveys and interviews asking how long it took to prepare a SWMP. For example, respondents to a survey carried out by BRE in 2006 for the Code for Sustainable Homes (BRE, 2006) from the Non Domestic sector identified the need for about half a day to prepare and set up a detailed SWMP with a maximum cost of about £300 (around three hours at a rate of about £100 per hour). Therefore in the costing process an estimate of between three hours for smallest projects to six hours for the highest value Non Domestic New Build projects was used.

SWMP implementation – This included the costs involved in hiring segregated skips and training staff. This was based on costs per skip and estimated time for staff training.

SWMP updating – The costs were based on the management time to update and audit the SWMP.

Benefits – These were the estimated cost savings from reducing waste disposal costs by reducing the waste generated and also by segregating waste which can then be reused or recycled. The costs saved were based on a survey BRE carried out of SWMP users as part of its work on the Code for Sustainable Homes (BRE, 2006) and Envirowise case studies (Envirowise, 2005).

The thresholds these calculations produced are as follows:

Sector	Basic SWMP	Detailed SWMP
Domestic New build	£250,000	Just above £250,000
Domestic Refurbishment	No data	No data
Domestic Demolition	Any size	£150,000
Non-domestic New build	£400,000	£1.6 million
Non-domestic Refurbishment	£150,000	£1.6 million
Non-domestic Demolition	Any size	£150,000
Civil engineering New build	£1.6 million	Over £2 million
Civil engineering Refurbishment	No data	No data
Civil engineering Demolition	Any size	£150,000

The authors applied DTI quarterly location factors to account for regional differences in prices.

### 3.3. Case studies

Case studies describing the benefits of implementing a SWMP include:

#### 1 Knox & Wells

An Envirowise case study from Knox & Wells Ltd, a building contractor based in Cardiff, describes how drawing up and implementing a SWMP for a building refurbishment project provided environmental and cost benefits (Envirowise, 2008a). The project involved the creation of sheltered housing in a Victorian building in Cardiff city centre. The project involved stripping out the old partition walls and floors and refitting to produce eight bedrooms, communal areas and staff accommodation. The client was the United Welsh Housing Association and the contract value was £250,000. The SWMP prepared included measures such as supervised skip segregation, a pre-work survey to identify and quantify potential waste and reused of damaged bricks as footings for landscape work. The benefits they found were a total cost savings of £4,150 (1.66% of project value), a 51% reduction in the waste management bill and a 29% reduction in the volume of waste sent to landfill.

This example is interesting as the project value is below the threshold at which SWMP are compulsory in England (they are not currently compulsory in Wales) and this is a small company (80 people), but they still managed to produce substantial savings.

#### 2 Taylor Woodrow Construction

Constructing Excellence quoted that Taylor Woodrow Construction has reduced costs and waste by implementing SWMPs. This includes reducing build costs by 3%, reducing materials on site by 20% and saving 0.2% of total project costs by segregating different wastes.

#### 3 BRE Smartwaste case studies

BRE have compiled case studies (BRE, 2008) to illustrate the benefits of SWMPs compiled using their Smartwaste system. These include the Cheswick Park office development and the Greenwich Millennium Village. The latter case study states that £150,000 was saved by cutting the number of skips required by more than half.

#### 4 CIOB case studies

The Chartered Institute Of Builders (CIOB) has published an online broadcast on SWMPs including case studies from clients, designers and contractors (CIOB, 2008). Contributors include WRAP, Defra, John Lewis, North Bristol NHS Trust, White Design, Davis Langdon, Skanska and Taylor Woodrow. The topics include procurement policy, implementing the SWMP and the benefits of SWMP such as cost savings for contractors and a good environmental reputation for clients.

#### 5 WRAP case studies

WRAP has published case studies on implementing SWMPs in conjunction with Envirowise (WRAP, 2008). These show the client and contractor perspectives and include case studies from Skanska, Taylor Woodrow, BAA, Thames Water, Brighton and Hove Council, Simons Construction and Laing O'Rourke. The case studies vary in detail and content, but show some real life examples of actions put in place as a result of the SWMP and the environmental and cost benefits that resulted. For example, the case study from Taylor Woodrow describes the costs saved by treating hydrocarbon and Japanese knotweed contaminated land instead of sending it to landfill. It also includes extracts from their SWMP showing the types of waste produced and what was done with them. The Skanska case study provides a comparison of forecast and actual waste produced. The forecast waste estimates were based on BRE data and previous experience. The amount of each category sent to landfill or reused/recycled is also given. Simons Construction worked out they save around £27.90 per tonne by segregating waste. They state that effective waste segregation gives a cost saving of at least 25% and that good materials management, such as not over ordering gives a waste reduction of at least 20%. The BAA case study describes setting targets and incentivising contractors as good practice use of SWMPs. The Brighton & Hove City Council case study describes their requirement for SWMPs to be produced for all their planning applications on sites over five units/houses or 500sqm.

### 3.4. Other information sources

Other sources of information on the benefits of SWMPs include reports and case studies on waste minimisation and resource efficiency that, although they do not directly mention SWMP, provide some idea of the savings that can be generated by implementing the type of actions a SWMP should encourage. These include:

#### 1 Saving money and raw materials by reducing waste in construction: case studies (Envirowise, 2005)

This report gives a good practice guide based on a range of 23 construction case studies that illustrate different measures to reduce waste, such as waste segregation and reuse of materials.

## 2 CIRIA Report (CIRIA, 2001)

CIRIA Report 536 describes studies of waste minimisation initiatives being undertaken on ten live projects that were under way during 1999–2000. The report highlights the economic benefits these can bring, in addition to the environmental benefits. This includes a case study from Laing Homes Langley Park Executive Housing site where £480,000 was saved by reusing roof tiles and the recycling of crushed concrete, brickwork as sub-base and fill material. Also on the Schal BP Amoco case study where waste segregation saved £6,000 in landfill tax.

Envirowise (Envirowise, 2008b) quote the CIRIA report as saying that SWMPs can produce:

- 15% less waste on site
- 43% less waste to landfill
- 50% saving in waste handling charges
- 40% saving on waste management costs compared to landfill disposal

## 4. Key processes to reduce waste

The construction and demolition companies in the AEA survey identified waste segregation as the most beneficial intervention that could be implemented via the introduction of SWMPs. Reuse of spoil, planning at the design stage and understanding waste streams were also identified as beneficial outcomes of using a SWMP.

The most important processes implemented as a result of the SWMP which reduced cost were identified in the AEA survey as:

- Lower waste disposal costs (44%)
- Better planning (16%)
- Reduced over ordering (16%)
- Waste awareness (16%)
- Unknown (7%)

The following design decisions to reduce waste were identified in the tEC consultation:

- Pre-fabrication off site
- Order materials pre-cut to size
- Use of materials that can be re-used or recycled at the end of building life
- Re-use of muck-away in landscaping or aggregate for highways
- Reduction in depth of foundations
- Design to standard sizes of timber, plasterboard sheets etc.

## 5. Summary of Existing Information

Organisation	Survey/project	Date	Scope	Aims	Output		
AEA	CRWP Survey of three stakeholder groups	March 2007 (complete)	Forty-three C&D companies were identified that utilised a SWMP. The sample group chosen represented small, medium and large companies in both construction and demolition to make the results more representative of the whole industry.	<ul style="list-style-type: none"> <li>Cost vs Benefit;</li> <li>Most and Least effective interventions;</li> <li>Willingness to set waste reduction targets (and to what level); and</li> <li>Waste audit trail.</li> </ul>	The study found that a lack of data collection by C&D companies caused the understanding of the exact impacts and costs of SWMPs to be difficult to evaluate. The introduction of an audit process could provide the impetus for companies to collect data allowing for more in depth analysis of the impact and cost of SWMP to be achieved.		
BRE	Case studies	2008 (complete)	Show the benefits of Smart Waste	Illustrate the benefits of SWMPs compiled using their Smartwaste system.	These include the Cheswick Park office development and the Greenwich Millennium Village. The latter case study states that £150,000 was saved by cutting the number of skips required by more than half.		
CIOB	Consultation for members	2007 (complete)	To prepare a submission to defra on the consultation for the SWMP Regulations in England 2008.	Survey their members on the use and implementation of SWMPs	Submission to defra		
Constructing excellence	Taylor wimpy construction			Case Study	Constructing Excellence quoted that Taylor Woodrow Construction has reduced costs and waste by implementing SWMPs. This includes reducing build costs by 3%, reducing materials on site by 20% and saving 0.2% of total project costs by segregating different wastes.		
Defra	Defra Cost Benefit analysis	2008	Outline the cost benefit of SWMP to suggest the level at which the legislation should be implemented.	Review the cost benefit of SWMP for the introduction of the SWMP regulations in England.	<b>Sector</b>	<b>Basic SWMP</b>	<b>Detailed SWMP</b>
					Domestic New build	£250,000	Just above £250,000
					Domestic Refurbishment	No data	No data
					Domestic Demolition	Any size	£150,000
					Non-domestic New build	£400,000	£1.6 million
					Non-domestic Refurbishment	£150,000	£1.6 million
					Non-domestic Demolition	Any size	£150,000
					Civil engineering New build	£1.6 million	Over £2 million
					Civil engineering Refurbishment	No data	No data
Civil engineering Demolition	Any size	£150,000					
Envirowise	Case Study	2008 (complete)	Highlight the benefits of Site Waste Management Plans	Demonstrates the cost and environmental benefits from planning and implementing a Site Waste Management Plan for a building refurbishment	The benefits of the project included total cost savings of £4,150 (1.66% of project value), a 51% reduction in the waste management bill and a 29% reduction in the volume of waste sent to landfill.		

Organisation	Survey/project	Date	Scope	Aims	Output
				project.	
Environment Agency	Consultation on Site Waste Management Plans	November 2008 (complete)	38 organisations were involved through face to face interviews.	Investigate the level of compliance with Site Waste Management Plan (SWMP) legislation in Hampshire and West Sussex	<p>There was a high observed level of basic compliance within companies consulted since the regulations were made a statutory requirement in April 2008;</p> <ul style="list-style-type: none"> <li>• However, variability was noted in the effectiveness of these plans and the mind-set of companies towards the legislation;</li> <li>• Lack of enforcement or monitoring is holding back real action by construction companies to reduce their waste;</li> <li>• The vast majority of companies consulted believed that the legislation as it stands will have no positive impact on the amount of fly-tipping that occurs in the construction industry;</li> <li>• There is a general lack of knowledge and even greater lack of real action on the part of local authorities in Hampshire and West Sussex with regard to their regulatory role. This can be put down in part to a lack of training and support; this situation is beginning to change for the better.</li> </ul>
FMB / Netregs	NetRegs SWMP survey	Sept 2008 (complete) repeated Sept 2009	Targeted at SME's through the FMB. 930 respondents of which 87% were working on projects under £300k.	Survey the take up of SWMP	Key finding was that more than half (51.2 per cent) of construction businesses were still unaware that SWMPs were mandatory for projects over £300,000 in England.
SECBE	Site Waste Management Plans – Effective Implementation?	Sept 2008 (complete)	SECBE and its partners have conducted a survey of all types of businesses and organisations that may be affected by the Site Waste Management Plan Regulations 2008 there were 475 participants, however, only 36% of respondents had personally been involved in the practical preparation or implementation of a SWMP.	To ascertain a true picture of understanding and implementation with a view to assessing whether further investment is needed to support the industry in achieving full compliance and to realise the cost benefits that can be achieved through efficient management of resources.	<p>Only 36% of respondents had personally been involved in the practical preparation or implementation of a SWMP. The survey respondents identified the main challenges to implementing SWMPs and the main benefits, which were listed as:</p> <ul style="list-style-type: none"> <li>▪ Environmental benefits (26%)</li> <li>▪ Financial benefits from better management of raw materials and waste (22%)</li> <li>▪ Financial benefits from less waste to landfill (19%)</li> <li>▪ As a management tool to improve forward planning or improve resourcing, logistics, better segregation etc. and to mitigate risks and ensure compliance with contractual obligations and environmental regulations (16%).</li> </ul>

# Appendix B – Survey email

Subject: WRAP SWMP Impact Survey

Dear Colleague

Past surveys and case studies have indicated that there can be significant financial and environmental benefits from utilising Site Waste Management Plans (SWMPs) to reduce and manage waste. WRAP have commissioned TRL to investigate these benefits and to identify the costs and impacts associated with preparing and implementing a SWMP. As part of this project TRL are carrying out a survey of clients, contractors and sub-contractors in the construction and demolition industry. The information gathered will provide WRAP, participants and the construction industry with a greater understanding of the economic and environmental benefits gained from the use of SWMPs and the main challenges facing the industry in implementing them. This will help to enable WRAP to provide effective support to the construction industry in preparing and implementing SWMPs.

Please get involved with this project by completing the online survey, which can be found at the link below. The questionnaire should only take around 15 minutes to complete and will provide invaluable information on the industry's experiences of using SWMPs. Respondents will also receive a copy of the survey results.

<http://www.trl.co.uk/wrap/swmp/index.html>

If you have any colleagues or clients who would also be interested in completing the survey please forward this invite to them. The deadline for responses is 5<sup>th</sup> June 2009.

Many thanks in advance.

Adam Davies

TRL (on behalf of WRAP)  
01344 770620

# Appendix C – Survey questions

**Note** – This document is for planning the online questionnaire and will not be visible in this way to the respondent. The online questionnaire can be accessed via <http://www.trl.co.uk/surveys/swmp/index.html>.

## Site Waste Management Plan Questionnaire

*This survey is being carried out by TRL on behalf of the Waste & Resources Action Programme (WRAP) as part of a project to evaluate the benefits and costs associated with Site Waste Management Plans and how the industry is using SWMPs to improve resource efficiency. All information provided is confidential and will only be used for the purposes of this study. The project also includes the development of **case studies** on the use of SWMPs. If you are **interested** in developing a case study for this project or would like a copy of the **survey results** please indicate this in Section G and ensure you include your contact details.*

For Sections A to E please base your answers on a representative project that your organisation has been involved in where a Site Waste Management Plan was implemented. Preferably this would be a recent project that has just been completed; however, you can use a current project if necessary. Section F consists of more general questions on your experience of SWMPs. You may send a copy of your completed SWMP via email by clicking the button below and refer to it in some of your answers to save time. The SWMP will be held in confidence by WRAP and no data specific to it will be published although WRAP may be publishing general conclusions from the survey.

This questionnaire should take you approximately 15 minutes to complete.

### Section A: Project description

- A1. What was your organisation's role in the project?
- a) Client/Project Owner (this includes Local Authorities and other government organisations)
  - b) Design Consultant
  - c) Principal Contractor
  - d) Sub-Contractor
  - e) Other. Please specify .....
- A2. Is the project in the
- a. Private sector
  - b. Public sector
- A3. What category is the project?
- a. New build
  - b. Refurbishment or maintenance/repair
  - c. Demolition
  - d. Demolition and Construction
- A4. What is the construction type?
- a. Housing: a detached or terraced house
  - b. Residential: multiple dwelling buildings (e.g. apartments or social housing)
  - c. Offices: commercial office space
  - d. Retail: shopping centres, supermarkets and other shops
  - e. Health: hospitals and primary care
  - f. Education: schools and higher education
  - g. Infrastructure: civil engineering projects
  - h. External works- public space or other external works that form part of a property development (but is not large scale infrastructure)

i. Bespoke: projects that do not fall within any of the above categories. Please specify .....

A5. Where was the project located?

- a. Rural
- b. Urban fringe
- c. Urban

A6. What was the size of project? (the price in the accepted tender excluding VAT for work at one site)

- a. Less than £100k
- b. £100 to £299k
- c. £300k to £499k
- d. £500k to £5m
- e. £5m to £10m
- f. £10m to £50m
- g. Over £50m

## Section B: Developing the SWMP

B1. Who initiated the SWMP?

- a. Client
- b. Design consultant
- c. Principal contractor
- d. Other. Please specify .....

B2. At what stage of the project was preparation of the SWMP initiated?

- a. Planning
- b. Design
- c. Start of work
- d. Other. Please specify .....

B3. Was the Principal Contractor involved in the development of the SWMP at the preparation or design stages?

- a. Yes, if yes what involvement did they have and what were the benefits gained by their early involvement? .....
- b. No.

B4. Was a template used to produce the SWMP?

- a. Yes, if so which
    - a. In-house SWMP Template
    - b. WRAP Template
    - c. BRE SMARTwaste
    - d. Envirowise SWMPBuilder
    - e. NetRegs
    - f. Others please specify .....
  - b. No, if not how did you produce your SWMP
- 
- 

B5. At what stage was responsibility of the SWMP passed to the principal contractor?

- a. Project inception
- b. Feasibility
- c. Scheme proposal
- d. Detailed design and procurement
- e. Mobilisation and construction
- f. Control remained with the client

- B6. Did you feel confident in preparing/contributing to the SWMP and complying with the SWMP Regulations?
- a. Yes
  - b. No. Please give reasons.....

## Section C: Planning using the SWMP

- c1. Were any targets set in the SWMP for **reducing waste**?
- a. Yes. Please specify.....
  - b. No
- c2. Were any targets set in the SWMP for **waste recovery**?
- a. Yes. Please specify.....
  - b. No
- c3. Who set the waste targets?
- a. Client
  - b. Principal contractor
  - c. Design consultant
  - d. Joint decision
  - e. Other. Please specify.....
- c4. Did you plan to implement or increase the following activities as a result of preparing a SWMP? (Please select all that apply).
- i. Prevent waste through design
  - ii. Reduce over ordering
  - iii. Improved storage of materials
  - iv. Waste segregation
  - v. Use of materials with a high recycled content
  - vi. Reuse of materials on site
  - vii. Recycling of waste produced
  - viii. Others, please specify.....
- c5. What sources of information were used in forecasting the quantities of waste that would be produced? (Please select all that apply).
- i. WRAP Net Waste Tool
  - ii. Other forecasting Tools. Please list any tools used.....
  - iii. Own experience
  - iv. Other, please specify.....
- c6. How do you select your waste management options? (Please select all that apply).
- i. Use a Waste Broker
  - ii. Use on-line directories
  - iii. Use local directory
  - iv. Framework contract
  - v. Specified by client
  - vi. Use a regular contractor
  - vii. Other .....

## Section D: Implementing the SWMP

- D1. Who was the controller or person responsible for the SWMP document once work commenced?
- a) Principal contractor Site Manager
  - b) Principal contractor Waste Champion
  - c) Client Project Manager

d) Other. Please specify .....

D2. Which of the following categories did you use to record the types and amounts of materials?  
(Please select all that apply).

- i. reused on site
- ii. reused offsite
- iii. recycled onsite
- iv. recycled offsite
- v. sent to another recovery onsite
- vi. sent to another form of recovery off site
- vii. sent to landfill
- viii. sent for other forms of disposal

D3. How often was the SWMP updated?

- a) For each waste removal
- b) Weekly
- c) Monthly
- d) Every 3 months
- e) Every 6 months
- f) Others, please specify \_\_\_\_\_

D4. Has the SWMP been inspected by the LA or Environment Agency?

- a) Yes
  - a) Local Authority. As part of a planning application.
  - b) Local Authority. Other.....
  - c) Environment Agency.
- b) No

D5. Did the client review the SWMP during construction?

- a) Yes
- b) No
- c) Don't know

D6. What percentage of the activities identified in the SWMP planning stage were implemented?

- a) 100%
- b) 75%
- c) 50%
- d) 25%
- e) 0%

D7. Did completing the SWMP highlight additional resource efficiency activities that were not identified at the SWMP planning (forecasting) stage? For example, opportunities to reuse material arose that were not initially foreseen.

- a) No.
- b) Yes. Please specify.....

D8. When was the SWMP reviewed by the project team?

- i. Never
- ii. At Project Meetings
- iii. Management Meetings
- iv. Weekly Meetings
- v. Daily Briefings

D9. Did the SWMP help to improve the communication of material resource efficiency on site?

- a) No. We already have an effective communication programme in place.
- b) No. We have not improved. Please give reasons.....
- c) Yes. We already had a communication programme but this has improved.
- d) Yes. Resource efficiency was not communicated before and now it is.

# Section E: Reviewing the SWMP

E1. Is the project complete?

- a) Yes
- b) No

E2. Was the SWMP reviewed after the work on-site was completed?

- a) Yes, if yes who by?
  - i. Client
  - ii. Principle contractor project manager
  - iii. Principle contractor waste champion
  - iv. All project team
  - v. Other. Please specify.....
- b) No, then at what stage of completion? Text box.....

E3. Which of the following were included in the review of SWMP?

- i. confirmation that the plan has been monitored on a regular basis to ensure that work is progressing according to the plan and that the plan was updated in accordance with this regulation;
- ii. a comparison of the estimated quantities of each waste type against the actual quantities of each waste type;
- iii. an explanation of any deviation from the plan; and
- iv. an estimate of the cost savings that have been achieved by completing and implementing the plan

E4. Were there any lessons learnt from implementing the SWMP?

- a) Yes. Please give details .....
- b) No.

E5. Who has been informed of the lessons learnt?

Text box.....

E6. Were waste targets

- a) Achieved?
- b) Exceeded?
- c) Not met? If not why?

E7. What is the estimated amount of waste prevented due to the use of a SWMP? (in tonnes or volume)

.....

E8. Did you segregate waste as a result of preparing a SWMP?

- a) Yes. If yes, what was the effect on your waste disposal costs.
  - a. Increased
    - Please give % increase in waste disposal cost .....*
    - Total waste disposal cost as percentage of project value .....*
  - b. Neutral
    - Please give % cost of waste disposal of overall project value .....*
  - c. Decreased
    - Please give % decrease and overall cost of waste disposal as % of project value.....*
- b) No.

- E9. What is your estimate of the money saved on this project due to the use of the SWMP?
- Neutral
  - £100 or less.
  - £101 to £1000
  - £1001 to £10,000
  - £10,001 to £50,000
  - £50,001 to £500,000
  - More than £500,000
  - Increased costs.
- E10. Were there any other benefits to the project apart from cost savings associated with the SWMP? E.g. better site management, better project planning, recording data, forecasting, health & safety
- Yes. Please specify.....
  - No.
- E11. Please estimate the time and cost you spent on the SWMP at different stages of the project:
- Approximate time spent on preparation (before work began on site) (hours)  
.....
  - Approximate time spent updating the SWMP during construction (hours)  
.....
  - Approximate cost of implementing the activities outlined in the SWMP (£)  
.....  
*Please provide breakdown below*
    - Increase in waste disposal costs (£) .....
    - Cost of additional time spent training staff (£).....
    - Increase in material purchase costs (£)
    - Others. Please specify .....
  - Time spent reviewing SWMP (hours) .....

## Section F: Overall experience of SWMPs

- F1. Had your organisation been involved in SWMPs before the regulations came into force?
- Yes, please provide some details .....
  - No
- F2. Has a SWMP been required by any planning applications your organisation has been involved in?
- Yes, if so please list. ....
  - No.
- F3. Has the use of SWMPs increased your organisation's **use of recycled materials**?
- No. We were already using recycled materials whenever possible.
  - No. We have not improved. Please give reasons.....
  - Yes. We used recycled products before, but we have increased our use.
  - Yes. We used very little before, but now we use a lot more.
- F4. Has the use of SWMPs increased your organisation's **waste reduction** activities?
- No. We were already very active in reducing waste.
  - No. We have not improved. Please give reasons.....
  - Yes. We were active before, but we have improved.
  - Yes. We did very little before, but now we are much more active.
- F5. Has implementing an SWMP improved your resource efficiency / waste management?
- Yes. It has benefits for all projects.

- b) Only on larger projects.
- c) No. It has made no difference.

F6. If waste targets are set in a SWMP (e.g. 50% recycled, 30% reused etc), are these normally achieved?

- a) Always.
- b) Most of the time.
- c) Sometimes.
- d) Rarely.
- e) Never.
- f) Do not set targets.

F7. **For Contractors and sub-contractors:** Are clients setting realistic targets?

- a) Yes
- b) No

Comments.....

F8. **For clients only:** Do contractors normally meet the targets you set?

- a) Yes
- b) No

Comments.....

F9. In your experience which action generates the most cost savings?

- a) Designing out waste
- b) Reusing waste
- c) Recycling waste
- d) Measures to reduce wastage rates
- e) Other, please specify .....

F10. What materials are the most cost savings made on?

- a) Wood
- b) Plasterboard
- c) Aggregates
- d) Metals
- e) Other. Please specify.....

F11. In your experience, do the actual waste and cost savings normally meet the forecasts?

- a) Yes, please provide some details .....
- b) No, if not why? .....

F12. Has preparing and implementing a SWMP become easier and more cost effective with experience?

- a) Yes, please provide some details .....
- b) No, if not why? .....

F13. What SWMP training have you undertaken? (Please tick all that apply)

- a) In-house
- b) WRAP
- c) Envirowise
- d) Others please specify .....

F14. Which of the following would help you to improve the use of SWMP? (Please tick all that apply)

- i. Further guidance
- ii. Training
- iii. Demonstrations
- iv. Templates

v. Others. Please specify.....

F15. If you have used a SWMP template, how useful did you find it in preparing SWMPs?

- a) It made preparing a SWMP much easier and more efficient.
- b) It helped, but wasn't key to the process.
- c) It was no help, but is as good as any other way of doing it.
- d) It made the process more complicated.

F16. Please describe any modifications you made to the template or any recommendations or suggestions to improve the template?

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F17. Do you use any guidance or tools to help you to develop your SWMPs?

- a) Yes, if so which
  - i. WRAP. Please state any tools used.....
  - ii. DEFRA
  - iii. NetRegs
  - iv. Envirowise
  - v. Others, please specify .....
- b) No – if no please select reasons why?
  - i. Have a competent person in-house
  - ii. Available guides are too complicated to follow.
  - iii. Others. Please specify .....

F18. Are there any challenges or barriers in preparing and implementing your SWMPs? e.g. culture change, lack of space on site, training staff

- a) Yes, please provide some details.....
- b) None

F19. In your experience, are there any key actions / behaviours for the successful implementation of a SWMP? e.g. perception of waste was changed, knowledge and awareness in the true cost of waste

- a) Yes, please provide some details .....
- b) No

F20. What do you believe the main positive benefits associated with SWMPs are? (Please rank the top 5. Select 1 for the most significant and 5 for the least significant)

- 1) Environmental benefits
- 2) Cost savings
- 3) Demonstrates compliance with waste legislation
- 4) Aids in project planning
- 5) Better management on site
- 6) Prevents fly tipping
- 7) Improves the organisation's green reputation
- 8) Other. Please specify.....
- 9) None.

F21. In your experience do the benefits of SWMPs outweigh any costs?

- a) Yes. Significantly.
- b) Yes. Slightly
- c) They balance out.
- a) No. Please describe the top three negative impacts.

## Section G: Contact information

We would be grateful if you would provide contact details for any clarification we might need as part of this project. Personal Information provided to TRL will not be passed on to any other organisation without your permission.

### G1. Company / Organisation Information

- 1) Organisation Name
- 2) Organisation Type
- 3) Address
- 4) Contact Name
- 5) Position in Organisation
- 6) Email
- 7) Website
- 8) Telephone Number
- 9) Fax Number

### G2. Would you be interesting in contributing to a WRAP case study on SWMPs?

- a) Yes.
- b) No.
- c) Possibly, but I would like additional information.

### G3. Would you like a copy of the survey results?

- 1) Yes.
- 2) No

Thank you very much for taking the time to complete this questionnaire. If you have any questions about this project please phone Adam Davies at TRL on 01344 770620 or email: [SWMP@trl.co.uk](mailto:SWMP@trl.co.uk).

If you have concerns about the way TRL are using your personal information, contact the Data Protection Manager in writing at TRL, Crowthorne House, Nine Mile Ride, Wokingham, Berks, RG40 3GA

The Data Protection Act 1998 gives you the right of access to your personal information held by TRL. An administrative charge of £10 (0% VAT) may be charged for such requests, and you will receive a response within 40 calendar days. Requests of this nature must be in writing, and you will be required to provide verification of your identity to authorise release of your information.

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