Design Stage Demolition, Excavation and Construction Site Waste Management Plan

Sondheim (Ambassadors) Theatre

For Delfont Mackintosh Theatres

July 2016

XCO2 energy

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About us:
XCO2 Energy are a low-carbon consultancy working in the built environment. We are a multi-disciplinary company consisting of both architects and engineers, with specialists including CIBSE low carbon consultants, Code for Sustainable Homes, EcoHomes and BREEAM assessors and LEED accredited professionals.

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Introduction

This report has been prepared on behalf of Delfont Mackintosh Theatres, for the proposed redevelopment of Sondheim Theatre. The site is located along the north side of West Street, near the popular Seven Dials area of central London's Theatreland, within the Borough of Camden.

The project brief revolves primarily around the creation of a 450 seat theatre auditorium. Public areas and rehearsal facilities are also to be improved with the intention of partially retaining the facade and certain period features of the original architecture. This internal reworking consists of the demolition and rebuild of the existing Ambassadors Theatre.

The Site Waste Management Plan (SWMP) Regulations 2008 have been revoked on 1 December 2014. However, the preparation of SWMPs for new development is considered best practice. The purpose of this Design Stage Site Waste Management Plan (SWMP) is to achieve high environmental performance, comply with the relevant regulatory requirements and reduce the cost of waste disposal at the demolition, excavation and construction stages.

This report will outline the methodologies for estimating waste volumes at concept design stage, provide the anticipated waste volumes and waste streams generated during demolition, excavation and construction stages of the site works, and set out recommended measures that are required to be adopted by the Principal Contractor at the proposed development.

This SWMP has been produced by XCO2 using design information provided by Aedas Architects.

Sondheim Theatre

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Proposed site location highlighted in pink

The application proposes a new dedicated theatrical transfer house to accommodate productions that have come to the end of their run in the subsidised sector. The proposed theatre will provide the opportunity for subsidised productions that would not otherwise have the opportunity to transfer to the West End.

It is currently very difficult for successful subsidised productions to transfer to the West End because the internal arrangement of most West End theatres differs substantially from more modern arrangements of the subsidised sector. The vast majority of West End theatres have traditional 'proscenium arch' stages whilst most originating theatres in the subsidised sector have more modern arrangements, such as thrust stages or are arranged 'in the round'. This means that a transfer has to be restaged, often at huge cost to the originating subsidised theatre and eroding the original artistic intention of the director, to the detriment of the audience experience.

There are currently no dedicated theatres in the West End to which productions arising in the subsidised theatre sector can transfer in the event of critical acclaim or audience demand. Typically, publically subsidised productions are pre-programmed in advance at the originating playhouses and run for a period of 6-8 weeks only. The proposed new theatre would provide an opportunity for successful subsidised shows to transfer to the West End for a further 8-16 weeks.

This increased run would provide the subsidised sector with an opportunity to increase revenue at a time of consistently squeezed funding pressures and cuts. It will also diversify the offer for theatre goers and open up a range of quality productions to be viewed as originally intended, enhancing the range and quality of productions and cementing London's status as a world cultural capital in theatre.

Such is the shortage of space in the West End that very many successful subsidised productions are simply never seen again after their original run. Others, due to the physical difficulties of restaging in a proscenium setting simply have no prospect of transfer at all, even if a space in the West End were available.

In order to create a modern and flexible internal arrangement, it is proposed that much of the building is demolished and rebuilt behind the retained West Street façade and the stucco return onto Tower Court. Historically significant elements of plasterwork are to be relocated within the new theatre.

The proposed theatre will then provide a much needed resource for the transfer of productions from the subsidised sector. In turn, the subsidised sector will be able to secure a longer run for critically acclaimed productions that would otherwise close for good, frustrating a large unmet demand from the audience. Thus, the cultural life of the West End will be enhanced along with the audience's opportunity to see good quality subsidised productions for a longer period of time. In their turn, the subsidised sector will realise the opportunity to increase their revenue in an environment of constantly reduced funding.

The proposals have attracted wide ranging support from within the industry. Nicholas Hytner (former Artistic Director of the National Theatre) summarised the situation as:

"Over recent years, a large number of the most successful and ambitious productions in the subsidised theatre sector have been unable to find a venue for further life, leaving a significant potential audience without an opportunity to see work it would like to see. Very often this work would not justify the risks involved in a transfer to a large West End theatre. Cameron Mackintosh's plans for his new 450 seat theatre would greatly increase the chances of a future life for successful productions form theatres like the Dorfman, the Almeida, the Royal Court and the Donmar as well as offering a suitable venue for regional transfers."

Full details of the need for a dedicated transfer house and how the proposed theatre meets that need is set out in the Design and Access Statement and Planning and Heritage Statement that accompany this application.

Limitations

This Design Stage Demolition, Excavation and Construction Site Waste Management Plan (hereafter referred to as the 'Site Waste Management Plan (SWMP)') has been prepared by XCO2 Energy for the sole use of Delfont Mackintosh Theatres.

The findings, conclusions and recommendations presented in this SWMP are based upon information provided by third parties. The work presented in this report was undertaken in January 2016 during concept design stage, and is based on information available during the said period of time.

As this SWMP is prepared during the concept design stage, the waste volumes set out in this report may constitute estimates, predictions and projections based on design information available at the time when the work was undertaken, as well as industry benchmarks for items where detail information regarding the demolition, excavation and construction works is inadequate at this stage.

XCO2 Energy does not guarantee or warrant any estimates or projections presented in this report. The Principal Contractor appointed for the redevelopment of Sondheim (Ambassadors) Theatre would be required to produce a separate SWMP, based on detailed design stage information and further estimations of waste volumes and waste streams prior to commencement of any works on site. It will be the full responsibility of the Principal Contractor to ensure that the relevant Waste Management policies and regulations are fully complied during the demolition, excavation and construction works at Sondheim Theatre.

Planning Policies and Legislation

The Planning Policies and Regulations relevant to waste management issues at Sondheim Theatre are outlined in this section.

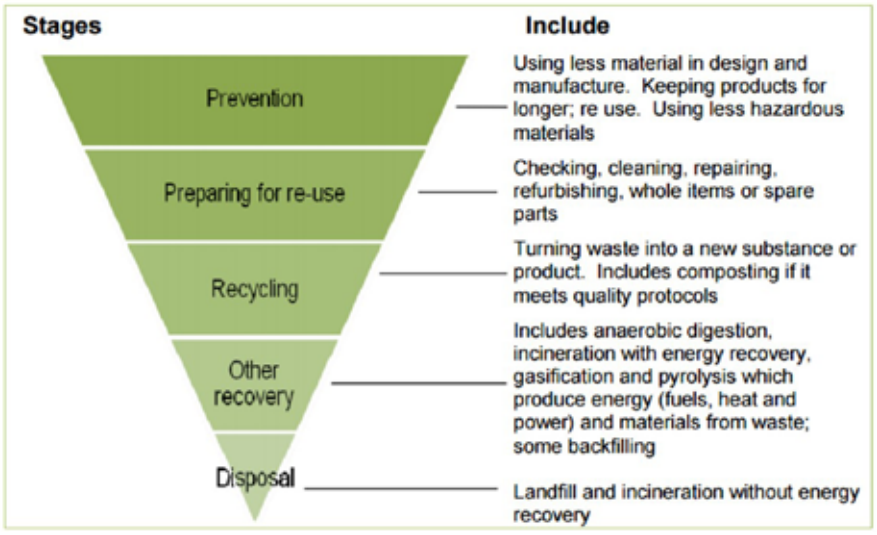
Waste Management Plan for England 2013

The Waste Management Plan for England (2013) outlines the steps required to move towards a zero waste economy. It fulfils Framework Directive Article 28 mandatory requirements, and other requirements set out in Schedule 1 to the Waste (England and Wales) Regulations 2014 (Amendments). An analysis of current waste management practices in England can be found in the plan.

National Planning Practice Guidance: Waste (2015)

This documents describes the consideration that planning authorities should give towards waste management. It recommends the following to be considered during evaluation of development planning applications:

- *sound management of waste from any proposed development, such as encouraging on-site management of waste where this is appropriate, or include a planning condition to encourage or require the developer to set out how waste arising from the development is to be dealt with*
- steps taken to *ensure effective segregation of waste at source including, as appropriate, the provision of waste sorting, storage, recovery and recycling facilities*
- A waste audit should be included for proposals that are likely to generate significant volumes of waste. *This audit should demonstrate that in both construction and operation phases of a proposed development, waste will be minimised as far as possible and that such waste as is generated will be managed in an appropriate manner in accordance with the Waste Hierarchy.*

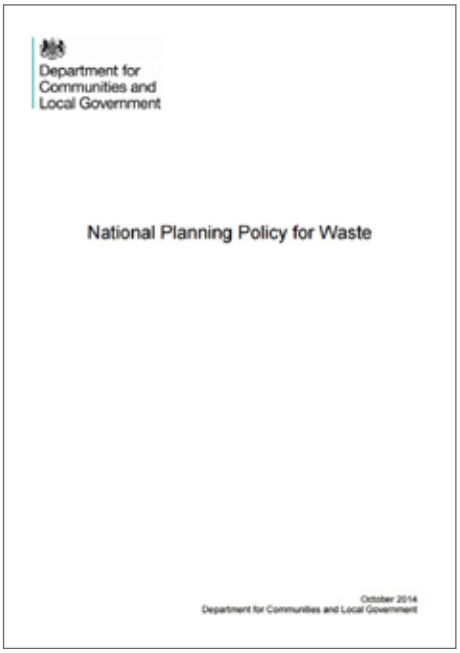


Waste Hierarchy, Waste (England and Wales) Regulations 2011

National Planning Policy for Waste (2014)

This document states that when determining planning applications for non-waste developments, Local Authorities should ensure that:

- *the handling of waste arising from the construction and operation of development maximises reuse/ recovery opportunities, and minimises off-site disposal.*

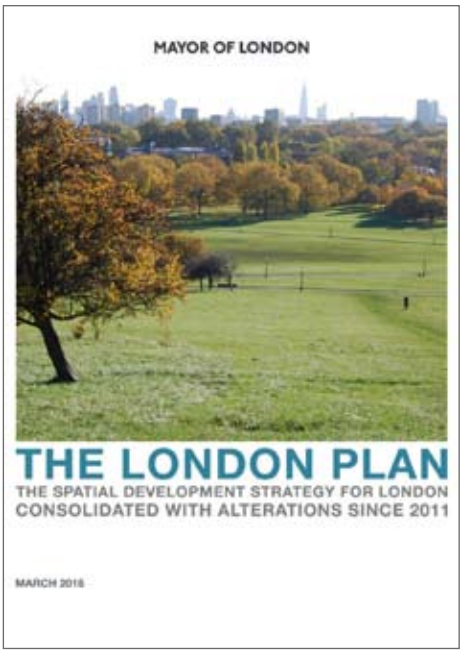


London Plan 2015 (Further Alterations to the London Plan)

The London Plan outlines the Greater London Authority's commitment to improve waste management in London. The policies relevant to waste management are as follows:

Policy 5.3 Sustainable Design and Construction

Development proposals should demonstrate that sustainable design standards are integral to the proposal, including its construction and operation, and ensure that they are considered at the beginning of the design process. This includes *minimising the generation of waste and maximising reuse or recycling.*



Policy 5.18 Construction, Excavation and Demolition Waste

New construction, excavation and demolition (CE&D) waste management facilities should be encouraged at existing waste sites, including safeguarded wharves, and supported by:

- *using mineral extraction sites for CE&D recycling*
- *ensuring that major development sites are required to recycle CE&D waste on-site, wherever practicable, supported through planning conditions.*

Waste should be removed from construction sites, and materials brought to the site, by water or rail transport wherever that is practicable.

LDFs should require developers to produce site waste management plans to arrange for the efficient handling of CE&D waste and materials.

Camden Council's Core Strategy 2010

In 2008, the government made the preparation of Site Waste Management Plans mandatory for all developments worth £300,000 and more. These describe and quantify each waste type expected to be produced in the course of a project and identify the waste management action proposed for each, including re-using, recycling, recovery and disposal. To ensure an integrated approach to waste management and the highest possible re-use and recycling rates, the Council may require, through a planning condition, or as part of a Construction Management Plan, the submission of a site waste management plan prior to construction.

It should be noted that the preparation of SWMPs is no longer mandatory, however, it is recommended as good practice for all major building developments.

Waste Regulations

The legislation relevant to waste management at the proposed development are as follows:

- The Controlled Waste Regulations 2012
- Environmental Protection Act 1990
- The Environment Act 1995
- The Environmental Protection (Duty of Care) Regulations 2003
- The Lists of Wastes Regulations 2005
- The Pollution Prevention and Control Regulations 2007
- The Hazardous Waste Regulations 2009
- The Waste Batteries and Accumulators Regulations 2009
- The Waste Management Regulations 2009
- The Waste Electrical and Electronic Equipment Regulations 2013
- The Waste Regulations 2014
- The Environmental Permitting Regulations 2015
- The Landfill Tax 1996, amendments 2015
- The Packaging (Essential Requirements) Regulations 2015

Waste Calculation Methodology

Demolition Waste

The quantity of demolition waste was estimated using the Waste Resources Action Plan (WRAP) Demolition Quantities Estimator tool available online. The external dimensions of the existing buildings on site to be demolished were included as inputs in the tool. The tool provides a material breakdown of the tonnage of demolition waste that are likely to be generated.

Excavation Waste

The quantities of excavation waste have been calculated based upon the existing building's layout and the excavation necessary in order to implement the extension below ground.

Construction Waste

The quantities of construction waste estimated for the proposed development were based upon benchmark waste quantities per unit of the Gross External Area by land use type (BRE's Reduction, Re-Use and Recycling of Construction Waste), or project specific targeted waste quantities per unit of Gross Internal Floor Area based on BREEAM requirements.

For Sondheim Theatre where the design team is targeting BREEAM New Construction 'Excellent', the quantity of construction waste was calculated based on the BREEAM target of <6.5 tonnes per 100m^2 of gross internal floor area (BREEAM UK New Construction non-domestic buildings technical manual 2014).

The breakdown of material waste streams for the Construction works was referenced from Building Research Establishment's (BRE) Case Studies of previous build types.

Estimated Waste Quantities

The section presents the estimated waste arisings from the demolition, excavation and construction phased based on the methodology set out in the previous section.

Approximately 3,407 tonnes of waste is anticipated to be generated from demolition through to construction stages at the proposed development at Sondheim Theatre, with 3,407 tonnes generated from the demolition phase, 692 tonnes generated from the excavation phase, and 165 tonnes generated from the construction phase.

Demolition Waste

Demolition waste quantities were calculated using the online WRAP Designing out Waste Tool for Buildings (http://nwtool.wrap.org.uk/, accessed 18 February 2016). It is estimated that approximately 3,407 tonnes of waste will be generated as a result of the demolition of the existing building on site. The anticipated breakdown are outlined in the following table.

Estimated quantities of demolition waste for Sondheim Theatre from WRAP tool

Waste Streams	Estimated quantities (tonnes)
Concrete	1,012
Masonry	1,411
Asphalt	0
Aggregates	117
Ferrous	588
Non-ferrous	39
Timber	141
Glass	4
Plasterboard	78
Slates	16
Miscellaneous	0
Total	3,407

Excavation Waste

Excavation waste quantities were calculated based on the current building layout, and the proposed new design. As the curent stalls are below ground and on a gradient to the stage area, 1.5m of excavation across the floor area of the building have been used to arrive at the unbulked volume of excavation waste, which is estimated to be 692 tonnes.

Construction Waste

The quantities of construction waste for Sondheim Theatre was estimated from the targeted BREEAM benchmark of <6.5 tonnes per 100m^2 of Gross Internal Floor area. It is anticipated that approximately 160 tonnes of waste will be generated during the construction process of the scheme. BRE case studies (http://www.smartwaste.co.uk/smartaudit/downloads/gmv_site_guide.pdf, accessed: 18/2/2016) were used for the estimation of the materials breakdown as shown in the following table.

Estimated quantities of construction waste for Sondheim Theatre

Waste Streams	Percentage of total construction waste	Estimated quantities (tonnes)
Ceramic materials	1%	2
Concrete	12%	19
Inert materials	2%	2
Installation materials	6%	10
Metal	4%	6
Packaging	23%	37
Plaster/cement	17%	27
Plastic	3%	5
Timber	15%	24
Miscellaneous	17%	27
Total	100%	160

Waste Management Measures

The section describes measures in which the waste generated during the redevelopment works at Sondheim Theatre will be managed by the Principal Contractor to increase reuse and recycling of waste materials in line with the Waste Hierarchy, and maximise amount of waste diverted from landfill, in line with the Waste Framework Directive.

General site waste management measures

- The Principal Contractor will be required to:
- Carry out a pre-demolition audit in line with the ICE Demolition Protocol or similar prior to the demolition of the existing building to identified any materials that can be reused or recycled on or off site. This is a requirement to meet BREEAM New Construction 'Excellent'.
- It is not expected that asbestos is present in the existing building, however, any asbestos identified during demolition will be cleared by a suitably qualified contractor, in accordance with the Control of Asbestos Regulation 2012.
- Ensure that personal protective equipment (PPE) are worm by all site personnel during the demolition, excavation and demolition works.
- Provide waste management training to all site personnel as part of the Tool Box talk.
- Reuse any materials available on site where feasible (e.g. reuse of aggregates as foundation etc).
- Organise delivery of materials for when they are required to minimise risk of damage to materials during stockpiling.
- Make agreements with materials suppliers to reduce the amount of packaging waste.
- Participate in a take-back scheme where possible.
- Implement the use of standard sized materials on site to minimise off cuts generated on site.
- Segregate of waste at source where feasible, and limiting the storage of potentially polluting materials on site as far as possible.

- Store and appropriately maintain all construction waste in suitable containers.
- Properly seal any hazardous waste including chemicals, cleaning agents, solvents and any materials containing solvents in sealed containers at the end of each day prior to storage in appropriately protected and bunded storage areas.
- Ensure that the disposal of all waste or removal of reuseable or recyclable materials from site is in accordance with the Environment Agency's Control of Pollution Act, 1974, Environment Act 1995, Hazardous Waste regulations 2005 and Duty of Care Regulations 1991. Copies of the Chain of Custodies and Waste Transfer Notes should be filed and kept on site for inspection when required. Records of waste transfers should be updated regularly, to ensure that all waste transported offsite has been correctly processed.

Hazardous Waste Management Plan

The Principal Contractor shall develop a waste management plan for hazardous waste and include for details of recycling and disposal of all other hazardous materials. The Principal Contractor will record and identify hazardous material and maintain waste transfer documentation.

Waste Prevention Actions

The measures presented in the following table will be adopted by the Design Team and Principal Contractor to reduce the amount of waste generated during the site works and maximise diversion from landfill, in order to achieve the following BREEAM Was01 targets:

- Construction waste: <7.5 m^3 or 6.5 tonnes per 100 m^3 Gross Internal Floor Area
- Diversion from landfill - Non-demolition waste: 70% by volume or 80% by tonnage
- Diversion from landfill - Demolition waste: 80% by volume or 90% by tonnage

Waste Streams	Recommended measures
Brickwork/blockwork	• Principal contractor to negotiate a reduce wastage rate with subcontractor where possible • Reuse or recycling on/off site where feasible
Mechanical and Electrical services	• Freeze design as early as possible • Allow for wastage allowance to reduce need to reorder • Ask suppliers to send product with minimal packaging • Buy in bulk to avoid individual package • Participate in packaging take back scheme
Cable wiring in demolition	• Segregate and send for recycling in order to recover high value metals
Copper cabling and pipework	• Copper cabling and pipework be set aside and the skip is secured to prevent theft
Doors	• Existing timber doors to be set aside for either sale to reclamation company or recycling where reasonable practical
Ceilings	• Plasterboard from demolition to be segregated into separate skips
Deliveries	• Send pallets back to supplier or use plastic pallets
Furniture	• Consideration for any furniture available on demolition to be offered to a charity
Flooring	• Demolition audit to identify potential for recycling of existing flooring
Glass	• Segregate for recycling offsite
Metal work	• Arrangement with specialist subcontractors to take back off cuts • Establish storage area for off cuts on site and reuse where possible on site
Off cuts	• Material setting out and accurate workmanship is required to minimise waste
Offsite fabrication	• Maximise off site fabrication of all structures and internal fittings of development • Pre-cast or pre-fabricated stairs

Waste Streams	Recommended measures
Packaging	• 1st priority - reduce amount used by suppliers and manufacturers • 2nd priority - identify opportunities for reuse and recycling with onsite segregation • Consider using a baler on site to compact cardboard, paper and plastic waste for easier handling and storage, and also to reduce cost of disposal.
Paint	• Water based paints to be used on site where reasonable practical subject to specification by the architect • Store material a minimum of 300mm away from finished walls to prevent damage • Recycling the pain cans under the Dulux scheme or similar • Consider using the Dulux paint solidifier system
Pallets	• Arrange for collection and return of good condition timber pallets to suppliers or consider the mending or recycling of broken pallets
Plastics	• Set aside for recycling through a waste transfer station
Plasterboard	• Segregate material to prevent damage • Store in a dry place • Recycle any plasterboard waste with a dedicated plasterboard and gypsum recovery operation
Structure	• Ensure cement bags are protected to prevent water damage
Site temporary lighting	• Use site lighting with protective cover to minimise damage and allow for reuse on other sites
Surplus materials	• Contractor to take off accurate quantities on drawings prior to order
Windows	• Timber /metal from windows to be recycled where reasonably practical

Appendix A: Site Waste Management Checklists

The Principal Contractor will be required to prepare a Site Waste Management plan and provide the information in line with the waste management checklists in this section.

The Principal Contractor shall appoint an Environmental Coordinator who will be responsible for instructing workers, overseeing and documenting results of the SWMP throughout the demolition, excavation and construction phases.

The Principal Contractor shall ensure that copies of this SWMP are distributed to the Client, the Project Manager, the Architect, the project team and each Subcontractor.

Project Information Sheet

Client:	Delfont Mackintosh Theatres
Principal Contractor:	
Name of person in charge of project:	
Author of SWMP:	
Project Title/Reference:	Sondheim (Ambassadors) Theatre
Project Cost Estimated:	£20 million
Building Area:	2,095m^2
Start Date:	
Completion Date:	
Description Of Project Scope:	
Waste Management Champion	
Person Responsible for SWMP	
Waste Storage Area Identified?	
Hazardous Waste Site Registration	
Specialist Waste Carrier Required	
Access for Waste Collection	
Have Targets for Waste Reduction been set?	Yes
BREEAM Waste Reduction Target:	• The amount of construction waste generated is lower than or equal to 7.5m^3 per 100m^2 of gross internal floor area • In addition, 70% by volume or 80% by weight of non-demolition waste; and 80% by volume or 90% by weight of demolition waste must be diverted from land fill.

Waste Management Responsibilities

	Company	Person in Charge	Contact Details
Principal Contractor			
Construction Manager			
Cost Manager			
Sub-contractor 1			
Sub-contractor 2			
Sub-contractor 3			
Sub-contractor 4			

Key questions for the Principal Contractor

The Principal Contractor is required to complete this section to assess the development/refurbishment for its potential to maximise waste savings

Design for Reuse and Recovery	
Can materials from demolition of the buildings or other phases be reused in the design?	
When materials are reused, can they be reused at their highest value?	
Can reclaimed products or components be reused?	

Design for Off Site Construction	
Can any part of the design be manufactured off site?	
Can site activities become a process of assembly rather than construction?	

Design for Materials Optimisation	
Can the design, form and layout be simplified without compromising the design concept?	
Can the design be coordinated to avoid/minimise excess cutting and jointing of materials that generate waste?	
Is the building designed to standard material dimensions?	
Can the range of materials required be standardised to encourage reuse of offcuts?	
Is there repetition and coordination of the design, to reduce the number of variables and allow for operational refinement (e.g. reusing formwork)?	

Design for Waste Efficient Procurement	
Has research been carried out by the design team and/or use of the Net Waste Tool to identify where on site waste arises?	
Can construction methods that reduce waste be devised through liaison with the contractor and specialist subcontractors?	
Have specialist contractors been consulted on how to reduce waste in the supply chain?	
Have the project specifications been reviewed to select elements/components/materials and construction processes that reduce waste?	

Design for Deconstruction and Flexibility	
Is the design adaptable for a variety of purposes during its life span?	
Can building elements and components be maintained, upgraded or replaced without creating excessive waste?	
Does the design incorporate reusable/recyclable components and materials?	
Are the building elements/components/materials easily disassembled?	
Can a Building Information Modelling (BIM) system or building handbook be used to record which and how elements/components/materials have been designed for disassembly?	

Recording of Waste - Register of Waste Carrier Licenses & Destination Environmental permits

With respect to the waste management companies that will be removing waste from the project or the facilities that such waste will be transported to, the tables below outline the waste management contractors, their waste management licenses, waste carrier licenses and exempt site licenses that have been checked and verified for use on this project:

Waste Carrier Details

Name	Contact Details	Registration Number	Expiry Date (dd/mm/yyyy)	Date checked with Environment Agency (dd/mm/yyyy)

Waste Destination Environmental Permit

Name	Location Details	Type of Facility	Env Permit / Exemption Reference Number	Env Permit / Exemption conditions meet waste streams	Date checked with Environment Agency (dd/mm/yyyy)

Waste Records

Information supplied from the waste transfer and destination companies is to be recorded within the following table on a regular basis.

Date Removed	Waste Type	Person removing the waste	Waste Site Licensed / Exempt?	Waste carrier and registration number	Confirmation of delivery

Forecast Versus Actual Waste Quantities

Figures from the initial waste stream forecasts and the actual waste stream records should be entered into the following tables for review by the Principal Contractor.

Waste Description	Activity producing the waste	Construction, demolition or excavation	Inert, Non-Hazardous or Hazardous?	Reused, recycled, recovered, Sewage Treatment Works, Waste Transfer Station or landfilled	On-site or off-site

Waste Description	Activity producing the waste	Forecast (m^3)	Forecast (tonnes)	Actual (m^3)	Actual (tonnes)	Forecast provided by: