



Forge Engineering Design Solutions

WASTE MANAGEMENT ASSESSMENT AND STRATEGY

WOODSTOCK EAST

Vanbrugh Trustees Limited & Pye Homes Ltd
c/o West Waddy ADP
The Malthouse
60 East St Helen Street
Abingdon
Oxfordshire
OX14 5EB

Forge Engineering Design Solutions Ltd
Forge House, 30 Digging Lane
Fyfield, Abingdon
Oxfordshire
OX13 5LY

T 01865 362 780
M 07780 452 099

Company Registration No. 8713789

Non-Technical Summary

This Waste Management Assessment and Strategy has been compiled for the proposed development south east of Woodstock. The proposal is for a mixed use urban extension to Woodstock which should include a new primary school, public open space and relocated football club, employment and retail units and the provision for a link and ride facility.

The report provides Cherwell District Council, West Oxfordshire District Council, and other statutory bodies the draft waste management strategy (in the form of a Site Waste Management Plan) and predicted waste quantities for both the construction and operational phase of the proposed development and planned measures to maximise waste prevention, reuse and recycling.

The Waste Management Assessment and Strategy has been developed based on key national and local legislation and policies and best practice guidance, with particular reference to the Code for Sustainable Homes which is an environmental assessment method for rating and certifying the performance of new homes in England, Wales and Northern Ireland. Category 5 of the Code for Sustainable Homes details waste management criteria and is subdivided into 3 categories that detail the criteria for the segregation and storage of wastes and steps to be taken to reduce, reuse and recycle construction materials.

The report proposes that all 4 available credits under category 1: Storage of non-recyclable waste and recyclable household waste are feasible to achieve. In addition 2 credits should be achieved for category 2: Construction Site Waste Management by implementing practices to achieve a diversion of 50% of non-hazardous construction waste from landfill and through the development and use of a compliant Site Waste Management Plan. The 1 available credit for category 3: Composting should be obtained by providing sufficient and adequate space for kitchen and garden compostable waste in the design of the residential units that meets the requirements of Cherwell District Council and West Oxfordshire District Council's current kitchen and green waste collection schemes.

The report identified the key materials to be utilised within the construction process, many of which the virgin material can be replaced by sourcing recycled materials.

Furthermore, it is estimated that 296,997 tonnes of waste, that could be generated during construction, could be prevented by implementing efficient procurement, storage and handling process to minimise over ordering of materials and wastage caused by damage.

The construction phase is estimated to generate in the region of 349,393 tonnes of inert and non-hazardous waste. Of which 296,997 tonnes can be reused and recycled on and off-site. All wastes generated during the construction phase can be managed in accordance with the Site Waste Management Plan to maximise reuse and recycling opportunities.

Once operational it is estimated that the proposed development could generate 1096 tonnes of household waste per annum with approximately 621 tonnes of this being diverted from landfill for composting or recycling. Residential units should incorporate sufficient internal waste storage containers to promote the separation of recycling and compostable materials at source.

Non-residential wastes produced from private business and the educational and recreational facilities are estimated to be in the region of 296 annual tonnes per year. Non residential units should be designed to incorporate their own/shared waste storage areas for waste and recyclables that are suitable sized for the proposed type and size of the units. At least a third of the allocated waste storage space should be dedicated to the storage of segregated materials for recycling.

1. Introduction

1.1 Introduction

This Waste Management Assessment and Strategy (WMAS) has been compiled for the proposed development south east of Woodstock, known as Woodstock East.

The proposed site is located adjacent to the A44 and the southern edge of Woodstock, some 13 kilometres north of Oxford City Centre. The site is approximately 74.7 ha in size.

The site mostly comprises agricultural fields with established trees and hedgerows. There is substantial woodland and hedgerow defining its' boundaries.

The proposal is for a mixed use urban extension to the town which should include housing (up to a maximum of 1500 dwellings that includes affordable housing and a 150 unit care village), a new primary school, public open space and relocated football club, some employment and retail and a provision for a link and ride facility. The proposals are to be design lead and inherent to the development should be a quality layout, design and landscaping accompanied by infrastructure, all of which is intended to respond and contribute to the town and its unique setting.

The purpose of this report should present Cherwell District Council (CDC), West Oxfordshire District Council (WODC), and other statutory bodies the draft waste management strategy and predicted waste quantities for both the construction and operational phase of the proposed development.

The report considers wastes generated during the construction and operational phases with the overall aim to:

Identify recycled materials to be utilised within the construction of the development and enable the prevention and minimisation of wastes. Where waste is produced, to ensure that it is reused, recycled or disposed of in the most practical sustainable manner and provide a template waste management strategy for the ongoing management of wastes.

This report should give all statutory bodies the opportunity to confirm that the proposed waste management strategy should meet legislative requirements and provide sufficient information to local authorities for the future waste management requirements of the proposed site.

1.2 Objectives

- Provide a summary of key legislation and associated requirements.
- Provide a summary of Oxfordshire County Councils Policies and Plans that provide guidance and mandatory requirements for waste management during the planning and construction phase.
- Identify likely construction materials based on proposed building types and uses.
- Identify recycled materials for use within the construction process to minimise the environmental impact from using virgin materials.
- Identify and quantify the likely waste streams resulting from the construction development and detail waste mitigation techniques in line with the principles of the waste hierarchy and the Local Plans of both CDC and WODC.
- Produce an adaptable Waste Management Strategy Template in the form of a draft Site Waste Management Plan.
- Provide provisional baseline data for waste quantities expected from the operational phase.

2. Legislation, Policy and Guidance

The following section outlines the legislation and guidance that has been considered and provides information on the waste management measures to be employed during the construction and operation phases of the development.

2.1 National Waste Legislation

2.1.1 Revised Waste Framework Directive (2008)

The revised Directive provides a definition of 'waste' and of other concepts such as 'recycling' and 'recovery'. It has applied a new waste hierarchy, expanded the 'polluter pays' principle by emphasising producer responsibility, applies more stringent waste reduction and waste management targets for Member States and requires enhanced content in waste management plans.

The definition of waste is given in the Waste Framework Directive (WFD) 2008 and is detailed below; the categories of wastes covered by the definition are listed in Table 2.1:

Any substance or object in the categories set out in Annex I which the holder discards or intends or is required to discard.

Table 2.1 Categories of waste listed in Annex 1 of the WFD 2008.

Annex I Categories of Waste	
Q1	Production or consumption residues not otherwise specified below.
Q2	Off-specification products.
Q3	Products whose date for appropriate use has expired.
Q4	Materials spilled, lost or having undergone other mishap, including any materials, equipment, etc, contaminated as a result of the mishap.
Q5	Materials contaminated or soiled as a result of planned action (e.g. residues from cleaning operations, packing materials, containers etc).
Q6	Unusable parts (e.g. reject batteries, exhausted catalysts etc).
Q7	Substances which no longer perform satisfactorily (e.g. contaminated acids, contaminated solvents, exhausted tempering salts, etc).
Q8	Residues of industrial processes (e.g. slags, still bottoms etc).
Q9	Residues from pollution abatement processes (e.g. scrubber sludges, baghouse dusts, spent filters, etc).
Q10	Machining/finishing residues (e.g. lathe turnings, mill scales, etc).
Q11	Residues from raw materials extraction and processing (e.g. mining residues, oil field slops, etc).
Q12	Adulterated materials (e.g. oils contaminated with PCBs, etc).
Q13	Any materials, substances or products whose use has been banned by law.

Q14	Products for which the holder has no further use (e.g., agricultural, household, office, commercial and shop discards).
Q15	Contaminated materials, substances or products arising from remedial action with respect to land.
Q16	Any materials, substances or products which are not contained in the above category.

The WFD Directive was transposed into national law in March 2011. There are three key developments from the WFD for Oxfordshire County Council, these are:

- The waste hierarchy is now Law and all waste producers must have regard for the waste hierarchy when managing their waste.
- A national waste prevention plan must be developed by 2014, increasing the importance of waste reduction activity.
- All waste producers (including Councils) must have recycling services in place for glass, metals, paper and plastics by 2015.

2.1.2 The Waste (England and Wales) (Amendment) Regulations 2012

On October 2012, the amended regulations came into force that relate to the separate collection of waste. They amend the Waste (England and Wales) Regulations 2011. From 1 January 2015, waste collection authorities must collect waste paper, metal, plastic and glass separately. It also imposes a duty on waste collection authorities, from that date, when making arrangements for the collection of such waste, to ensure that those arrangements are by way of separate collection.

2.1.3 Hazardous Waste (England and Wales) (Amendment) Regulations 2009

Provides the requirements for controlling and tracking the movement of hazardous waste and bans mixing different types of hazardous waste. The legality and monitory process of disposal is also detailed in full.

2.1.4 Environmental Protection (Duty of Care) Regulations 1991, as amended, 2003

These Regulations are implemented through the Environmental Protection Act 1990 and requires all businesses that produce, import, treat or dispose of controlled waste to ensure that the waste is handled legally and safely from production through to end of process or disposal. The waste producer has responsibility for their own wastes from generation through to final disposal and must ensure that the wastes are managed in compliance with legislation.

2.1.5 Landfill (England and Wales) Regulations 2002

These Regulations require waste to be treated before it is sent for disposal. Definition of the treatment is stated as physical, thermal, chemical or biological processes that change the characteristics of the waste in order to reduce its volume or hazardous nature to facilitate its handling or enhance recovery.

2.1.6 Environmental Permitting (England and Wales) Regulations 2010

These Regulations put into force a common permitting programme for various activities which may have an impact on the environment and human health and details what restrictions there are to minimise damage.

The Regulations detail activities that are exempt from permitting. However all exempt activities still need to register their exemption. Exemptions that are relevant to this project include:

- U1 and U3 (for educational facilities) exemptions detail the parameters that allow the use of suitable non-hazardous waste rather than virgin raw material or material which has ceased to be waste as in the construction process. The exemption lists strict criteria on which wastes can be used, what it can be used for and in which quantities.
- T5 and T6 exemptions detail the exempt treatment operations of construction and soil materials for the screening and blending of waste, treatment of waste wood and plant matter by chipping, shredding, cutting or pulverising.

2.2 National Planning Policies

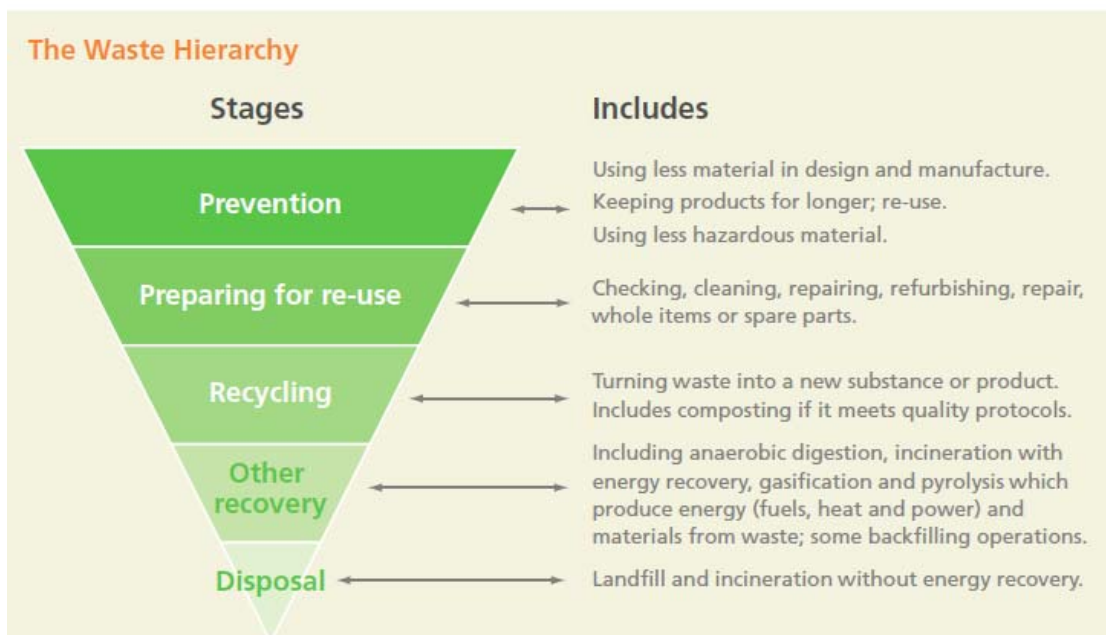
2.2.1 Government Review of Waste Policy 2011

This review highlighted the key priority to maximise efforts to manage waste in line with the waste hierarchy and reduce the carbon effect of waste. The review findings encourage waste prevention and reuse, supporting greater resource efficiency and support initiatives which reward and recognise individuals who reduce, reuse and recycle their waste.

The 'waste hierarchy' was used to direct the review, which is both a guide to sustainable waste management and a legal requirement of the revised EU Waste Framework Directive, and implemented in law through the Waste (England and Wales) Regulations 2011. The hierarchy gives top priority to waste prevention, followed by preparing for reuse, then recycling, other types of recovery (including energy recovery), and last of all disposal (e.g. landfill).

The waste hierarchy is displayed in the following diagram.

Diagram 2.1 The Waste Hierarchy



Source: Government Review of Waste Policy in England and Wales 2011

2.2.2 National Planning Policy Framework 2012

The National Planning Policy Framework sets out the Government’s planning policies for England and how these are expected to be applied. This Framework does not contain specific waste policies, since national waste planning policy is part of the National Waste Management Plan for England 2013. However, local authorities preparing waste plans and taking decisions on waste applications should have regard to policies in this Framework so far as relevant.

2.2.3 Waste Management Plan for England 2013

The Waste Management Plan for England is a high level document which is non-site specific. It provides an analysis of the current waste management situation in England, and evaluates how it should support implementation of the objectives and provisions of the revised WFD.

2.2.4 Planning Policy Statement 10: Planning for Sustainable waste Management

The Planning Policy Statement 10 (PPS10) previously formed part of the national waste management plan for the UK. This statement has since been withdrawn; however the statement is relevant to this assessment as the Review of Municipal Solid Waste Forecasts 2014 for Oxfordshire references PPS10 and states that developments should be in accordance with the PPS.

PPS10 implements the principle that regional planning bodies and all planning authorities should, to the extent appropriate to their responsibilities, prepare and deliver planning strategies that:

- Help deliver sustainable development through driving waste management up the waste hierarchy, addressing waste as a resource and looking to disposal as the last option, but one which must be adequately catered for.
- Provide a framework in which communities take more responsibility for their own waste, and enable sufficient and timely provision of waste management facilities to meet the needs of their communities.
- Help implement the national waste strategy, and supporting targets, are consistent with obligations required under European legislation and support and complement other guidance and legal controls such as those set out in the Waste Management Licensing Regulations 1994.

2.3 Guidance and Best Practice

2.3.1 Code for Sustainable Homes (CfSH)

CfSH is an environmental assessment method for rating and certifying the performance of new homes in England, Wales and Northern Ireland. It is a national standard for use in the design and construction of new homes with a view to encouraging continuous improvement in sustainable home building. The Code works by awarding new homes a rating from Level 1 to Level 6, based on their performance against 9 sustainability criteria which are combined to assess the overall environmental impact. Level 1 is entry level above building regulations, and Level six is the highest, reflecting exemplary developments in terms of sustainability.

The sustainability criteria by which new homes are measured is divided into 8 categories, the most relevant category to this WMAS is:

- Category 5 Waste – Storage for recyclable waste and compost, and care taken to reduce, reuse and recycle construction materials (minimum standards present).

Category 5 Waste is subdivided into 3 categories titled Was 1, Was 2 and Was 3. The following 3 tables detail extracts from the 3 subcategories.

Table 2.2 Category 5 Waste Was 1

Was 1	Storage of Non-recyclable Waste and Recyclable Household Waste	Credit
Storage of household waste	<p>An adequate external space should be allocated for waste storage and sized to accommodate containers according to the largest of the following two volumes:</p> <ul style="list-style-type: none"> • The minimum volume recommended by British Standard 5906 (British Standards Institution, 2005) based on a maximum collection frequency of once per week. This volume is 100 litres for a single bedroom dwelling, with a further 70 litres for each additional bedroom. • The total volume of the external waste containers provided by the Local Authority. <p>Storage space must provide inclusive access and usability. Containers must not be stacked.</p>	M*

Storage of recyclable household waste	<p>Dedicated internal storage for recyclable household waste can be credited where there is no (or insufficient) dedicated external storage capacity for recyclable material, no Local Authority collection scheme and where the following criteria are met:</p> <p>At least three internal storage bins:</p> <ul style="list-style-type: none"> • All located in an adequate internal space, • With a minimum total capacity of 60 litres. 	2
Storage of recyclable household waste	<p>A combination of internal storage capacity provided in an adequate internal space, with either a Local Authority collection scheme, or no Local Authority collection scheme but adequate external storage capacity.</p> <p style="text-align: center;">Local Authority collection scheme</p> <p>In addition to a Local Authority collection scheme (with a collection frequency of at least fortnightly), at least one of the following requirements must be met:</p> <ul style="list-style-type: none"> • Recyclable household waste is sorted after collection and a single bin of at least 30 litres is provided in an adequate internal space. • Materials are sorted before collection and at least three separate bins are provided with a total capacity of 30 litres. Each bin must have a capacity of at least 7 litres and be located in an adequate internal space. • An automated waste collection system which collects at least three different types of recyclable waste. <p style="text-align: center;">No Local Authority collection scheme but adequate external storage capacity.</p> <p>For houses and flats there must be at least three identifiably different internal storage bins for recyclable waste located in an adequate internal space with a minimum total capacity of 30 litres or with a minimum individual capacity of at least 7 litres. AND</p> <p>For houses, an adequate external space must be provided for storing at least three external bins for recyclable waste with a minimum total capacity of 180 litres or with a minimum individual capacity of 40 litres.</p> <p>For flats, a private recycling scheme operator must be appointed to maintain bins and collect recyclable waste regularly. Recycling containers must be located in an adequate external space, be sized according to the frequency of collection, based on guidance from the recycling scheme operator and store at least three types of recyclable waste in identifiably different bins.</p>	4

*Mandatory

	<p>place.</p> <p>OR</p> <p>A Local Authority green/kitchen waste collection system (this can include an automated waste collection system).</p> <p>All facilities must also:</p> <ul style="list-style-type: none"> • be in a dedicated position, • provide inclusive access and usability (Checklist IDP), • have a supporting information leaflet provided to each dwelling. 	
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It is worth noting that the CfSH is planned to be phased out. The Building Research Establishment has launched consultation on a BREEAM based standard. With a planned Spring 2015 launch. However, as the standard has not been finalised or is it referenced to in either of the councils policies or plans this report has based its assessment and recommendations on the current CfSH.

The draft Cherwell Local Plan 2006–2031 is being amended, the current draft requires all new homes to meet Code 4 and the West Oxfordshire Draft Local Plan 2012 requires all new homes to achieve Code 4 immediately and Code 6 by 2016.

2.3.2 Building Research Establishment Environmental Assessment Method (BREEAM)

The BREEAM UK New Construction scheme is a performance based assessment method and certification scheme for new buildings. The primary aim of the scheme should mitigate the life cycle impacts of new buildings on the environment.

The BREEAM scheme rates buildings as either, Pass (30%), Good (45%), Very Good (55%), Excellent (70%) or Outstanding (85%).

The waste section within the standard encourages the sustainable management (and reuse where feasible) of construction, operational waste and waste through future maintenance and repairs associated with the building structure. The scheme encourages good design and construction practices with the aim to reduce the waste arising from the construction and operation of buildings, encouraging its diversion from landfill. It includes recognition of measures to reduce future waste as a result of the need to alter the building in the light of future changes to climate.

To achieve any of the construction waste management credits the assessed development must have a BREEAM compliant Resource Management Plan (commonly referred to as a Site Waste Management Plan) that should be written in line with best practice.

The draft Cherwell Local Plan 2006–2031 requires all new non-residential developments to meet at least BREEAM ‘very good’ standard and the West Oxfordshire Draft Local Plan 2012 requires all

new non-residential developments to meet at least BREEAM 'very good' from 2013 and BREEAM 'excellent' from 2016.

2.3.3 Site Waste Management Plans (SWMP)

SWMPs are no longer a legal requirement but they are still required in order to comply with CFSH and BREEAM certification. A SWMP is a tool to enable the assigned responsible person(s) to think through every stage of the project and work out in advance what materials should be used, estimate how much waste should be produced and set realistic targets for how much of that waste can be prevented, reused, recycled, recovered or disposed of. The SWMP sets out how resources should be managed and wastes controlled at all stages during the construction project.

A SWMP covers:

- who should be responsible for resource management,
- what types of waste should be generated
- how the waste should be managed,
- which contractors should be used to ensure the waste is correctly recycled or disposed of responsibly and legally, and
- how the quantity of waste generated by the project should be measured.

The draft SWMP for the proposed development is shown in Appendix 2.

2.3.4 British Standard 5906:2005 Waste Management in Buildings

This British Standard is a code of practice for methods of storage, collection, segregation for recycling and recovery, and on-site treatment of waste from residential and non-residential buildings and healthcare establishments. This British Standard is applicable to new buildings, refurbishments and conversions of residential and non-residential buildings, including but not limited to retail and offices.

2.3.5 Construction 2025: Strategy (Gov, 2013)

The strategy sets out a plan for long-term strategic action by government and industry to continue to work together to promote the success of the UK construction sector.

It focuses on key growth markets in:

- Smart technologies.
- Green construction.
- Overseas trade.

To support this strategy the Waste Resources Action Programme (WRAP) has set up The Built Environment Commitment that provides a framework for action by businesses and sector bodies throughout all areas of the built environment to lower carbon and improve resource efficiency in everyday activities. The Commitment is open to all organisations across the built environment sector, including construction clients, contractors, designers and suppliers to sign up and state

their commitment e.g. to divert 50% by weight of non-hazardous construction waste generated by the project from landfill and report on their actions.

2.4 Waste Policy and Guidance for Oxfordshire

2.4.1 Regional Spatial Strategy

The South East Plan was the regional spatial strategy for the south east of England. It was revoked by government on 25 March 2013 under the Regional Strategy for the South East (Partial Revocation) Order 2013. The revocation of the South East Plan decentralises planning powers to local authorities. However, the National Planning Policy Framework requires councils to work together to address strategic priorities across boundaries and development requirements which cannot be wholly met within their own areas under the duty to co-operate.

2.4.2 Oxfordshire Waste Partnership Joint Municipal Waste Management Strategy

In 2007 Oxfordshire developed and adopted a Joint Municipal Waste Management Strategy (JMWMS) and action plan, and Oxfordshire council formed the working group Oxfordshire Waste Partnership (OWP) to manage and improve waste management within the county by implementing the strategy.

OWP comprised of Cherwell District Council, Oxford City Council, Oxfordshire County Council, South Oxfordshire District Council, Vale of White Horse District Council and West Oxfordshire District Council.

The Oxfordshire Waste JMWMS was originally agreed in January 2007; it was reviewed and updated following consultation in 2012/13. The revised strategy sets details plans for dealing with Oxfordshire's municipal waste through to 2030.

In 2011/12 OWP councils recycled or composted over 60% of household waste. Oxfordshire County Council produces less waste per person than any other County Council in England.

The OWP has since been dissolved, but the strategy was adopted by all councils and is therefore relevant to this report. The aims of the JMWMS are detailed in the following table.

Table 2.5 Aims of the JMWMS for Oxfordshire

Subject	Aim
Reduce and reuse	Provide advice, services and information to help householders, businesses and the community reduce and reuse materials and avoid waste. Set a good example by reducing the councils own waste.
Recycling and composting	As a minimum, achieve a combined recycling and composting rate of at least: <ul style="list-style-type: none"> • 65% of household waste by 2020. • 70% of household waste by 2025.
Dealing with residual waste	Minimise waste to landfill and recover energy from non-recyclable waste through the operation of the Ardley Energy from Waste facility.
Dealing with hazardous waste	Encourage the separation of hazardous wastes so they can be safely managed.
Land use planning	Ensure that new waste facilities are built in suitable locations, using the Waste Planning role of Oxfordshire County Council.
Creating markets	Help to develop markets for the recyclable materials that the councils collect, seeing materials not as waste but as a valuable resource.
Working in partnership	Improve waste management services offered by working together through the Oxfordshire Waste Partnership and with others.

2.4.3 Oxfordshire Waste Prevention Strategy 2010–2020

The Waste Prevention Strategy 2010 – 2020 sets out OWP’s vision to maximise waste prevention across the county for the period 2010 – 2020. It forms part of the wider JMWMS for Oxfordshire.

In 2012 the strategy underwent a Refresh consultation which noted that in 2012–13 411kgs per household of residual waste was produced. The Strategy also contributes to the Oxfordshire 2030 Sustainable Community Strategy pledge to “Reduce waste and increase reuse and recycling by households and businesses”.

The table below sets out 8 priority areas for waste prevention activity from 2010 – 2020. The first six areas are household waste streams and are shown in order of priority for OWP resourcing. The final two areas cover commercial waste and run alongside the work being undertaken on household waste.

Table 2.6 Waste Priorities in Oxfordshire

Priority Waste Stream	Joint Policy
Household Waste	
1. Garden waste and compostable food waste	Promote home composting to reduce organic waste collected and processed by Councils.
2. Avoidable food waste	Deliver a campaign to reduce avoidable food waste.
3. Bulky waste and smaller reusable items	Develop reuse of bulky items at Household Waste Recycling Centers and from bulky collections where possible. Raise awareness and understanding of the importance of material reuse.
4. Nappy waste	Promote the benefits of using Real Nappies and give practical advice on their usage.
5. Packaging waste and carrier bags	Promote the reduction of packaging waste by providing simple, practical “smart shopping” advice to residents. Promote efforts by retailers and central government to reduce packaging waste at source and spread good news on their achievements.
6. Junk mail	Provide information and advice to help residents and local businesses reduce junk mail.
Commercial Waste	
7. Trade waste	Introduce measures to remove trade waste from the household stream and provide viable alternatives for trade waste disposal. Support businesses in reducing their waste and recognise their achievements.
8. Waste from Council activities	Minimise waste generated from their own activities.

2.5 Local Planning Policies

2.5.1 West Oxfordshire Local Plan 2011 and West Oxfordshire Draft Local Plan 2012

The West Oxfordshire Local Plan 2011 lists policies relating to all aspects of social and economic development and environmental protection in the district. These saved policies provide the basis for local planning decisions until they are replaced by the new Local Plan.

The West Oxfordshire Draft Local Plan is proposed to be adopted in July 2015, subject to the assessment process. Therefore the findings and recommendations of this report have been collaborated to meet the current requirements of the West Oxfordshire Local Plan 2011 and the current proposed future requirements of the West Oxfordshire Draft Local Plan 2012.

One of the 4 key objectives of the West Oxfordshire Draft Local Plan 2012 should protect and enhance the environment and reduce the impact from climate change. It is proposed that this should be achieved through the improved sustainable design and construction of new

developments. As a general principle, all developments should be expected to meet or exceed relevant national minimum standards for sustainable construction.

In 2009, the District Council jointly commissioned a study of the potential for decentralised, renewable and low carbon technologies and local requirements for sustainable construction. The study concluded that in West Oxfordshire these objectives can most easily and effectively be achieved through the adoption of the CfSH and BREEAM.

Core Policy 3 of the West Oxfordshire Draft Local Plan 2012 states that all development proposals should be required to achieve high standards of sustainable design and construction. In particular new dwellings should be expected to achieve CfSH (or equivalent) Level 4 from 2013 and Code Level 6 from 2016.

All non-domestic developments should be expected to achieve at least BREEAM 'very good' from 2013 and BREEAM 'excellent' from 2016.

2.5.2 Saved policies of the Adopted Cherwell Local Plan 1996 and Cherwell Local Plan 2006–2031

The Cherwell Local Plan 1996 does not outline specific requirements relating to construction and demolition wastes. The emerging Cherwell Local Plan 2006–2031 does contain strategic policies that ensure the build of sustainable communities and sustainable development.

CDC provides a range of planning guidance (Supplementary Planning Guidance documents and Supplementary Planning Document) to assist in the planning decision making. These documents are in addition to the statutory Adopted Cherwell Local Plan 1996. In particular Policy ESD 3: Sustainable Construction details that the delivery of sustainable development is a fundamental theme of the Cherwell Local Plan and the Council places a high priority on the achievement of sustainable construction.

All new homes should be expected to meet at least Code Level 4 of the CfSH with immediate effect, unless exceeded by the standards set for NW Bicester Eco-Town (See Policy Bicester1). All new non-residential development should be expected to meet at least BREEAM 'Very Good' with immediate effect.

The draft Cherwell Local Plan 2006–2031 (when approved) should replace the Adopted Cherwell Local Plan 1996. It is anticipated that the new plan should be adopted in February 2015. Therefore the findings and recommendations of this report have been collaborated to meet the current requirements of the Adopted Cherwell Local Plan 1996 and the current proposed future requirements of the Cherwell Local Plan 2006–2031.

2.5.3 Saved policies of the existing Minerals and Waste Local Plan 1996 and the Oxfordshire Minerals and Waste Local Plan: Core Strategy Consultation Draft (February 2014)

Oxfordshire counties current planning policy minerals and waste is contained in the saved policies of the Minerals and Waste Local Plan (1996). This is being replaced by a new Minerals and Waste Local Plan.

Oxfordshire County Council has issued the draft Minerals and Waste Local Plan: Core Strategy for consultation. The Core Strategy should be adopted in December 2015 and should provide a planning strategy and policies for the supply of minerals and the management of waste in Oxfordshire for the period to 2030.

The consultation draft states that the County Councils aim should achieve more sustainable waste management practices and break the link between economic growth and the environmental impact of waste by moving the management of waste up the waste hierarchy, away from disposal to reuse, recycling, composting and treatment to recover resources. In addition the Council plan to make provision for a waste management capacity that should allow Oxfordshire to be net self-sufficient in meeting its own needs for construction, demolition and excavation waste.

3. Methodology

This assessment seeks to characterise the nature and likely amount of waste generated during the construction and operational phase of the proposed development.

Construction wastes include wastes generated during the preparation of the site, construction of infrastructure and site clear-up.

Operational wastes include those produced by residential units, commercial units and grounds maintenance once the proposed site is completed.

Construction wastes have been predicted by utilising the Building Research Establishment's waste benchmarks and the current proposed usage of the site taking into account construction techniques and site conditions such as drift and bedrock geology.

A conservative approach to calculating estimated construction waste volumes has been assumed, based upon the maximum likely waste volumes. This helps to ensure that the strategies employed to manage the waste are robust enough to deal with any unexpected volumes.

Operational wastes have been forecast using existing data from CDC and WODC, WRAP research and the BS5906:2005 Waste Management in Buildings document.

All calculations of quantities have been based on the following proposed land use.

Table 3.1 Land Use Predictions

Use	Area	Likely footprint
Residential (C3)	31.49ha	150,000m ² See Note
Retail (A1/A2/A3/A4)	Included within residential and Care Village area.	Up to 930m ² of retail uses within a local hub.
Care Village (C2 with elements of A3/A4/D2)	3.62ha	120 homes (included in residential total). Should include publically accessible bar, restaurant and gym.
Education (D1)	2.28ha	2 form entry. 2,217 m ² .
Locally Led Employment (B1/B2/B8) including link and ride	3.11 ha	7,500 m ² .
Football Club (D2)	3.71 ha	480m ²

Note: It is proposed that the split of properties across the two district councils should result in approximately 150 units for the Care Village and 400 residential units based in WODC and 950 residential units in CDC.

4. Construction Waste

The following sections detail the overarching waste management practices that would be employed during the construction phase of the proposed development, which would implement the Waste Hierarchy's waste minimisation stages of; Prevention; Reuse; Recycling; Recovery and lastly disposal.

4.1 Construction Waste Best Practice

As detailed in section 2.3.3 a compliant SWMP should be developed for the proposed development with the aim of:

- improving material resource efficiency by promoting the economic use of construction materials and methods so that waste is minimised and any waste that is produced can be reused, recycled or recovered before disposal options are explored; and
- reduce the likelihood of unlawful management of wastes such as escape, theft and fly tipping by ensuring compliance with existing legal controls and providing an audit trail of any waste removed from the site.

The SWMP should be the live record of wastes reused onsite or offsite, recovered offsite or disposed of with details of volume or tonnage and waste contractors and facilities used.

At design stage the compliant SWMP should contain appropriate benchmarks, commitments and procedures for waste minimisation and diversion from landfill. Achievement against set waste prevention and minimisation targets should be reported on at management meetings utilising the data within the SWMP.

The draft SWMP is detailed in Appendix 2. The SWMP should be updated throughout the project as more detailed information becomes available.

4.2 Setting Targets

Appropriate targets and objectives need to be set in relation to waste management of the proposed development. This would ensure that a clear action plan is generated for the management of specified types and quantities of materials identified.

Targets and objectives are to be agreed, monitored and reported on to the Project Team at inaugural meetings with the contractors.

The process of setting targets and objectives should result in the Project Team focussing on:

- Quantifying raw material wastage.
- Quantifying the generation of each waste stream.
- Improvements in current working practices; methods by which the waste streams are being handled and stored.
- The available waste disposal routes used.

This should in turn identify best practice methods and further waste minimisation opportunities. The on-going monitoring against the targets should assist in determining the success of waste management initiatives and progress against these targets should be relayed back to the Project Team.

WRAP's Net Waste Tool 2008 Standard and Good Practice recovery rates provides a % recovery rates by material which can be utilised to establish initial targets for the proposed development.

Table 4.1 Standard and Good Practice Recovery Rates

Material	MRF Recovery Rate Mixed Waste Skip		MRF Recovery Rate Segregated Skip	
	Standard Recovery %	Good Practice Recovery %	Standard Recovery %	Good Practice Recovery %
Bricks and Blocks	60	70	80	90
Aggregates	90	100	95	100
Surfacing Materials*	90	100	95	100
Tiles and Ceramics	60	70	80	90
Concrete	70	80	75	95
Screed	70	80	75	95
Gravel	90	10	95	100
Sand	90	100	95	100
Stone	90	100	95	100
Other Inert**	90	100	95	100
Plasterboard	0	20	30	75
Metals	70	85	80	95
Wooden Pallets	57	75	70	90
Unprocessed Timber	57	75	70	90
Processed Timber	24	30	30	70
Packaging***	10	75	85	90
Glass	0	21	Default to Mixed Waste	
Insulation	0	50	Default to Mixed Waste	
All Flooring (Tiled and Roll)	0	0	Default to Mixed Waste	
Plastic	70	75	Default to Mixed Waste	
Structural Waterproofing****	0	0	Default to Mixed Waste	
Gypsum Products*****	80	90	Default to Mixed Waste	
Electrical Services	20	50	Default to Mixed Waste	

*Includes Asphalt, Bitumen and Macadam.

**Other non-hazardous inert wastes such as soils and excavation wastes.

***Includes paper, cardboard and plastic packaging only.

**** Includes damp-course membranes and roofing materials, including mastic asphalt, polymers and bitumen.

*****Includes cement, mortar, plaster and render.

In addition to utilising the Net Waste Benchmarks of Good Practice to set targets the SWMP should need to specify the following targets to meet the requirements of the CfSH:

- Target benchmarks for resource efficiency, i.e. m³ of waste per 100 m² or tonnes of waste per 100 m² (set in accordance with best practice).
- Achieve at least 50% by weight or by volume of non-hazardous construction waste generated by the project has been diverted from landfill or at least 85% by weight or by volume of non-hazardous construction waste generated by the project has been diverted from landfill.

At conceptual stage targets can be estimated using the proposed footprint and building uses. Upon appointment the Principal Contractor is responsible for reviewing the waste targets to ensure that they are achievable and identify further improvements with the emphasis being on continual improvement.

4.3 Prevention of Waste Through Procurement and Storage Practices

To minimise potential waste of on-site materials during the proposed works it is advised that the SWMP covers procurement best practice. In particular the procurement process should assess any built in waste allowances during the procurement of raw materials and establish the waste allowances of main construction components.

Attention should be paid to the ordering of materials including ordering of exact lengths rather than standard lengths, minimisation of surplus packaging and utilisation of supplier take back schemes.

Delivery of materials should be managed to prevent damage to goods, acceptance of incorrect deliveries (quantities or specification) and delivery to required location to minimise double handling.

The location and provision of raw materials and waste storage onsite should be clearly labelled, identifying the materials that can be received. Provisions that would be made include:

- Temporary offices retaining all details to the SWMP and waste management monitoring and reporting details;
- Storage areas for raw materials and assembly areas for construction components to be located away from sensitive receptors;

-
- Colour coded skips/receptacles to be provided for segregated wastes for reuse and recycling;
 - Dedicated skips/receptacles to be provided for wastes requiring off-site disposal;
 - Hazardous waste, materials to be stored in appropriately secure compounds, clearly labelled to identify their hazardous properties accompanied by the appropriate Control of Substances Hazardous to Health assessment sheets; and
 - Any fuels, oils and chemicals would be stored in appropriate containers, banded and in accordance with good site practices and regulatory requirements, located away from sensitive receptors.

The provision of effective and secure storage areas for raw materials is important to ensure that potential loss of material from damage, vandalism or theft is avoided, including:

- Ensuring deliveries to the site are; as far as reasonably possible, on a just-in-time basis.
- Providing on-site security.
- Installing security fencing where needed.

Temporary site waste segregation areas would be provided to ensure construction waste materials are securely stored prior to recycling or disposal, where space allows. Where onsite space should be limited for waste material segregation a licensed external contractor may be used to separate and process recycled materials. Documentary evidence to confirm the process has been undertaken correctly should be produced.

Implementation of good practice measures in term of on-site storage and security practices would assist in reducing unnecessary wastage of material and ensure that high standards are maintained throughout the development process.

4.4 Prevention of Waste Through Construction Techniques

To minimise potential waste of on-site materials during the proposed works it is advised that consideration is given to off-site fabrication and delivery of building elements. Examples of alternative construction materials and techniques, but not limited to, are:

- Beam and Block Pre-cast Concrete floors used instead of ground bearing slabs.
- Engineered timber joists used instead of standard timber joists cut to length on site.
- Pre-cast Concrete Plank Floors used instead of standard timber joists cut to length on site.
- Pre-fabricated Truss Rafters used instead of standard timber rafters cut to length on site.
- Roof rafters and floor joists should be positioned at standard spacing to suit the standard supply width of insulation to be used between them to minimise trimming.
- Dug material should be used for backfilling and landscaping where possible.

The use of pre-fabricated building elements can significantly reduce the amount of “off-cut” waste produced.

4.5 Monitoring and Reporting

The Principal Contractor would be required to discuss and agree recovery rates to be targeted at inaugural meetings inline with the overall project targets.

A monitoring report (part of the SWMP) would then be generated on a monthly basis which would include details of the progress made in diverting waste materials from landfill, against the agreed targets.

On completion of the work the contractor would report on the site performance against the agreed waste targets to the Project Team and CDC and WODC. This would be accompanied by evidence of actual volume/quantities of waste collected for disposal and the volume collected for reuse and recycling.

Contractors would be expected to provide evidence through the collation of waste transfer notes, invoices and similar. This information would be detailed in the SWMP.

It would be preferable to register and report against targets with WRAP's Built Environment Commitment programme to enable the continual development of Benchmarks and the sharing of best practice.

4.6 Transport and Traffic

The logistics associated with waste from the proposed works would be affected by a wide range of factors. The quantity and types of waste materials generated would fluctuate during the construction phase and the resulting number of waste collections would depend on a range of variables including the amount of storage space for wastes, storage containers used and segregation methods.

The Principal Contractor is responsible for providing construction waste logistic forecasts which would be discussed with waste contractors and CDC and WODC following the appointment of relevant parties.

The impact of traffic associated with the movement of raw and waste materials during the proposed works on surrounding neighbours and the local road network could be minimised by a combination of initiatives e.g. adoption of vehicle backhauling.

The prevention of waste in the first instance should have a direct positive impact on the reduction of waste vehicle movements required to transport waste from the site.

4.7 Quality Protocols

Quality Protocols (QP's) clearly set out the steps that must be taken for the waste to become a non-waste product or material that can be either reused by business or industry, or supplied into other markets, enabling recovered products to be used without the need for waste regulation controls. QP products meet British Standards and therefore guarantee quality.

Where possible QP recycled materials should be used in construction. Relevant QP's are:

- Production of aggregates from inert waste.
- Manufacture of secondary raw materials from waste non-packaging plastics.
- Gypsum from waste plasterboard.

4.8 Construction Wastes Streams and Quantities

This section aims to determine the material types and waste volumes that should arise from the construction phase of the project. Typically, construction waste falls into three classifications: inert, non-hazardous and hazardous wastes.

To enable the construction waste streams to be identified some assumptions of the likely construction materials used and the likely construction techniques employed must be made. These assumptions are based on current and best practice building construction techniques with regards to sustainability and waste minimisation, ground conditions and predicted external works such as foundations, drainage, utilities, road construction and hard and soft landscaping.

4.8.1 Site Ground Conditions

The site investigation has identified the site geology to be approximately 300mm of topsoil, which is underlain by a bedrock geology of either the Cornbrash Formation or Forest Marble Formation.

Bearing capacity tests for preliminary building foundation design were carried out. A safe bearing capacity of 175 kN/m² was identified, which allows for shallow strip foundations to be utilised.

California Bearing Ration (CBR) tests were carried out for road foundation design. A CBR of 5% was identified for preliminary design, which allows for relatively shallow road foundation construction.

Infiltration tests in accordance with BRE Digest 365 Soakaway Design were carried out. An average infiltration rate of 1.72×10^{-4} infiltration rate was identified, which indicates that infiltrating Sustainable Drainage Systems (SuDS) such as soakaways, infiltration basins and porous paving could be utilised, which omits the need for above or below ground attenuating SuDS structures.

The site investigation identified the soil at the site to be un-contaminated and suitable for reuse on-site where there is a need, such as backfilling of excavations and landscaping.

Based on the findings of the site investigation, excavations for buildings, hardstandings and road foundations could be kept to a minimum to reduce waste arising due to excavation. Surface water drainage excavation could also be kept to a minimum by utilising porous paved areas for SuDS rather than underground attenuating tanks or large above ground attenuation basins.

4.8.2 Predicted Construction Materials and Techniques

Foundations for building are predicted to be shallow foundations to a depth of 1.000m below ground levels. Foundations are predicted to be between 06.00m to 0.800m wide. Concrete strip foundations can utilise Recycled Aggregates such as crushed brick and concrete to minimise use of virgin aggregates.

Surface Water drainage SuDS are predicted to be shallow source control techniques such as swales, infiltration basins, porous paving and geo-cellular soakaways. Geo-cellular crates and plastic pipework that is manufactured using recycled plastic could be sourced to minimise use of virgin materials.

Foundations for roads are predicted to be shallow with a road construction depth in the region of 500mm. Recycled Aggregates such as crushed brick and concrete can be utilised for road sub-bases to minimise use of virgin aggregates.

As-dug material should be reused wherever possible for back filling of foundation trenches, drainage trenches, utility excavations and the formation of a level football playing field and outdoor recreation areas. It is proposed to reuse all dug material from excavations onsite.

Based on the existing buildings surrounding the site, it is predicted that the proposed buildings are likely to be constructed with a stone or reconstituted stone outer leaf with internal leafs and walls constructed of block at ground floor levels and timber stud walls for walls above ground floor level.

For waste minimisation and speed of construction, ground floors are likely to be constructed of beam and block floors, which are made and supplied to fit the proposed buildings. Floors above ground floor are likely to be constructed of either pre-cast concrete for flats and offices, engineered joists for houses, which are made and supplied to fit the proposed buildings.

Roofs are likely to be finished with either slates or tiles, which are laid on truss rafters, which are made and supplied to fit the proposed buildings.

Insulation would be provided to external walls, floors and roofs in compliance with Building Regulations.

The South East Plan sets targets for CDE recycling of 50% for 2015, rising to 60% thereafter. The recent survey of this waste stream by WRAP (Construction, demolition and excavation waste arisings, use and disposal for England 2008 by Capita Symonds for WRAP) suggests there is little opportunity to improve on these targets, and these are therefore the targets applied to this assessment.

The above assumptions have been used to predict the waste streams and volumes identified in Appendix 1. The waste streams identified are not exhaustive as the actual construction materials used would not be confirmed until the detailed design stage.

It is predicted, that without waste minimization techniques the development's construction waste production could be in the region of 349,393 tonnes of waste.

However, through the implementation of The Waste Hierarchy mitigation techniques of Prevention; Reuse; Recycling; Recovery and Disposal the actual construction waste could be reduced to around 53,396 tonnes. This results in an 85% reduction in waste, which equates to approximately 296,997 tonnes of waste being diverted from disposal to landfill.

This information has also been used to create the draft SWMP, which is shown in Appendix 2. This is a template for subsequent design stage and construction stage and should be up-dated during each phase of the development.

4.8.3 Possibilities for use of Recovered Materials

The New Build Bill of Quantities (NB-BOQ) Table in Appendix E includes an estimation of the quantities of each recycled waste stream that can be reused in the new development.

A number of significant waste streams and recovered uses have been identified:

Concrete Hardstanding and Concrete Masonry

Concrete can be segregated and crushed on or off-site, to produce Recycled Concrete Aggregate (RCA), and reused as general engineering fill and sub-base in the construction of the road and car parking areas as well as the foundation for the buildings.

There are several identified applications in the new build construction process where RCA can be used:

- General engineering backfill around foundations
- Road sub-base and capping layers
- Hardcore blinding below concrete slabs
- New concrete applications

Non-Concrete Masonry – Brick and Stone

Brick and Stone can be segregated and crushed on or off-site, to produce Recycled Aggregate (RA), and reused as general engineering fill and sub-base in the construction of the road and car parking areas as well as the foundation for the buildings.

There are several identified applications in the new build construction process where RA can be used:

- General engineering backfill around foundations
- Road sub-base and capping layers
- Hardcore blinding below concrete slabs
- New concrete applications

Ground Works

All excavated soil can be reused on site for re-grading the site, which is currently predominantly covered in hard standings and buildings.

Timber

Reclaimed timber could be used on or off site for non-structural applications. Timber can be segregated and chipped on site or sent off-site for recycling. Chipped timber could be used in soft landscaped areas, e.g. in the communal park and play areas.

Glass

Glass can be segregated and sent off-site for recycling, or crushed on site and used for drainage pipe, service and block paving bedding aggregate.

Lorries can transport waste to the recycling facilities and return with recycled products such as Recycled Aggregate (RA) and Recycled Concrete Aggregate (RCA). The lorry movements could be organized such that lorries do not make journeys unloaded - they leave the site with demolition waste and make the return journey loaded with RA or RCA.

5. Operational Waste

5.1 Introduction

All new developments should provide safe and convenient facilities for residents and non-residential units to segregate, recycle and dispose of their waste. This section outlines the plan which should be adopted to manage the waste arising from the residential and non-residential units of the proposed development once operational. An integrated approach to waste and recycling collection has been taken to ensure sustainable waste management and waste minimisation.

5.2 CDC and WODC Waste Management Services

Oxfordshire County Council is one of the best performing counties in England for recycling, with over 60% of waste being recycled or composted. The proposed development should need to account for existing waste management requirements to support OCC in maintaining a zero waste to landfill increase per residential unit on 2012/13.

Table 5.1 outlines the waste management services that are currently provided by CDC and WODC for household waste.

Table 5.1 Household Waste Management Services

Waste*	Cherwell District Council	West Oxfordshire District Council
Summary	Alternative fortnightly, curb side collection of recycling, food and garden waste and residual waste.	Fortnightly collection of residual waste. Weekly collection of recyclables and food waste. Fortnightly collection of garden waste.
Household Residual Waste	Green bin.	Grey Bin.
Recyclables	Blue box (paper, tins and cans, cardboard, drinks cartons, tin foil and foil trays, magazines and newspapers, aerosols , plastic bottles and containers).	Black box (aerosols, foil, plastic bottles, tins, plastics, cans, cardboard, cartons).
Food	Brown caddy bin.	Grey caddy bin into outside Green wheelie bin.
Garden	Brown caddy bin.	Large grey bin or grey kitchen caddy.
Bulky Items	By arranged collection.	Household recycling centre or by arranged collection.

Glass	Banks – segregated glass colours.	Black recycling bins or recycling banks.
Clothes and textiles	Recycling banks.	Bagged and placed into black recycling box.
Household Metal	Recycling banks (recycle pots and pans, hand tools, baking tray, metal door fittings etc.)	Household recycling centre.
Small electrical items	Placed on top of household or recycling bin on collection day OR Pink WEEE recycling banks.	Household waste recycling centre.
Batteries	Plastic battery recycling bag – leave on top of household or recycling bin on collection day.	Household waste recycling centre.
Car Batteries	Household waste recycling centre.	Household waste recycling centre.
Clinical waste	Yellow sack or Yellow sharps container. Collected by the council upon request.	Yellow sack or Yellow sharps container. Collected by the council upon request.
Cooking oil	Not specified.	Store in plastic container and placed in black recycling box.

*Source CDC and WODC website.

Table 5.2 outlines the waste management services that are currently provided by CDC and WODC for commercial waste.

Table 5.2 Non-residential Waste Management Services

Waste	Cherwell District Council	West Oxfordshire District Council
	Weekly collection service.	Weekly collection service.
Recyclables	Blue trade recycling sacks (paper, plastic bottles, food & drink cans, aerosol cans, cardboard).	Weekly rental of a variety of bag, sack and bin sizes. OR Designated Trade Waste Recycling Centres at Redbridge and Ardley.
Non-recyclables	Weekly chargeable service.	Chargeable service.
Food waste	No service	Bin or bag service.

5.3 Static Recycling Centres

The closest existing public recycling centres to the proposed development are listed in the following table.

Table 5.3 Recycling Centres near the Proposed Development

Site*	Glass	Paper	Cans	Card	Plastics	Textiles	Shoes	WEEE
Woodstock Hensington Rd car park	y	y	y	y	y	y	n	y
West Oxfordshire, Stonesfield	y	y	y	y	y			
Layby A44 next to Car Showroom	y		y					
Site West Oxfordshire, Long Hanborough	y	y	y	y	y			
Jolly Boatman Pub Banbury Rd, Cherwell	y					y	y	

- Source: www.recycleforoxfordshire.org.uk and www.recyclenow.com/bank-locator.

For all large residential developments and those that include community facility such as shops, community hall and educational facilities, the developer may be required to provide (at their expense) static recycling sites.

CDC requires that on large developments (above 100 properties) the developer should provide the complete range of recycling banks (brown, green, clear glass, and textiles for non-profit). To minimise vehicle movements, banks should be provided at key locations such as schools, shops and open spaces within developments.

Based on the assumption of an additional 1500 dwellings, future detailed plans for the redevelopment of the site may need to accommodate at least 2 additional static recycling sites where residents can deposit recyclables into recycling banks or similar.

5.4 Future Generation of Household Waste

Predictions of future local authority collected solid waste has been made by utilising the latest full years data reported by CDC and WODC via the online Waste Data Flow website for April 2013 – March 2014.

At this stage of the proposed project the figures can only be considered indicative of waste generation rates in future years.

Table 5.4 outlines the average household waste generation rate per residential unit for CDC and WODC.

Table 5.4 Average Household Waste Generation for CDC and WODC per Annum

District	Total Waste per unit Kg	Recycling, Composting / Reuse per unit Kg	Residual Waste per unit Kg
CDC	750	416	334
WODC	739	434	305

*Source Wastedataflow.org report generated on 09/10/14.

The average household waste generation rate for each district council has been used to provide an estimate of the future waste arising from the proposed households. This is detailed in Table 5.5.

Table 5.5 Estimated Household Waste Arising per annum

Proposed units	Total Waste Tonne*	Recycle/Compost Tonne*	Residual Waste Tonne*
950 units in CDC	712	395	317
520 units in WODC	384	226	158
Total	1096	621	475

*Waste tonnage data for recyclables, compost and residual wastes obtained from Wastedataflow.org. Numbers have been rounded.

The proposed development could generate up to 1096 tonnes of household waste per annum, of that 621 tonnes would be sent for recycling or composting and 476 tonnes would be residual waste, if current waste generation levels remain the same.

The predicted future waste generation quantities have been devised using CDC and WODC data. The quantities are considered indicative as a variety of factors should impact upon the actual quantities including the final design and construction of the proposed development, the potential split of properties serviced by CDC and WODC and future waste minimisation and recycling activities implemented by each Council.

5.5 Storage of Household Wastes

BS5906:2005 Waste management in buildings – Code of practice details the methods of storage, collection, segregation for recycling and recovery, and on-site treatment of waste from residential and non-residential buildings. In addition to the Code of practice, all waste storage containers and facilities should be required to comply with BS8300:2009 Design of buildings and their approaches to meet the needs of disabled people, BS5709:2006 Gaps, gates and stiles and BS 1703:2005 Refuse chutes and hoppers.

Internal and external waste storage facilities should be provided to residents to enable the effective segregation of wastes. The internal storage capacity should be provided in an adequate space suitable to accommodate the waste collection system operated by CDC or WODC (final design dependant upon split of properties serviced by each Council).

Adequate external space should be allocated for waste to be stored and should be sized to accommodate the larger of the following two volumes:

- Minimum volume recommended in the BS5906 (i.e. 100 litres per single bedroom unit and 70 Litres per additional bedroom based on a maximum weekly collection).
- Total volume of external waste containers provided by the Local Authority for each waste stream without stacking containers.

Each household should have a suitable hard surface within the cartilage of the property of sufficient size to store the waste containers.

The majority of residents should require sufficient space to store at least a standard 240lt wheeled bin, a compostable and food waste bin and a recyclables container. Residential units serviced by CDC should also need an area to store small electrical items to prevent these being stacked onto the waste recycling container.

The preferred location for waste storage containers is to the rear of the property within a designated area where each bin can be individually accessed and removed by residents. Storage of wastes to the front on properties should be avoided unless it can be integrated as part of the building and architectural design. For bulky wastes it has been assumed that residents should make arrangements with the local authority for collection and temporarily store the waste in an agreed location within their property boundary.

Waste storage for flats should comprise of high quality communal waste storage facilities with large wheeled bins for the separate collection of waste and recyclables. Residents should not be required to walk more than 30meters to the waste storage facility. The waste facilities should be strategically located and sized according to the frequency of collection. The storage facilities should be sufficiently sized to house wheeled bins for the segregation of a minimum of three types of wastes in identifiable bins.

The waste facilities should be designed to allow easy access and removal of wheeled bins, including suitable hard flooring free from obstacles and sufficient space between and around wheeled bins. Bulky wastes should be disposed of via the local authority and stored in an agreed location until their collection.

5.6 Collection of Household Waste

The individual developers should fulfil CDC and WODC current waste collection requirements and pre-order the necessary number of receptacles from each district council. It should be the responsibility of the individual developers to agree with CDC and WODC as to the specific quantity, type and size required and the frequency of collection.

The developers should be responsible for the delivery of waste receptacles to each household before the first collection is needed. The waste receptacles should remain the responsibility of the

individual developers until the household receives their first waste collection. This should avoid the delivery of waste receptacles to unoccupied properties.

In accordance with BS5906, the distance from the cartilage of properties to the refuse collection vehicle should not exceed 15meters and the distance from communal bin stores to the refuse collection vehicle should not exceed 10 meters.

5.7 Home Composting

The proposed development should give consideration to garden layouts and allow space for home composting bins or heaps. CDC requires developers to provide 330litre home composters for properties at their own cost and show their inclusion in planning submission. Consideration should be given the different requirements for different garden sizes.

5.8 Provision of Litter Bins

Where residential developments contain public open space or retail units, developers should be required to provide litter bins and recycling bins. The number, type and location should be agreed with the planning authority, waste management team. Similar provision may also be required on non-residential developments.

5.9 Future Generation of Non-residential Waste

Non-residential waste is difficult to estimate and forecast. There is no mandatory reporting on behalf of waste producers, therefore waste arising estimates are based on assumptions and extrapolations of existing data. Furthermore waste generated by a business in one year can be significantly different from the following year. This may be due to growth or downsizing of the business. Closure or relocation of a business can significantly skew the statistics. In addition the impact of waste minimisation activities by businesses should be considered

The calculation of future generation of non-residential waste has been estimated using the British Standard 5906:2005 Waste Management in Buildings, research published by WRAP and in-house modelling data. Table 5.6 outlines the average non-residential waste generation rate per unit.

Table 5.6 Non-residential Waste Generation per Unit

Unit	Annual Waste Arising Tonnes
Super Market	116
Retail (A1 /A2/A3/A4)	47
Care Village (C2 with elements of A3/A4/D2)	16
Education (D1)	18
Locally Led Employment (B1 /B2/B8) including link and ride **	75
Football Club (D2)	24
Total	296

*Assumption that there is 400 pupils.

** Waste tonnage calculated based on locally led employment being mainly offices.

It is estimated that the proposed non-residential development could generate 296 tonnes of waste per annum.

The calculation and composition of non-residential waste generation should be refined at a later design stage when specific elements have been confirmed. This should enable the expected number and type of waste containers, storage requirements and collection frequencies to be established.

Maintenance of the communal landscaped areas of the proposed development should generate compostable waste. It is anticipated that this should be either utilised on the landscaped areas or sent for off-site composting.

5.10 Storage of Non-residential Wastes

Non-residential units should be provided with their own/shared waste storage areas for waste and recyclables with ease of access for end users and collection vehicles. At least a third of the allocated waste storage space should be dedicated to the storage of segregated materials for recycling.

All waste storage areas should be clearly labelled to prevent cross-contamination of recyclables and waste is minimised. The waste storage areas should have smooth floors, free from steps or other obstacles. Any steps should incorporate a drop-kerb.

5.11 Collection of Non-residential Wastes

It is assumed that non-residential waste should be collected by external waste management companies. It should be the responsibility of the occupiers to arrange for waste and recycling to be collected from their premises.

Waste collection frequencies should be dependant on the type of business operated; chosen storage method e.g. wheeled bins, compactors or bailers and the schedule of the waste contractor.

5.12 Collection Vehicle Access Requirements

The layout of roads within the proposed development should be such as to ensure reasonable convenience for the collection vehicle and collectors and arranged so that the vehicles can continue mainly in a forward motion. Vehicles entering service areas should enter and leave in a forward direction. Where turning is not reasonably avoidable turning places should be provided for the largest current / proposed vehicle.

CDC and WODC both utilise 26tonne Gross Vehicle Weight (GVW) collection vehicles that require a turning circle (kerb to kerb) of 19.9m and for wall to wall a 21.5m turning circle should be required. The collection vehicles should not be required to reverse more than two complete vehicle lengths. This means that turning circles or turning points should have to be provided with restrictions on parking at collection points.

Street layout design should ensure that collection vehicles have suitable access and can get to within 5m of the kerbside collection points for all properties as waste contractors should not be required to walk more than 10 metres to collect bins.

Road structure should be equivalent to that of a main highway and suitable, where necessary, to carry the weight of a fully laden collection vehicle. Rumble strips and block pavers are not suitable at junctions or any other location where a collection vehicle would be expected to turn. Manholes and other utilities covers should be sited away from the road where possible. If locating these covers within the road is unavoidable, they should be designed to withstand in excess of the maximum GVW of our collection vehicles.

5.13 Waste Container Hygiene

It is common for sludge to adhere to the inside of waste containers. Frequent cleansing of this sludge is essential. In all new scheme discussions with the local authority should be held to establish existing cleaning services and if these can be rolled out across the proposed development. Where it is not feasible for the local authority to undertake the cleansing of the containers and the property owner is responsible for it, one or more spare containers should be installed under cover so that the work can be carried out on a rotation basis.

6 Conclusions and Recommendations

6.1 Introduction

This WMAS has taken into account the need to lessen the overall impact of waste generation through prevention, reuse and recycling of materials from both the construction and operational phases inline with key legislation, policy and guidance. It is predicted, that without waste minimization techniques the development's construction waste production could be in the region of 349,393 tonnes of waste. See waste estimate calculations in Appendix 1.

However, through the implementation of The Waste Hierarchy mitigation techniques of Prevention; Reuse; Recycling; Recovery and Disposal the actual construction waste could be reduced to around 53,396 tonnes. This results in an 85% reduction in waste, which equates to approximately 296,997 tonnes of waste being diverted from disposal to landfill.

The draft SWMP in Appendix 2 is designed to be utilised and developed throughout the design, construction and operational phases of the proposed development to further identify waste reduction measures and to monitor performance against agreed targets.

The WMAS has taken into account the requirements of the CfSH and proposes that all 4 available credits under Was 1: Storage of non-recyclable waste and recyclable household waste are feasible to achieve. In addition 2 credits should be achieved for category Was 2: Construction Site Waste Management by implementing practices to achieve a diversion of $\geq 50\%$ of non-hazardous construction waste from landfill. The 1 available credit for Was 3: Composting should be obtained by providing sufficient and adequate space for the kitchen and garden compostable waste in the design of the residential units that meets the requirements of CDC and WODC's current kitchen and green waste collection schemes.

6.2 Construction Phase

It is recommended that the Principal Contactor signs up to The Built Environment Commitment supported by WRAP to detail the proposed projects waste minimisation targets and report on these upon completion to enable baselines are established and support continual improvement within the construction sector.

Waste management should be incorporated into the procurement process to minimise wastes produced from over ordering, double handling or storage. Waste arisings are to be segregated at the source into agreed waste categories. The Principal Contractor should provide suitable waste storage areas within the construction site for the separate storage of wastes such as timber, metals, hardcore, cardboard.

Where the construction site is space restricted and cannot offer segregation and storage of wastes, off-site segregation should be utilised through appropriate waste contractors. Waste management should be scheduled for the agenda of site management meetings and a monthly monitoring report produced detailing current progress against targets and expectations.

6.3 Operational Phase

It is estimated that the proposed development could generate 1096 tonnes of household waste per annum with approximately 621 tonnes of this being diverted from landfill for composting or recycling. Residential units should incorporate sufficient internal waste storage containers to promote the separation of recycling and compostable materials at source.

External waste storage areas should be provided to enable the segregation and suitable storage of waste containers which is sufficient to meet the current requirements of CDC and WODC waste collection schemes.

Non-residential units should be provided with their own/shared waste storage areas for waste and recyclables that are suitable sized for the proposed type and size of the commercial units. At least a third of the allocated waste storage space should be dedicated to the storage of segregated materials for recycling.

APPENDIX 1 – Materials and Waste Quantities

Dwelling Buildings Raw Material	length m	width m	height m	Volume m3	Unit Weight kg/m3	Number of Dwellings	Raw Material Weight tonnes	Predicted Standard Waste tonnes	Mitigation Type	Mitigation Technique	Reduced Waste Due to Mitigation tonnes	Predicted Waste Reduction tonnes	Predicted Waste Reduction %
Concrete Foundations	36.0	0.600	0.450	9.7	2400	1500	34992	1750	Reduction	Procurement Management	350	1400	80
External Wall Inner Block Leaf	29.0	0.100	7.900	22.9	1375	1500	47252	2363	Reduction	Procurement Management	945	1418	60
Recon stone External Leaf	31.0	0.125	7.900	30.6	2200	1500	101021	5051	Reduction	Procurement Management	2020	3031	60
Internal Block Wall	7.0	0.100	6.000	4.2	1375	1500	8663	433	Reduction	Procurement Management	173	260	60
Internal Stud Wall Timber	16.5	0.100	6.000	9.9	100	1500	1485	74	Reduction	Procurement Management	30	45	60
Internal Stud Wall Plasterboard	16.5	0.025	6.000	2.5	1000	1500	3713	186	Recycled	Returned to Supplier	74	111	60
Cavity Wall insulation - Earthwool	30.0	0.125	7.900	29.6	40	1500	1778	89	Reduction	Procurement Management	18	71	80
Ground Floor insulation	8.0	6.000	0.100	4.8	40	1500	288	14	Reduction	Procurement Management	3	12	80
Concrete Ground Floor Slab	8.0	6.000	0.125	6.0	2400	1500	21600	1080	Prevention	Beam & Block Floor	0	1080	100
Floor Screed	8.0	6.000	0.060	2.9	2200	1500	9504	475	Reduction	Procurement Management	190	285	60
First floor insulation - Celotex	8.0	6.000	0.100	4.8	2250	1500	16200	810	Reduction	Procurement Management	162	648	80
Timber Joist First Floor	8.0	6.000	0.225	10.8	70	1500	1134	57	Prevention	Posi Joist	0	57	100
Roof insulation	9.0	7.000	0.400	25.2	40	1500	1512	76	Reduction	Procurement Management	30	45	60
Roof Tiles/Slate	9.0	7.000	0.015	0.9	2500	1500	3544	177	Reduction	Procurement Management	71	106	60
Timber Roof Structure	9.0	7.000	0.150	9.5	100	1500	1418	71	Prevention	Roof Trusses	0	71	100
Timber Joinery (skirting & architrave)	100.0	0.010	0.100	0.1	550	1500	83	4	Reduction	Procurement Management	2	2	60
Excavation Spoil - Foundations	36.0	0.600	0.700	15.1	2000	1500	45360	36288	Re-use	Planning	0	36288	100
Excavation Topsoil - Dwelling footprint	9.0	7.000	0.300	18.9	2000	1500	56700	56700	Re-use	Planning	0	56700	100
Totals							350244	105697			4068	101629	
									Gross potential Waste				
										Actual Waste			Waste Prevented/Reused or Recycled

Non - Residential Buildings Raw Material	length m	width m	height m	Volume m3	Unit Weight kg/m3	Raw Material Weight tonnes	Predicted Standard Waste tonnes	Mitigation Type	Mitigation Technique	Reduced Waste Due to Mitigation tonnes	Predicted Waste Reduction tonnes	Predicted Waste Reduction %
Concrete Foundations	2150.0	0.800	0.450	774	2400	1858	93	Reduction	Procurement Management	19	74	80
External Wall Inner Block Leaf	2150.0	0.100	7.900	1699	1375	2335	117	Reduction	Procurement Management	47	70	60
Recon stone External Leaf	2150.0	0.125	7.900	2123	2200	4671	234	Reduction	Procurement Management	93	140	60
Internal Block Wall	1075.0	0.100	6.000	645	1375	887	44	Reduction	Procurement Management	18	27	60
Internal Stud Wall Timber	1075.0	0.100	6.000	645	100	65	3	Reduction	Procurement Management	1	2	60
Internal Stud Wall Plasterboard	1075.0	0.025	6.000	161	1000	161	8	Recycled	Returned to Supplier	3	5	60
Cavity Wall insulation - Earthwool	2150.0	0.125	7.900	2123	40	85	4	Reduction	Procurement Management	1	3	80
Ground Floor insulation	1145.1	10.000	0.100	1145	40	46	2	Reduction	Procurement Management	0	2	80
Concrete Ground Floor Slab	1145.1	10.000	0.125	1431	2400	3435	172	Prevention	Beam & Block Floor	0	172	100
Floor Screed - Ground Floor	1145.1	10.000	0.060	687	2200	1512	76	Reduction	Procurement Management	30	45	60
First floor insulation - Celotex	1145.1	10.000	0.100	1145	2250	2576	129	Reduction	Procurement Management	26	103	80
Pre-cast Concrete First Floor	1145.1	10.000	0.225	2576	70	180	9	Prevention	Posi Joist	0	9	100
Floor Screed - First Floor	1145.1	10.000	0.060	687	2200	1512	76	Reduction	Procurement Management	30	45	60
Roof insulation	1145.1	10.000	0.400	4580	40	183	9	Reduction	Procurement Management	4	5	60
Roof Tiles/Slate	1145.1	10.000	0.015	172	2500	429	21	Reduction	Procurement Management	9	13	60
Timber Roof Structure	1145.1	10.000	0.150	1718	100	172	9	Prevention	Roof Trusses	0	9	100
Timber Joinery (skirting & architrave)	3816.6	0.010	0.100	4	550	2	0.1	Reduction	Procurement Management	0.04	0	60
Excavation Spoil - Foundations	2150.0	0.800	0.700	1204	2000	2408	1926	Re-use	Planning	0	1926	100
Excavation Topsoil - Building footprint	1145.1	10.000	0.300	3435	2000	6871	6871	Re-use	Planning	0	6870.6	100
Totals						29388	9602			281	9522	
									Gross potential Waste			
										Actual Waste		Waste Prevented/Reused or Recycled

External Works	length m	width m	height m	Volume m3	Unit Weight kg/m3	Weight per m kg/m	Raw Material Weight tonnes	Predicted Standard Waste tonnes	Mitigation Type	Mitigation Technique	Reduced Waste Due to Mitigation tonnes	Predicted Waste Reduction tonnes	Predicted Waste Reduction %	
Asphalt Surfacing Materials	11597	10	0.200	23193	2300		53345	2667	Reduction	Procurement Management	1067	1600	60	
Excavation spoil	11597	10	0.3	34790	2000		69580	55664	Re-use	Planning	0	55664	100	
Excavation - Topsoil	11597	10	0.25	28992	2000		57984	57984	Re-use	Planning	0	57984	100	
Precast Concrete Kerbing	11597	0.1	0.225	261	2400		626	31	Reduction	Procurement Management	13	19	60	
Drainage Pipework - Plastic	5798	-	-	-	-		5	28992	1450	Reduction	Procurement Management	580	870	60
Drainage Pipework - Clay	23193	-	-	-	-		100	2319340	115967	Reduction	Procurement Management	46387	69580	60
Totals							2529866	233763			48046	185717		
									Gross potential Waste					
										Actual Waste		Waste Prevented/Reused or Recycled		

Packaging, Fixings and Fillers	Total Cumulative Building Area	Weight per 100m2 kg/100m2	Raw Material Weight tonnes	Predicted Standard Waste tonnes	Mitigation Type	Mitigation Technique	Reduced Waste Due to Mitigation tonnes	Predicted Waste Reduction tonnes	Predicted Waste Reduction %
Packaging - Timber	161451	35	57	57	Recycling	Planning	0.57	56	99
Packaging - Cardboard	161451	5	8	8	Recycling	Planning	0.08	8	99
Packaging - Plastics	161451	5	8	8	Recycling	Planning	0.08	8	99
Packaging - Metals	161451	10	16	16	Recycling	Planning	0.16	16	99
Plastics - Empty Cartridges	161451	20	32	32	Recycling	Planning	0.32	32	99
Metals - Screws, Nails, pipes Etc	161451	6	10	10	Recycling	Planning	0.10	10	99
Totals			131	131			1	129	

Total Construction Gross Waste 349393 Tonnes
Actual Construction Waste 52396 Tonne
Waste Prevented/Reused or Recycled 296997 Tonnes
85.0 %

Retail and Employment Footprint/floor&Roof Area	Length of external walls/foundations	Estimated length of Internal Block walls	Estimated length of Internal Stud walls	
	300	70	35	35
	450	90	45	45
	615	112	56	56
	600	110	55	55
	450	90	45	45
	600	110	55	55
	300	70	35	35
	450	90	45	45
	525	100	50	50
	615	112	56	56
	675	120	60	60
	525	100	50	50
	300	70	35	35
	300	70	35	35
	525	100	50	50
	375	80	40	40
	300	70	35	35
	525	100	50	50
	8430	1664	832	832

School/Education

Footprint/floor&Roof Area	Length of external walls/foundations	Estimated length of Internal Block walls	Estimated length of Internal Stud walls	
	2217	282	141	141

Football Club

Footprint/floor&Roof Area	Length of external walls/foundations	Estimated length of Internal Block walls	Estimated length of Internal Stud walls	
	480	94	47	47

Care Village Communal Facilities

Footprint/floor&Roof Area	Length of external walls/foundations	Estimated length of Internal Block walls	Estimated length of Internal Stud walls	
	324	110	55	55

Total Floor/Roof Area	Total External Walls Length	Total Block Walls Length	Total Stud Walls Length	
	11451	2150	1075	1075
	m2	m	m	m

APPENDIX 2 – Draft Site Waste Management Plan

Site Waste Management Plan for Woodstock East						
Client:	Vanbrugh Trustees Limited & Pye Homes Ltd	Principal contractor:	TBA	Estimated cost of the project:		
Project location:	Adjacent to the A44 on the southern edge of Woodstock	Project Footprint m2:	277418 approx			
Revision Date:	14.11.14					
Stage of project:	Conceptual					
Person & company completing this form:	Debbie Prichard, Forge Engineering Design Solutions Ltd	Designated Site Waste Manager:	TBA			

Targets	
1	Use of recycled materials in the project (tonnes or % per m2)
2	100% reuse of inert excavated wastes on site.
3	19.2 m3 of waste per 100m2 of development.
4	>50% by weight or by volume of non-hazardous construction waste generated by the project will be diverted from landfill.

Waste Prevention								
	Prevention Activity	Material type	Waste reduced		Estimated Cost Saving	Date for completion	Status	Reference to project document / drawing
			(m ³)	(Tonnes)				
	Dwelling Buildings Raw Material							
1	Beam & Block Floor	Concrete Ground Floor Slab		1080				
2	Posi Joist	Timber Joist First Floor		57				
3	Roof Trusses	Timber Roof Structure		71				
4	Procurement Management	Concrete Foundations		1400				
5	Procurement Management	External Wall Inner Block Leaf		1418				
6	Procurement Management	Recon stone External Leaf		3031				
7	Procurement Management	Internal Block Wall		260				
8	Procurement Management	Internal Stud Wall Timber		45				
9	Procurement Management	Cavity Wall insulation - Earthwool		71				
10	Procurement Management	Ground Floor insulation		12				
11	Procurement Management	Floor Screed		285				
12	Procurement Management	First floor insulation - Celotex		648				
13	Procurement Management	Roof insulation		45				
14	Procurement Management	Roof Tiles/Slate		106				
15	Procurement Management	Timber Joinery (skirting & architrave)		2				
	Non - Residential Buildings Raw Material							
16	Beam & Block Floor	Concrete Ground Floor Slab		172				
17	Posi Joist	Pre-cast Concrete First Floor		9				
18	Roof Trusses	Timber Roof Structure		9				
19	Procurement Management	Concrete Foundations		74				
20	Procurement Management	External Wall Inner Block Leaf		70				
21	Procurement Management	Recon stone External Leaf		140				
22	Procurement Management	Internal Block Wall		27				
23	Procurement Management	Internal Stud Wall Timber		2				
24	Procurement Management	Cavity Wall insulation - Earthwool		3				
25	Procurement Management	Ground Floor insulation		2				
26	Procurement Management	Floor Screed - Ground Floor		45				
27	Procurement Management	First floor insulation - Celotex		103				
28	Procurement Management	Floor Screed - First Floor		45				
29	Procurement Management	Roof insulation		5				
30	Procurement Management	Roof Tiles/Slate		13				
31	Procurement Management	Timber Joinery (skirting & architrave)		0				
	External Works							
32	Procurement Management	Asphalt Surfacing Materials		1600				
33	Procurement Management	Precast Concrete Kerbing		19				
34	Procurement Management	Drainage Pipework - Plastic		870				
35	Procurement Management	Drainage Pipework - Clay		69580				

Waste Carriers and Disposal Sites

Planned Waste Destinations (including permit, license or registered exemption reference number and details):

A	B	C
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Waste Carriers (including their waste carrier registration number):

A	B	C
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Waste Reuse / Recycling and Disposal

Quantity (specify volume or weight, e.g. m³, kg, T, number of skips)

Types of waste arising (add more rows if needed)	EWC code	Reused				Recycled				Disposed of		
		on site		off site		for use on site		for use off site		sent to recycling or reprocessing facility	land-fill	
		T	A	T	A	T	A	T	A	T	A	
Inert												
Excavation Topsoil - Dwelling footprint	170504		56700									
Excavation Spoil - Foundations	170504		1926									
Excavation Topsoil - Commercial Building footprint	170504		6871									
External Works excavation spoil	170504		55664									
External Works excavation topsoil	170504		57984									
Bricks	170102											
Concrete	170101											
Tiles & ceramics	170103											
Non-hazardous												
Packaging - Timber	150103								56			
Packaging - Cardboard	150101								8			
Packaging - Plastics	150102								8			
Packaging - Metals	150104								16			
Plastics - Empty Cartridges									32			
Metals	170405								10			
Packaging	15018											
Canteen food waste	200108											
Insulation (glass/wool/foam)	170604											
Asphalt & tar	1703											
Gypsum	170802											
Plastics	170203											
Timber	170201											
Hazardous												
Electrical & Electronic (TV, Fridge, AirCon units, lamps)	1602											
Totals (m³, kg, T)												
Performance score as %												
SWMP target %									50%		≤49%	