15 Construction Waste

15.1.1 This chapter considers wastes arising during the demolition, excavation and construction required to develop the EfW CHP facility. It seeks to quantify the amount of waste arising as well as identify the different types of materials and how they will be managed. The assessment also seeks to assess the potential environmental impacts associated with the handling and disposal of the waste arising and where appropriate propose mitigation measures for avoiding and minimising any negative effects.

15.1.2 For the purposes of this assessment, 'waste' is defined as: "*any substance or object which the holder discards or intends or is required to discard",* as specified by Section 75 (2) of the Environmental Protection Act 1990 and comprises the following distinct elements:

- Demolition – produced from demolition of existing buildings/structures
- Excavation – produced from earth moving activities; and
- Construction – produced from construction of new buildings/structures.

15.1.3 Vast amounts of waste produced in the UK each year end up in landfill. Better use of inert waste materials, particularly construction and demolition waste, to substitute primary materials is identified as one of the key elements in the reduction of waste nationally. The Government's strategy for managing waste and resources is based on the waste hierarchy – prevention, minimisation, re-use, recycling, energy recovery and disposal.

15.2 Relevant Legislation and Policy

15.2.1 **Site Waste Management Plan Regulations 2008** (Ref 15-1) **-** The Site Waste Management Plans Regulations came into force on 6 April 2008 making Site Waste Management Plans (SWMP) compulsory for all construction projects in England costing over £300,000. A SWMP records the amount and type of waste produced on a construction site and how it will be reused, recycled or disposed of.

15.2.2 **Waste Strategy for England 2007** (Ref 15.2) – The Waste Strategy for England aims to break the link between economic growth and waste growth and put more emphasis on waste prevention and re-use. It also aims to meet and exceed the landfill diversion targets including for non-municipal waste. The strategy also seeks to reduce greenhouse gas emissions from waste management and to achieve an annual net reduction of at least 9.3 million tonnes of carbon dioxide equivalent per year compared to 2006.

15.2.3 To stimulate diversion of construction and demolition waste from landfill, the Government is considering, in conjunction with the construction industry, a possible new target of halving the amount of waste going to landfill by 2012 as a result of waste reduction, re-use and recycling.

15.2.4 **PPS10: Planning for Sustainable Waste Management** (Ref 15.3) – PPS10 sets the overall planning framework for waste and seeks to drive waste management up the waste hierarchy, addressing waste as a resource and only disposing of it as a last resort. PPS10 encourages implementation of Site Waste Management Plans for all proposed new developments to help in identifying the type of material to be demolished and/or excavated, opportunities for the re-use

and recovery of materials and to demonstrate how off-site disposal of waste will be minimised and managed.

15.2.5 **Plymouth Core Strategy** (Ref 15.4) – The Plymouth Core Strategy was adopted in April 2007 and provides the overall framework for waste planning in Plymouth. Policy CS26 on Sustainable Waste Management sets out the key considerations for development proposals that will generate waste to facilitate a more sustainable approach to waste management. It states that *"the Council will promote sustainable waste management by: promoting waste minimisation through the provision of waste audits for major developments; requiring the integration of facilities for waste minimisation, re-use, recycling and composting in association with the planning, construction and occupation of new development".*

15.2.6 **Plymouth Waste Development Plan Document (DPD)** (Ref 15.5) **–** The Plymouth Waste DPD was adopted in 2008 and focuses on providing site allocations and a decision-making framework to ensure that the Core Strategy waste objectives are realised. Policy W8 on Considerations for Waste Development Proposals requires waste development proposals not to have unacceptable impacts on environmental, social or economic assets. It also requires all buildings to incorporate measures consistent with the principles of sustainable design and construction equivalent to BREEAM excellent standard.

15.3 Assessment Methodology

General Approach

15.3.1 As noted in the introduction, this assessment seeks to characterise the nature and likely amount of waste generated during the demolition, excavation and construction required to develop the EfW CHP facility. It also assesses the potential environmental impacts associated with the management of these wastes.

15.3.2 The main contractor, Kier, has produced an outline Site Waste Management Plan (SWMP) - see Appendix 15.1. Within the SWMP, Kier has predicted the types and amounts of demolition, excavation and construction waste arising and these figures have been used to inform this assessment.

15.3.3 The SWMP also determines whether the waste arisings will be re-used, recycled or sent to landfill. Factors influencing this include the potential hazard the material may pose to the environment, the benefits of its re-use, its volume and whether any potential or ready markets exist for its recovery.

Determination of Significance

15.3.4 There are no nationally agreed criteria for assessing the magnitude of impacts or significance of effects arising from waste management. Each project is evaluated according to its individual characteristics. Overall, the fundamental purpose of a waste management assessment is to characterise waste types and arisings and to identify the existing and potential methods employed for their management.

15.3.5 The significance of the effect (whether beneficial or adverse) is largely conditioned by the type, location and capacity of local and regional waste management facilities and their ability to manage waste in an environmentally responsible way. However, an assessment of the likely effects that arise at the waste management facilities is outside the scope of this assessment and

thus it has been assumed that waste carriers and waste management companies will adhere to any conditions imposed upon them as a result of planning or environmental regulations. MVV and the main contractor, Kier will ensure that all waste carriers and receiving facilities hold the appropriate licenses and that Waste Transfer Notes are completed for any waste that is transported off site.

15.3.6 The significance of effects for the purposes of this study will be determined largely by professional judgement, taking account of the predicted waste arising and local waste management strategies and policies. The significance of effect will be rated according to the following scale:

- **Major** – an effect which in isolation could have a material influence on planning decision making process – this would be considered significant;
- **Moderate** – an effect which on its own could influence decision making, particularly if combined with other similar effects – likely to be significant, judgement to be applied;
- **Minor** – an effect which on its own is likely to have negligible influence on planning decision making when combined with other effects could have a more material influence – less likely to be considered significant, a judgement needs to be applied; and
- **Negligible** – no effects, not significant.

15.4 Baseline Conditions

15.4.1 Construction and Demolition (C&D) waste is the largest single waste stream produced in Plymouth. The Plymouth Waste DPD (Ref 15.5) estimates that every year, Plymouth produces approximately 500,000 tonnes of C&D waste. It also estimates that by 2021, there will be between 378,000 and 841,000 tonnes of C&D waste arising in Plymouth. In total, the Council will need to plan for the management of between 741,000 and 1, 426,000 tonnes of waste annually by 2021 from Municipal Solid Waste (MSW), Commercial and Industrial (C&I), C&D and hazardous waste streams. Table 15.1 below shows the waste arisings projections for Plymouth based on the Council's medium growth scenario[1] as presented in Appendix 4 of the Waste DPD.

Table 15.1 Waste Arising Projections 2005-21(000tpa) (Medium Growth Scenario)

Waste Stream	2005	2010	2013	2015	2018	2020	2021
Municipal Solid Waste	163	175	185	192	203	212	216
Industrial and Commercial	195	207	213	217	217	217	217
Construction and Demolition	566	566	566	566	566	566	566
Special	25	26	27	28	28	28	28
Total	**949**	**974**	**991**	**1, 002**	**1,014**	**1,022**	**1,027**

[1] The Medium growth scenario assumes: MSW - 1% growth rate to 2021, C&I –2% to 2006, 1% to 2016 and 0% to 2021, C&D 0% to 2021 and for special waste, similar growth rates to C&I.

15.4.2 The Waste DPD states that there is existing capacity for the processing of C&D waste for re-use in construction but cautions that the market is volatile and difficult to predict due to it being highly demand driven. The DPD does not allocate sites for the management of C&D waste but states that there is potential to further develop facilities for managing this waste stream in Plymouth.

15.4.3 For MSW and C&I waste, the Waste DPD states that there is a significant shortage of strategic facilities and a step change is required to meet recycling/composting and recovery targets if Plymouth is to meet its obligations and move towards more sustainable waste management. The DPD makes allocation of both strategic and local sites for the future management of MSW and C&I waste.

15.5 Assessment of Materials and Waste Management Methods

Demolition, Excavation and Construction Waste

15.5.1 The likely amount of waste arising from the demolition, excavation and construction of the proposed facility has been estimated by the main contractor, Kier as shown in Table 15.2 below.

15.5.2 Approximately 40,000 cubic metres of waste are anticipated to be generated during demolition, excavation and construction. It should be noted that this figure is indicative; the actual quantities will be recorded once demolition, excavation and construction activities commence.

Table 15.2 Estimated Volumes of Construction Waste

Material	Quantity on m^3									
	Total amount	Re-used on site	Re-used off site	Recycled for use on site	Recycled for use off site	Sent to recycling facility	Sent to WML exempt site	Disposal on site	Disposal to landfill (non-hazardous)	Disposal to landfill (hazardous)
Soils/Stones	29,900	29,900	-	-	-	-	-	-	-	-
Inert	6,483	3,000	-	-	-	3,483	-	-	-	-
Concrete	1,500	-	-	-	-	1,500	-	-	-	-
Office Waste	120	-	-	-	-	60	-	-	60	-
General Domestic	500	-	-	-	-	250	-	-	250	-
Rebar	100	-	-	-	-	100	-	-	-	-
Scrap metals	150	-	-	-	-	150	-	-	-	-
Oils	2	-	-	-	-	-	-	-	-	2
Epoxy packaging and residue	1							-		1
Japanese knotweed	1500							1,500[2]		
Timber	75	-	-	-	-	75	-	-	-	-
Totals	**40,331**	**32,900**	**-**	**-**	**-**	**5,618**	**-**	**1,500**	**310**	**3**

[2] Treatment and burial at depth

15.5.4 **Demolition** – The only demolition proposed is of two existing bridges.

15.5.5 The site is vacant and was last used for the recycling of demolition materials arising from projects within the Dockyard. When the previous occupants left the site they did not remove mounds of processed and unprocessed demolition materials; this existing material will be removed by the MoD in an appropriate manner prior to MVV taking occupation of the site.

15.5.6 **Excavation** - Excavated materials will arise as a result of earth moving activities associated with the construction of the proposed facility. Assuming that the excavated materials will be suitable for re-use on an industrial site, it is planned that the cut and fill quantities will be balanced on site to avoid any off-site disposal. There will also be a relatively small amount of rock excavated to enable the route of the electricity cables to be constructed.

15.5.7 **Construction** – General construction waste will arise during the construction of the proposed development. This will be re-used or recycled wherever possible as described below.

15.5.8 **Hazardous materials** – Previous ground investigations at the site have not encountered significant concentrations of contaminated soils and in addition, it is expected that the majority of excavated material should be suitable for re-use across the site.

15.5.9 There are two stands of Japanese Knotweed (one within Blackies Wood to the north of the main building footprint and one on the slopes of Table Top Mountain (to the south of the site boundary but adjacent to the construction compound). The stands will be treated and eradicated to halt the spread of this invasive species with the resulting material, including any associated soils, either buried at depth on site or disposed of at an appropriately licensed facility.

15.5.10 During installation of the bridge parapets, small amounts of epoxy will be used. Packaging and any excess epoxy would require disposal at an appropriately licensed facility.

Waste Management Methods

15.5.11 In terms of waste management methods used, it is anticipated that:

15.5.12 **Re-use** – Excavated material (soils) will be retained on site for re-use as backfill while hard rubble will be crushed and re-used on site. Unsuitable material for engineering fill will be used for landscaping. Piling and drainage arisings will be used in engineering fill/and or landscaping. Top soil will be limited.

15.5.13 Plastic sheeting can be re-used as weather protection; pallets can be re-used on site in moving materials around and polypropylene bags can be used for storing waste. Packaging will be returned to suppliers for re-use where possible.

15.5.14 **Recycling** – It is expected that there will be some concrete waste airings. This is likely to be treated off site to produce high quality recycled aggregates which can substitute virgin aggregates.

15.5.15 Any scrap metal likely to arise will be sent for recycling off site. Good practice is to segregate metals on site by type. Waste Electrical and Electronic Equipment (WEEE) should be consigned to an appropriate recycling facility or a specialist WEEE recycler.

15.5.16 There is potential to recycle plastics if they are properly segregated to avoid contamination. Cardboard can also be recycled as can uncontaminated timber/wood which can be shredded and used for the manufacture of fibre and chip boards.

15.5.17 **Disposal** – Waste that cannot be re-used or recycled or that is hazardous is likely to end up in landfill. This will include a small amount of waste oil and epoxy packaging. These wastes will be dealt with by licensed operators and disposed of in secure sites.

15.6 Mitigation

15.6.1 The proposed mitigation measures focus on promoting sustainable waste management in line with the waste hierarchy. They also focus on integrating good site management practices to ensure resource efficiency and reduce potential for any other negative environmental effects like odour and litter.

15.6.2 In order to minimise the volume of waste generated during the construction of the EfW CHP facility, the contractor will prepare a SWMP. An outline SWMP has been prepared and is presented in Appendix 15.1. The SWMP will cover the following elements, where applicable to each phase:

General Practices

- An approved person will be nominated to be responsible for good site practice. Their responsibilities will include arranging collection and effective disposal to an appropriate facility (including efficient recording of transfer notes) of all waste generated at the site;
- A system for recording and monitoring the amount of waste generated, recycled and disposed of (including the disposal site location) will be established; and
- Training will be implemented for relevant site personnel in proper waste management handling procedures.

Reduction of Waste

- Site practices will be put in place to minimise the potential for damage or contamination of construction materials (for example designated areas for storage);
- Work activities will be planned effectively in order to minimise over-ordering of construction materials;
- Prefabricated panels will be used in construction, where feasible, in order to reduce waste generation on site and associated transportation impacts;
- Purchasing power will be used to minimise materials packaging and ensure that packaging is recyclable where feasible; and
- Any unused materials will be returned to suppliers (where possible) or used on another project.

Re-use / Recycling

- Cut and fill management will be employed during construction, in order to maximise re-use of the inert demolition materials on-site;
- Waste will be monitored, sorted and stored in as many categories as appropriate to enhance re-use or recycling of materials (avoid cross contamination) and ensure their proper disposal;
- The potential for on-site processing of waste and re-use of materials to generate secondary aggregate will be investigated and any licenses necessary for such activities will be obtained;
- Where structural and durability issues are not compromised, materials will be specified from recycled sources;
- All suppliers will be requested to take back unwanted packaging for recycling or re-use;
- Where inert demolition and construction materials cannot be re-used on site, potential off-site users will be identified and the plan developed for delivery of materials.

Disposal

- General site waste will be stored in enclosed bins or compaction units separate from demolition and construction waste. A reputable collector will be employed by the contractor to remove general refuse from the site, separately from the demolition and construction wastes, to minimise potential odour and litter impacts;
- Any excavated soils removed from site for disposal to a landfill will undergo Waste Acceptance Criteria (WAC) testing in order to correctly classify the material in terms of waste disposal. The results of any WAC testing will be supplied to the chosen waste acceptor at an early stage of the development in order to locate a suitable landfill site;
- Any materials that are hazardous will be removed and managed by appropriately licensed contractors; and
- Where construction and demolition waste cannot be re-used or recycled on or off site a reputable collector will be employed by the contractor to remove this waste to landfill.

15.7 Assessment of Effects and Significance

15.7.1 The direct effects of the waste arising from demolition, excavation and construction on the environment are judged to be negligible (see definitions in paragraph 15.3.6), with the implementation of the SWMP. This is because the expected type of waste arising is largely inert and is expected to be re-used or recycled in most cases. Any hazardous waste arisings, including waste oils, epoxy packaging, will be handled and disposed of in an appropriate manner.

15.7.2 The effects of any hazardous/contaminated materials are discussed further in Chapter 10 of this ES. Previous ground investigations at the site have not encountered significant concentrations of contaminated soils. If contamination is encountered during site works it should be reported to the Local Authority and may require remediation and/or collection by a specialised hazardous waste operator and subsequent disposal at a licensed facility.

Table 15.3 Impacts and Significance

Impact	Comments	Nature of Impact	Anticipated Effect Significance	Mitigation	Residual Effect
Demolition, excavation and construction waste arisings	Demolition waste is expected to arise from demolition of two bridges Existing processed and unprocessed demolition waste left from previous occupant will be managed as excavation material. Excavation materials will be generated from earth moving activities Japanese Knotweed will be treated and eradicated with the resulting material, including any associated soils, either buried at depth on site or disposed of at an appropriately licensed facility. 40,331 cubic metres of waste are anticipated to be generated as a result of demolition, excavation and construction. Of this 32,900 cubic metres are proposed to be re-used on site and 5,618 cubic metres are proposed to be recycled.	Temporary	Minor to negligible	Implementation of the SWMP to ensure the minimisation of waste and maximise the amount reused on site. Hazardous waste will be handled and disposed of in an appropriate manner.	Negligible

15.8 Conclusion

15.8.1 The proposed development will require the levelling and grading of the existing site, demolition of two existing bridges, construction of a new single open span bridge, excavation of materials during earth moving activities, construction of new buildings to house the proposed EfW CHP facility, construction of ancillary buildings and infrastructure, and landscaping. This assessment has focused on the likely quantities and types of materials arising from these activities and how they should be managed.

15.8.2 It is expected that the majority of the waste arising will be re-used on site or sent off site for recycling. Only small quantities are likely to be sent for disposal to landfill. Any hazardous waste arising will be dealt with by a specialised hazardous waste operator.

15.8.3 No significant environmental effects are envisaged.

15.9 References

15.1 Site Waste Management Plan Regulations 2008 SI No. 314.

15.2 Waste Strategy for England (DEFRA 2007).

15.3 Planning Policy Statement 10 (PPS10): Planning for Sustainable Waste Management (CLG, 2011).

15.4 Plymouth Core Strategy 2006-2021 (Plymouth City Council, Adopted 2007).

15.5 Plymouth Waste Development Plan Document 2006-2021 (Plymouth City Council, Adopted 2008).