

15 ASSESSMENT OF ENVIRONMENTAL IMPACTS

15.1 Introduction

This Chapter of the EIAR comprises an assessment of the likely impact of the proposed development on the waste generated from the development as well as identifying proposed mitigation measures to minimise any impacts.

A site-specific Construction and Demolition Waste Management Plan (C&D WMP) has been prepared by AWN Consulting Ltd to deal with waste generation during the construction and demolition phases of the project and has been included as Appendix 15.1. The C&D WMP was prepared in accordance with the 'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects' document produced by the National Construction and Demolition Waste Council (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government in July 2006.

A separate Operational Waste Management Plan (OWMP) has also been prepared for the operational phase of the development and is included as Appendix 15.2 of this Chapter.

These documents will ensure the sustainable management of wastes arising at the development in accordance with legislative requirements and best practice standards.

15.2 Assessment Methodology

The assessment of the impacts of the proposed development arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports. A summary of the documents reviewed, and the relevant legislation is provided in the C&D WMP and in the OWMP provided in Appendix 15.1 and 15.2 respectively.

This Chapter is based on the proposed development, as described in Chapter 3: Description of Proposed Development and considers the following aspects: -

- Legislative context.
- Demolition phase.
- Construction phase (including preparation, excavation and levelling).
- Operational phase.

A desk study was carried out which included the following: -

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland.
- Description of the typical waste materials that will be generated during the demolition, construction and operational phases.
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the demolition, construction and operational phases of the proposed development have been calculated. The waste types and estimated quantities are based on published data by the EPA in the National Waste Reports and National Waste Statistics, data recorded from similar previous developments, Irish and US EPA waste generation research, other available research sources and waste collection data from the existing neighbouring development.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 15.1.6.

A detailed review of the existing ground conditions on a regional, local site-specific scale are presented in Chapter 7: Land and Soil. Chapter 7 of the EIAR also discusses the environmental quality of any soils which will have to be excavated to facilitate construction of the proposed development.

15.3 Receiving Environment

Waste management in Ireland is subject to EU, national and regional waste legislation which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended).

In addition, the Irish government issues policy documents which outline measures aimed to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document A Resource Opportunity – Waste Management Policy in Ireland was published in 2012 and stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention.

The strategy for the management of waste from the construction phase is in line with the requirements of the Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects published in 2006. The guidance document Construction and Demolition Waste Management: A handbook for Contractors and Site Managers was also consulted in the preparation of this assessment.

There are currently no Irish guidelines on the assessment of operational waste generation and guidance is taken from industry guidelines, plans and reports including the *EMR Waste Management Plan 2015 – 2021*, *BS 5906:2005 Waste Management in Buildings – Code of Practice, 5*, The Dún Laoghaire Rathdown County Council (DLRCC) *Dún Laoghaire Rathdown County Council Bye-Laws for the Storage, Presentation and Collection of Household and Commercial Waste (2009)*, *the DLR Refuse and Recycling Storage Guidelines (2017)*, *the draft DLRCC ‘DLR (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws’ (2019)* *the EPA National Waste Database Reports 1998 – 2012* and *the EPA National Waste Statistics Web Resource*

15.3.1 Proposed Development

The subject site is located at Woodbrook, Shankill, Co. Dublin, generally bounded by the Old Dublin Road (R119) to the west, Shanganagh Public Park and Shanganagh Cemetery to the north, Woodbrook Golf Course to the east and Corke Lodge and woodlands to the south.

In terms of waste management, the receiving environment is largely defined by Dún Laoghaire-Rathdown County Council (DLRCC) as the local authority responsible for setting an administering waste management activity in the area. This is governed by the requirements set out in the Eastern-Midlands Region (EMR) Waste Management Plan 2015-2021.

The waste management plan sets out the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of “70% preparing for reuse, recycling and other recovery of construction and demolition waste” (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The National Waste Statistics update published by the EPA in July 2019 identifies that Ireland’s current progress against this C&D waste target is at 68% and our progress against ‘Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)’ is at 45%. Both of these targets are required to be met by 12 December 2020 in accordance with the requirements of the Waste Framework Directive.

The *Dún Laoghaire-Rathdown County Development Plan 2016 – 2022* also sets policies and objectives for the DLRCC area which reflect those set out in the regional waste management plan.

In terms of physical waste infrastructure, DLRCC no longer operates any municipal waste landfill in the area. There are a number of waste permitted and licensed facilities located in the Eastern-Midlands Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and two waste-to-energy facilities

15.4 Characteristics of the Proposed Development

A full description of the development can be found in Chapter 3: Description of Development. The characteristics of the development that are relevant in terms of waste management are summarised below.

The subject site is located at Woodbrook, Shankill, Co. Dublin, generally bounded by the Old Dublin Road (R119) to the west, Shanganagh Public Park and Shanganagh Cemetery to the north, Woodbrook Golf Course to the east and Corke Lodge and woodlands to the south.

The proposed development consists of a residential-led development comprising 685no. residential units and 1no. creche facility in buildings ranging from 2 to 8-storeys.

15.4.1 Demolition Stage

There will be no demolition associated with this development.

15.4.2 Construction Stage

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The construction contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

In addition, soil, stones, gravel and clay will require excavation to facilitate basement completion and construction of foundations, and the installation of underground services. As per Table 15.1, project engineers have estimated that c. 69,434m³ soil, stone, gravel and clay from the entire site including the 2 no. replacement golf holes will be required to be excavated. All excavated material from the golf course will be re-used onsite and it is not envisaged that any of this material will be removed offsite. It is anticipated that c.38,000m³ of material will need to be excavated from the residential area of the site, however it is envisaged that c.29,300m³ of excavated material will be reused onsite. The net surplus of the remaining excavated material (c. 8,700m³) will be taken for appropriate offsite reuse, recovery, recycling and/or disposal.

These estimates will be refined prior to commencement of construction. If the material that requires removal from site is deemed to be a waste, removal and reuse/recycling/recovery/disposal of the material will be carried out in accordance with the *Waste Management Act 1996 (as amended)*, the *Waste Management (Collection Permit) Regulations 2007 (as amended)* and the *Waste Management (Facility Permit & Registration) Regulations 2007 (as amended)*. The volume of waste requiring recovery/disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under Article 27 classification (European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011).

In order to establish the appropriate reuse, recovery and/or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous*. Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste including potential pollutant concentrations and leachability. It is anticipated that the surplus material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in Ireland or, in the unlikely event of hazardous material being encountered, be transported for treatment/recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction workers e.g. organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided onsite during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific C&D WMP. The C&D WMP provides an estimate of the main waste types likely to be generated during the C&D phase of the proposed development and these are summarised in Table 15.1.

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	1254.3	10	125.4	80	1003.5	10	125.4
Timber	1064.3	40	425.7	55	585.4	5	53.2
Plasterboard	380.1	30	114.0	60	228.1	10	38.0
Metals	304.1	5	15.2	90	273.7	5	15.2
Concrete	228.1	30	68.4	65	148.2	5	11.4
Other	570.2	20	114.0	60	342.1	20	114.0
Total	3801.0		862.8		2580.9		357.3

Table 15.1: Estimated off-site reuse, recycle and disposal rates for construction waste

It should be noted that until final materials and detailed construction methodologies have been confirmed it is difficult to predict with a high level of accuracy the C&D waste that will be generated from the construction of the proposed development as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

15.4.3 Operational Stage

As noted in Section 15.1, an OWMP has been prepared for the development and is included as Appendix 15.2. The OWMP provides a strategy for segregation (at source), storage and collection of all wastes generated within the building during the operational phase including dry mixed recyclables, organic waste and mixed non-recyclable waste as well as providing a strategy for management of waste glass, batteries, WEEE, printer/toner cartridges, chemicals, textiles, waste cooking oil and furniture.

The total estimated waste generation for the development for the main waste types based on the AWN Waste Generation Model (WGM) is presented in Tables 15.2, 15.3 and 15.4 below, and is based on the uses and areas as advised by the project architects (O'Mahony Pike) September 2019.

Waste type	Waste Volume (m ³ /week)			
	2 Bedroom (Duplexes)	3 Bedroom (Duplexes/ Houses)	4 Bedroom (Houses)	5 Bedroom (Houses)
Organic Waste	0.02	0.02	0.02	0.03
DMR	0.12	0.14	0.18	0.22
Glass	0.01	0.01	0.01	0.01
MNR	0.07	0.08	0.10	0.12
Total	0.22	0.24	0.31	0.38

Table 15.2 Estimated off-site reuse, recycle and disposal rates for construction waste.

Waste type	Waste Volume (m ³ /week)			
	Apartment Block A	Apartment Block B	Apartment Block C	Apartment Block D
Organic Waste	1.09	2.30	2.30	0.54
DMR	8.02	16.85	16.85	3.95
Glass	0.21	0.45	0.45	0.10
MNR	4.44	9.34	9.34	2.19
Total	13.77	28.94	28.94	6.79

Table 15.3: Estimated waste generation for the proposed development for the main waste type.

Waste type	Waste Volume (m ³ /week)			
	Apartment Block E	Apartment Block ODR01B&A	Park Edge Duplexes (Combined)	Crèche
Organic Waste	0.32	0.67	0.22	0.05
DMR	2.34	4.88	1.47	1.75
Glass	0.06	0.13	0.04	0.01
MNR	1.30	2.71	0.98	0.96
Total	4.02	8.38	2.70	2.76

Table 15.4: Estimated waste generation for the proposed development for the main waste type.

The residents and tenants will be required to provide and maintain appropriate waste receptacles within their units to facilitate segregation at source of these waste types. The location of the bins within the units will be at the discretion of the residents. As required, the residents and tenants will need to bring these segregated wastes from their units to their allocated Waste Storage Areas (WSAs). All WSA's can be viewed on the plans submitted with the application.

The OWMP seeks to ensure the development contributes to the targets outlined in the EMR Waste Management Plan 2015 – 2021, DLRCC waste bye-laws and the draft DLRCC waste bye-laws.

Mitigation measures proposed to manage impacts arising from wastes generated during the operation of the proposed development are summarised below.

15.5 Potential Impact of the Proposed Development

This section details the potential waste effects associated with the proposed development.

15.5.1 Construction Stage

The proposed development will generate a range of non-hazardous and hazardous waste materials during the excavation and construction. General housekeeping and packaging will also generate waste materials as well as typical municipal wastes generated by construction employees including food waste.

Waste materials will be required to be temporarily stored on site pending collection by a waste contractor. Dedicated areas for waste skips and bins will be identified across the site. These areas will need to be easily accessible to waste collection vehicles.

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

Wastes arising will need to be taken to suitably registered/permitted/licenced waste facilities for processing and segregation, reuse, recycling, recovery, and/or disposal as appropriate. There are numerous licensed waste facilities in the Eastern Midlands region which can accept hazardous and non-hazardous waste materials and acceptance of waste from the proposed development would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. Where possible, waste will be segregated into reusable, recyclable and recoverable materials. The majority of demolition and construction materials are either recyclable or recoverable.

Recovery and recycling of C&D waste has a positive impact on sustainable resource consumption, for example where waste timber is mulched into a landscaping product or waste asphalt is recycled for use in new pavements. The use of recycled materials, where suitable, reduces the consumption of natural resources.

There is a quantity of soil, stone, gravel and clay which will need to be excavated to facilitate the proposed development. It is anticipated that c. 38,000m³ of material will be excavated from the residential area of the site, however it is envisaged that c. 29,300m³ of material will be reused onsite. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

The potential effect of construction waste generated from the proposed development is considered to be **short-term, not significant** and **neutral**.

15.5.2 Operational Stage

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill.

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas.

Waste contractors will be required to service the development on a regular basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

The potential impact of operational waste generation from the development is considered to be **long-term, not significant and negative**.

15.5.3 Do-Nothing Impact

If the proposed development was not to go ahead there would be excavation, construction or operational waste generated at this site. There will be a neutral effect on the environment.

15.5.4 Potential Cumulative Impacts

In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the construction phase. Due to the high number of waste contractors in the Dublin region there would be sufficient contractors available to handle waste generated from a large number of these sites simultaneously, if required. Similar waste materials would be generated by all the developments.

There are similar existing residential developments close by, along with the neighbouring religious and sporting sites and these developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such the effect will be a **long-term, imperceptible and neutral**.

15.5.5 Risks to Human Health

The potential impacts on human beings in relation to the generation of waste during the construction and operational phases are that incorrect management of waste could result in littering which could cause a nuisance to the public and attract vermin. A carefully planned approach to waste management and adherence to the project specific C&DWMP and OWMP, will ensure appropriate management of waste and avoid any negative impacts on the local population. As such the effect will be a **long-term, imperceptible and neutral**.

15.6 Ameliorative, Remedial or Reductive Measures

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

15.6.1 Construction Stage

As previously stated, a project specific C&D WMP has been prepared in line with the requirements of the requirements of the guidance document issued by the DoEHLG and is included as Appendix 15.1. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the proposed development. Prior to commencement, the contractor(s) will be required to refine/update the C&D WMP or submit an addendum to C&D WMP to DLRCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

A quantity of soil, stone, gravel and clay which will need to be excavated to facilitate the proposed development. Project Engineers have estimated that c. 69,434m³ of excavated material will need to be removed offsite, however it is envisaged that c. 29,300m³ of excavated material will be reused onsite along with all material excavated from earthworks on the new 2 no. golf holes. It is envisaged that approximately 8,700m³ of material will need to be removed from site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented: -

- Building materials will be chosen with an aim to 'design out waste'.
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated:-
 - Concrete rubble (including ceramics, tiles and bricks).
 - Plasterboard.
 - Metals.
 - Glass.
 - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible.
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site.
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required).
- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works.
- All construction staff will be provided with training regarding the waste management procedures.
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal.

- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities.
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the EC (Waste Directive) Regulations (2011). EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that Article 27 will be used.

These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, the EMR Waste Management Plan (2015-2021). It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

15.6.2 Operational Stage

As previously stated, a project specific OWMP has been prepared and is included as Appendix 15.2. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the EMR Waste Management Plan 2015 – 2021 and abiding by the DLRCC waste bye-laws and draft waste bye-laws.

In addition, the following mitigation measures will be implemented: -

- On-site segregation of all waste materials into appropriate categories including (but not limited to): -
 - Organic waste.
 - Dry Mixed Recyclables.
 - Mixed Non-Recyclable Waste.
 - Glass.
 - Waste electrical and electronic equipment (WEEE).
 - Batteries (non-hazardous and hazardous).
 - Cooking oil.
 - Light bulbs.
 - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.).
 - Furniture (and from time to time other bulky waste).
 - Abandoned bicycles.
- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials.
- All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available.
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations, the Litter Pollution Act 1997, the EMR Waste Management Plan (2015 – 2021) and the DLRC waste bye-laws and draft waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

15.7 Residual Impact of the Proposed Development

The implementation of the mitigation measures outlined in Section 15.6 will ensure that the high rate of reuse, recovery and recycling is achieved at the development during the demolition, excavation and construction phases as well as during the operational phase. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

15.7.1 Construction Stage

A carefully planned approach to waste management as set out in Section 15.6 and adherence to the C&D WMP during the construction and demolition phase will ensure that the effect on the environment will be **short-term, imperceptible** and **neutral**.

15.7.2 Operational Stage

During the operational phase, a structured approach to waste management as set out in Section 15.6 will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will be **long-term, imperceptible** and **neutral**.

15.8 Monitoring

The management of waste during the construction phase should be monitored to ensure compliance with relevant local authority requirements, and effective implementation of the C&D WMP including maintenance of waste documentation.

The management of waste during the operational phase should be monitored to ensure effective implementation of the OWMP by the building management company and the nominated waste contractor(s).

15.8.1 Construction Stage

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the demolition, excavation and construction phases where there is a potential for waste management to become secondary to progress and meeting construction schedule targets. The C&D WMP specifies the need for a waste manager to be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

15.8.2 Operational Stage

During the operational phase, waste generation volumes should be monitored against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the WSAs where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contactor costs.

15.9 Difficulties Encountered

There were no difficulties encountered during the production of this Chapter of the EIAR.

15.10 Interactions

Adherence to the mitigation measures outlined in Section 15.6 will ensure that there are no significant impacts on resource or waste management from the proposed development. The management of waste during the construction phase in accordance with the C&D WMP and during the operational phase in accordance with the OWMP will meet the requirements of regional and national waste legislation and promote the management of waste in line with the priorities of the waste hierarchy.

15.10.1 Land and Soils

During the construction phase excavated soil, stone, gravel and clay (c. 69,434 m³) will be generated from the excavations required to facilitate site levelling, construction of the basement, construction of new foundations, the installation of underground services and attenuation tank. It is estimated that c. 38,000m³ of material will need to be excavated from the residential area of the development, however it is envisaged that c. 29,300m³ of excavated material will be reused onsite. Where material has to be taken off site (c. 8,700m³) it will be taken for reuse or recovery, where practical, with disposal as last resort. Adherence to the mitigation measures in Chapter 15 and the requirements of the C&D WMP, will ensure the effect is *long-term, imperceptible* and *neutral*.

15.10.2 Material Assets Transport

Local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the site during the construction and operational phases of the development. The increase in vehicle movements as a result of waste generated during the construction phase will be temporary in duration. There will be an increase in vehicle movements in the area as a result of waste collections during the operational phase but these movement will be imperceptible in the context of the overall traffic and transportation increase and has been addressed in Chapter 14: Material Assets (Transportation). Provided the mitigation measures detailed in Chapter 15 and the requirements of the OWMP (included as Appendix 15.2) are adhered to, the effects will be short to long-term, imperceptible and neutral.