Watfore Limited

Creamfields Residential Development

Construction Environmental Management Plan

252666-00-RPT-CEMP

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Job number 252666-00

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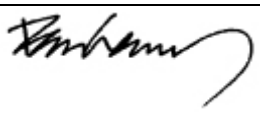
		Signature			
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1 Introduction

1.1 Overview

This Construction Environmental Management Plan (CEMP) has been prepared by Arup to support Watfore Limited's application for consent for the proposed strategic housing development (SHD) at the Creamfields Site (Former CMP Dairy Site) on the Kinsale Road and Tramore Road, in Cork City.

Watfore Limited will have a construction management team which will supervise aspects of the construction phase of the proposed development.

Watfore Limited's construction management team will ensure the contractor (and any subcontractors) will comply with all of the performance requirements set out in the tender documentation including the conditions attached to statutory consents which may be granted by An Bord Pleanála, Irish Water and other relevant statutory consent authorities.

Watfore Limited's construction management team will ensure compliance with the mitigation measures set out in the Environmental Impact Assessment Report (EIAR).

This CEMP sets out the duties and responsibilities which will be imposed on the contractor in the construction contract. Watfore Limited's construction management team will be responsible for ensuring that the contractor complies with all the requirements of this CEMP.

1.2 Purpose

The purpose of this CEMP is to provide a framework that outlines how Watfore Limited will manage and where practicable minimise negative environmental effects during the construction of the proposed development. Construction is considered to include all site preparation, enabling works, demolition, materials delivery, materials and waste removal, construction activities and associated engineering works.

This CEMP identifies the minimum requirements with regard to the appropriate mitigation, monitoring, inspection and reporting mechanisms that need to be implemented throughout construction. Compliance with this CEMP does not absolve Watfore Limited from compliance with all legislation and bylaws relating to their construction activities.

This CEMP has been produced as part of the application for consent to ensure compliance with legislative requirements and the EIAR and associated ecological reports that have been prepared for the proposed development.

1.3 Approach

This CEMP provides a framework to:

- Describe the programme for environmental management during construction;

- Implement those monitoring and mitigation measures identified in the EIAR and associated ecological reports;
- Outline the principles and minimum standards required during the development of the CEMP (and associated Method Statements) and throughout construction;
- Identify the relevant roles and responsibilities for developing, implementing, maintaining, and monitoring environmental management; and
- Outline the procedures for communicating and reporting on environmental aspects of the proposed development throughout construction.

It is intended that this CEMP would be expanded and updated prior to the commencement of any construction activities on site. The CEMP is a dynamic document and will remain up to date for the duration of the construction period. The CEMP may need to be altered during the lifecycle of the construction period to take account of monitoring results, legislative changes, outcomes of third-party consultations etc.

Following appointment, the contractor will be required to develop more specific Method Statements that are cognisant of the proposed construction activities, equipment and plant usage and environmental monitoring plan for the proposed development. This CEMP should not be considered a detailed Construction Method Statement as it would be the responsibility of the contractor, appointed to undertake the individual works, in association with Watfore Limited, to implement appropriate procedures and progress this documentation prior to commencement of construction.

This CEMP outlines the range of potential types of construction methods, plant and equipment which may be used by any contractor appointed to enable their effects to be assessed for the purposes of the planning authority's environmental impact assessment and appropriate assessment prior to determining whether to grant planning permission.

1.4 Structure

This CEMP is structured as follows:

- **Section 1** introduces the proposed development and outlines the purpose of the CEMP;
- **Section 2** describes in detail the proposed development;
- **Section 3** describes the construction strategy for the proposed development;
- **Section 4** sets out the framework and mechanisms through which environmental requirements would be managed;
- **Section 5** outlines the procedures to be employed during construction to manage environmental aspects;
- **Sections 6** and **7** describe in detail the measures to be implemented to minimise likely significant negative effects, as far as practicable, during the construction of the proposed development.

1.5 Updates to CEMP

The detailed CEMP is considered a 'live document' that will be reviewed and revised regularly as construction progresses. The process for update, review and approval of the CEMP must be documented in the detailed CEMP to ensure that all revisions can be easily understood, applied and updated.

The contractor is required to update the CEMP to ensure that it:

- Is in accordance with the mitigation measures specified in the EIAR and associated ecological reports and this CEMP;
- Is in accordance with any conditions that may be prescribed as part of the consent(s) for the proposed development;
- Aligns with those design and construction details described in the EIAR and associated ecological reports and ensures there is no material change in terms of significant effects on the environment;
- Where practicable the contractor should seek to identify opportunities for further reducing significant negative environmental effects and to implement best practice in as far as reasonably practicable, i.e., take every reasonable effort to reduce and prevent negative effects, while enhancing benefits; and
- Will have regard to the guidance contained in the handbook published by Construction Industry Research and Information Association (CIRIA)[1].

Further, the following plans, and any others considered relevant, will be incorporated into the CEMP:

- Construction Compound Management Plan;
- Construction Traffic Management Plan;
- Noise and Vibration Management Plan;
- Water Quality Management Plan;
- Dust Management Plan;
- Invasive Species Management Plan; and
- Emergency Incident Response Plan.

It is expected that amendments to the CEMP may be necessary to reflect inter alia changes in the project scope, contract scheduling, contractor appointments, environmental management policies, practices or regulations, and developments on the site. These reviews and updates are necessary to ensure that environmental performance is subject to continual improvement and that best practice is implemented throughout construction.

[1] CIRIA (2015) Environmental Good Practice on Site Guide, 4th Edition

2 The Proposed Development

2.1 Overview

Watfore Limited intend to apply to An Bord Pleanála (the Board) for permission for a Strategic Housing Development with a total application site area of c. 3.39 ha, on lands located at the former CMP Dairies site at Kinsale Road / Tramore Road, Cork. Refer to **Figure 1** for a site location map.

The site is located North of the Kinsale Road Roundabout and is bounded by Tramore Road to the north, Kinsale Road to the east, existing commercial developments to the south and the existing Musgrave Distribution Site to the west.

The existing topography of the site generally increases in elevation from approximately 6.0mOD (Malin) in the southern part of the site to 12.5mOD (Malin) in the northern part of the site.

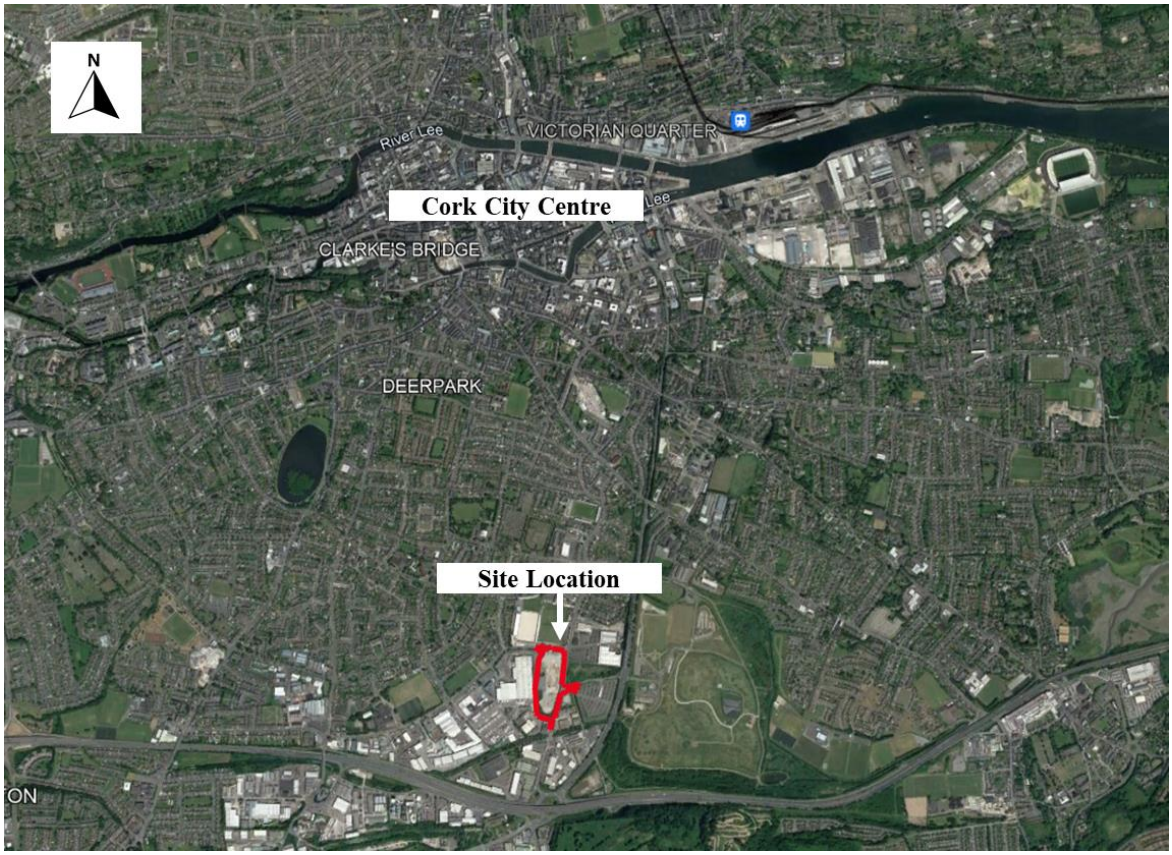

Figure 1: Site Location. Background Mapping: © Google Maps. Not to scale.

2.2 Elements

The proposed development will consist of a strategic housing development of 609 no. residential dwellings (561no. apartments and 48no. townhouse apartments, to include 189no. 1-bed dwellings; 338no. 2-bed dwellings; 48no. 3-bed dwellings; and 34no. 4-bed dwellings) and ancillary facilities arranged in 12no. buildings (Buildings B, C, E, F, G, H, I, J, L, M, and N and a standalone 100sq.m. coffee kiosk) varying in height from 1 to 15 floors over ground.

All of the dwellings proposed in Buildings E and F (257no. dwellings) will consist of Build To Rent apartments, and a 289sqm crèche with ancillary outdoor play area, a 547.5sqm community hub facility, a 550sqm gym, a 218sqm retail unit, and a 272sqm café at ground floor level.

The proposed development will also include: 209 no. shared car parking spaces (including EV charging points) provided on surface and within an undercroft carpark; 1,145 no. bicycle parking spaces provided in dedicated external and internal cycle stores/shelters; and 21no. motorcycle spaces.

The proposed total gross floor area above ground is 60,833.7m^2.

The proposed development will also include the provision of private, communal and public open space, including all balconies and terraces; internal roads and pathways; pedestrian access points; hard and soft landscaping and boundary treatments; waste storage; 5 no. ESB substations and 1no. ESB kiosk; plant, including rooftop solar PV panels; signage; new footpath and cycle lane along Kinsale Road; new access from Kinsale Road; an upgrade of the Kinsale Road/Mick Barry Road junction to facilitate improved pedestrian access to the Black Ash Park and Ride; an upgrade to the existing access from Tramore Road; a cycle lane on Tramore Road; public lighting; all site development works, including the demolition of existing hardstanding areas; and all drainage works, to include a new foul pumping station, and the diversion of the existing combined sewer and manhole, at the c. 3.39ha former CMP Dairies site, known as Creamfields, at Kinsale Road and Tramore Road, Cork.

Extracts of the site plan for Level 0 and Level 1 of the proposed development are presented in **Figure 2** and **Figure 3.**

Table 1: Approximate Building Gross Floor Space

Building	Internal Gross Floor Area (m^2)
Building B	**7790**
Building C	**10575**
Building J	**6960**
Duplex Building G	**1094**
Duplex Building H	**874**
Building I	**874**
Building L	**2062**
Duplex Building M	**679**
Building N	**2843**
Building E	**13045**
Building F	**13885**
Total	**60681**

2.3 Project Participants

Table 2: List of Main Project Participants

Role	
Client	Watfore Limited
Architect	Reddy Architecture & Urbanism
Civil & Structural Engineers	Arup
Contractor	To Be Confirmed
Mechanical and Electrical Engineers	EDC Engineering
Project Manager	KSNPM
Quantity Surveyor	KSN
PSDP	KSNPM
Fire Consultant	Daire Byrne & Associates
Landscape Architect	Cunnane Stratton Reynolds
Planning Consultant	Coakley O'Neill
Property Consultants	Savills
Traffic & Transport Engineers	Arup
Environmental Consultants	Arup
Daylight & Sunlight Assessment	Arup
Wind Microclimate Assessment	B Fluid

Figure 2: Extract of Site Layout – Level 0. Source: Reddy Architecture + Urbanism. Not to scale.

Figure 3: Extract of Site Layout – Level 1. Source: Reddy Architecture + Urbanism. Not to scale.

3 Construction Strategy

3.1 Duration and Phasing

The proposed development is anticipated to be constructed in five sequential phases; four main construction phases preceded by a site enabling works phase. It is intended that the construction of the proposed development will be completed together with a Primary Care Centre development, located in the north-western part of the site.

In summary, the proposed development consists of the following components and is described further on the relevant drawings and architectural reports that accompany this application:

- **Site Enabling Works (2-4 months)**
- **Phase 1 Construction (circa. 2.5-3.5 years):**
    - Primary Care Centre Including Retail – Pharmacy (this is the subject of a separate planning application)
    - Retail (Gym, Creche, and Café)
    - Town Square
    - Court Garden
    - Coffee Kiosk
    - Residential Blocks E & F
    - New entrance from Kinsale Road
    - Ancillary Site Development Works (Including underground services, pavement upgrade works, central avenue site works, surface car parking, landscape works, etc.)
- **Phase 2 Construction (circa. 2-2.5 years):**
    - Residential Blocks G & C
    - Ancillary Site Works
- **Phase 3 Construction (circa. 2.5-3.5 years):**
    - Residential Blocks J, H, B
    - Ancillary Site Development Works (Including underground services, pavement upgrade works, landscape works – Meadow 2 etc.)
- **Phase 4 Construction (circa. 1.5-2.5 years):**
    - Residential Blocks I, L, M & N

- Ancillary Site Development Works (Including underground services, pavement upgrade works, landscape works – Meadow 1 etc.)

- **Project Completions (circa. 3-6 months)**

It is assumed construction will commence within 4-8 months of a final planning grant. This assumption relies on tender strategy, design progression and market factors, etc.

The specifics of the durations and sequence of works will be further informed by the appointed contractor during the tender period in due course.

The phasing plan is presented in **Figure 4** and **Figure 5**.

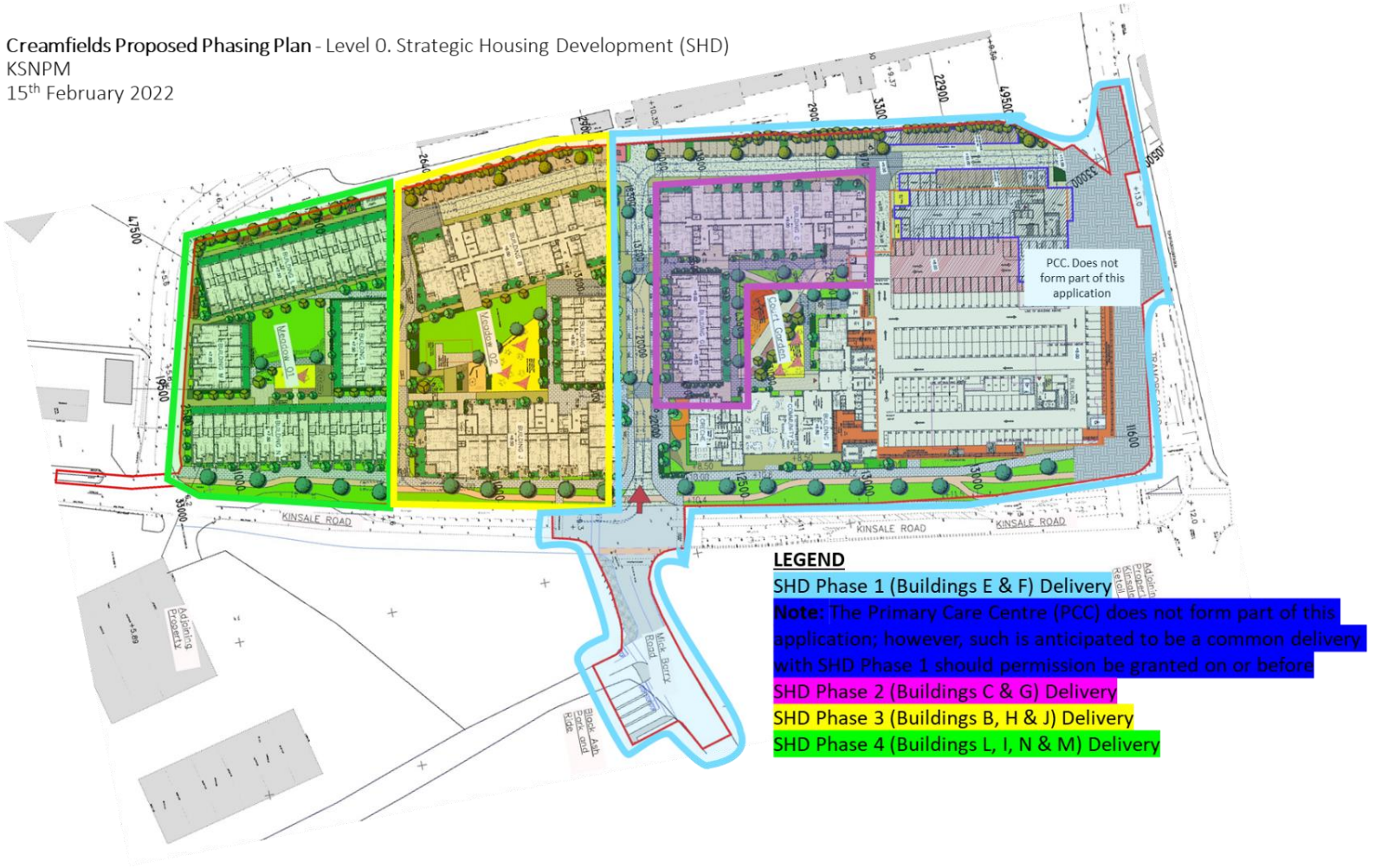

Figure 4: Phasing Plan – Level 0. Not to scale.

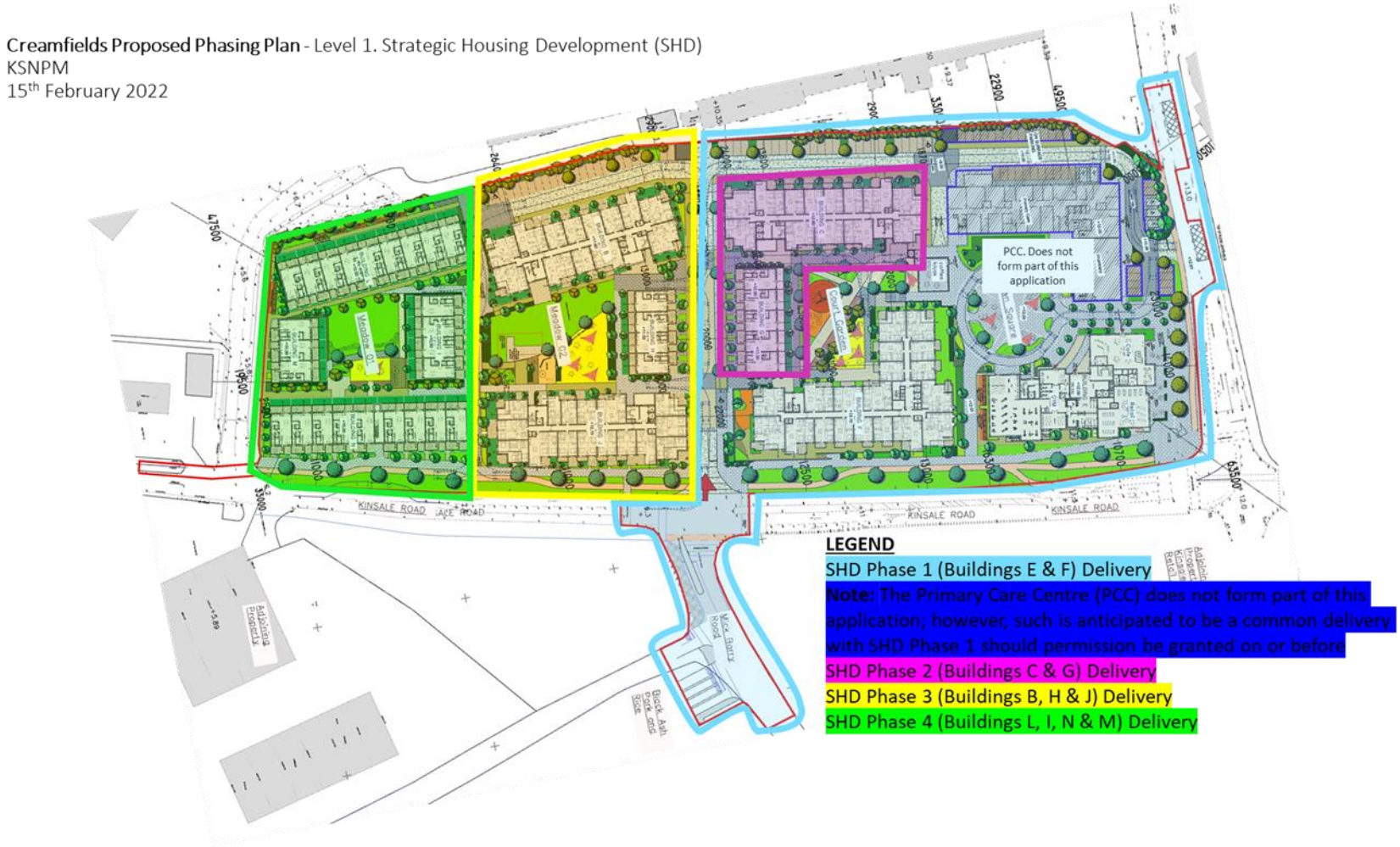

Figure 5: Phasing Plan – Level 1. Not to scale.

3.2 Site Preparation and Enabling Works

The site preparation and enabling works, to be carried out by the appointed Contractor, will include erecting perimeter hoardings around the site, construction of the site compound and storage areas, forming site access and egress points, enacting the traffic management plan, providing site security and erecting cranes.

3.3 Demolition and Site Clearance

There are no buildings or structures currently present on the site, however there are concrete ground floor slabs and foundations for previously demolished structures within the site.

The proposed development includes the demolition and removal of the existing concrete ground floor slabs and foundations along with carpark surfacing. The approximate area of hardstanding to be removed is 18,308m^2 and includes the areas is outlined in **Figure 6** below.

Figure 6: Extract from Google Maps marked up to show existing concrete ground slabs and foundations | red: concrete floor slabs/ foundations, blue: carpark | not to scale

3.3.1 Pre-Demolition and Condition Surveys

A pre-demolition survey will be undertaken to provide sufficient information for the Main Contractor to prepare a detailed Demolition Management Plan (DMP), giving methodology and work sequences for the demolition phase.

This survey will inform the Design Team and Specialist Demolition Contractor of the ground floor slab and foundation construction so that measures can be put in place to ensure the safe demolition. This information will also assist in the preparation of a detailed Waste Management Plan for these waste streams.

A Construction and Demolition Resource and Waste Management Plan has been prepared as part of this planning application package and is included in **Appendix 5.2** of the EIAR. In this Plan, it is estimated that approximately 45,920m^3 of excavated material will be generated from the proposed development. Where possible clean, non-hazardous or inert excavation material will be re-used. The Contractor will endeavour to send all other remaining materials to authorised facilities for beneficial re-use, recovery or recycling so far as is reasonably practicable, in accordance with the provisions of the Waste Management Act, 1996 as amended.

This pre-demolition survey will be accompanied by a detailed risk assessment to identify potential hazards, and necessary mitigation measures for safe demolition.

Dilapidation surveys will also be carried out as required in all adjoining properties, roads and footpaths and issued to the property owners and local authorities in advance of the demolition and excavation works.

3.3.2 Asbestos Audit

Asbestos Containing Materials (ACMs) were identified in a previous asbestos survey and during standard geo environmental sampling undertaken as part of site investigation works at the proposed development site. A formal asbestos audit will therefore be undertaken prior to any demolition and excavation works. If ACM is encountered during construction, a risk assessment will be carried out to determine its suitability for re-use. If re-use within the site is not possible, contaminated material will be removed offsite to an appropriately licenced facility.

3.3.3 Structural Demolition

The structural demolition scope for the development will be minimal as the previous buildings that were present onsite have already been demolished. The demolition works to be undertaken as part of the development comprise the demolition and removal of the existing concrete ground floor slabs and associated foundations.

All demolition works will be carried out with due consideration toward mitigating noise and vibration pollution to minimise disturbance to the surrounding area. Dust suppression systems, such as misters, will be used during the demolition operations, keeping air pollution to a minimum.

To comply fully with works specification, planning conditions, environmental and safety requirements and adhering to demolition best practice, the works will be undertaken by adopting a methodology that combines the following operations:

- Saw cutting and lifting:
  This method will be adopted in sensitive locations.

- Mini excavators and breakers:
  The use of mini excavators and breakers may be adopted in constricted locations around the site where larger machinery may not be appropriate.
- Hydraulic concrete breaking equipment:
  The use of breaking equipment will be employed to break out ground floor slabs and any external areas of hard-standing, such as car parking areas. The breaker will typically be fitted to a 20T excavator but there may be some hand-held tools utilised in isolated or constricted locations.

3.4 Services and Utilities Requirements

3.4.1 Existing Services

There is an existing Irish Water 600mm diameter combined sewer which enters the site from the west and exits to the east before ultimately draining away from the site in a north-easterly direction. There are existing utilities on site that previously served the former CMP site (e.g. water, power, telecoms). These are assumed to be redundant but will be reviewed by the contractor in advance of any works.

There is existing potable watermain infrastructure located adjacent to the site within Kinsale Road (150mm diameter) and Tramore Road (200 mm diameter).

It is understood there are two surface water outfalls into the Tramore River to the south of the site. These are understood to take surface water runoff from the roads and buildings to the north.

3.4.2 Watermain

It is proposed to provide a new connection from the existing watermain in Kinsale Road to serve the site.

A bulk water meter will be provided downstream of the connection point. Downstream of the bulk water meter a series of ring mains will be provided on site from which each development block will be fed.

The assumed water metering strategy for the individual buildings within the site is described in **Figure 7** (and drawing 252666-ARUP-ZZ-XX-DR-C-3000 included with the planning application) and will be confirmed and agreed with Irish Water during detailed design. It is assumed that booster pumping will be required for high rise buildings on site.

External fire hydrants will be connected to the ring mains on site. A pre-connection enquiry has been submitted to Irish Water and they have issued a Confirmation of Feasibility Letter confirming they have capacity within their network to serve the development without upgrade. Subsequent to this, the planning design drawings were shared with Irish Water and they have issued a Statement of Design Acceptance.

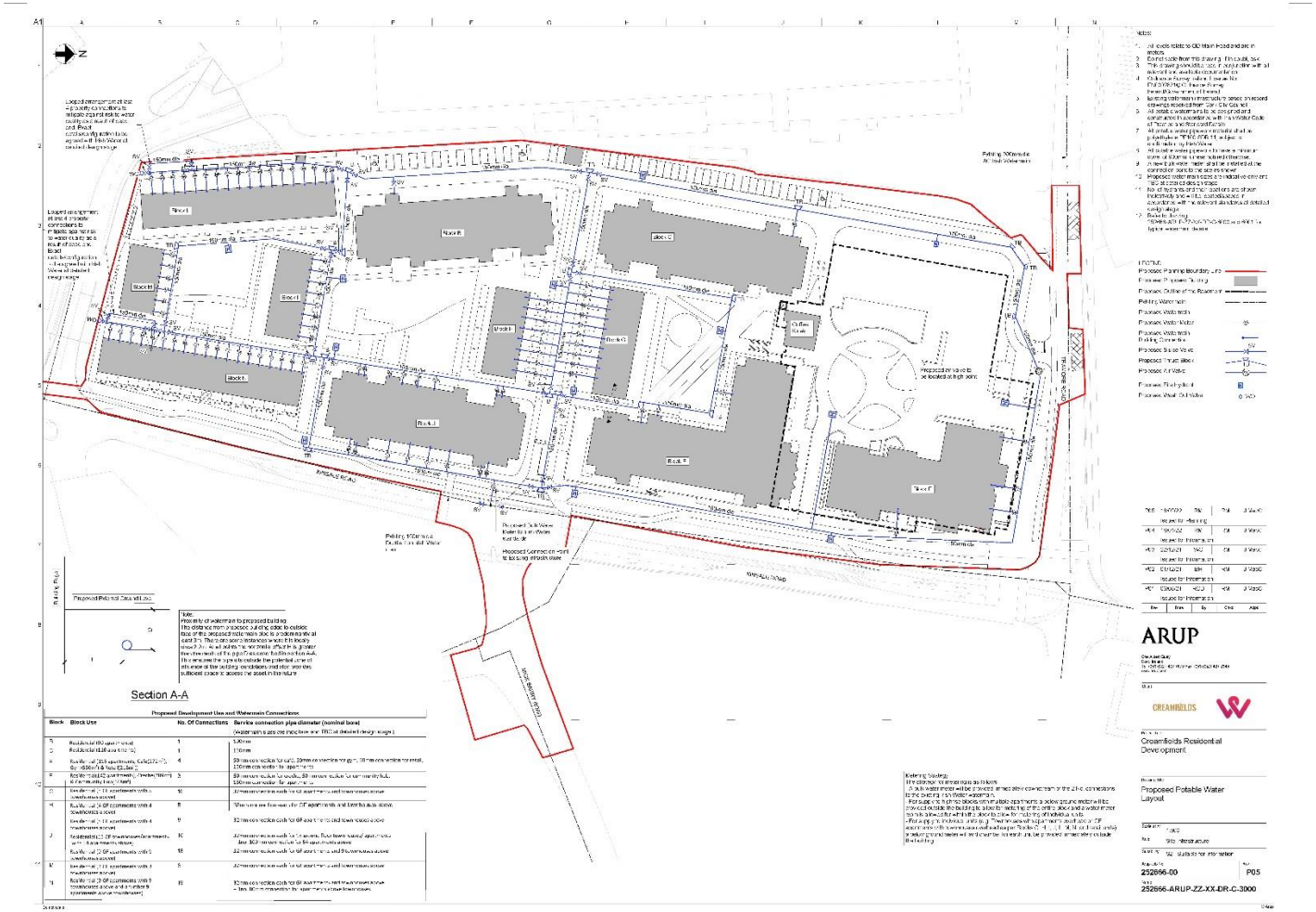

Figure 7: Watermain Layout. Not to scale.

3.4.3 Foul Sewer

It is proposed to construct a dedicated below ground foul network to collect and convey all foul water generated by the development. Foul water flows generated on site are expected to be as follows.

As described in **Section 3.4.1** there is an existing 600mm diameter combined sewer crossing the site from west to east. This sewer will be diverted to accommodate the proposed buildings/site layout. The sewer will be diverted beneath a proposed site road and the route will take into account any Irish Water wayleave requirements.

It is proposed to discharge all foul water from Block E in the northern section of the site via gravity to the diverted combined sewer.

The remaining buildings to the south cannot discharge to the combined sewer via gravity due to the topography of the site. As a result, it is proposed to discharge foul runoff from most of the site to a centrally located Pumping Station (PS). A rising main from the PS will discharge to the combined sewer to the north. Refer to **Figure 8** and drawing 252666-ARUP-ZZ-XX-DR-C-2000 included with this planning application.

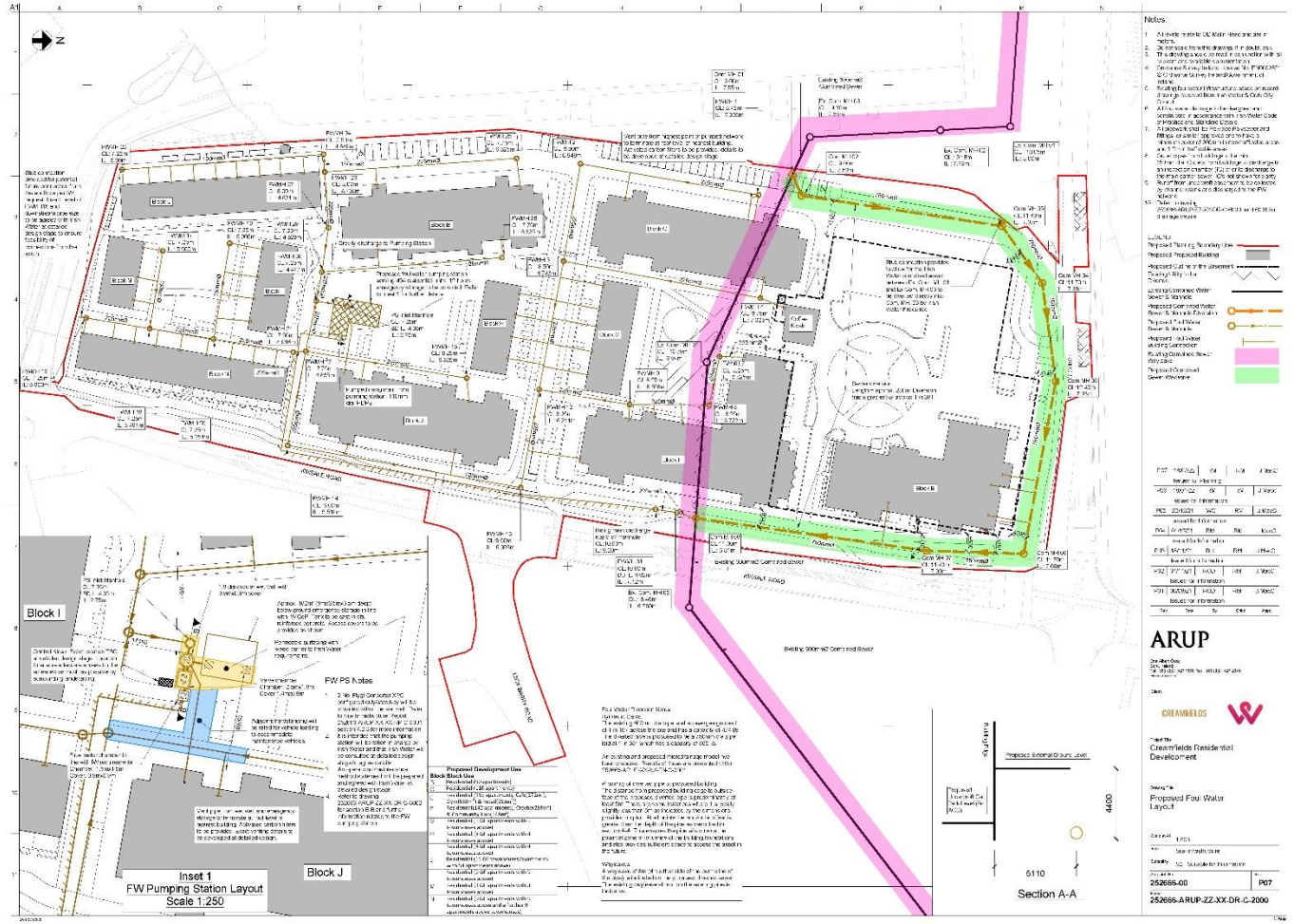

Figure 8: Foul Sewer Layout. Not to scale.

3.5 Construction of New Buildings

3.5.1 Podium Structure Works

The proposed development requires the construction of one single storey podium structure to serve Block E and the public realm space. The podium structure will be under the footprint of Block E and will support podium landscaped courtyards and open spaces between these buildings. Beneath the podium structure, car and bike parking will be provided along with waste storage rooms and plantrooms.

3.5.2 Earthworks

During the construction of the foundations, site services and attenuation tanks it is estimated that approximately 45,920m^3 of excavated material will be generated from the proposed development. It is noted that there is likely to be asbestos contamination present in soils on site.

Once the foundations are constructed and contaminated soil removed, fill materials will be required to build up the site to the required levels, in addition further fill will be required for under hard and soft landscaping areas.

Although the soil to be excavated may contain contaminants it may also have suitable engineering properties that could make it useful as a fill material. A detailed analysis will be undertaken to consider the potential options for reuse of the soil. Should this highlight potential options and subject to any legal requirements such as environmental licensing, the contaminated soil will be treated and retained on site for re-use where possible. Suitable potential re-use options include under hard and soft landscaping areas such as public open spaces. This is likely to comprise a sustainable solution but will likely require some offsite disposal for excess soils.

If it is required to export contaminated soil offsite for disposal (with or without treatment) it is likely to be classified as either non-hazardous waste with trace level of asbestos or hazardous waste. In this case, it will likely be exported and disposed of outside of Ireland.

Samples from the ground investigation will be compared to the limits defined in the EU Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II to Directive 1999/31/EC, referred to as the Waste Acceptance Criteria (WAC). In addition, the results will be compared to the contents of the EPA Hazardous Waste Classification Paper Tool (version WM3 V1) using the online tool HazWaste Online to determine if the materials are considered hazardous.

The assessment criteria used to categorise the soils are based on Irish and European standard criteria. The operators of landfills may use their own discretion to set their own limits for materials.

A Construction and Demolition Resource and Waste Management Plan has been prepared for the proposed development which details the management of exported

soils from site. This document will be further updated by the contractor prior to construction and is included as part of this planning application package.

3.5.3 Foundations

The design of the foundations will be subject to detailed design at a later stage but initial indications from the site investigation carried out would suggest that a piled / raft slab solution may be the preferred foundation type. If piling is deemed the preferred solution these would be either Continuous Flight Auger or rotary cored piles to minimise noise and vibration.

3.5.4 Ground Floor slab and Substructure

In general, it is envisaged that the ground floor of each building will comprise reinforced concrete suspended slabs, spanning onto the pile caps. The exact depths of excavation required for the ground floor and foundation structures varies, depending on existing ground level, however it will generally be in the region of 1-2.5m below existing ground level.

Block E will be constructed on top of a podium structure as described in **Section 3.5.5.**

3.5.5 Podium Slab and Transfer Structures

The podium structure comprising a reinforced concrete flat slab will be constructed beneath Block E including the hard and soft landscaped areas in this part of the development. The outer walls and the internal core walls and columns will be constructed from in-situ concrete. The western, northern and eastern walls of the podium bounding the Tramore Road and Kinsale Road will be retaining structures designed as propped cantilevers and therefore will require the podium floor slab to be cast and cured prior to backfilling.

Due to varying structural grids between residential and commercial/ car parking, a transfer structure will be required at Level 01 of Block E. It is intended that this is to consist of a thickened reinforced concrete flat slab designed to support the loading from the residential block over.

3.5.6 Superstructure Works

It is envisaged that the proposed buildings are all to be a combination of in-situ and / or precast concrete construction.

Stability will be achieved through central reinforced concrete lift and stair cores in each building, extending to ground floor level, and diaphragm action of the slabs.

The concrete framing for all buildings will be constructed on a sequential basis with concrete pumping envisaged. The floor slabs will be supported using temporary props as necessary, to ensure the stability of the structure at all times during the construction process. Concrete will be delivered to site using a ‘just-in-time’ approach. This will help mitigate against traffic congestion as well as reducing the amount of space required for material storage on site.

3.5.7 Façade and Fit Out Works

Once the building structure has been well advanced, the completion of the facades and the installation of mechanical and electrical services and building finishes will commence.

It is proposed that fit-out, handover and occupation of the buildings will be carried out on a phased basis. The proposed phasing may be subject to change as the project progresses.

Final drainage and utility connections will be completed towards the end of the construction programme for each phase.

3.5.8 Landscaping Works

Once the building fit-out, finishes and underground utility connections are substantially complete at the end of each construction phase, the completion of hard and soft landscaping of the Level 01 Podium areas and the Level 00 ground level areas will commence, including all ties-ins to existing and surrounding roadways, paths and cycle lanes.

3.5.9 Adjacent Proposed Public Infrastructure Development

The following confirmed and possible future adjacent public infrastructure projects may be constructed during one or more of the construction phases.

- BusConnects Cork

The appointed Contractor will liaise with Cork City Council and any contractors appointed for the above works as required, to ensure coordination of construction works in the area.

4 Environmental Management Framework

4.1 Overview

The contract(s) awarded for the proposed development will include a requirement for the contractor to comply with relevant documentation including the EIAR, the associated reports, planning (and other statutory consent) conditions received and this CEMP.

As part of the environmental management framework contractors will be required to comply with all relevant environmental legislation and take account of published standards, accepted industry practice, national guidelines and codes of practice appropriate to the proposed development. Due regard should be given to the guidance and advice given by ISO14001 standard[2] and Construction Industry Research and Information Association (CIRIA) guidance[3,4,5].

The contractor will be required to develop and implement an Environmental Management System (EMS) that follows the principles of ISO14001. Further, the contractor's EMS should include an environmental policy, operational, monitoring and auditing procedures to ensure compliance with all environmental requirements and to monitor compliance with environmental legislation and the environmental management provisions outlined in the relevant documentation.

4.2 Responsibilities

4.2.1 Employer

Watfore Limited will be the employer responsible for ensuring that competent parties are appointed to undertake construction and that sufficient resources are made available to facilitate the appropriate management of risks to the environment.

4.2.2 Employer's Representative

Watfore Limited and/or the Employers Representative (ER) appointed by Watfore Limited will be responsible for monitoring compliance with the CEMP. The ER may be required to appoint temporary or permanent specialists with appropriate skills and experience as required to implement on site procedures and monitor construction on behalf of the employer, i.e. competent experts in biodiversity, noise, vibration, dust, waste, land, soils, contamination and/or water.

[2] ISO (2015) ISO 14001:2015 Environmental management systems -- Requirements with guidance for use
[3] CIRIA (2015) Environmental Good Practice on Site C692 (fourth edition) (C762)
[4] CIRIA (2015) Coastal and marine environmental site guide (second edition) (C744)
[5] CIRIA (2002) Brownfield development sites: ground-related risks for buildings (X263)

4.2.3 The Contractor

The contractor(s) appointed will be responsible for the organisation, direction and execution of environmental related activities during the detailed design and construction of the proposed development. The contractor is required to undertake all activities in accordance with the relevant environmental requirements including the consent documentation and other regulatory and contractual requirements.

4.2.4 Site Manager

A Site Manager will be appointed by the contractor to oversee the day-to-day management of working areas within the site and ensure that effective, safe, planned construction activities are delivered on an ongoing basis to the highest standards. The Site Manager will be a suitably qualified, competent and experienced professional that will oversee site logistics, communicate regularly with construction staff, accommodate project-specific inductions for staff on site and ensure that all work is compliant with the relevant design standards and health and safety legislation.

4.2.5 Environmental Manager

An Environmental Manager will be appointed by the contractor to ensure that the CEMP is effectively implemented. The Environmental Manager will be a suitably qualified, competent and experienced professional that would perform the necessary tasks, review environmental procedures and consult with the members of the construction team and stakeholders as requited. The Environmental Manager will be responsible for:

- Preparing, maintaining and implementing the CEMP;
- Establishing, implementing, and maintaining the EMS in line with ISO 14001;
- Conducting regular environmental inspections and audits as specified in the contract and checking adherence to the CEMP;
- Ensuring that construction occurs in accordance with the relevant environmental requirements and that such compliance is adequately recorded and documented;
- Completing a site inspection and compiling an environmental compliance as agreed and specified in the CEMP;
- Attending site and stakeholder meetings as required;
- Keeping up-to-date with relevant environmental best practice and legislative changes;
- Liaising with the relevant staff to prepare Method Statements and relevant plans for all activities where there is a risk of environmental damage;
- Having a detailed level of knowledge on all aspects of environmental information associated with the proposed development;

- Ensuring all personnel have undertaken adequate environmental inductions, awareness briefings and training (including subcontractors);
- Dealing with environmental complaints; and
- Managing and responding to environmental incidents and ensuring that all incidents are recorded and reported in an appropriate manner.

4.2.6 Liaison Manager

A liaison manager will be appointed and will be responsible for managing such tasks as the following:

- Briefing residents/ neighbours on progress and issues as necessary;
- Liaison with Cork City Council and emergency services as appropriate; and
- Liaison with local Gardaí, particularly in relation to traffic movements and permits where necessary.

Contact details for the liaison manager will be posted on all construction site notice boards and on any other information or correspondence, which may be distributed from time to time.

4.2.7 Environmental Specialists engaged by the Contractor

To fulfil its obligations under the CEMP and to support its Environmental Manager, the contractor will be responsible for engaging suitably qualified and experienced professionals including where necessary the following (i.e. depending on the scope of the contract) competent experts:

- Project archaeologist;
- Project ecologist;
- Noise and vibration specialist;
- Air quality and dust specialist;
- Land, soils and contamination specialist(s); and
- Water specialist.

4.3 Communication Procedures

4.3.1 Community and Stakeholder Engagement

The contractor will take all reasonable steps to engage with stakeholders in the local community, focusing on those who may be affected by the construction works including residents, businesses, community resources and specific vulnerable groups.

Communication with the local community, Cork City Council and other relevant stakeholders shall be undertaken at an appropriate level and frequency throughout

construction. Where communications are related to environmental issues the Environmental Manager will be informed and engaged with, as appropriate.

4.3.1.1 Community Liaison

Watfore Limited recognises the importance of effective community liaison in order to reduce nuisance to residents, to ensure public safety and welfare and to help ensure the smooth running of construction activities. Important issues in ensuring good relations are:

- Providing information for the public during the construction phase, (particularly nearby sensitive receptors);
- Providing the correct points of contact and being responsive; and
- Ensuring good housekeeping in all aspects of the operations.

A ‘good neighbour’ policy will be implemented, as far as possible. Key aspects of this policy include:

- Early implementation of the policy i.e. from the commencement of construction;
- Reduction of nuisance factors;
- Maintaining access to neighbouring premises and businesses;
- Clear and concise information; and
- Undertaking timely liaison with stakeholders.

4.3.2 Advance Notice of Works

The contractor will ensure that local residents, businesses, occupiers, general users of the area and stakeholders are informed in advance of construction activities that may affect them. Relevant obligations and procedures in relation to advance notice of works will be identified in the updated CEMP.

All notifications will detail the nature, estimated duration and working hours. All notifications will include a project-specific contact number to which any enquires can be directed. The contractor will be responsible for preparing and issuing the notifications subject to the relevant approval and consents.

Watfore Limited and the contractor in consultation with Cork City Council and statutory stakeholders will decide whether to arrange any further targeted consultation with the public or relevant stakeholders in advance of specific construction activities on a local basis.

4.3.3 Emergency Contacts

An emergency contact list will be established and made available to all construction staff employed. The contact list shall be displayed prominently on site as well as at suitable locations where construction activity is being carried out around working areas. The contact list will include key environmental representatives that may need to be contacted in the event of an incident.

4.3.4 Enquiries and Complaints

The contractor will establish a process for handling all enquiries including complaints. All enquiries will be recorded and a log will be maintained to include details of the response and action taken. This will be available upon request for inspection to Cork City Council. All enquiries, whether a query or a complaint, will be dealt with in a timely manner.

The Environmental Manager will be immediately informed of any environmental-related issues that have been raised. Where appropriate, the Environmental Manager would be responsible for informing Cork City Council, relevant stakeholders and statutory bodies.

5 Environmental Management Procedures

5.1 Training, Awareness and Competence

The contractor (and their subcontractors) will be selected with due consideration of relevant qualifications and experience. The contractor will be required to employ construction staff with appropriate skills, qualifications and experience appropriate to the needs of the works to be carried out during construction.

A site induction will be provided to all construction staff before they commence work on site. Where appropriate, the contractor will identify specific training needs for the construction workforce and will ensure that appropriate training requirements are fulfilled.

The contractor will establish an Environmental Training and Awareness Programme and ensure that all personnel receive adequate training prior to the commencement of construction activities. A baseline level of environmental awareness will be established through the site induction programme. Key environmental considerations and objectives will be incorporated into this induction. Specifically, site inductions will cover the following as a minimum:

- Introduction to the Environmental Manager;
- Description of the CEMP and consequences of non-compliance;
- The requirements of due diligence and duty of care;
- Overview of conditions of consents, permits and licences;
- Requirements associated with community engagement and stakeholder consultation;
- Identification of environmental constraints and notable features within the site; and
- Procedures associated with incident notification and reporting including procedures for dealing with damage to the environment.

Nobody will work on site without first receiving environmental induction. Signed records of environmental training will be established, maintained and made available to the Employers Representative.

Site briefings and talks would be carried out on a regular basis to ensure that construction staff have an adequate level of knowledge on environmental topics and community relations and can effectively follow environmental control procedures throughout construction.

5.2 Meetings

Watfore Limited and/or the Employer's Representative will arrange regular meetings to discuss environmental matters and ensure effective coordination to be attended by:

- Watfore Limited;

- The Employer's Representative;
- Contractor (including Site Manager);
- Environmental Manager; and
- Environmental Specialists – engaged by either Watfore Limited and/or the contractor.

The Environmental Manager will be responsible for arranging and holding monthly meetings and site walk overs with the Employer's Representative. The Environmental Manager would develop and distribute minutes of the monthly meetings and distribute them accordingly.

5.3 Monitoring, Inspections and Audits

For the duration of the contract(s), the environmental performance of the contractor will be monitored through site inspections and audits. The programme for monitoring, inspections and audits shall be specified in the contract and it is likely to be a combination of internal inspections and independent external audits that may be either random or routine.

Records of all inspections carried out will be recorded on standard forms and all actions should be closed out in a reasonable time. The updated CEMP will include further details of inspection procedures.

5.3.1 Monitoring

Mitigation and monitoring will be carried out in accordance with the requirements of the EIAR and associated ecological reports so that construction activities are undertaken in a manner that does not give rise to significant negative effects. Suitable monitoring programmes will need to be developed, implemented, documented, and assessed.

The results of all environmental monitoring activities would be reviewed by the Environmental Manager on an ongoing basis to enable trends or exceedance of criteria to be identified and corrective actions to be implemented as necessary. The contractor will be required to inform the Employer's Representative of any continuous exceedances of criteria.

5.3.2 Inspections

Routine inspections of construction activities will be carried out by the Environmental Manager daily to ensure all necessary environmental measures relevant to the construction activities are being effectively implemented by construction staff, ensuring legal and contractual conformity.

More detailed inspections would be undertaken by the Environmental Manager on a weekly basis.

The weekly inspections would be appropriately documented by the Environmental Manager and copies of these records and any action required to be undertaken should be made available to the Employers Representative.

Each month one of the weekly inspections will include a review of environmental documentation and records. The monthly inspection will be recorded on a standard form and reported to the Employers Representative within five days of the inspection taking place. This standard form will address the following as a minimum:

- Summary of compliance/non-compliance with the CEMP;
- Results and interpretation of the monitoring programme;
- Key issues noted in inspections and/or audits;
- Summary record of non-conformities, incidents and corrective actions;
- Summary of environmental complaints and queries received in relation to environmental matters; and
- Summary record of environmental training undertaken by staff.

5.3.3 Audits

Watfore Limited will arrange for independent environmental audits to be carried out by a third-party during construction. External audits provide the opportunity for an independent auditor to advise on compliance with applicable environmental regulatory requirements, the efficacy of the environmental management approaches used, and recommendations for reducing identified environmental risks (if considered appropriate).

Further, regulatory and statutory bodies may undertake site visits to monitor compliance with legislative and regulatory requirements. These site visits may occur randomly throughout the construction period. The contractor will facilitate these visits and the Environmental Manager will be available to provide information as required and deal with any issues that may arise during, or as a result of, these visits.

Planned and documented audits aimed at evaluating the conformance of the EMS would also be carried out by the Environmental Manager. The Environmental Manager will establish a schedule for internal audits and this inspection calendar will be made available to the Employer’s Representative. These environmental audits will be scheduled at least once every three months.

Standard forms for reporting and audit items will be prepared and will include but not be limited to the following activities:

- Review of environmental documentation to establish if relevant requirements are being achieved and if continual improvement is occurring;
- Site inspection and interviews with onsite personnel; and
- Reporting with recommendations.

For any environmental nonconformities found, the auditor will prepare a Corrective Actions Report to describe and record the findings of the non-conformance. The verification of previous Corrective Actions Reports should be also recorded.

Upon completion of an audit, the auditor will review all Corrective Actions Reports and prepares an Audit Report to summarise:

- Corrective action requests raised;
- Previous corrective action requests closed; and
- Observations made during the audit.

The Environmental Manager will be entitled to participate in all audits. Notwithstanding this, the Employers Representative shall produce and provide the contractor with a copy of each audit report within five working days of the audit. Each audit report will detail the findings from the auditor, specify non-conformances identified and outline the proposed corrective action.

5.4 Incident Response

5.4.1 Corrective Actions

5.4.1.1 Overview

Corrective actions are measures to be implemented to rectify any non-conformances (i.e. exceedance of criteria or targets) identified during monitoring, inspections and/or audits.

In the first instance, an investigation should be undertaken by the Environmental Manager to identify the cause of any non-conformances. Appropriate remedial measures shall be identified and implemented as soon as practicable to prevent further exceedances. If necessary, the appropriate statutory authority and stakeholders will be notified.

Where new or amended measures are proposed, the relevant CEMP will be updated accordingly by the Environmental Manager and the Employer's Representative should be informed at the earliest opportunity.

5.4.1.2 Corrective Action Reports

As previously mentioned, a Corrective Actions Report is prepared on foot of any non-conformances identified during environmental monitoring, inspections and/or audits on site. The Corrective Actions Report will describe in detail the cause and effect of a non-conformance on site and describe the recommended corrective action that is required to remedy it.

An appropriate timeline for closing out the corrective actions will be identified by the contractor as well as arrangements for the Environmental Manager verifying the Corrective Actions Report and informing appropriate authorities and stakeholders in a timely manner.

5.4.2 Emergency Incidents

5.4.2.1 Overview

Emergency incidents are those occurrences that give rise to significant negative environmental effects including but not limited to the following:

- Any malfunction of any mitigation measure and/or environmental protection system;
- Any emission that does not comply with the requirements of the contract and relevant licences;
- Any circumstance with the potential for environmental pollution; or
- Any emergency that may give rise to environmental effects (e.g. significant spillages or fire outbreak).

As discussed in **Section 4.3.3** an emergency contact list will be established and made available to all construction staff employed. The contact list shall be displayed prominently on site as well as at suitable locations where construction activity is being carried out around working areas. The contact list will include key environmental representatives that may need to be contacted in the event of an incident.

5.4.2.2 Spill Control Measures

Every effort will be made to prevent pollution incidents associated with spills during the construction of the proposed development. The risk of oil/fuel spillages will exist on the site and any such incidents will require an emergency response procedure. Given the scale and extent of the proposed development, contractors will carry spill kit materials in their cabins.

The following steps provide the procedure to be followed in the event of an oil/fuel spill occurring on site:

- Identify and stop the source of the spill and alert people working in the vicinity;
- Notify the Environmental Manager immediately giving information on the location, type and extent of the spill so that they can take appropriate action;
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident;
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill;
- If possible, cover or bund off any vulnerable areas where appropriate such as drains, watercourses and/or sensitive habitats;
- If possible, clean up as much as possible using the spill control materials;

- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited;
- The Environmental Manager shall inspect the site as soon as practicable and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring; and
- The Environmental Manager will notify the appropriate stakeholders such as Cork City Council, National Parks and Wildlife Service, Department of Environment Climate and Communications, and Department of Housing, Local Government and Heritage and/or the EPA.

Environmental incidents are not limited to just fuel spillages. Therefore, any environmental incident must be reported, recorded and investigated in accordance with the procedures described in **Section 4.4**.

5.4.2.3 Emergency Incident Response Plan

A set of standardised emergency response procedures will govern the management of emergency incidents. The contractor will be required to detail emergency incident response procedures and to develop an Emergency Incident Response Plan.

The Emergency Incident Response Plan will contain emergency phone numbers and the method of notifying local authorities, statutory authorities and stakeholders. Contact numbers for key personnel will also be included therein. Contractors will be required to adhere to and implement these procedures and ensure that all staff and personnel on site are familiar with the emergency arrangements.

In the case of work required in an emergency, or which if not completed would be unsafe or harmful to workers, the public or local environment, Cork City Council will be informed as soon as reasonably practicable of the reasons and likely duration. Examples may include where the ground needs stabilising if unexpected ground conditions are encountered, concrete pouring taking longer than anticipated due to delayed deliveries or equipment failure.

In the event of an emergency incident occurring, the contractor will be required to investigate and provide a report including the following, as a minimum:

- A description of the incident, including location, the type and quantity of contaminant and the likely receptor(s);
- Contributory causes;
- Negative effects;
- Measures implemented to mitigate adverse effects; and
- Any recommendations to reduce the risk of similar incidents occurring.

The contractor will consult with the relevant statutory authorities, stakeholders and relevant parties such as the Health and Safety Authority, the Fire Authority, the Ambulance Service, the EPA, utilities companies and Cork City Council when

preparing and developing response measures. Further, if any sensitive receptor is impacted, the appropriate environmental specialists will be informed and consulted with accordingly.

Any response measures will be incorporated into an updated Emergency Incident Response Plan that should be disseminated accordingly to construction staff, Watfore Limited and the Employer's Representative.

5.4.2.4 Emergency Access

The contractor will be required to maintain emergency access routes throughout construction and identify site access points for each working area.

This should be developed in partnership with the emergency services and documented as part of the Emergency Incident Response Plan.

5.4.3 Extreme Weather Events

The contractor will consider the effects of extreme weather events and related conditions during construction. The contractor will use a short to medium range weather forecasting service from Met Eireann or other approved meteorological data and weather forecast provider to inform short to medium term programme management, environmental control and mitigation measures.

All measures deemed necessary and appropriate to manage extreme weather events will be considered and will specifically cover training of personnel and prevention and monitoring arrangements for staff. As appropriate, method statements will also consider extreme weather events where risks have been identified, e.g., construction works adjacent to public roads and business premises.

5.4.4 Unexpected Discoveries

Appropriate procedures will be put in place in the event of encountering unexpected archaeological or cultural heritage assets or subsurface contamination during intrusive ground works.

Appropriate procedures will be developed as part of the CEMP and the Environmental Manager will ensure that specialists (e.g., archaeologist) are facilitated to ensure management in accordance with industry best practice and effective compliance with the relevant legislation. All unexpected discoveries will be reported to the appropriate authorities and documented in an appropriate manner.

5.5 Reporting

5.5.1 Environmental Compliance Report

The contractor will be required to submit a monthly report to the Employer's Representative for review and approval. The report shall address the following as a minimum:

- Summary of compliance with the CEMP including identification of any non-conformances;
- Interpretation of the results of ongoing monitoring;
- Detailed description of any issues and/or non-conformances identified during inspections and/or audits;
- Record of incidents and corrective actions (including Corrective Actions Reports as appropriate);
- Synopsis of environmental complaints received / queries raised by stakeholders; and
- Records of environmental training undertaken (as appropriate).

5.5.2 Incident Investigation Reports

The contractor will inform the Employer's Representative of all emergency incidents immediately and prepare an initial report within 24 hours setting out the details of the incident and cause(s) if known. The contractor will be required to complete the Environmental Incident Report and any further documentation requested by the Employer's Representative in relation to the incident within 7 days of the incident occurring. The Contractor will respond to all comments made by the ER on any incident.

The Environmental Incident Report will contain details of the incident including the location, known and suspected causes and weather conditions. It will define the scale and effects (short, medium, long term, temporary/permanent) as well as required corrective actions and mitigation/ remediation/compensation measures (as appropriate).

5.6 Environmental Records

Records of all environmental documentation will be maintained including monitoring, test results, method statements and plans. All records will be kept up to date and be made available for audits, inspections and periodical reporting. The Contractor will maintain the following environmental records (as a minimum) that will be made available for inspection to the Employer's Representative and the relevant authorities, if required:

- Management Plans;
- Records of environmental incidents;

- Monthly environmental reports;
- Records of environmental training;
- Register of environmental complaints;
- Corrective Action Reports;
- Environmental inspection and audit reports;
- All monitoring data;
- Waste and chemical inventories; and
- Health and Safety records.

6 General Requirements

6.1 Good Housekeeping

A "good housekeeping" policy will be employed at all times. This will include, but not necessarily be limited to, the following requirements:

- General maintenance of working areas and cleanliness of welfare facilities and storage areas;
- Provision of site layout map showing key areas such as first aid posts, material storage, spill kits, material and waste storage, welfare facilities etc;
- Maintain all plant, material and equipment required to complete the construction work in good order, clean, and tidy;
- Keep construction compound, access routes and designated parking areas free and clear of excess dirt, rubbish piles, scrap wood, etc. at all times;
- Details of site managers, contact numbers (including out of hours) and public information signs (including warning signs) will be provided at the boundaries of the working areas;
- Provision of adequate welfare facilities for site personnel;
- Installation of appropriate security, lighting, fencing and hoarding at each working area;
- Effective prevention of oil, grease or other objectionable matter being discharged from any working area;
- Provision of appropriate waste management at each working area and regular collections to be arranged;
- Excavated material generated during construction will be reused on site as far as practicable and surplus materials/soil, should it be deemed a by-product, shall be recovered or if considered to be waste material, disposed of to a suitably authorised waste facility site;
- Effective prevention of infestation from pests or vermin including arrangements for regular disposal of food and material attractive to pests will be implemented. If infestation occurs the contractor will take appropriate action to eliminate and prevent further occurrence;
- Maintenance of self-contained wheel washing facilities at the construction compound and other contaminant measures as required;
- No discharge of site runoff or water without agreement of the relevant authorities and an appropriate discharge licence, if relevant;
- Open fires will be prohibited at all times;
- The use of less intrusive noise alarms which meet the safety requirements, such as broadband reversing warnings, or proximity sensors to reduce the requirement for traditional reversing alarms;

- Maintenance of public rights of way, diversions and entry/exit areas around working areas for car users, pedestrians and cyclists where practicable and to achieve inclusive access; and
- Material handling and/or stockpiling of materials, where permitted, will be appropriately located to minimise exposure to wind. Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods.

6.2 Working Hours

The timing of construction activities, core working hours and the rate of progress of construction works are a balance between efficiency of construction and minimising nuisance and significant effects.

The core construction working hours for the proposed development will be:

- 8am – 6pm: Monday to Friday; and
- 8am – 4pm: Saturday.

or as stipulated on the Planning Permission in due course.

The hours above correspond to the current construction programme.

Breaking equipment will be employed to break-out ground floor slabs and any areas of hardstanding, such as car parking areas. All rock breaking/fracturing activities will be undertaken during daytime hours. The removal of waste material off site by road and regular deliveries to site would be generally confined to daytime hours but outside of peak traffic hours (i.e. 10am to 4pm).

It may be necessary in exceptional circumstances to undertake certain activities outside of the core construction working hours. Any construction outside of the core construction working hours will be agreed in advance with Cork City Council and scheduling of such works will have regard to nearby sensitive receptors.

6.3 Security

Adequate security will be provided to prevent unauthorised entry to or exit from any working areas. The following measures may be used to prevent unauthorised access:

- Install CCTV and alarm systems where required;
- CCTV and security systems will be sited and directed so that they do not intrude into occupied residential properties;
- Provide adequate security guards and patrols where required;
- When there is no site activity, close and lock site gates and set appropriate site security provisions in motion;

- Consult with neighbouring properties, local businesses and local crime prevention officers including Cork City Council and An Garda Síochána on site security matters as required; and
- Prevent access to restricted areas and neighbouring properties by securing equipment on site such as scaffolding and ladders.

6.4 Hoarding and Fencing

A site boundary in the form of hoarding or fencing will be established around the full perimeter of the site before any significant construction activity commences. The hoarding/fencing will be a minimum of 2.4m high to provide a secure boundary to what can be a dangerous environment for those that have not received the proper training and are unfamiliar with construction operations.

Site hoarding also performs an important function in relation to minimising nuisance and effects including:

- Noise emissions (by providing a buffer);
- Visual impact (by screening the working areas, plant and equipment); and
- Dust minimisation (by providing a buffer).

The erection of hoarding would be of a similar nature to what is carried out on most construction sites. Mounting posts would be erected by using a mini-digger and the posts would be set in concrete or otherwise secured. The size and nature of the posts and hoarding would depend on the requirements for any acoustic mitigation as well as preferences that the contractor may have. Where practicable, hoarding and fencing would be retained and re-configured and re-used between working areas as the construction activities progress.

The following measures will be applied in relation to hoarding and fencing:

- Maintenance of adequate fencing and hoardings to an acceptable condition to prevent unauthorised access to working areas and provide noise attenuation, screening, and site security where required;
- Appropriate sight lines/visibility splays will be maintained around working areas to ensure safety of both vehicles and pedestrians is preserved;
- Use of different types of fencing and hoarding (e.g. mesh fence of solid hoarding including hoardings used for noise control);
- Temporary fences may be used in certain areas, such as for short term occupation of working areas;
- Display information boards with out of hours contact details, telephone helpline number (for comments/complaints) and information on the works;
- Erect notices on site boundaries to warn of hazards on site such as deep excavations, construction access, etc.;
- Signage to be displayed which direct pedestrians and convey “Business as Usual” for adjoining businesses;

- Ensure suitable measures for tree protection are implemented as required;
- Keep hoarding and fencing free of graffiti or posters;
- Retain existing walls, fences, hedges and earth banks as far as reasonably practicable; and
- Appropriate positioning of the fencing or hoarding to minimise the noise transmitted to nearby receptors or from plant, equipment and vehicles entering or leaving the working area.

6.5 Services and Lighting

6.5.1 Services and utilities

Site services will be installed as part of the enabling works in parallel with the rearrangement and diversion of existing utilities. Working areas will be powered by mains supplies or diesel generators where an electrical supply is not available.

6.5.2 Lighting

Site lighting will typically be provided by tower mounted 1000W metal halide floodlights. The floodlights will be cowled and angled downwards to minimise spillage to surrounding properties. The following measures will be applied in relation to site lighting:

- Lighting will be provided with the minimum luminosity sufficient for safety and security purposes. Where practicable, precautions will be taken to avoid shadows cast by the site hoarding on surrounding footpaths, roads and amenity areas;
- Motion sensor lighting and low energy consumption fittings will be installed to reduce usage and energy consumption; and
- Lighting will be positioned and directed as not to unnecessarily intrude on adjacent buildings and businesses, ecological receptors and structures used by protected species, nor to cause distraction or confusion to passing motorists.

6.6 Welfare Facilities

Welfare facilities will be provided, as appropriate, for construction staff and site personnel such as locker rooms, toilets, showers, kitchen etc. The construction compound located within the site boundary, will be used as the location for worker welfare facilities.

Potable water will be made available by installing a temporary construction water connection. A temporary foul water connection will be made to the existing combined sewer which traverses the site. In the event that this connection is not possible, self-contained sanitary facilities will be used, with wastewater stored and tankered off-site to appropriately licenced disposal facilities.

6.7 Reinstatement of Working Areas on Completion

All working areas and access routes will be reinstated as work proceeds during construction. All plant, equipment, materials, temporary infrastructure and vehicles will be removed at the earliest opportunity.

6.8 Health and Safety

All Health & Safety, Fire Safety and security requirements will be provided in co-ordination with Cork City Council and Watfore Limited. A Construction Traffic Management Plan has been prepared and is included with this application. Watfore Limited will ensure that the Construction Traffic Management Plan (CTMP) will be further developed by the contractor, prior to the commencement of construction, to ensure that construction traffic will be managed and monitored safely and efficiently throughout the construction phase. This is to protect members of the public. The CTMP includes all suitable temporary signage, barriers and hoarding as necessary.

All construction staff and operatives will be inducted into the security, health and safety and logistic requirements on site prior to commencing work.

All Contractors will be required to progress their works with reasonable skill, care and diligence and to proactively manage the works in a manner most likely to ensure the safety, health and welfare of those carrying out construction works, all other persons in the vicinity of the working areas and interacting stakeholders.

All aspects of works and project facilities will comply with legislation, good industry practice and all necessary consents.

The requirements of the Safety, Health and Welfare at Work Act 2005 (Government of Ireland, 2005), the Safety, Health and Welfare at Work (Construction) Regulations, 2013 (Government of Ireland, 2013), as amended, (the “Regulations”) and other relevant Irish and EU safety legislation will be complied with at all times.

As required by the Regulations, a Health and Safety Plan will be formulated which will address health and safety issues from the design stages through to completion of the construction and maintenance phases. This plan will be reviewed and updated as required, as the development progresses.

In accordance with the Regulations, a ‘Project Supervisor Design Process’ has been appointed and a ‘Project Supervisor Construction Stage’ will be appointed as appropriate.

The Project Supervisor Construction Stage will assemble the Safety File as the project progresses.

7 Environmental Management

This section describes the specific environmental requirements identified as part of the specimen design and EIAR and associated ecological reports that will need to be adhered to.

It should be noted that the measures in this CEMP provide a summary of minimum requirements that will be developed as the project progresses. It is intended that the measures set out herein will be discussed in more detail with relevant stakeholders as required to support the identification of any additional measures to be taken account of during construction.

7.1 Traffic and Transportation

The following measures will be implemented in relation to traffic and transportation during construction:

Construction Traffic Management Plan

A Construction Traffic Management Plan has been prepared and is included with this application. The Construction Traffic Management Plan (CTMP) will be further developed by the contractor, prior to the commencement of construction, to ensure that construction traffic will be managed and monitored safely and efficiently throughout the construction phase.

The CTMP provides details of intended construction practices for the development, including:

- Outlining the minimum road safety measures to be implemented at the site access/egress locations and at the approaches to such access/egress locations, during the works.
- Demonstrating to the contractor and suppliers the need to adhere to the relevant guidance documentation for such works.
- Providing the basis for the contractor to further develop the details of the CTMP.

Please refer to the **Appendix A** to this CEMP, *Construction Traffic Management Plan* for further information.

7.2 Air Quality and Climate

Emissions to air during construction will occur, although the prevailing weather, the extent of the works and the distance from sensitive receptors will determine the extent of the effects. The focus of the control procedures will therefore be to reduce the generation of airborne material.

‘Standard mitigation’ measures will be implemented, as per guidance presented in the TII document *Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes* (TII, 2011). These will include the following:

- Spraying of exposed earthwork activities, temporary stockpiles and site haul roads during dry weather;
- Provision of wheel washes facilities at the site entrance;
- Covering of temporary stockpiles;
- Control of vehicle speeds, speed restrictions and vehicle access; and
- Sweeping of hard surface roads.

In addition, the following measures will be implemented. These measures are based on best practice as outlined in the British Research Establishment (BRE) document *Controlling particles, vapour and noise pollution from construction sites* (BRE, 2003) and the Institute of Air Quality Management (IAQM) document *Guidance on the assessment of dust from demolition and construction* (IAQM, 2016).

- Exhaust emissions from vehicles operating within the working areas, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor through regular servicing of machinery;
- During dry periods when dust generation is likely or during windy periods, working areas and vehicles delivering material with dust forming potential will also be sprayed with water, as appropriate;
- Areas where materials will be handled and stockpiled will be designed to minimise their exposure to wind – all temporary stockpiles shall be kept to the minimum practicable height with gentle slopes;
- There shall be no long-term stockpiling within the working areas and storage time will be minimised;
- Material drop heights from plant to plant or from plant to stockpile will be minimised;
- Dust screens will be implemented at locations where there is the potential for air quality effects during the construction phase e.g. mesh netting to be erected around the scaffolding to minimise dust emissions from the site; and
- Truck loads will be covered when carrying material likely to generate dust.

Employee awareness is also an important way that dust may be controlled on any site. Staff training and the management of operations will ensure that all dust suppression methods are implemented and continuously inspected. Further details on employee training is provided in **Section 5.1** above.

The following mitigation measures will be implemented during the construction phase of the development to minimise CO_2 emissions:

- A Construction Traffic Management Plan to be prepared by the contractor in advance of the commencement of the construction will be implemented in full. This will minimise congestion and encourage car sharing and the use of public transport, where practicable;
- Materials will be handled efficiently on site to minimise the waiting time for loading and unloading, thereby reducing potential emissions;
- Engines will be turned off when machinery is not in use; and

- The regular maintenance of plant and equipment will be carried out.

7.3 Noise and Vibration

Specific noise abatement measures will be taken to comply with the recommendations of BS 5228-1 and 2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites: Noise and vibration* (BSI, 2014) and the *European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001* (EC, 2001).

The following specific measures will be implemented during the construction phase to ensure noise and vibration effects are minimised:

- Site representatives shall be appointed to be responsible for matters relating to noise and vibration;
- Equipment will be switched off when not required;
- Internal haul routes will be well maintained;
- Rubber linings shall be used in chutes and dumpers etc. to reduce impact noise;
- Plant and vehicles will be started sequentially rather than all together;
- Construction plant and activities to be employed on site will be reviewed to ensure that they are the quietest available for the required purpose;
- Generators will be located away from sensitive receivers and will be enclosed;
- Where required, improved sound reduction methods e.g. enclosures shall be used;
- For all construction works likely to generate off-site vibration, the contractor will be required to meet the vibration limits set out in BS 5228.
- Acoustic barriers will be provided around construction works to minimise the effects of noise and vibration generating activities in the vicinity of sensitive locations;
- Typically, site activities will be limited to 8am – 6pm, Monday to Friday; and 8am – 4pm, Saturday. It may also be necessary in exceptional circumstances to undertake some other types of activities outside of normal construction core working hours. Any such working hours outside the normal construction core working hours will be agreed with Cork City Council. The planning of such works will have regard to nearby sensitive receptors;
- A Community Liaison Plan shall be prepared to provide for effective community liaison to help ensure the smooth running of construction activities and to address any issues that may arise.
- Avoid unnecessary revving of engines and switch off equipment when not required;
- Keep internal haul routes well maintained and avoid steep gradients;

- Use rubber linings in, for example, chutes and dumpers to reduce impact noise;
- Minimise drop height of materials; and
- Start-up plant and vehicles sequentially rather than all together.

The following more specific measures will also be implemented where practicable:

- In accordance with Best Practicable Means, plant and activities to be employed on site will be reviewed to ensure that they are the quietest available for the required purpose;
- Where required, improved sound reduction methods, e.g. enclosures should be used;
- Site equipment should be located away from noise sensitive areas, as much as is feasible;
- Regular and effective maintenance by trained personnel should be carried out to reduce noise and/or vibration from plant and machinery;
- A 2.4 metre high hoarding will be provided around the construction site;
- Limiting the hours during which site activities likely to create high levels of noise or vibration are carried out;
- Establish channels of communication between the contractor/developer, Local Authority and residents;
- Appointing of a site representative responsible for matters relating to noise and vibration; and

Monitoring typical levels of noise and vibration during critical periods and at sensitive locations for comparison with limits and background levels.

7.4 Biodiversity

Mitigation measures (of relevance in respect of any potential ecological effects) will be implemented throughout the project, including the preparation and implementation of detailed method statements. The works will incorporate the relevant elements of the guidelines outlined below:

- *The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads.* National Roads Authority, Dublin (2010).
- *Control of water pollution from construction sites. Guidance for consultants and contractors (*C532). CIRIA. H. Masters-Williams et al (2001)
- *Control of water pollution from linear construction projects. Technical guidance (C648).* CIRIA. E. Murnane, A. Heap and A. Swain. (2006)

All personnel involved with the proposed development will receive an on-site induction relating to construction and operations, and the environmentally sensitive nature of the Tramore River and to re-emphasise the precautions that are required as well as the control measures to be implemented. Site managers,

foremen and workforce, including all subcontractors, will be suitably trained in risks and preventative measures.

All staff and subcontractors have the responsibility to:

- Work to agreed plans, methods and procedures to eliminate and minimise environmental impacts,
- Understand the importance of avoiding on-site impacts, including noise and dust, and how to respond in the event of an incident to avoid or limit environmental impact;
- Respond in the event of an incident to avoid or limit environmental impact;
- Report all incidents immediately to the site manager;
- Monitor the workplace for potential environmental risks and alert the site manager if any are observed; and
- Co-operate as required, with site inspections.

7.4.1 Water Quality

The employment of good construction management practices will minimise the risk of impacts to soil, stormwater run-off, seawater or groundwater. Measures relevant to hydrology are provided in **Section 7.8** and are in accordance with Construction Industry Research and Information Association (CIRIA) guidance – *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors* (Masters-Williams *et al*, 2001).

7.4.2 Noise

Specific noise abatement measures will be taken to comply with the recommendations of BS 5228-1 and 2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites: Noise and vibration* (BSI, 2014) and the *European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001* (EC, 2001).

Specific measures will be implemented during the construction phase to ensure noise and vibration effects are minimised. These measures are described in **Section 7.4**, will minimise the risk of adverse impacts from the noise and vibration during the construction phase.

7.4.3 Protection of Habitats

There will be a defined working area which will be fenced off to prevent inadvertent damage to adjoining habitats.

To prevent incidental damage by machinery or by the deposition of spoil during site works, any habitats earmarked for retention nearby will be securely fenced or sign posted early in the construction phase. These will be clearly visible to machine operators.

Habitats that are damaged and disturbed will be left to regenerate naturally or will be rehabilitated and landscaped, as appropriate, once construction is complete.

7.4.4 Invasive Species Management

An *Invasive Species Management Plan* (ISMP), which has been included as **Appendix B,** will be agreed with Cork City Council prior to the works being carried out.

The contractor will employ a suitably qualified ecologist to update the plan prior to the commencement of construction. The updated plan will contain the following:

- Site background including proposed works
- Extent of the Japanese Knotweed infestation
- Specific control plan to be put in place
- Site hygiene protocols
- Responsible individuals
- Follow up requirements
- Any other relevant information

There are a number of management options that may be implemented to control and prevent the spread of invasive species. Those involved in the application of herbicides/pesticides will be competent to do so and will have sufficient experience and knowledge in the area of herbicides/pesticides application.

All staff involved in the application of herbicides/pesticides will have received appropriate training, which may include achieving competency certification in the safe use of herbicides/pesticides through a National Proficiency Tests Council registered assessment centre or achieving an appropriate FETAC award in this area.

Further details have been included in **Appendix B** *Invasive Species Management Plan.*

7.5 Archaeology, Architecture and Cultural Heritage

Archaeological monitoring of the southern end of the proposed development site in the area of the former Macroom railway line will be carried out. Should railway infrastructure be found, it will be preserved by record, i.e. a written and photographic record will be made.

7.6 Townscape and Visual

The proposed measures relate to implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking, etc.

- Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site rubbish.
- Site hoarding will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate.
- To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compound, and scaffolding visible during the construction phase are of a temporary nature only and therefore require no remedial action other than as stated above.

7.7 Land, Soils, Geology and Hydrogeology

The following measures will be implemented in relation to land and soils during construction:

- Potential pollutants shall be adequately secured against vandalism and will be provided with proper containment according to the relevant codes of practice. Any spillages will be immediately contained and contaminated soil shall be removed from the proposed development and properly disposed of in an appropriately licensed facility.
- Dust generation shall be kept to a minimum through the wetting down of haul roads as required and other dust suppression measures.
- Any stockpiles of earthworks and site clearance material shall be stored on impermeable surfaces and covered with appropriate materials where necessary.
- Silt traps shall be placed in gullies to capture any excess silt in the run-off from working areas.
- Soil and water pollution will be minimised by the implementation of good housekeeping (daily site clean-ups, use of disposal bins, etc.) and the proper use, storage and disposal of these substances and their containers as well as good construction practices as described the CIRIA guidance.
- A contingency plan for pollution emergencies will also be developed by the appointed contractor prior to the commencement of works and regularly updated. The contingency plan will identify the actions to be taken in the event of a pollution incident in accordance with the CIRIA guidance which requires the following to be addressed:
    - Containment measures;
    - Emergency discharge routes;
    - List of appropriate equipment and clean-up materials;
    - Maintenance schedule for equipment;
    - Details of trained staff, location and provision for 24-hour cover;
    - Details of staff responsibilities;

- Notification procedures to inform the relevant environmental protection authority or Cork City Council
- Audit and review schedule;
- Telephone numbers of statutory water undertakers and local water company; and
- List of specialist pollution clean-up companies and their telephone numbers.

Loss of crushed rock aggregate and granular aggregate potential area

Excavated material will be removed during the construction phase. Where possible, excavated material will be reused as construction fill. The appointed contractor will ensure acceptability of the material for reuse for the proposed development with appropriate handling, processing and segregation of the material. This material would have to be shown to be suitable for such use and subject to appropriate control and testing according to the Earthworks Specification(s). These excavated soil materials will be stockpiled located within the working area where possible, using an appropriate method to minimise the impacts of weathering. Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff. Any surplus suitable material excavated that is not required elsewhere for the proposed development shall be used for other projects where possible, subject to appropriate approvals/notifications.

Ground movements

Ground movement, horizontal movement and vibration monitoring will be implemented during construction activities to ensure that the construction does not exceed the design limitations.

Ground movements will be controlled through the selection of a foundation type and method of construction which are suitable for the particular ground conditions.

Pollution from construction activities

The employment of good construction management practices will minimise the risk of pollution of soil, storm water run-off, adjacent watercourses and groundwater. The construction management of the site will take account of the recommendations of the CIRIA guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams et al., 2001) to minimise as far as possible the risk of soil, groundwater and surface water contamination.

Measures, as recommended in the guidance above, that will be implemented to minimise the risk of spills and contamination of soils and waters, include:

- The construction management of the site will take account of the recommendations of the CIRIA guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams et al., 2001) to minimise as far as possible the risk of soil, groundwater and surface water contamination;

- Training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures;
- Careful consideration will be given to the location of any fuel storage facilities. These will be designed in accordance with guidelines produced by CIRIA, and will be fully bunded;
- All vehicles and plant will be regularly inspected for fuel, oil and hydraulic fluid leaks. Suitable equipment to deal with spills will be maintained on site;
- Ensure that all areas where liquids are stored or cleaning is carried out are in designated impermeable areas that are isolated from the surrounding area e.g. by a roll-over bund, raised kerb, ramps or stepped access;
- Minimise the use of cleaning chemicals;
- Use trigger-operated spray guns, with automatic water-supply cut-off.

During construction, the potential risk to site users and member of the public from contaminated dust will be managed using standard health and safety measures as outlined in the Health and Safety Authority guidance document on working with asbestos (HSA 2013). This states that:

> *"Removal of asbestos from contaminated soil will require a specialist asbestos contractor for any friable asbestos to be removed."*

And

> "*A risk assessment by an independent competent person should determine the most appropriate control measures and remediation strategies.*"

Control measures for the construction stage will be devised based on a risk assessment carried out by the contractor prior to the development and will be specific to the construction methods.

Earthworks Haulage

Earthworks haulage will be along agreed predetermined routes along existing national, regional and local routes. Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to its original condition. Where practicable, compaction of any soil or subsoil which is to remain in situ along the sites will be avoided.

Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe runoff and prevent ponding and flooding. Runoff will be controlled through erosion and sediment control structures appropriate to minimise the water impacts in outfall areas. Care will be taken to ensure that the bank surfaces are stable to minimise erosion.

Removal of soils;

Excavations in made ground will be monitored by an appropriately qualified person to ensure that any spots of contamination encountered are identified,

segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure no cross-contamination with clean soils elsewhere throughout the site.

Where possible, excavated material will be retained and reused on site as construction fill or off site as a by-product under an Article 27 notification.

The appointed contractor will ensure acceptability of the material for reuse for the proposed development with appropriate handling, processing and segregation of the material. This material would have to be shown to be suitable for such use and subject to appropriate control and testing according to the Earthworks Specification(s). These excavated soil materials will be stockpiled within the working area where possible, using an appropriate method to minimise the impacts of weathering. Any surplus suitable material excavated that is not required elsewhere for the proposed development shall be used for other projects where possible, subject to appropriate approvals/notifications (e.g., Article 27).

7.8 Water

The following best practice water management measures will be implemented during the construction phase:

- A filter drain and silt pits will be located at the base of all embankments, settled solids will be removed from the silt pits regularly;
- Temporary stockpiles will be surrounded by silt fencing;
- Where at all possible, soil excavation will be completed during dry periods and undertaken with excavators and dump trucks. Topsoil and subsoil will not be mixed together. Excavation and earthworks will be suspended during and immediately following periods of heavy rainfall to minimise sediment generation and soil damage;
- Oil, petrol and other fuel containers will be double-skinned and bunded to be able to contain 110% volume to guard against potential accidental spills or leakages entering local watercourses;
- A spill kit including an oil containment boom and absorbent pads will be on site at all time;
- A designated bunded refuelling area on an impermeable surface will be provided at a minimum distance of 15m away from any watercourse. No vehicles will be left unattended when refuelling;
- Dedicated fuel storage areas will be introduced on-site which will be a minimum of 15m from watercourses or drains or, alternatively, fuelling will take place offsite;
- All vehicles and plant will be regularly maintained, washed and inspected for fuel, oil and hydraulic fluid leaks;
- Machinery including hand-tools will never be washed in watercourses or drainage ditches or within 15m of watercourses or drainage ditches;

- Concrete pouring will not take place during heavy rain when run off is likely due to excess water. Shuttering will be designed to accommodate small increases in the volume of material contained within the shuttered area due to rainfall. Pre-cast concrete will be used if possible; otherwise all cast-in-place concrete will be isolated from flowing water for a minimum of 48 hours to allow pH to reach neutral levels;
- Wash down and washout of concrete transporting vehicles will not be permitted at the location of construction. Such wash down and washout activities will take place at an appropriate facility offsite or at the location where concrete was sourced;
- Oily water associated with construction activities will pass through an oil separator before discharging into the surface water drainage system which discharges into the local watercourse to the west of the site;
- Ensure that all areas where liquids are stored, or cleaning is carried out are in a designated impermeable area that is isolated from the surrounding area, e.g. by a roll-over bund, raised kerb, ramps or stepped access;
- Use collection systems to prevent any contaminated drainage entering surface water drains, watercourses or groundwater, or draining onto the land;
- Minimise the use of cleaning chemicals;
- Use trigger-operated spray guns, with automatic water-supply cut-off;
- Use settlement lagoons or suitable absorbent material such as flocculent to remove suspended solids such as mud and silt;
- Ensure that all staff are trained and follow vehicle cleaning procedures. Post details of the procedures in the work area for easy reference;
- Fuel, oil and chemical storage on site will be secure;
- Site storage will be on an impervious base within a secondary containment system such as a bund;
- A spill kit with sand, earth or commercial products that are approved for the stored materials will be kept close to the storage area. Staff will be trained on how to use spill kits correctly;
- Damaged, leaking or empty drums will be removed from site immediately and disposed of via a registered waste disposal contractor;
- Mobile plant will be refuelled in a designated area, on an impermeable base away from drains or watercourses;
- A wheel-wash will be installed for use by all construction vehicles leaving site;
- A road-sweeper will be used to remove dirt and debris from roads;
- Silt traps will be located around the site to collect run off, with settled solids removed regularly and water recycled and reused where possible; and

- A bypass petrol interceptor will be installed in the car park drainage network prior to connection to the existing drainage network to prevent any hydrocarbon spills from entering the surrounding drainage network.

A summary of the best practice measures relevant to hydrology are provided as follows and are in accordance with CIRIA guidance, and will be implemented by the contractor:

- Construction compound will be located in areas that are at minimal risk of flooding (outside 1:100-year flood zone);
- A monitoring regime/programme for water quality will be put in place;
- There will be no tracking of machinery within watercourses;
- Silt fences/swales shall be provided at all locations where surface water run-off may enter/leave the working areas, and adjacent to the haul roads;
- All works undertaken will be fully consolidated to prevent run-off of silt;
- Access/haul roads shall be set back from watercourses by at least 10m where possible.

7.8.1 Foul Drainage

The foul drainage associated with the welfare facilities at the construction compound includes a canteen, toilets, showers and hand wash basin only. Wastewater will be disposed of by connection to the existing foul drainage system or by removal from site to an appropriately licensed treatment facility.

7.8.2 Flooding

- No construction materials or temporary stockpiles will be stored in flood plains or in areas which would impede flood flow paths; and
- In relation to effects of extreme weather events and related conditions the contractor will use a short to medium range weather forecasting service from Met Eireann or other approved meteorological data and weather forecast provider to inform short to medium term programme management, environmental control and mitigation measures.

7.9 Resource and Waste Management

Construction – General

In addition to the inherent design measures which will be implemented during the construction phase, the following mitigation measures will be implemented:

- Waste disposal will be minimised so far as is reasonably practicable;
- Possibilities for re-use of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use. Where excavated material may not be re-used within the proposed works the

Contractor will endeavour to send material for recovery or recycling so far as is reasonably practicable;

- Waste from the proposed development will be transported by authorised waste collectors in accordance with the relevant Irish waste legislation (Waste Management (Collection Permit) Regulations, 2007 as amended;
- Waste from the proposed development will be delivered to authorised waste facilities in accordance with the relevant Irish waste legislation (Waste Management Acts 1996-2016) as amended;
- Source segregation: Where possible, metal, timber, glass and other recyclable material will be segregated on site in a designated area within the construction compound during construction works and will be removed off site to a permitted/licensed facility for recycling. Where required waste stream colour coding, and photographs of wastes will be used to facilitate segregation. Where waste generation cannot be avoided this will maximise the quantity and quality of waste delivered for recycling and facilitate its movement up the waste hierarchy away from landfill disposal and reduce its environmental effect;
- Material management: 'Just-in-time' delivery will be used so far as is reasonably practicable to minimise material wastage;
- Supply chain partners: The contractor will engage with the supply chain to supply products and materials that use minimal packaging, and segregate packaging for reuse;
- Waste Auditing: The contractor will record the quantity in tonnes and types of waste and materials leaving site during the construction phase;
- Waste fuels/oils may be generated from equipment used on-site during construction and may be classified as hazardous waste. Such wastes will be stored in a secure, bunded area on-site prior to collection by a Contractor who holds the appropriate waste collection permit;
- Possibilities for re-use of excess uncontaminated soil and stone only as fill or in landscaping works within the site will be considered following appropriate testing to ensure material is suitable for its proposed end use. Where excess excavation material may not be re-used within the proposed works the Contractor will endeavour to send material for recovery or recycling so far as is reasonably practicable;
- The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material, which is recovered, and which is disposed of;
- The contractor will ensure that any off-site interim storage or waste management facilities for excavated material have the appropriate waste licences or waste facility permits in place;
- Site office and food waste arising on site will be source separated at least into dry mixed recyclables, biodegradable residual wastes;

- Waste bins, containers, skip containers and storage areas will be clearly labelled with waste types which they should contain, including photographs as appropriate;
- The site will be maintained to prevent litter and regular litter picking will take place throughout the site;
- Excessive temporary works will be avoided, existing facilities will be reused as appropriate;
- Paints, sealants and hazardous chemicals etc. will be stored in secure, bunded locations;
- All hazardous waste will be separately stored in appropriate lockable containers prior to removal from site by an appropriate waste collection holder; and
- Waste generated on site will be removed as soon as practicable following generation for delivery to an authorised waste facility.
- If asbestos/contaminated material is encountered during construction, a risk assessment will be carried out to determine its suitability for re-use. If re-use within the site is not possible, contaminated material will be removed offsite to an appropriately licenced facility.

7.10 Population and Human Health

Measures which will be implemented to minimise effects on the general amenity of residents will include:

- The erection of directional and information signage for members of the public to indicate alternative routes and paths to be taken and convey “Business As Usual” for adjoining businesses;
- The provision of information to local residents and businesses during the construction phase;
- The provision of community liaison and nomination of personnel to manage community relations; and
- The preparation of an emergency response plan to cover foreseeable risks.

Industry-standard traffic management measures will be put in place to alleviate construction-related traffic disruptions. Refer to **Section 7.1** for further details.

Dust emissions will be controlled throughout the construction phase. Refer to **Section 7.2** for details of dust mitigation measures.

Noise and vibration disturbance will also be minimised. Best practice measures for noise control on construction sites will be adhered to during construction. Refer to **Section 7.3** for further details of noise and vibration mitigation measures.

As required by regulation and legislation, a Health and Safety Plan will be prepared to address health and safety issues during the construction phase. This plan will be reviewed and updated as required, as the development progresses.

The Project Supervisor Construction Stage will assemble the Safety File as the project progresses.

7.11 Material Assets

The following measures in relation to material assets during construction will be implemented:

- The contractor will undertake their own surveys to establish full extent of underground services prior to the commencement of construction to support any surveys already undertaken as part of early design work and statutory consent applications
- Put measures in place to ensure that there are no interruptions to existing utilities and services unless this has been agreed in advance with the relevant service provider
- All utilities and services diversions will be agreed and undertaken as part of the enabling works and in advance of the commencement of construction activities
- All works near utilities apparatus will be carried out in ongoing consultation with the relevant utility company and/or local authority and will be in compliance with any requirements or guidelines they may have.
- Where new services are required, the Contractor will apply to the relevant utility company for a connection permit where appropriate and will adhere to their requirements;
- All construction activities in the vicinity of existing services and utilities will be carried out with ongoing consultation with the relevant service provider and undertaken in compliance with any requirements or guidelines they may have.

7.12 Major Accidents and Disasters

The proposed development will be designed and built in line with best international current practice and, as such, mitigation against the risk of major accidents and/or disasters will be embedded throughout the design. The contractor will be required to ensure that all fire safety requirements are provided for in co-ordination with Cork City Council. Appropriate site personnel will be trained as first aiders and fire marshals. The contractor will also be required to maintain an emergency response plan which will cover all foreseeable risks i.e. fire. In preparing this plan the contractor will be required to liaise with the emergency response services.

The mitigation measures, which will limit the likelihood and consequence of a vehicle collision, include a Construction Traffic Management Plan (CTMP). Prior to the commencement of works the appointed contractor will prepare a CTMP, which will be agreed with Watfore Limited and Cork City Council. This will be a live document which will be updated/added to as construction progresses and will be implemented for the duration of the proposed works.

See **Section 7.8** for details on pollutant control.

8 References

BRE (2003). *Controlling particles, vapour and noise pollution from construction sites*

BSI (2014). *BS 5228-1 and 2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites: Noise and vibration*

CIRIA (2002). *Brownfield development sites: ground-related risks for buildings (X263)*

CIRIA (2015). *Coastal and marine environmental site guide (second edition) (C744)*

CIRIA (2015). *Environmental Good Practice on Site C692 (fourth edition) (C762*)

CIRIA (2015). *Environmental Good Practice on Site Guide, 4th Edition*

CIRIA. E. Murnane, A. Heap and A. Swain. (2006). *"Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 - strict protection of certain species/applications for derogation licences"* issued on behalf of the Minister of the Environment, Heritage and Local Government on the 16th of May 2007.

CIRIA. H. Masters-Williams et al (2001). *Control of water pollution from construction sites. Guidance for consultants and contractors (C532). Control of water pollution from linear construction projects. Technical guidance (C648).*

Daire Byrne & Associates (2021) *Part B (Fire Safety) of the Building Regulations Compliance Report.*

DHLGH (2020) *Building Regulations (2006): Technical Guidance Document B Fire Safety (as amended, 2020).*

EC (2001). European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001.

Institute of Air Quality Management (IAQM) (2016). *Guidance on the assessment of dust from demolition and construction.*

ISO (2015). ISO 14001:2015 *Environmental management systems -- Requirements with guidance for use*

NRA (2006). *Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes*

NRA (2010). *Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*

TII (2011). *Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes*

TII (2020). *The Management of Invasive Alien Plant Species on National Roads – Technical Guidance*

Appendix A

Construction Traffic Management Plan

A1 Construction Traffic Management Plan

Watfore Ltd

Creamfields Housing Development

Construction Traffic Management Plan

252666-00-RPT-CTMP-SHD

Issue 2 | 14 February 2022

Job number 252666-00

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Document verification

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Job title		Creamfields Housing Development			**Job number** 252666-00
Document title		Construction Traffic Management Plan			**File reference**
Document ref		252666-00-RPT-CTMP-SHD			
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Draft 1	24 Nov 2021	**Description**	First draft		
			Prepared by	Checked by	Approved by
		Name	Simon Van Jaarsveld	Stephen Ginn	Stephen Ginn
		Signature			
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		Description	Issued for Planning		
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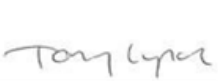
		Name	Simon Van Jaarsveld	Tony Lynch	Stephen Ginn
		Signature			
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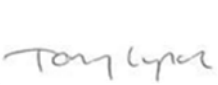
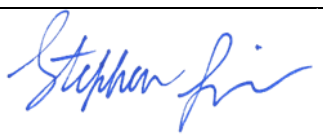
			Prepared by	Checked by	Approved by
		Name	Simon Van Jaarsveld	Tony Lynch	Stephen Ginn
		Signature			
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		Description			
			Prepared by	Checked by	Approved by
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Contents

1 Introduction

1.1 General

This report is an outline Construction Traffic Management Plan for the Strategic Housing Development proposed by Watfore Ltd proposed by Watfore Ltd at the former "CMP Dairies" site at Kinsale Road / Tramore Road, Cork. The Construction Traffic Management Plan (CTMP) will be further developed by the contractor, prior to the commencement of construction, to ensure that construction traffic will be managed and monitored safely and efficiently throughout the construction phase.

1.2 Purpose and Scope

This Construction Traffic Management Plan will be a key construction contract document, the implementation of which will reduce possible impacts which may occur during the construction of the proposed scheme.

The objectives of this CTMP are to:

- Outline minimum road safety measures to be implemented at the site access/egress locations and at the approaches to such access/egress locations, during the works;
- Demonstrate to the contractor and suppliers the need to adhere to the relevant guidance documentation for such works; and
- Provide the basis for the contractor to further develop the details of this CTMP.

Watfore Limited and/or the Employers Representative (ER) appointed by Watfore Limited will be responsible for ensuring that the contractor manages the construction activities in accordance with this CTMP.

Objectives and measures are also included for the management, design and construction of the project to control the traffic impacts of construction insofar as it may affect the environment, local residents and the public in the vicinity of the construction works.

In the event that the approval is granted for the proposed development, the CTMP will address the requirements of any relevant conditions, including any additional mitigation measures which are conditioned. The CTMP (updated by the contractor prior to construction to incorporate these conditions) will require approval from the Cork City Council and An Garda Síochána.

The objective of this CTMP is to ensure that the residual impacts to the public road network during the construction phase of the proposed development are minimised and that transport related activities are carried out as safely as possible and with the minimum disruption to other road users. The CTMP has also been prepared for the purpose of identifying appropriate and safe methods of access for construction traffic to the proposed scheme.

This CTMP describes the traffic management for the transportation of construction materials, equipment and personnel along the public road network to facilitate the construction of the proposed development. Light vehicles, such as cars and vans, will be used by site operatives travelling to and from the site. Heavy Construction Vehicles (HCV) will be required to deliver general construction materials, such as concrete, to the site and for the removal of excavated material that is to be disposed of off-site.

This CTMP will remain a live document that will be reviewed by the contractor and updated, where necessary, throughout the construction phase.

1.3 Implementation

Key to the implementation of the CTMP is the dedication of an on-site manager (nominated by the contractor) who will supervise the implementation of the plan and regularly liaise with and update the supervising employer's representative team on the operation of the plan and any proposed improvements. All site personnel will be charged with following good practice and will be encouraged to provide feedback and suggestions for improvements. Site personnel will also be required to ensure compliance with the requirements of the site's CTMP.

1.4 Document Revision

The CTMP will be subject to on-going review throughout the construction phase of the proposed scheme, and regular auditing and site inspections.

All of the information required to further develop the CTMP will be highlighted in the specification for the construction contract. The contractor will be required to include further details and/or confirmation, as described below.

2 Proposed Construction Traffic Generation

2.1 Overview

The potential temporary impacts of the scheme on the road network are as follows:

- Temporary impacts during construction due to the excavation of materials in order to facilitate construction, and the associated movements of excavation vehicles;
- Temporary impacts associated with the importing of construction materials to the works areas, and the relevant movements of delivery and construction vehicles and construction workforce;
- Construction staff commuting to and from the construction compounds; and
- General service traffic associated with construction activities (i.e. plant deliveries, visitors, traffic between compounds and working areas, etc.)

2.2 Traffic Generation from Proposed Scheme

The level of construction traffic associated with the proposed development will vary over the course of the construction programme. It is envisaged that construction will take place in four phases, starting at the northern part of the site with phase 1 and gradually moving towards the south as the remaining construction phases commences.

Although both applications, the Strategic Housing development and the Primary Care Centre site boundaries overlap, they are separate applications and it is assumed for the purpose of this CTMP that both applications will be granted planning permission and therefore that the construction of each development will occur concurrently.

The construction phasing is the best guess now and will need to be updated after planning permission is obtained and more detail on the construction programme becomes available. The current estimation suggests that following a site enabling works period of 2-4 months, Phase 1 will take approximately 2.5 – 3.5 years to complete, Phase 2 will take approximately 2 – 2.5 years, Phase 3 will take approximately 2.5 – 3.5 years and finally, phase 4 will take 1.5 – 2.5 years. It is estimated project completions will take 3 – 6 months.

An opening year of 2025 is assumed for Phase 1 of the development. Following this, construction will commence at Phase 2, and so forth. In 2025 therefore there will be traffic associated with first residential blocks occupied by residents and the functional primary health care facility and construction traffic associated with Phase 2.

By 2030, which corresponds to the Opening Year +5 it has been assumed that both development phases 1 and 2 will be completed and occupied and that phase 3 will be under construction. In 2040, the entire development will be in place and therefore no construction traffic associated with the development will be on the road network.

Heavy and Light Construction Vehicles

The movements of HCV's and LCV's to and from the site is expected to generate traffic from the following activities:

- Enabling works (piling, substructure, etc.);
- Superstructure works;
- Façade;
- Fit-Out; and
- Landscaping.

The fit-out and landscaping works are expected to be the most intensive from a construction vehicle perspective. During this time, it is estimated that approximately 250 HCV and LCV vehicles will travel to the site per week (i.e. a total of 500 two-way vehicle movements).

Assuming a 5.5 day working week, this would equate to a daily total of 46 HCV/LCV vehicles travelling to the site (a total of 92 two-way movements).

Allowing for an increase to account for any miscellaneous deliveries, it is proposed to increase this figure to a total of 50 vehicles per day (i.e. 100 two-way movements). Based on experience on previous construction projects it is estimated that 33 of the 50 vehicles will be HCV's, with the remaining 17 expected to be LCV's.

Heavy vehicles are expected to have an evenly spread distribution profile starting early in the morning throughout the day towards the evening.

Assuming HGV deliveries will not occur early in the morning and late in the evening and within an 8-hour time period everyday, assuming an 8-hour work day, it is estimated that on average a total of 4 HCV's and 2 LCV's arrive and depart the site (a total of 6 vehicles) in the peak periods on the local road network. This represents 8 HCV and 4 LCV trips per hour.

At a consultation meeting with Cork City Council (CCC), the Council requested that a stress test be carried out on the construction traffic trip generation to ensure that a worst case is represented. To ensure that a robust assessment is carried out a stress test scenario will be carried out for construction traffic by assuming that there are 50% more HCVs and LCVs arriving and departing during peak hours. This therefore represent 6 HCVs and 3 LCVs arriving and departing (a total of 9 vehicles) in the peak periods on the local road network. This represents 12 HCV and 6 LCV trips per hour.

Workforce

The most intensive phase of construction for workforce numbers is also the fit-out and landscaping phases, when a total of 250 construction personnel are expected to be on site per day.

Due to the site benefiting from bus services in the vicinity and cycle connectivity, it is therefore envisaged that a proportion of the construction staff will travel to and from the site by public transport and other alternative modes. It is anticipated that approximately 25% of staff will travel by bus, by bike or on foot.

To support this, only a limited amount of parking is proposed for construction staff (to be located within the applicant's landholding). Those workers that do travel to the site by car will be encouraged to car-pool, and it is assumed that there will be an average occupancy of 1.2 persons per car.

Therefore assuming 75% of staff will travel by car and an average car occupancy of 1.2 persons per car it is estimated that a total of 156 vehicles will travel to the site on a daily basis for construction workers. Allowing a 10% increase to account for miscellaneous trips increases this to 172 vehicles per day at the site.

Construction hours are expected to be from 08:00-18:00; however, the arriving and departure of personnel on site will be managed not to coincide with peak hour traffic. This can be done by agreeing with Cork City Council that site personnel should arrive before or after peak hour traffic. The prevailing peak hours should be determined closer to the time of construction by carrying out new link counts or by reviewing traffic data collected by permanent counting stations on the N40 and the N27.Based on the above it has been assumed that between 20 to 25%

(Assume 22.5%) of the construction personnel trips (38 vehicles) arrive on site during the morning peak and depart the site during the evening peak on the local road network, respectively. Allowance is also made for the off-peak direction during each peak hour period to account for instance for a contractor leaving the site during the AM peak due to unforeseen circumstances. A stress test has been carried out by adding 50% more construction traffic to the estimated traffic, to ensure that a robust assessment is carried out.

Conclusion

The table below shows the estimated construction traffic during peak hours. It shows two scenarios, Scenario 1: Expected Construction Traffic and Scenario 2: Stress test, where 50% more construction traffic has been added as a worst case.

Table 1: Estimated Construction Traffic during peak hours

Assessment Scenario	**HGV Trips**		**LGV Trips**		**Contractor / Workforce Trips**	
	Arrival	***Departure***	***Arrival***	***Departure***	***Arrival***	***Departure***
2025 Opening Year	6	6	3	3	57	7
2025 Opening Year + 5 Years	6	6	3	3	7	57
2025 Opening Year + 15 Years	-	-	-	-	-	-

2.3 Envisaged Construction Equipment

Construction equipment and vehicles required for each construction element/operation will be delivered to site by appropriate vehicles. Specific equipment and vehicles which are deemed to be required for the proposed development by the principal contactor, suppliers and staff are to be confirmed and included in the updated CTMP, prior to the commencement of construction.

3 Matters to be Addressed in More Detail

The contractor will be required to ensure that the contents of this CTMP are further developed prior to the commencement of works. The contractor will implement monitoring measures to confirm the effectiveness of the mitigation

measures outlined in the CTMP. The updated CTMP will address the following issues:

- Site/works area access and egress;
- Traffic management signage;
- Timings of material deliveries to site;
- Traffic management speed limits;
- Road cleaning;
- Vehicle cleaning;
- Road condition;
- Road closures;
- Enforcement of traffic management plan;
- Emergency procedures during construction; and
- Communication.

These items are explained in detail in the remainder of this section of the plan.

3.1 Site Access and Egress

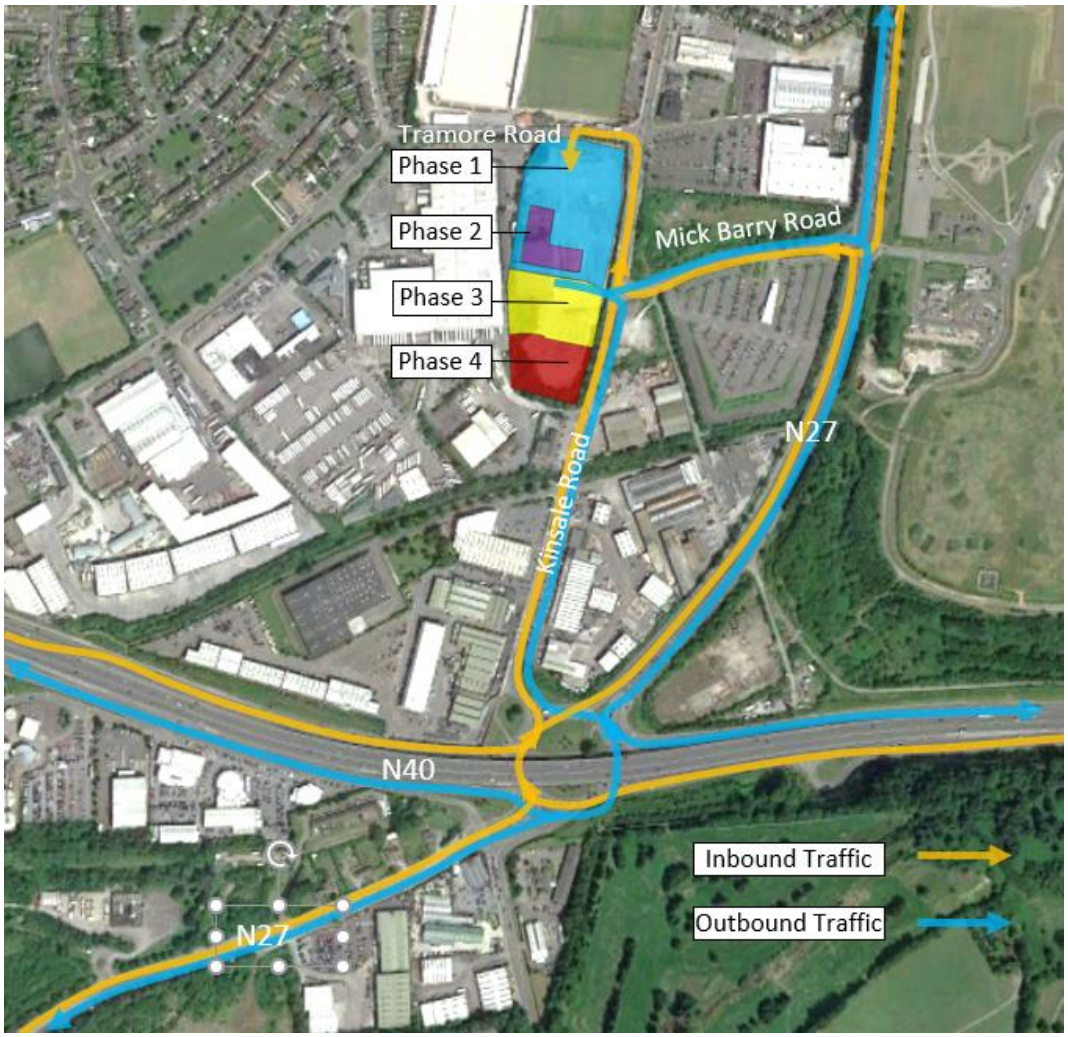
The proposed site access locations will be identified and the contractor will provide advanced warning signs, in accordance with Department of Transport's 'Traffic Signs Manual, Chapter 8: *Temporary Traffic Measures and Signs for Roadworks* (August 2019), on the approaches to proposed site access locations, a minimum of one week prior to construction works commencing at that location.

There are two accesses proposed to the site. The first access is off Tramore Road, at the original access to the site, while the second proposed access is to add a fourth arm to the Kinsale Road / Mick Barry Road junction, providing access to the site. During discussions with CCC, it was noted that Tramore Road / Kinsale Road junction is currently operating close to capacity and it was agreed that measures should be put in place to minimise the potential traffic impact on this junction.

To this end it is proposed that construction traffic should enter and exit the development site in a one way system. Both accesses will be operational from construction phase 1 onwards.

Figure 1 shows the proposed construction traffic circulation for the site development. It is proposed that the Tramore Road access is only used for inbound construction traffic while the Kinsale Road / Mick Barry junction access is used for outbound construction traffic. The greater majority of construction is expected to approach the site from the N40 and the N27 to the south of the development site. Some contractor vehicles and site employees are expected to approach the site from the City Centre direction.

Figure 1: Construction Traffic Circulation



3.2 National Road Network

Junction 6 on the N40 and the N27 national primary routes are anticipated to be utilised as the access route for all construction activity during the construction period.

3.3 Local Road Network

The following local roads will be utilised as haul routes during the construction period:

- Mick Barry Road
- Kinsale Road
- Tramore Road

As outlined earlier in this report, Tramore Road will only be used for inbound construction traffic. This is expected to minimise the traffic impact on the road network and especially Tramore Road as this will avoid right turning movements and include only left turning movements which involves less conflict with other

traffic movements. Compared to right turning traffic, left turning traffic movements has much higher capacity.

No construction traffic will be permitted to use Tramore Road approaching from the west. Although some contractors and staff may travel southbound from the City Centre towards the site and turn right onto Tramore Road, no HCV vehicles will take this route.

3.4 Traffic Management Signage

The Contractor will undertake consultation with the relevant authorities for the purpose of identifying and agreeing signage requirements. Such signage will be installed prior to works commencing on site.

Proposed signage will include warning signs to provide warning to road users of the works access/egress locations and the presence of construction traffic. All signage will be provided in accordance with the Department of Transport's 'Traffic Signs Manual, Chapter 8: *Temporary Traffic Measures and Signs for Roadworks* (August 2019).

In summary, the contractor will ensure that the following elements are implemented:

- Consultation with the relevant authorities for the purpose of identifying and agreeing signage requirements;
- Provision of temporary signage indicating site access route and locations for contractors and associated suppliers; and
- Provision of general information signage to inform road users and local communities of the nature and locations of the works, including project contact details.

3.5 Timings of Material Deliveries to Site

In order to reduce impacts on local communities and residents adjacent to the proposed sites:

- The contractor will liaise with the management of other construction projects in the area (if any) and the local authorities to co-ordinate deliveries;
- The contractor will schedule deliveries in such a way that construction activities and deliveries activities do not run concurrently, where practicable, e.g. avoiding pouring of concrete on the same day as material deliveries in order to reduce the possibility of numbers of construction delivery vehicles arriving at each site/works area location simultaneously, resulting in build-up of traffic on road network;
- The contractor will schedule deliveries to and from any proposed temporary construction materials storage yards or compounds such that traffic volumes on the surrounding road network are kept to a minimum;
- A construction phase programme of works will be developed by the contractor in liaison with Cork City Council, specifically taking into account

potential road repair works that are included in the local authority's road works schedule;

- HGV deliveries to specific areas of the site will be suspended on the days of any major local events, etc. that have the potential to cause larger than normal traffic volumes in the overlap areas. This in particular can include events at Musgrave Park;
- The contractor will liaise with members of the local community to ensure that construction-related traffic will not conflict with sensitive events such as funerals;
- Specific construction moratoria (for example, certain busy periods) as indicated by Cork City Council will be respected and incorporated into the construction phasing programme;
- HGV deliveries will avoid passing schools at opening and closing times where it is reasonably practicable; and
- Construction activities will normally be undertaken during daylight hours for all construction stages. It is anticipated that at critical certain stages of the construction works night-time and weekend work will be required, subject to consultation with Cork City Council and An Garda Síochána.

3.6 Traffic Management Speed Limits

Adherence to posted / legal speed limits will be emphasised to all staff and suppliers and contractors during induction training. Drivers of construction vehicles and HGVs will be advised that vehicular speeds in sensitive locations, such as local community areas, will be restricted to appropriate levels.

3.7 Road Cleaning

It will be a requirement of the works contract that the contractor carry out periodic road sweeping/cleaning operations to remove any scheme related dirt and material deposited on the road network by construction / delivery vehicles. Road sweepers will dispose of material following sweeping of road network, to a licensed waste facility.

3.8 Vehicle Cleaning

It will be a requirement of the works contract that the contractor will provide dry or wet wheel washing facilities where appropriate, and any other necessary measures to remove mud and organic material from vehicles exiting sites or works areas.

3.9 Road Condition

The contractor will ensure that:

- Loads of materials leaving each site will be evaluated and covered if considered necessary to minimise potential dust impacts during transportation.

- The hauliers will take all reasonable measures while transporting waste or any other materials likely to cause fugitive losses from a vehicle during transportation to and from site, including but not limited to:
    - Covering of all waste or material with suitably secured tarpaulin/ covers to prevent loss; and
    - Utilisation of enclosed units to prevent loss.
- The roads forming part of the haul routes will be monitored visually throughout the construction period and a truck mounted vacuum mechanical sweeper will be assigned to roads along the haul routes as required.
- In addition, the contractor will, in conjunction and through agreement with Cork City Council:
    - Undertake additional inspections and reviews of the roads forming the haul routes prior to the construction phase to record the condition of these roads at that particular time; and
    - Such surveys will comprise, any recording or documentation processes as determined necessary by Cork City Council.
- Where requested by Cork City Council prior to the commencement of construction operations, pavement condition surveys will also be carried out along roads forming part of the haul routes. These will record the baseline structural condition of the road being surveyed immediately prior to construction.
- Throughout the course of the construction of the proposed scheme, on-going visual inspections and monitoring of the haul roads will be undertaken to ensure any damage caused by construction traffic is recorded and that Cork City Council is notified. Arrangements will be made to repair any such damage to an appropriate standard in a timely manner such that any disruption is minimised.
- Upon completion of the construction of the proposed scheme, the surveys carried out at pre-construction phase will be repeated and a comparison of the pre and post construction surveys carried out.

3.10 Enforcement of Traffic Management Plan

All project staff and material suppliers will be required to adhere to the CTMP. The contractor will agree and implement monitoring measures to confirm the effectiveness of the CTMP and compliance will be monitored by the supervising employer's representative. Regular inspections / spot checks will also be carried out to ensure that all project staff, material suppliers and hauliers follow the measures specified in the CTMP.

3.11 Emergency Procedures During Construction

The contractor will ensure that unobstructed access is provided for all emergency vehicles along all routes and site accesses.

The contractor will provide to Cork City Council and the emergency services, the contact details of the contractor's personnel responsible for construction traffic management.

In the case of an emergency which occurs off site all construction traffic will be notified of the incident and location.

3.12 Communication

The contractor will ensure that close communication with Cork City Council and the emergency services is maintained throughout the construction phase. Such communications will include:

- Submissions of proposed detailed traffic management measures for comment and approval,
- Ongoing reporting relating to the condition of the road network and updates to construction programming,
- Information relating to local and community events that could conflict with proposed traffic management measures and construction traffic in order to implement alternative measures to avoid such conflicts.

The contractor will also ensure that the local community is informed of proposed traffic management measures in advance of their implementation. Such information will be disseminated by posting advertisements in local newspapers and delivering leaflets to houses in the affected areas. Such information will contain the contractor's contact information for members of the public to obtain additional information and to provide additional knowledge such as local events, sports fixtures etc. which may conflict with proposed traffic management measures.

4 Conclusions

This CTMP will form part of the construction contract and is designed to reduce possible impacts which may occur during the construction of the proposed development.

The CTMP will be further developed by the contractor following consultation with An Garda Síochána and Cork City Council.

The Employer representative will be responsible for ensuring that the contractor manages the construction activities in accordance with this CTMP and will ensure that any conditions of planning are incorporated into the site specific CTMP.

4.1 Monitoring

The implementation of the CTMP will be monitored by the contractor and employer's representative. Regular inspections / spot checks will be carried out to ensure that all project staff, material suppliers and hauliers follow the measures specified in the CTMP.

Appendix B

Invasive Species Management Plan

B1 Invasive Species Management Plan

DixonBrosnan
environmental consultants

Invasive Species Management Plan (ISMP)

Creamfields,
Kinsale Road, Cork

On Behalf of
Arup

February 2022

Project	Invasive Species Management Plan (ISMP) for proposed development at Creamfields, Kinasle Road, Cork	
Client	Arup	
Project Ref.	2111	
Report No.	2111	
Client Ref.	-	
Date	**Revision**	**Prepared By**
07/12/21	1st Draft	Sorcha Sheehy BSc PhD
20/12/21	2nd Draft	Carl Dixon BSc MSc
15/02/22	Issue to client	

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Table of Contents

1. Introduction

The information in this report has been compiled by DixonBrosnan Environmental Consultants, on behalf of the applicant. It provides information on the control of invasive species during construction works.

Invasive plant species have been recorded within the proposed development site boundary at Creamfields, Kinsale Road, Cork. One third schedule invasive species Japanese Knotweed (*Fallopia japonica*) was recorded within the proposed development site boundary. The medium impact species (NBDC) Buddleia (*Buddleja davidii*) and Himalayan Honeysuckle (*Leycesteria formosa*) and the low impact species Winter Heliotrope (*Arctostaphylos luciana*) were also recorded within the proposed development site.

This Invasive Species Management Plan (ISMP) describes the strategy that will be adopted during the construction and operation of the proposed development to manage the knotweed and other invasive species. This ISMP is a working document. Following the appointment of the contractor, and prior to commencing works on site, the ISMP will be further developed by the contractor.

The main objective of the ISMP is to control and prevent the spread of invasive species during the construction phase.

2. Methodology

This plan applies the most relevant and current guidance in relation to the treatment and management of invasive plant species in construction projects. The following guidance was referred to in preparation of this plan.

- NRA (2010) Guidelines for the Management of Noxious Weeds and Non- Native Invasive Plant Species on National Roads. National Roads Authority, Dublin.
- IW-AMP-SOP-009 Information and Guidance Document on Japanese knotweed
- Chapter 7 and Appendix 3 of the TII Publication: *The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads* (NRA, 2010)
- *Best Practice Management Guidelines for Japanese Knotweed* (Invasive Species Ireland, 2015)
- *Circular Letter NPWS 2/08 Use of Herbicide Spray on Vegetated Road Verges* (National Parks and Wildlife Service 2008)

3. Legislation

The control of invasive species in Ireland comes under the Wildlife (Amendment) Act 2000, where it states that

'Any person who— [...] plants or otherwise causes to grow in a wild state in any place in the State any species of flora, or the flowers, roots, seeds or spores of flora, ['refers only to exotic species thereof']][...] otherwise than under and in accordance with a licence granted in that behalf by the Minister shall be guilty of an offence.'

The Birds and Natural Habitats Regulations 2011 (SI 477 of 2011), Section 49(2) prohibits the introduction and dispersal of species listed in the Third Schedule, which includes Japanese Knotweed, as follows: "any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow [….] shall be guilty of an offence."

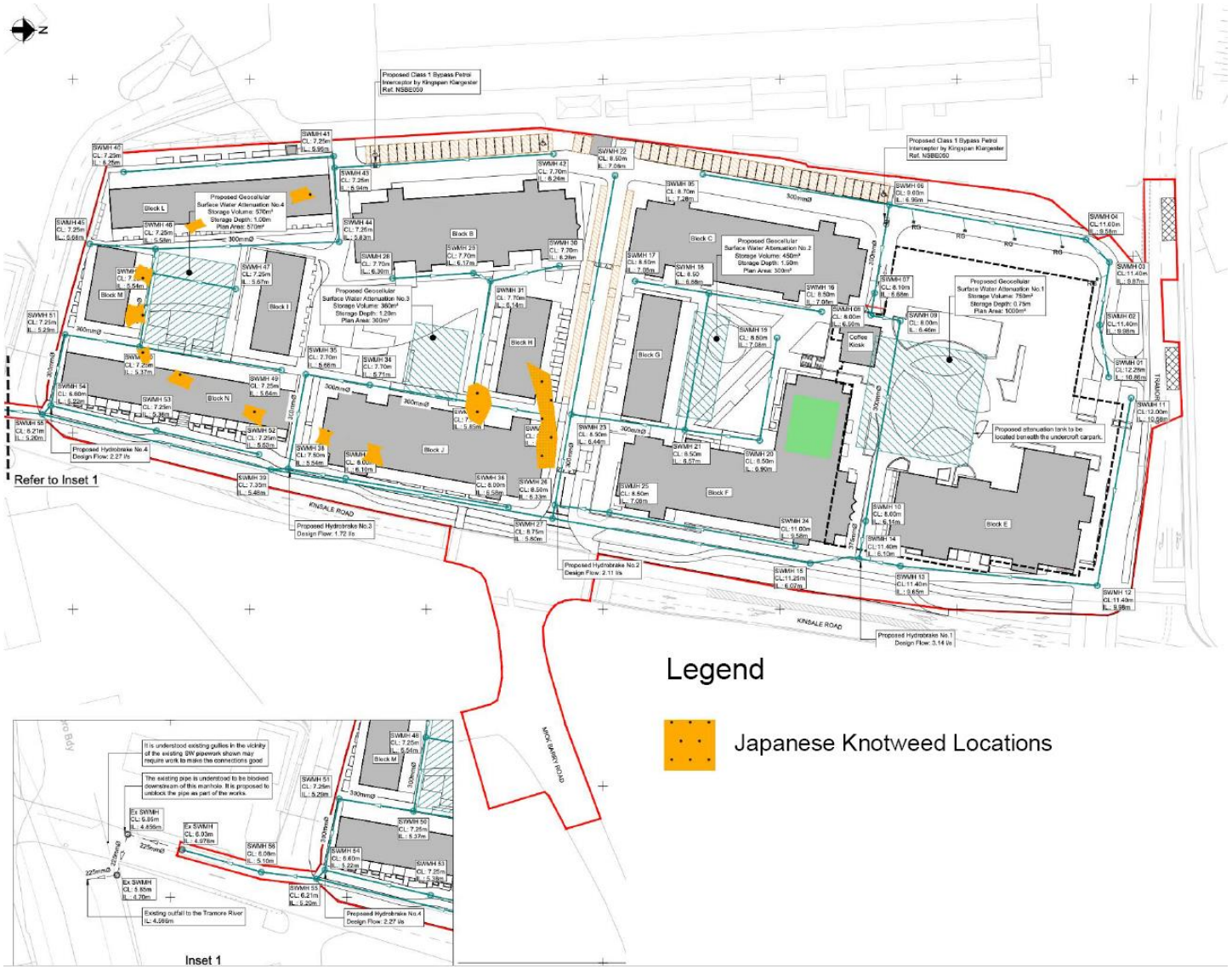

Figure 1. Location of Japanese Knotweed at proposed development site

Japanese Knotweed, which is listed on the Third Schedule, was recorded in dense stands within scrub habitat on the southern portion of the proposed development site.

Three other non-native species, Buddleia, Himalayan Honeysuckle and Winter Heliotrope, were also recorded with a scattered distribution at the proposed development site. These species are not included in the Third Schedule and therefore, the presence at these species at the proposed development site does not have the potential to lead to an offence under the Birds and Natural Habitats Regulations 2011 (SI 477 of 2011). However, the National Biodiversity Centre (NBDC) notes that under the right ecological conditions, these species may have an impact on the conservation goals of a European site or impact on a water body achieving good/high ecological status under the Water Framework Directive (Directive 2000/60/EC).

4. Invasive Species Within the Study Area

Dense stands of Japanese Knotweed dominate scrub habitat in the southern section of the proposed development site (**Figure 1**). The medium impact listed species (NBDC) Buddleia and Himalayan Honeysuckle were also recorded within the proposed development site boundary. Buddleia and Winter Heliotrope (a low impact species) were recorded along the Mick Barry Road at the east of the site.

Japanese Knotweed is a highly invasive, non-native species which was originally introduced as an ornamental plant but has since spread along transport routes and rivers to become a serious problem. From an ecological viewpoint it out-competes native species by forming dense stands which suppresses growth of other species. It grows extremely vigorously and can penetrate through small faults in tarmac and concrete and thus can damage footpaths, roads and flood defence structures. As it can survive in poor quality soils, including spoil, it often thrives in brownfield sites and in urban areas.

Buddleia (also known as the butterfly bush) is a member of the Buddlejaceae family. It is very fast growing and can reach 2m in its first year, producing flowers and setting seed. Buddleia is a native of China but is common as a garden plant owing to its profusion of flowers which tend to attract a considerable diversity of butterflies (hence its other common name). It is frequently found in waste ground in urban environments, though has a widespread distribution throughout the country. It colonises bare ground very rapidly and can quickly form mono-typic stands. As Buddleia tolerates very poor soils, it is capable of growing on walls, rock outcrops or sub-soils, conditions which are frequent on new road schemes. In particular it poses a threat where such features are being left to re-colonize naturally as in rock cuttings, eskers, etc.

Himalayan Honeysuckle, also known as Pheasant's Bush, is a deciduous shrub, up to 2m tall; leaves oval 5-18cm long; tall green bamboo like stems; purple berries, 5-12mm. There are no documented impacts recorded for this species though appears to be expanding its range in Britain and Ireland. It forms dense thickets that can exclude native vegetation. Its fruits are dispersed widely by birds, particularly robins and chaffinches and small mammals. Himalayan Honeysuckle is used as a hedging plant and as cover for pheasants. It is still widely sold as an ornamental.

Winter heliotrope is a member of the Asteraceae family, is a low-growing herbaceous plant originating in North Africa. It is established widely in Ireland being frequent along roadsides, hedgerows, woodland edges and waste ground. As apparently only the male plant that is

present in Ireland, its spread is confined to vegetative means. Winter heliotrope produces large roundish leaves up to 30cm in diameter, which are downy underneath. Its pale pink flowers, which are amongst the earliest flowers of the year appearing in December and January, have a distinctive sweet smell. The foliage appears later in spring (though last year's foliage may not dieback completely) and forms a dense carpet at about 30cm in height.

5. Japanese Knotweed Management During Construction Phase

This purpose of this plan is to:

- Identify the extent of the infestation on the site
- Ensure further growth and spread of the plant on the site does not occur
- Ensure the plant is not spread to other sites either adjacent to the infested site or through transportation of contaminated soil to another site
- Identify the best method for managing and controlling Japanese Knotweed and other invasive species on the site with regard to the proposed site works and construction methods
- Communicate the plan to all site operatives to ensure success of the plan
- Document and record the treatment and management methods carried out on site for future reference, for future site owners and site users and to avoid litigation.

The contractor will employ a suitably qualified ecologist to update the plan prior to the commencement of construction. The updated plan will contain the following:

- Site background including proposed works
- Extent of the Japanese Knotweed infestation
- Specific control plan to be put in place
- Site hygiene protocols
- Responsible individuals
- Follow up requirements
- Any other relevant information

5.1 Management Options for Japanese Knotweed

There are a number of suitable management options to control and prevent the spread of Japanese Knotweed. The methodology outlined in this document will be updated, if required, based on an up to date survey of the contaminated area. The proposed management plan will be agreed with Cork City Council prior to the works being carried out. It should be noted that:

- Where any infested material (soil containing Knotweed species) is to be taken off site, a licence to transport the material will be required from National Parks and Wildlife Service (NPWS).

- A landfill, which is licensed to accept such material, will be identified to dispose of the excavated material. The landfill site operator will be informed of what the material contains.

- Where herbicide treatment will be used, consideration will be given to the proximity of the herbicide treatment to watercourses and other vegetation.

For all management plans, site hygiene protocols will be implemented. These protocols will apply to sites which are infested with Knotweed and those where Knotweed is not growing to prevent contaminated material being brought to site. Site hygiene protocols are outlined in **Section 5.3** below.

5.2 Pre-Construction Survey

Since invasive species spread quickly, prior to the commencement of treatment, a pre-construction survey will be undertaken to identify the extent of invasive species at that time. The survey will be undertaken by a suitably qualified ecologist. This information will be utilised to update the ISMP.

5.3 Site Hygiene at Contaminated Areas

Construction equipment, vehicles and footwear may provide a vector for the spread of invasive species. Maintaining site hygiene at all times in an area affected by invasive species is essential to prevent further spread.

The following site hygiene measures will be implemented for the contaminated area:

- Understand the potential extent of the rhizome (root) system underground – up to seven metres horizontally and three metres vertically.

- Where possible, the contaminated area will be avoided and fenced off, or the extent of the rhizomes clearly marked.

- If possible, the use of machinery with tracks will be avoid contaminated areas. Movement of machinery between contaminated and non-contaminated areas must be controlled and adequate power washing measures implemented.

- Areas where contaminated soil is to be stockpiled on site will be clearly identified and marked out.

- Designated entry and exit points will be identified for personnel on foot and for small mobile equipment. A delineated access track, to be maintained free of knotweed species, will be established through the site to minimise the spread of Knotweed species by permitted vehicles accessing the site.

- Vehicles, including footwear and tools, leaving the site will be inspected for any plant material and washed down (using a pressure washer) in a dedicated vehicular wheel

wash down facility, which will drain into a contained area within the site. Particular care is required with tracked machines.

- Vehicles used in the transport of contaminated material will be visually checked and washed down into a contained area before being used for any other work, either in the same area or on a different site.
- Only vehicles required for essential works including site investigation works will be brought on site and the number of visits minimised as much as practicable.
- Material gathered in the dedicated wash down contained areas will be appropriately disposed of off-site.
- For any subsoil or topsoil entering the site, the supplier will be required to provide an assurance that it is free of knotweed.
- All site personnel will be made aware of measures to be taken and will be informed of the requirements of the ISMP.
- Site hygiene signage, in relation to the management of invasive species, will be erected.

6. Japanese Knotweed Management Options

In addition to the possible advance treatment works and pre-construction survey, areas identified as requiring specific invasive species treatment will be demarcated and the designated control measures implemented at the earliest possible stage to reduce the risk of spread along the proposed scheme or beyond the land take.

There are a number of management options that may be implemented to control and prevent the spread of invasive species. These are presented in the sections below.

Those involved in the application of herbicides/pesticides will be competent to do so and, consequently, will have sufficient training, experience and knowledge in the area of herbicides/pesticides application.

All staff involved in the application of herbicides/pesticides will have received appropriate training, which may include achieving competency certification in the safe use of herbicides/pesticides through a National Proficiency Tests Council registered assessment centre or achieving an appropriate FETAC award in this area.

It is likely that chemical treatment, as described in **Section 6.1** will be the most suitable method for the identified invasive species.

6.1 Chemical Treatment

The control of knotweed will require the use of herbicides, which can pose a risk to human health, to non-target plants or to wildlife. In order to ensure the safety of herbicide applicators and of other public users of the site, it is essential that a competent and qualified person carries out the herbicide treatment. A qualified and experienced contractor will be employed to carry out all treatment work.

The contractor will follow the detailed recommendations of the following documents for the control of invasive species and noxious weeds:

- *Chapter 7 and Appendix 3 of the TII Publication: The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads* (NRA, 2010)
- *Best Practice Management Guidelines for Japanese Knotweed* (Invasive Species Ireland, 2015)
- *Circular Letter NPWS 2/08 Use of Herbicide Spray on Vegetated Road Verges* (National Parks and Wildlife Service 2008)

These documents include measures to aid the identification of relevant species, with details for the timing, chemicals and methodology for chemical control, and for measures to avoid environmental damage during the use of herbicides.

Chemical treatment involves the application of an herbicide to invasive species plant such as knotweed stands without any excavation or removal of the plant material. The preferred types of herbicides to be used in the treatment of knotweed are Glyphosate and 2,4-D Amine.

If herbicide is applied as the treatment option, it may need to be reapplied for up to five years after the first application to ensure the plant control measures have been effective.

Glyphosate is non-persistent and can be used near water but it is not selective (i.e. it is a broad spectrum chemical and will impact all plant species) whereas 2,4-D Amine can be persistent for up to one month, and can also be used near water but is more selective on certain plants. The selection of chemical by the contractor and supervising ecologist will depend on seasonal factors, site conditions, proximity to water, surrounding habitats etc.

The most effective time to apply Glyphosate is from July to September (or before cold weather causes leaves to discolour and fall). The majority of herbicides are not effective during the winter dormant stage because they require living foliage to take up the active ingredient.

Reapplication rates will depend on site specific considerations including the extent of the infestation, its location, and the time of year treatment commences. Details of the proposed chemical treatment plan will be included in the updated ISMP.

Foliar treatment (spraying) is usually applied with a sprayer such as a knapsack sprayer or a larger spray system. It is important to use a treatment dye to identify clearly all areas treated. Foliar treatment is an efficient way to treat large monocultures of invasive plants, or to spot-treat individual plants that are difficult to remove mechanically such as Japanese Knotweed.

In the case of knotweed, depending on weather and temperatures in the days following the initial treatment, and to ensure optimal uptake of herbicide into the rhizome system, a second similar treatment will be required usually within ten days, before the internal vascular system is no longer capable of translocating the herbicide to the root system.

While the upper surface of the leaves will be easier to treat, it is also important to treat the leaf under surface as knotweed possesses many stomata openings on the leaf under surface. Dead stems can be cut, removed and burned on/off site in accordance with the relevant legislation.

The stem injection method is sometimes used for knotweed control. This treatment requires a higher concentration of the active ingredient than is used in foliar applications. It involves the use of a specialist herbicide injection tool whereby the injection tool injects the herbicide directly into each of the canes approximately 20-30cms from the base of each cane (between the 1st and 2nd nodule).

Subsequently approximately 10 mL of herbicide mix is injected into each cane at a ratio of 5:1 through the use of a specialist stem injection tool. The application of glyphosate-based products by injection is most effective when applied in the early Autumn (mid to late Sept). Regrowth will occur in subsequent years, albeit much less vigorously, which will require follow up treatment at the appropriate time of year. Spot treatment will be required each year until no regrowth is observed.

In order to ensure that the use of herbicides does not contravene legislation, the contractor must comply with Circular Letter NPWS 2/08 *Use of Herbicide Spray on Vegetated Road Verges* from the National Parks and Wildlife Service dealing with the application on to non-target areas.

6.2 Excavation and Chemical Treatment On-Site

This option employs both physical and chemical methods of treatment. This method is employed in situations where treatment of invasive species, in particular knotweed, is required to be completed in a relatively short timeframe. Generally, digging up the rhizomes and re-cultivating it stimulates plant growth and will result in more successful herbicide application and management.

In summary, this management method requires cutting and killing of the surface plant. The cut material must be left on top of plastic sheeting until dried out and subsequently monitored for any sign of regrowth. Storage of cut material should not take place within flood risk zone of a river. The cut material should not be placed in a green waste recycling bin. Once dried out, the material should be burned on site in accordance with the relevant legislation. The surface of the affected area should be raked with tines to remove crowns and surface material, and in order to break up the rhizomes, bringing them to the surface, which will stimulate leaf production. This will make the plant more vulnerable to herbicide treatment. The more rhizomes that are brought to the surface, the more growth will occur, allowing for a more successful treatment. An excavator can be used to scrape the surface crowns and rhizomes into a pile and then to cultivate the ground to stimulate rhizomes to produce a higher density of stems for treatment. Reapplication of herbicide may be required for up to five years after initially application, subject to the site-specific management plan.

6.3 Excavation and burial

Excavated material containing knotweed can also be buried on site. This will require burying the material at a depth of at least five metres. The contaminated material must be covered with a root barrier membrane before being backfilled with topsoil, or other, suitable fill material. The manufacturer’s guarantee is required that the membrane will stay intact for at least 50 years. An accurate map and record of the location of the burial site, to prevent any future accidental disturbance, is required, and future owners must be informed of its position. If soil containing knotweed is stockpiled, the material must be stored in a manner that will not harm health or the environment. The stockpile should be on an area of the site that will remain

undisturbed. The area should be clearly fenced and marked with warning signs, and the stockpile should be regularly treated with herbicide to prevent any regrowth or re-infestation.

As a precaution, the stockpiled material should be laid on a root barrier membrane and covered to avoid contaminating the site further. The contractor must also comply with all waste legislation.

6.4 Excavation and root barrier membrane

Excavated material containing knotweed can also be buried on site within a root barrier membrane cell. The procedure is similar to that described in **Section 6.3** above.

This method will require burying the material at a depth of at least two metres. The contaminated material must be placed in a contained cell formed by a root barrier membrane before being backfilled with topsoil, or other, suitable fill material. The manufacturer's guarantee is required that the membrane will stay intact for at least 50 years. The method for stockpiling prior to burial would be as described as above. The contractor must also comply with all waste legislation.

6.5 Excavation and bund method

Where there is not sufficient depth on a site excavated material can be placed in a structured bund. The bund will comprise a raised area above ground level or a shallow excavation, no more than 0.5m deep, and lined with a root barrier membrane. The manufacturer's guarantee is required that the membrane will stay intact for at least 50 years. This method of treatment can also be used where knotweed material needs to be moved from a location and there is another area of the site available to contain it.

The aim of this method is to concentrate the rhizome material into the upper surface of the bund, where it will grow and be controlled by herbicide. If the rhizome is buried deep, it will become dormant when inside the bund and regrow when the apparently clean soil is used for landscaping on the site. The bund location needs to be clearly marked by warning signs and protected from potential accidental damage. Reapplication of herbicide may be required for up to five years after the initial application, subject to the site-specific management plan.

The appointed contractor must comply with waste legislation if this method is to be considered.

6.6 Excavation and removal from site

Where the above treatment options are not possible because the site is too small to contain excavated material, or too shallow for burial, or where there is a lack of space or where the infestation simply cannot be avoided by the construction works, removal of excavated material may be the only option. If any invasive species plant material is collected (e.g. by hand-pulling or mowing), it is important that its disposal will not lead to a risk of further spread. Where there are small amounts of Knotweed material to be removed it is possible to double bag the material and send to a licenced waste facility for disposal. Where the amount of material is larger in volume, it will be necessary to haul it from site to a suitably licenced waste facility.

Invasive species material, particularly roots, flower heads or seeds, must be disposed of at licensed waste facilities appropriately buried, or incinerated in compliance with the relevant legislation. Disposal must be carried out in accordance with the relevant waste management

legislation. Invasive species plant material or soil containing residual herbicides may be classified as either ‘hazardous waste’ or ‘non-hazardous waste’ under the terms of the Waste Management Acts, and both categories may require special disposal procedures or permissions. If the material has been treated with a persistent herbicide, the excavated material must be classified as hazardous waste and must be disposed of to a hazardous waste facility. Advice would need to be sought from a suitably qualified waste expert regarding the classification of the waste and the suitability of different disposal measures.

The movement of invasive plant material requires a licence from the NPWS under Section 49 of the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended).

7. Preferred Treatment Option Advance Chemical Treatment and Continued Chemical Treatment of Regrowth

The knotweed within the proposed development boundary is located within an area zoned as Flood Zone C. The risk of fluvial, pluvial, tidal and groundwater flooding on the site is low. However, in the event of a very extreme high-intensity rainfall event, the capacity of the drainage system on the site could be exceeded, leading to surface water/ ponding on the site. As there is the potential for flooding to impact on the area currently contaminated with knotweed species, there is the potential for fragments of knotweed to be spread from the works area and inadvertently distributed off-site.

Having assessed the available management options and constraints associated with this particular site, it has been concluded that *in-situ* chemical treatment prior to construction, careful management of the works and continued in-situ chemical treatment post construction is the preferred option. This is primarily due to the following significant constraints.

The risk of fragments of knotweed being spread outside of its current distribution is high as high flood levels could result in fragments of knotweed, which are dislodged during site works, being carried downstream along the River Lee and thus impacts on off-site receptors could occur.

For the re-growth material within the site or juvenile plants, a foliar spray application using a cowled knapsack sprayer will allow for efficient treatment when stems are too small and fragile to use stem injection.

Therefore, the following methodology is proposed:

1. Contractors will commence chemical treatment of the knotweed species in this area, in order to avoid the continued spread of the species. The preferred method for initial treatment is stem injection and spot treatment. This will be carried out under the supervision of a qualified ecologist who will ensure that the correct methodology and appropriate site hygiene methods are utilised. This ISMP will be updated by the supervising ecologist if required. Early treatment will effectively reduce the length of time that chemical treatment will be required. It is noted that knotweed can persist for long periods and the sooner treatment commences, the more rapidly this species will be eradicated from the works area.

2. Prior to the commencement of site works, the extent of contamination will be determined by site investigations including trial pits. This information will be used to determine the area of contamination taking into account that the roots of knotweed can extend 7m from the parent plant. If it is determined by visual inspections/trial hole investigation that viable plants remain within the work area the spreading of this viable Knotweed plant material outside the current area of contamination is not permitted.

3. Following the above, the identified area of contamination will be clearly fenced and all works in relation to knotweed will be carried out only within this fenced area.

4. Where possible, contaminated soil will remain on-site and be treated. The transport of any material that must be removed off site for disposal, as part of the construction works, will require a licence from the NPWS.

5. Any excavations that are carried out as part of the project, must be contained within this area and the spread of any fragments of viable plant material or contaminated soil outside of this area must be effectively prevented. All hygiene protocols as listed in this ISMP must be effectively implemented.

6. Any contaminated material including material from the wash down area must be contained within the identified and fenced contaminated area or removed to a suitably licenced facility offsite in line with standard hygiene measures.

7. Once works within the contaminated area is complete a follow-up programme of works will commence to treat any regrowth of knotweed. This will consist of stem injection and spot treatment and it will continue until the supervising ecologist can certify that Knotweed has been effectively eradicated.

8. The application of herbicide (injection/spot treatment) must take into account the risk of flooding which must be assessed immediately prior to the use of herbicides. Treatment will not be carried out when heavy rain is forecast or in the winter period when there is a higher risk of flooding and adverse weather.

8. Management of Other Non-native Species During Construction Phase

As noted in **Section 3** of this report, there is no statutory obligation to remove Buddleia, Winter Heliotrope or Himalayan Honeysuckle. However, removal is recommended.

8.1 Buddleia and Himalayan Honeysuckle

These species are straightforward to control using a mixture of mechanical removal and herbicide treatment. It is noted that Buddleia is a plant that favours disturbed sites, physical grubbing of plants can provide ideal conditions for the germination of seeds. Therefore, care needs to be taken to ensure re-vegetation of controlled areas is undertaken swiftly. The branches of Buddleia are capable of rooting as cuttings, so care should also be taken to ensure material is disposed of in a manner to avoid this risk.

Physical Control

Management methods such as digging it out are applicable only to minor infestations at the initial stage of invasion. Hand-picking of young plants is feasible but should be undertaken with care to avoid soil disturbance which can give rise to a flush of new seedling. Grubbing of mature stands as a sole attempt at control is not recommended for the same reason. After uprooting, it is essential to plant the ground in order to prevent a flush of new seedling growth.

When it is cut, both species grow back from the stump very vigorously. Mowing of young plants does not provide control as they re-sprout with vigour. Where removal of mature plants is not feasible in the short term, the flower heads should be cut off in June before seed set.

Chemical Control

Recommended practice for the application of herbicides requires cutting back of plants to a basal stump during active growth (late spring to early summer) which is then treated (brushed on) immediately with a systemic weed killer mix. Foliar application of triclopyr or glyphosate

may be adequate for limited infestations of younger plants but should be followed up at 6 monthly intervals. Where herbicide treatment will be used, consideration will be given to the proximity of the herbicide treatment to watercourses and other vegetation.

8.2 Winter Heliotrope

8.2.1 Physical Control

Due to the extensive rhizome network, physical removal of winter heliotrope is really only practical on a limited scale. Where mechanical means can be employed, it should be possible to deal with larger infestations but due to the potential for regeneration from fragments of roots, it may be best to tackle its control using a combination of excavation with follow-up treatment by herbicides. As with other plants with the potential to spread from small root fragments, disposal of material should be undertaken with due caution to prevent accidental spread of the plant. Other means of disposal include burial of material at a depth of at least 2m, incineration or disposal to licensed landfill. There is no evidence that the material would withstand composting though this approach would probably only be suitable for limited infestations.

8.2.2 Chemical Control

An application of a glyphosate-based herbicide after flowering in February to March is recommended by Cornwall Nature Reserves (2008), though the Royal Horticultural Society (2008b) recommends spraying in mid- summer or later but before the foliage begins to die back.

9. Conclusion

Japanese Knotweed is a high risk invasive plant species and will be treated in accordance with this ISMP.

It is important that knotweed is effectively eradicated within the site boundary and that the spread of this species outside of the site boundary via surface water discharges or construction works does not occur.

Herbicide treatment of knotweed via stem injection and spot treatment will commence as soon as practically possible under the supervision of a qualified ecologist. Site investigations will be carried out prior to the commencement of works to determine if Knotweed species are still present and the degree of contamination.

This information will be utilised to determine the extent of the contaminated area and will be utilised to update this ISMP. Detailed fencing and hygiene protocols will ensure that viable plant material will not be spread outside of its current distribution area. Following completion of works, monitoring and treatment protocols will be implemented to ensure any regrowth is effectively treated.

Buddleia, Himalayan Honeysuckle and Winter Heliotrope are considered a lower risk species and will be treated via cutting back to a basal stump or grubbing out followed by chemical treatment. Treatment will continue until the supervising ecologist certifies that this species has been effectively removed from the works area.

References

Invasive Species Ireland (2015) Best Practice Management Guidelines for Japanese Knotweed

IW-AMP-SOP-009 Information and Guidance Document on Japanese knotweed

National Parks and Wildlife Service (2008) Circular Letter NPWS 2/08 Use of Herbicide Spray on Vegetated Road Verges

National Roads Authority (2010) The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads

NRA, 2010 Chapter 7 and Appendix 3 of the TII Publication: *The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*