Construction Environmental Management Plan (CEMP)

FOR

RESIDENTIAL DEVELOPMENT

AT

ST. PAUL'S COLLEGE, SYBIL HILL,
RAHENY, DUBLIN 5

October 2019

ON BEHALF OF

CREKAV TRADING GP LTD.

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DOCUMENT CONTROL SHEET

Client	Crekav Trading GP Ltd.
Project Title	Residential Development at St. Paul's College, Sybil Hill, Raheny, Dublin 5
Document Title	Construction Environmental Management Plan (CEMP)

Revision	Status	Author(s)	Reviewed	Approved	Issue Date
1.0	Draft	Mairead Foran *Environmental Consultant*	Jim Dowdall *Director*	Jim Dowdall Director	22/08/2019
2.0	Draft	Mairead Foran *Environmental Consultant*	Mairead Foran *Environmental Consultant*	Muriel Ennis *Principal Environmental Consultant*	24/08/2019
3.0	Draft	Mairead Foran *Environmental Consultant*	Muriel Ennis *Principal Environmental Consultant*	Jim Dowdall Director	29/09/2019
4.0	Draft	Mairead Foran *Environmental Consultant*	Muriel Ennis *Principal Environmental Consultant*	Jim Dowdall Director	06/10/2019
5.0	Final	Mairead Foran *Environmental Consultant*	Muriel Ennis *Principal Environmental Consultant*	Jim Dowdall Director	14/10/2019

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1 INTRODUCTION

This Construction Management Plan CEMP has been prepared by Enviroguide Consulting on behalf of Crevak Trading GP Ltd. for Residential Development ("the Proposed Development") at St. Paul's College, Sybil Hill, Raheny, Dublin 5 ("the project"). This CEMP details the proposed works and defines the environmental measures that shall be implemented for the construction works in order to manage, minimise or mitigate any potential environmental impacts that may arise as a result of the Proposed Development. A detailed description of the Proposed Development is provided in Section 2.

1.1 Objective/Purpose

The objective/purpose of this document is to set out and communicate the procedures, standards, management responsibilities and key environmental obligations that apply to all contractor organisations, their sub-contractors and employees in order to address and prevent potential environmental effects that may arise from the construction of the Proposed Development. This CEMP will be required to meet the requirements of ISO 14001 and ISO 14004 for Environmental Management Systems. This CEMP is to be read in conjunction with the Asbestos Survey and Lead Paint Survey procured by Crekav Trading GP Ltd. (for the building to be demolished and included in Appendix 13 of the EIAR) and with reference to the Environmental Impact Assessment Report (EIAR) and Appropriate Assessment Natura Impact Statement. A Construction, Demolition & Waste Management Plan (CDWMP) prepared by O' Connor Sutton, Cronin, Consulting Engineers, (OCSC) for the Proposed Development has been incorporated into this document and forms part of this report..

1.2 Scope of the CEMP

This CEMP defines the approach to environmental management implementation and roll-out of the project.

Compliance with the CEMP, the procedures, work practices and controls **will be mandatory** and must be adhered to by all personnel and contractors employed on the construction / roll-out phase of the Proposed Development. This CEMP seeks to promote best environmental practices on-site for the duration of the construction phase.

1.3 'Live document'

This CEMP is considered a 'live' document and as such will be reviewed on a regular basis. Updates to this CEMP may be necessary due to any changes in environmental management practices and/or contractors. In addition to further mitigation measures that may be identified as part of detailed design and review in terms of Environmental Impacts.

As detailed in the later sections, the procedures agreed in this CEMP will be audited throughout the project roll-out phase to ensure compliance.

This CEMP will be updated, following grant of planning permission, to ensure all conditions, emission limit values and trigger levels contained within the Grant of Permission are incorporated and it will also set out how this will be achieved.

2 PROPOSED DEVELOPMENT DESCRIPTION

2.1 Proposed Development Site Overview

The Proposed Development lands currently accommodate grasslands formerly associated with St. Paul's College secondary school at Sybil Hill in Raheny, Dublin 5 approximately 5km from Dublin City Centre (see figure 1 for site location). The site is predominantly greenfield except for 1 no. small prefabricated building. This building will be demolished as part of the Proposed Development to facilitate construction of 657 no. residential units with ancillary infrastructure including a new access road and public open space. The current facilities adjoining the site include an existing secondary school (St. Paul's College), sports pitches and facilities and a religious community (the Vincentian Order) based at Sybil Hill House (a protected structure).

St. Paul's College and Sybil Hill House lie to the immediate west of the subject site. The lands are bounded by a mixture of fencing, masonry walls and existing mature trees mainly comprising evergreen oak as well as existing brick walls along the northern boundary with St. Anne's Park (see figure 2 for site layout). The site is currently accessed from the R808 Sybil Hill Road.. There is also a residential facility for the Vincentian Order adjoining the site to the northwest. There is a residential development, The Meadows, to the northwest of the site. To the west and directly across Sybil Hill Road from the Proposed Development is the 'Little Sisters of the Poor's nursing home and Convent.

FIGURE 1 SITE LOCATION

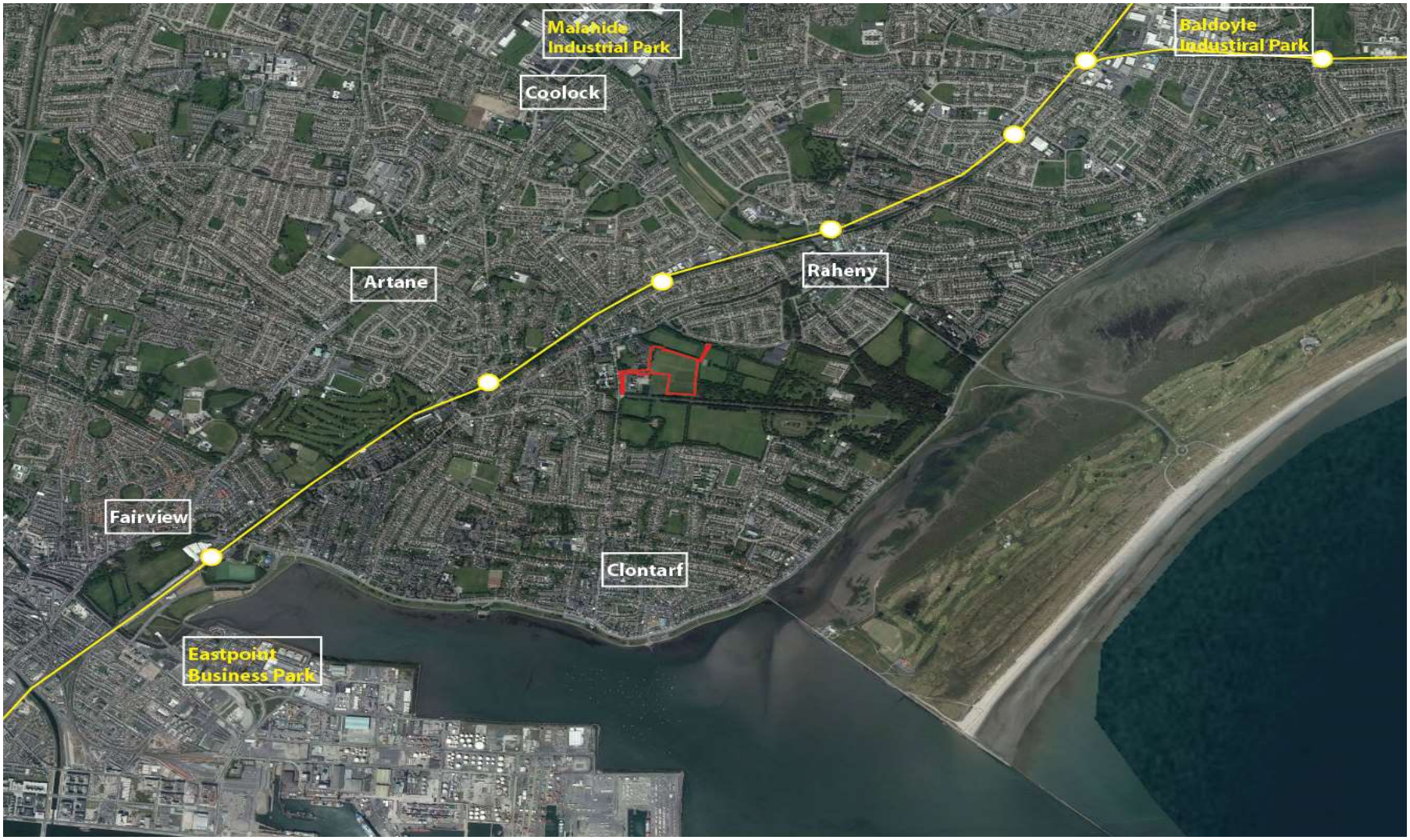
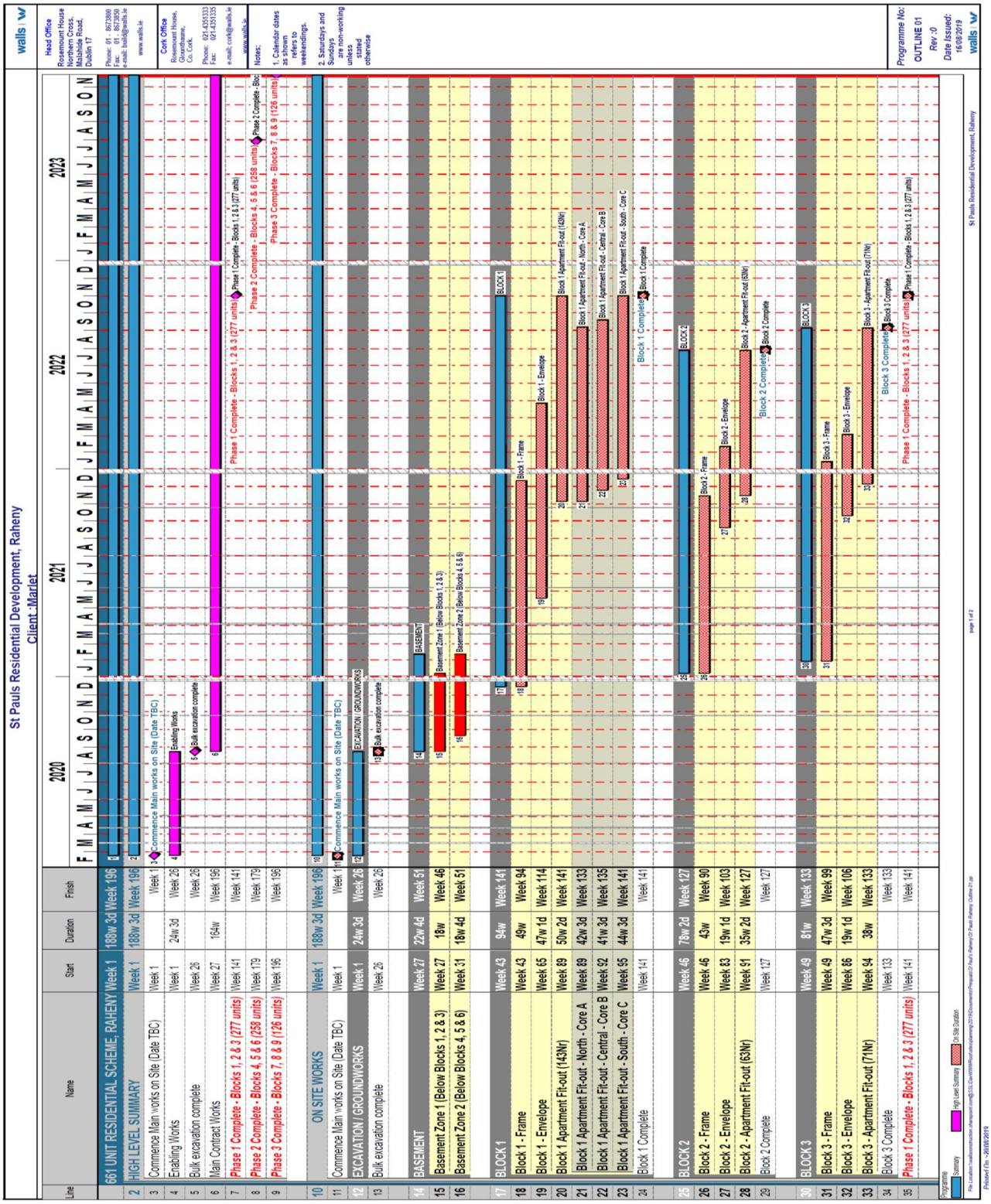


FIGURE 2 SITE LAYOUT

FIGURE 3 BUILD SCHEDULE



2.2 Proposed Development Overview

The development will consist of the construction of a residential development set out in 9 no. blocks, ranging in height from 5 to 9 storeys accommodating 657 no. apartments, residential tenant amenity spaces and a crèche.

At basement level the site will accommodate car parking spaces, bicycle parking, storage, services and plant areas.

Landscaping will include extensive communal amenity areas, and a proposed significant area of public open space.

The Proposed Development also includes for the widening and realignment of an existing vehicular access onto Sybil Hill Road and the demolition of an existing pre-fab building to facilitate the construction of an access road with from Sybil Hill Road between Sybil Hill House (a Protected Structure) and St Paul's College incorporating upgraded accesses to Sybil Hill House and St Paul's College and a proposed pedestrian crossing on Sybil Hill Road.

The Proposed Development also includes for the laying of a foul water sewer in Sybil Hill Road and the routing of surface water discharge from the site via St. Anne's Park to the Naniken River and the demolition and reconstruction of existing pedestrian stream crossing in St. Anne's Park with integral surface water discharge to Naniken River[1].

3 CONTROL OF THE CONSTRUCTION PROCESS

3.1 Project Roles and Responsibilities

3.1.1 Project Environmental Consultant

A Project Environmental Consultant will be appointed for the duration of the Construction phase. The Project Environmental Consultant will be responsible for producing all environmental reporting procedures. The Project Environmental Consultant will be trained and qualified in the field of Environmental Management

The principal duties of the Project Environmental Consultant will include:

- Overall responsibility for maintaining and the ongoing development of the CEMP, and all related supporting documents such as environmental control plans and procedures;
- Ensure compliance with the Conditions of the Planning Permission;
- Ensuring the mitigation measure set out in the Environmental Impact Assessment Report (**EIAR**) are implemented;
- Advise and guide site management (*e.g:* Construction Manager) on environmental issues;
- Be responsible for the maintenance of all environmental related documentation; and
- Produce environmental data trends/incident reports as required.

[1] It should be noted that the terms Naniken River and Naniken Stream are interchangeable and for the purpose of this planning application and all supporting reports and documentation both names refer to the same waterbody.

3.1.2 Construction Director

The Construction Director will be responsible for the overall execution and organisation of all environmental related activities, as appropriate. Some of the principal duties and responsibilities of this role include;

- Overall responsibility for the implementation of the CEMP;
- Allocating the correct resources in order to ensure the successful implementation of the CEMP; and
- Assist in the management review of the CEMP for suitability and effectiveness.

3.1.3 Construction Manager

The Construction Manager is directly responsible to the Construction Director in assisting with the successful execution of the Proposed Development. The principal duties and responsibilities of this role in respect of the CEMP include:

- To report to the Construction Director on the on-going performance and development of the CEMP;
- To discharge his/her responsibilities as per the CEMP; and
- To support and augment the Construction Management Team (CMT) through the provision of adequate resources and facilities for the duration of the implementation of the CEMP.

3.1.4 Environmental Officer

The CMT Environmental Officer will have responsibility for daily tasks on site, some of the principal duties and responsibilities of this role include:

- Report to the Construction Manager on the environmental performance of staff, employees and contractors;
- Ensure compliance with environmental procedures and method statement; and
- Ensure development of the CEMP and that environmental procedures, method statements and work instructions are adequately executed and adhered to with respect to environmental requirements on site on a daily basis.

3.2 Environmental Incidents and Complaints

The Construction Manager will be responsible for maintaining a register of any incidents/events that may occur on site. The Construction Manager will also develop and implement an appropriate complaints procedure, and all follow up actions on the construction site will be managed by the CMT. The Project Communications Officer (to be appointed) is responsible for responding to any issues or complaints that may be raised by the public in relation to the construction phase of the project, they will also liaise with the Environmental Officer on community concerns relating to the environment.

3.3 Monitoring, Continual Improvement and Review

This CEMP will be reviewed and updated as necessary for the duration of the construction phase. This will ensure that the developments environmental commitments will be continuously monitored in order to mitigate any potential forthcoming risks and to continue best practice.

4 CONSTRUCTION WORKS MANAGEMENT

4.1 Construction Phase

The Proposed Development is located in the northern suburbs of Dublin City, c. 5km from the city centre, in an established residential area.

The site of the Proposed Development is located east of the R808 Sybil Hill Road, immediately east of St Paul's College (Secondary School) and Sybil Hill House (a protected structure), in Raheny, Dublin 5; see Figure 2 above. The R808 Sybil Hill Road runs north-south connecting the R105 Howth Road (north of the Proposed Development) with the R807 Clontarf Road (to the south).
The site of the Proposed Development is enclosed:

(i) by the grounds of St Anne's Park to the north, east and south;

(ii) by the sports grounds of St Paul's College to the south; and

(iii) to the west by residential development at The Meadows, Sybil Hill House and St Paul's College.

The 4-storey Convent building / grounds of the Little Sisters of the Poor is located to the immediate west of Sybil Hill Road.

The Proposed Development comprises the construction of a residential development to accommodate apartments and residential amenity spaces, located on lands east of St Paul's College, Sybil Hill Road, Raheny, Dublin 5. The redline boundary for the Proposed Development is c. 6.7 hectares (**ha**) and the Site (development site) is c. 6.4ha.

As a general overview, the Proposed Development comprises:

a) Nine (9) no. residential apartment blocks, ranging in height from 5 storeys to 9 storeys, accommodating 657 no. apartments consisting of:

   (i) 224 no. 1 bed units

   (ii) 378 no. 2 bed units

   (iii) 55 no. 3 bed units

b) Residential tenant amenity spaces

c) A crèche

d) Public open space provided to the south of the residential development

e) Balconies and terraces to be provided on all elevations at all levels for each residential apartment block

f) 465 no. basement car parking spaces

g) 34 no. surface car parking spaces (including 2 no. GoCar, 2 no. electric car and 2 no. disabled parking spaces)

h) 1646 no. bicycle parking spaces

i) Refuse storage, services, plant areas

j) All associated site development works necessary to facilitate the Proposed Development, which includes widening and realignment of the existing vehicular access onto Sybil Hill Road, to facilitate the construction of an access road with footpaths and on-road cycle tracks

k) A proposed pedestrian crossing on Sybil Hill Road.

l) The Proposed Development also includes for the laying of a foul water sewer in Sybil Hill Road and the routing of surface water discharge from the site via St. Anne's Park to the Naniken River (which may also be referred to as the Naniken Stream).

4.1.1 Phase I

Phase I will comprise 277 units and will commence in early 2021 with the site enabling works and basement dig. Once these works are complete (approximately 7 months duration) construction works will commence. It is expected that Phase I will be completed by the end of 2022. See Figure 3 – Build schedule.

This Phase will also involve the construction of site services infrastructure and the excavation of the basement for the apartments. Excavated material from the basement will be retained on the development lands to make up necessary levels in Phase I.

4.1.2 Phase II

Phase II will comprise of 3 blocks 4, 5 & 6 and all ancillary over ground and underground works. This Phase comprises a total of 258 units and is due for completion by the end of 2023.

4.1.3 Phase III

Phase III will comprise of 3 blocks 7,8 & 9 giving a total of 122 units for this Phase, and all ancillary over ground and underground works. This will complete the build and will be completed by the end of 2023. There is no basement in phase 3.

See figure 4 below for the Proposed Development Phasing Plan.

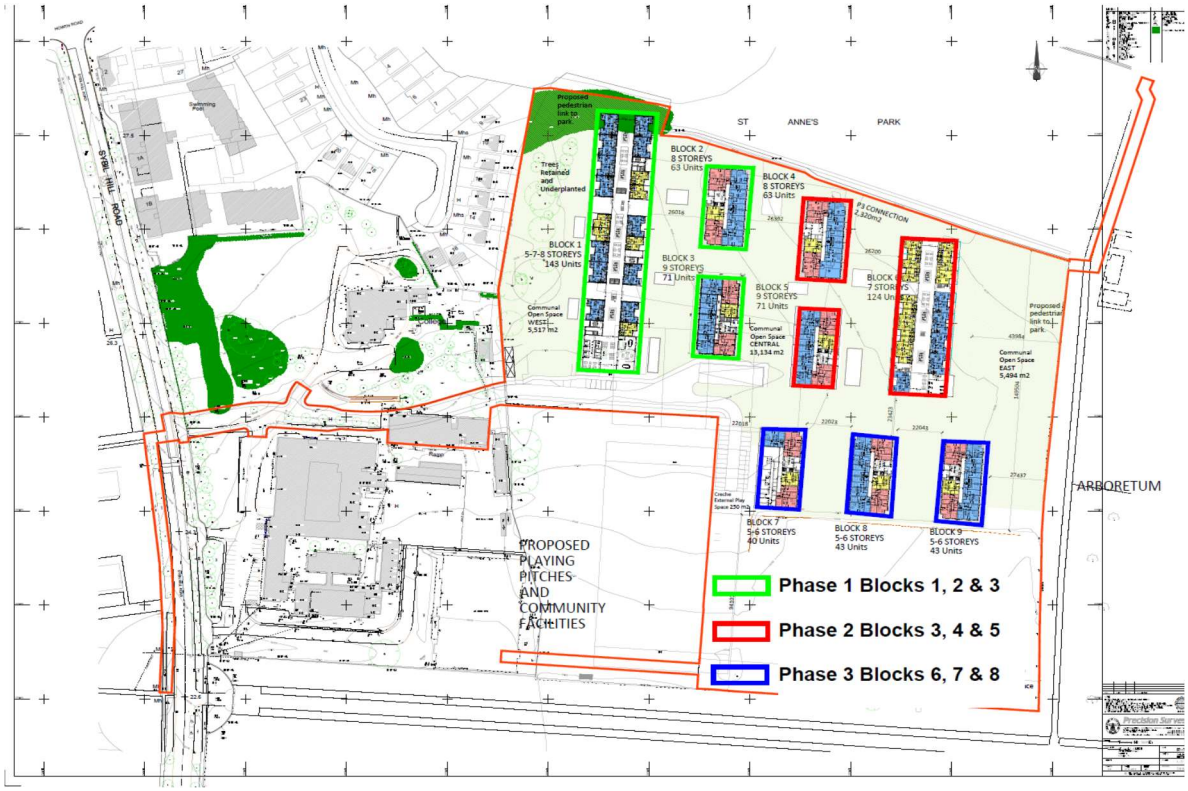


FIGURE 4 PHASING PLAN

4.2 Working Hours

It is envisaged that primarily standard working hours for the construction industry will be adhered to during the course of the construction process (i.e. working hours normally permitted by Dublin City Council include 7.00 – 18.00 Monday to Friday and 8.00 – 14.00 Saturdays).

No general works are envisaged to be carried out on Sundays. Should there be a need to work Sundays/Bank Holidays, a written request will be made to Dublin City Council for permission to do so. This may be required for tower crane erection and removal. Any conditions from DCC relating to out of hours working will be followed including any required notifications to relevant parties.

4.3 Cranes, Lifting of Equipment and Road Closures

Tower cranes and concrete placing booms will be required to erect the Reinforced Concrete (RC) frame. A combination of a goods hoists and a telehandler will offload and distribute materials for the finishing trades.

All lifting equipment and appliances will carry current test certificates and be inspected prior to use. Trained banksmen will always attend the cranes.

Permits and approval for road restrictions will be applied for with Dublin City Council and all parties involved will be kept informed on progress. All permit conditions will be rigorously adhered to and attached to this CEMP.

Following approval, details of the works proposed including dates, times and mobile telephone number of supervisors will be forwarded to all appropriate personnel.

All documents relating to movements of oversize loads such as cranes and test certificates shall be retained on site for inspection.

4.4 Site Security Arrangements, Public Health and Safety and Site Access and Egress

The Proposed Development lands have existing boundaries that prevent access and egress; however, the development will be monitored by CCTV cameras where appropriate given the sensitive land uses which adjoin the site. A site compound and will also be set up before any construction work commences on site, in agreement with the secretary of St. Paul's College. Hoarding/temporary fencing will be erected to delineate all site works from public areas located adjacent to the development.

Security of the site is an important issue with respect to restricting site entry to personnel solely involved in the construction process during working hours and preventing unauthorised access out of hours. Site access for all personnel and visitors will be strictly controlled and all visitors will report to the site offices prior to entering the construction area.

Regular inspections of the hoarding will be undertaken to ensure that the safety of any vehicles or pedestrians is not compromised. Site accommodation including offices and welfare facilities will be provided on the existing site area within the construction site boundary.

There will be no onsite parking provisions for Site Operatives and Visitors, and the use of public transport will be encouraged.

4.5 Site Storage

Due to the site restrictions, storage of materials will be minimal. No large materials will be stored on site until such times as they are required. Glazing and cladding systems will be delivered with a view to only keeping one week's worth of installation on site at any one time. Such materials will be loaded out evenly on the required floors. At no time during the project will materials or other items be placed outside the hoarding line.

5 OPERATIONAL CONTROLS

The proposed environmental control measures that will be implemented during the construction phases are detailed in the below sections.

5.1 Noise and Vibration

Chapter 9 of the Environmental Impact Assessment Report (EIAR) submitted with this application identifies potential noise sources during the Construction Stage as:

- Demolition of prefab building.
- Site clearance and excavation;
- Construction related traffic;
- Construction vibration.

A Construction Noise and Vibration Management Plan will be designed and implemented by a third-party consultant for the construction process. A programme of monitoring will be put in

place to monitor site activity and noise levels generated. The contractor will ensure that all best practice noise and vibration control methods will be used as necessary in order to ensure impacts to nearby residential noise sensitive locations are not significant. The Noise and Vibration Management Plan will address the following areas:

5.1.1 Noise Sensitive Locations

The site is bounded by an established institutional area (St. Paul's College secondary school and Vincentian Order provincial house) and residential area to the west (Ardilaun Court residential development, and The Meadows Estate residential development, where the majority of properties are single private residences). On all other sides the site is bounded by a public park, and an important local sports and recreational facility. Steps will be taken to ensure that any noise arising will be adequately mitigated. It should be noted that as part of the scheme design due consideration has been given to the issue of noise and physical and operational measures have been proposed in order to mitigate potential noise impacts associated with the site.

5.1.1.1 Baseline Noise Survey

Noise monitoring was carried out in January 2019, which gives an indication to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2007: *Acoustics – Description, measurement and assessment of environmental noise.* The closest noise sensitive locations to the Proposed Development are located along the western boundary including the aforementioned The Meadows' residential estate at distance of approximately 50m, St. Paul's College and Sybil House and St Anne's Park at distances of approximately 20 – 30m. Attended noise monitoring was carried out at three locations as described below.

Location N1 is located north west of the development within a green area of the 'The Meadows' residential area.

Location N2 is located north west of the development, on a green area between Sybil Hill House and the recently completed residential apartment building off Sybil Hill Road.

Location N3 is located along the south-western boundary of the development within the ground of St. Pauls school campus.

5.1.2 Assessment of Noise Effects

Consideration will also be given to advice in relation to establishing significant construction noise effects as set out in BS5228. During the construction and demolition phases, the development shall comply with British Standard 5228 '*Noise Control on Construction and open sites Part 1. Code of practice for basic information and procedures for noise control.*

5.1.3 Best Practice Guidelines for the Control of Construction Noise

Best practice control measures from construction sites within BS 5228 (2009 +A1 2014) *Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2* will be used to control noise and vibration impacts. The recommendations contained within the EIAR Chapter 9 will be incorporated into this CEMP as follows:

BS 5228 include guidance on the various aspects of construction site noise mitigation, including, but not limited to:

Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

Referring to the key noise generating sources during the construction phases, the following best practice migration measures should be considered:

- For mobile plant items such as cranes, dump trucks, excavators and loaders, maintaining enclosure panels closed during operation can reduce noise levels over normal operation. Mobile plant should be switched off when not in use and not left idling.
- For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system.
- For percussive tools such as concrete breakers, a number of noise control measures include fitting muffler or sound reducing equipment to the breaker 'tool' and ensure any leaks in the air lines are sealed. Erect localised screens around breaker or drill bit when in operation in close proximity to noise sensitive boundaries.
- For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Standard construction site hoarding with a mass per unit of surface area greater than 7 kg/m^2 can provide adequate sound insulation. Construction site hoarding will be required around the site boundary during demolition and excavation phases along the west, northern and southern site boundaries.

Liaison with the Public

A designated noise liaison officer (who may be the Environmental Officer referred to above) will be appointed to oversee site during construction works. Any noise complaints will be logged and followed up in a prompt fashion by the liaison officer. In addition, prior to particularly noisy construction activity, e.g. demolition, breaking, piling, etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

Project Programme

The phasing programme will be arranged to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. If piling or breaking works are in progress on a site at the same time as other works of construction or demolition that themselves may generate significant noise and vibration, the working programme will be phased so as to ensure noise limits are not exceeded due to cumulative activities.

5.1.4 The Introduction of New Noise Sources onto the Proposed Development Lands

The potential of any item of plant to generate noise will be assessed prior to the item being brought onto the site with regard to the following:

- Consideration of Alternatives;
- Information to be submitted by the contractor; and
- In-situ Noise Measurement.

5.1.5 Noise Control Audits

Noise control audits will be conducted at regular intervals through the construction phase of the development. In the first instance, it is envisaged that such audits will take place on a monthly basis. This will be subject to review and the frequency of audits may be revised if deemed appropriate.

The purpose of the audits will be to ensure that all appropriate steps are being taken to control construction noise emissions. To this end, consideration will be given to issues such as the following:

- Hours of operation being correctly observed;
- Opportunities for noise control ‘at source’;
- Optimum siting of plant items;
- Plant items being left to run unnecessarily;
- Correct use of proprietary noise control measures;
- Materials handling;

- Poor maintenance; and
- Correct use of screening provided and opportunities for provision of additional screening.

5.1.6 Vibration

Ground vibration may also potentially occur during the construction phase. Vibration can be measured in terms of Peak Particle Velocity (PPV), this is expressed in millimetres per second (mm/s). Vibration standards can be considered in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. For example, vibration is perceptible at around 0.5mm/s in the case of road traffic, however at higher magnitudes, this vibration may become an annoyance.

Rock breaking and piling are considered the primary sources of vibration during the construction phase of a project. These would occur at higher levels of vibrations (up to 12mm/s and 6mm/s respectively), and this can be tolerated for events of a short duration.

Guidance relevant to the protection of building structures is contained in the following documents:

- British Standard BS 7385: 1993*: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration,* and;
- British Standard BS 5228: 2009+A1 2014: *Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.*

5.1.6.1 Vibration Mitigation Measures

The Noise and Vibration Management Plan will detail the measures to be taken to mitigate the vibration during construction. The below measures will be taken to ensure that no significant vibration levels occur, and that all appropriate steps are taken to assist in effective vibration level management:

- Vehicle engines shall be switched off when not in use;
- Machines will be fitted with suitable silencers;
- If appropriate, acoustic screens will be deployed;
- Offsite fabrication;
- In method statement/risk assessment the contractor will highlight any activity that may cause significant vibration levels, and include measures in helping to mitigate these emission levels;
- Equipment is to be task-specific; and
- Best practice noise and vibration control measures will be employed by the contractor and screening provided to adjoining properties

5.2 Air Quality, Dust and Emissions

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK and the USA.

Effective site management regarding dust emissions will be ensured by the formulation of a Dust Management Plan (DMP) for the site.

The key features of the DMP will be:

- The specification of a site policy on dust including a DMP;
- The identification of the site management responsibilities for dust;
- The development of documented systems for managing site practices and implementing management controls; and
- The development of means by which the performance of the DMP can be assessed.

5.2.1 Dust Control Measures

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

At the construction stage (Phase I, II and II), the siting of construction activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions (as per the submitted planning documentation and Chapter 8 of the EIAR on Air Quality provided by AWN Consulting and on Microclimate as provided by B-Fluid) in order to minimise the potential for significant dust nuisance. In addition, good site management will include the ability to respond to adverse weather conditions (e.g. wind) by either restricting operations on-site or using effective control measures quickly before the potential for nuisance occurs:

- During working hours, technical staff shall be on site and available to monitor dust control methods as appropriate;
- All buildings will have external scaffolding with dust screening;
- Complaint registers will be maintained on site detailing all telephone calls and letters of complaint received in connection with construction activities, together with details of any remedial actions carried out;
- It will be the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions. Regular Toolbox Talks / briefings will be given to construction staff, subcontractors and operatives to raise awareness of the need to minimise dust. The implementation of dust suppression will be monitored, reviewed and any actions required addressed on an ongoing basis; and
- At all times, the procedures put in place will be strictly monitored and assessed.

The dust minimisation measures shall be reviewed at regular intervals during the construction phase to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practise and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed, and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are highlighted below.

5.2.1.1 Dust Control – Site Roads

Site roads (particularly unpaved) can be a significant source of fugitive dust from construction sites if control measures are not in place. However, effective control measures can easily be enforced. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25% to 80%.

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles;
- Bowsers will be available during periods of dry weather throughout the construction period. Research has found that the effect of watering is to reduce dust emissions by 50%. The bowser will be used during dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use; and
- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

5.2.1.2 Dust Control - Land Clearing / Earth Moving

Land clearing / earth-moving during periods of high winds and dry weather conditions can be a significant source of dust.

During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will be used to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust. If this fails to adequately address the dust levels, then this activity will temporarily cease for the duration of the adverse weather.

5.2.1.3 Dust Control – Storage Piles

The location and moisture content of storage piles are important factors which determine their potential for dust emissions. The following dust controls – storage piles measures will be employed as best practice:

- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site; and
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust.

The regular watering of stockpiles has been found to have an 80% control efficiency.

5.2.1.4 Dust Control – Public Roads

Spillage and blow-off of debris, aggregates and fine material onto public roads should be reduced to a minimum by employing the following measures:

- Vehicles transporting material with potential for dust emissions to an off-site location shall always be enclosed or covered with a tarpaulin to restrict the escape of dust;
- Public roads outside the site shall be regularly inspected for cleanliness, as a minimum daily, and cleaned as necessary. A road sweeper will be deployed to ensure that public roads are kept free of debris; and
- The wheels of all Lorries will be washed / cleaned prior to leaving the site so that traffic leaving the site compound will not generate dust or cause the build-up of aggregates and fine material in the public domain.

5.2.2 Dust Management Summary

The pro-active control of fugitive dust it is necessary to ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released,

will contribute towards the achievement of no dust nuisance occurring during the construction phase. The key features with respect to control of dust emissions and nuisance dust will be:

- The implementation of a DMP which sets out a number of practical measures to control fugitive dust;
- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the DMP can be monitored and assessed; and
- The specification of the measures to be taken to control dust emissions before it occurs and effective measures to deal with any complaints received.

5.3 Drainage and Water Quality

Chapter 7 of the EIAR - Hydrology, Hydrogeology and Water identifies a number of potential risks to water during the construction stage as follows:

- Deleterious materials stored on site during construction
- Contaminated run-off from construction activities
- Illegal disposal of chemicals and oil
- Cleaning activities
- Leaks and spillages (e.g. from vehicles)
- Litter/animal faeces
- Vegetation/landscape maintenance
- Soil erosion
- De-icing Activities
- Vehicle Deposit Exhausts & Pollutants.

Surface Water Infrastructure

A new surface water network will be provided with an outfall to the Naniken River via Sustainable Urban Drainage Systems (SuDs) measures. Any outflow to the Naniken River during the construction phase will be via a full retention interceptor. No outfall to the Naniken River will occur prior to the connection of the above.

Surface water runoff during construction stage can be potentially contaminated. The most likely forms of contamination are “siltation” and spillage.

Siltation is where soil and particulate matter are washed away in the storm by rainwater. Siltation will be mitigated on the project using stilling tanks and strainers within the site to prevent silt being lost to the drainage network.

As fuels and oils are required in construction it is necessary to mitigate the possibility of there being an accidental leakage of these liquids to a water course. As per the construction methodology and legislative requirements all fuels stored on site will be bunded and all chemicals will be stored in an appropriate chemical storage tank. Should a spillage of fuel occur on site during construction it is likely that there will be a localised moderate impact on the environment which will be short in duration.

The following mitigation measures shall be implemented with the construction of the surface water sewer network as recommended in Chapter 7 of the EIAR:

- The filtering of surface water that is likely to be contaminated by soil particles in order to reduce the silting effects of these particles in the receiving downstream watercourse;
- Construction of suitable silt traps prior to the surface water out-falling to the existing watercourse;
- Relocation of existing services and preparation of detailed construction Methods Statements;
- The preparation of a detailed Construction & Environmental Management Plan (CEMP) (this document) to include measures to protect against contamination and runoff.

Appropriate storage and settlement facilities will be provided on site. Areas of high risk include

- Fuel and chemical storage;
- Refuelling Areas;
- Vehicle and Equipment washing areas; and
- Site Compound.

Fuel, oils and chemicals will be stored on an impervious base with a bund. Under LEED (Leadership in Energy and Environmental Design) there will be a strategy put in place to prevent pollution of the watercourse. In particular, there will be a strategy put in place to prevent pollution of the nearby watercourse, The Naniken Stream, to the north-east of the site. In most cases this will involve collecting the run-off and routing it to treatment by filtration, settlement or specialist techniques. As well as treatment immediately prior to discharge, water can be treated at source and on route to the discharge point - though this does not necessarily negate the need for further treatment before discharge. Widely used techniques include silt trap and surface drainage protection. Concrete mixer trucks will not be permitted to wash out on site with the exception of cleaning the chute into a container which will then be emptied into a skip. Such skips will be watertight. (This will be a requirement of supply).

As part of the overall construction methodology, sediment and water pollution control risks arising from construction-related surface water discharges will be considered. All works carried out as part of these infrastructure works will comply with all Statutory Legislation including the Local Government (Water Pollution) acts, 1977 and 1990 and the contractor will cooperate in-full with Irish Water and the Environment Section of Dublin City Council in this regard. A wastewater Discharge Licence will be sought from Irish Water and the conditions contained therein will be incorporated into this CEMP.

Section 5.3.1 below includes mitigation measures for critical elements of mitigating the negative effect of storage and handling of harmful materials, where required. All personnel working on the site will be trained in the implementation of emergency procedures. This CEMP and the relevant documents produced will be formulated in consideration of standard best international practice including but not limited to:

- *CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors,*
- *Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C650), 2005,*

- *BPGCS005, Oil Storage Guidelines,*
- *CIRIA 697, The SUDS Manual, 2007,*
- *UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004.*
- *Construction Industry Research and Information Association CIRIA C648: Control of water pollution from linear construction projects: Technical guidance (Murnane et al. 2006)*
- *CIRIA C648: Control of water pollution from linear construction projects: Site guide (Murnane et al. 2006)*
- *Inland Fisheries Ireland (2016). Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.*

5.3.1 Drainage and Water Quality Mitigation Measures

The following mitigation measures have been proposed to ensure that no potential adverse effects will arise from construction-related surface water discharges from the Proposed Development. The construction contractor will be required to implement the following specific mitigation measures, for release of hydrocarbons, polluting chemicals, sediment/silt and contaminated waters control:

- Specific measures to prevent the release of sediment over baseline conditions to the Naniken Stream (and subsequently the Tolka Estuary) and Dublin Bay during the construction work, which will be implemented as the need arises. These measures include, but are not limited to, the use of silt traps, silt fences, silt curtains, settlement ponds and filter materials. This is particularly important when undertaking any works/upgrading to the surface and foul water drainage networks at the Proposed Development site;
- Provision of exclusion zones and barriers (e.g. silt fences) between earthworks, stockpiles and temporary surfaces to prevent sediment washing into the Naniken stream and/or existing drainage systems and hence the downstream receiving water environment;
- Silt traps shall not be constructed immediately adjacent to the Naniken stream, i.e. a buffer zone between the trap and the watercourse with natural vegetation must be left intact. Imported materials such as terrain, straw bales, coarse to fine gravel should be used either separately or in-combination as appropriate to remove suspended matter from discharges;
- Monitoring shall be carried out on surface water discharge (if necessary and as specified in any Discharge Licence associated with the construction phase of the project);
- Provision of temporary construction surface drainage and sediment control measures to be in place before the construction of the pipeline and/or earthworks commence;
- Weather conditions will be taken into account when planning construction activities to minimise risk of run-off from the site;
- Prevailing weather and environmental conditions will be taken into account prior to the pouring of cementitious materials for the works adjacent to the Naniken Stream and/or surface water drainage features, or drainage features connected to same. Pumped concrete will be monitored to ensure no accidental discharge. Mixer washings and excess concrete will not be discharged to surface water drainage systems.
- Concrete washout areas will be located remote from the Naniken Stream or any surface water drainage features, where feasible, to avoid accidental discharge to watercourses;

- Any fuels of chemicals (including hydrocarbons or any polluting chemicals) will be stored in a bunded area to prevent any seepage of into the Naniken Stream, local surface water network or groundwater, and care and attention taken during refuelling and maintenance operations;
- Temporary oil interceptor facilities shall be installed and maintained where site works involve the discharge of drainage water to receiving waters;
- All containment and treatment facilities will be regularly inspected and maintained;
- All mobile fuel bowsers shall carry a spill kit and operatives must have spill response training. All fuel containing equipment such as portable generators shall be placed on drip trays. All fuels and chemicals required to be stored on-site will be clearly marked;
- Implementation of response measures to potential pollution incidents;
- Emergency procedures and spillage kits will be available and construction staff will be familiar with emergency procedures in the event of accidental fuel spillages;
- All trucks will have a built-on tarpaulin that will cover excavated material as it is being hauled off-site and wheel wash facilities will be provided at all site egress points;
- Water supplies shall be recycled for use in the wheel wash. All waters shall be drained through appropriate filter material prior to discharge from the construction sites;
- The removal of any made ground material, which may be contaminated, from the construction site and transportation to an appropriate licenced facility shall be carried out in accordance with the Waste Management Act, best practice and guidelines for same;
- A discovery procedure for contaminated material will be prepared and adopted by the appointed contractor prior to excavation works commencing on site. These documents will detail how potentially contaminated material will be dealt with during the excavation phase; and
- Implementation of measures to minimise waste and ensure correct handling, storage and disposal of waste (most notably wet concrete, pile arisings and asphalt).

5.4 Waste Management

5.4.1 Training and awareness

A member of the construction team will be appointed as Waste Manager to ensure commitment, operational efficiency and accountability during the construction and development (C&D) phases of the project.The Waste Manager will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for the waste management on site. He/she will be also trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and know how to implement the waste section of the CEMP.

Training of the site crew in effective waste management is the responsibility of the Waste Manager. A waste training program will be organised at the commencement of the project. A basic awareness course will be held for all site crew to outline the CEMP and to detail the segregation of waste materials at source. This may be incorporated into the induction course or the safety-training course. This basic course will describe the materials to be segregated, the storage methods and the location of the waste storage areas. Asubsection on hazardous wastes will be incorporated and the particular dangers of each hazardous waste will be explained.

5.4.2 Waste Manager Training and Responsibilities.

The nominated Waste Manager will be assigned responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid him/her in the organisation, operation and recording of the waste management system implemented on site.

The Waste Manager will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the Waste Manager to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and salvage.

The Waste Manager will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site.

5.4.3 Proposed Waste Management Options

Waste materials generated will be segregated on site where it is practical. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out by the appointed waste management contractor. Skips and other receptacles will be provided to facilitate segregation at source. The appointed waste contractor will collect and transfer the waste according as receptacles are filled. There are numerous permitted and licensed waste contractors in the Dublin Region that provide this service.

Typical non-hazardous and hazardous waste streams generated by construction and demolition at typical sites are shown below along with their accompanying European Waste Code (EWC) Classification.

Waste Materials Categorisation		
Category	Description	Code
Non-Hazardous	Metals	17 04
	Wood, glass, plastic	17 02
	Soil, stones, dredged soils	17 05
	Gypsum based materials	17 08
	Cardboard	15 01 01
	Glass	17 02 02
	Bituminous mixtures, coal tar, tar products	17 03
	Concrete, bricks, tiles, ceramics	17 01
	Electrical and Electronic Components	16 02

	Liquid Fuels	13 07
	Wood Preservatives	03 02
	Batteries	16 06
	Soil and stones containing dangerous substances	17 05 03
	Waste construction material containing asbestos	17 06 05
	Other construction and demolition wastes containing dangerous substances	17 09 03

Table 1: C&D Waste Categories

Non-hazardous arisings:

During the demolition phase an amount of materials will arise. Details on type and quantities are set out in Table 3 later. Materials will include glass, concrete, masonry, tiles, ceramics, plasterboard, timber, steel and tarmac.

The classification of materials as non-hazardous and/or hazardous will be based on the www.hazwasteonine.com web based system as well as classification using Waste Acceptance Criteria in accordance with the European Communities (EC) Council Decision 2003/33/EC, which establishes criteria for the acceptance of waste at landfills.

Hazardous arisings:

The demolition work will not include the removal of the ground floor slab of the existing buildings. No soil beneath the buildings will be excavated. It is not therefore expected that there will be any contaminated soils encountered or arising as part of these enabling works.

It is noted that any soil generated as part of the works will be managed to ensure appropriate handling and disposal in accordance with Irish and EU legislative requirements. It is proposed that prior to any bulk excavation that a suitably qualified professional will be engaged to take samples of the subject area for the excavation to test for contamination and a suitable strategy will be drawn up and submitted to detailing the method of dealing with any contaminated material found.

In the event there is to be any on site storage of fuels or oils during the demolition process then all storage tanks and draw-off points will be bunded and located in a dedicated, secure area of the site. Provided that these requirements are adhered to, and site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil wastage at the site.

OHSS Ltd. completed an Asbestos Surveys in August of 2019. Asbestos containing materials (ACMs) were identified in the existing buildings to be demolished in substructure, the ceiling and walls, bitumen adhesives and cement on site.

The removal of asbestos must be carried out by a suitably qualified contractor in accordance with S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010. All material will be taken to a suitably licensed or permitted facility. This design note will be included in the tender for the demolition contractor.

Paints, glues, adhesives and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

Outline surveys of the existing buildings have been undertaken by the Client. Taking into account the age, type and nature of construction it is not expected that any paints, glues, and adhesives will be encountered.

Waste Electrical and Electronic Equipment (WEEE) (containing hazardous components), printer toner/cartridges, batteries (Lead, Ni-Cd or Mercury) and/or fluorescent tubes and other mercury containing waste may be generated during demolition activities or from temporary site offices. These wastes (if encountered) will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

The management of the main waste streams are detailed as follows:

5.4.3.1 Soil/Subsoil

Soil will be excavated to facilitate construction of foundations, access roads, the installation of site services and general landscaping. Where possible, excavated topsoil will be reused on site for landscaping. It is anticipated that any additional soil will be removed from the site for reuse, recovery and/or disposal as there are limited suitable onsite re-use options.

The Waste Management Hierarchy states that the most preferred option for waste management is prevention and minimisation of waste, followed by reuse and recycling/recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The excavations are required to facilitate construction so the preferred option (prevention and minimisation) cannot be accommodated for the bulk excavation phase.

The next option (beneficial reuse) may be possible for some and potentially all of the inert natural material (Category A1). This material could be used as fill material in other construction projects or engineering fill for waste licensed sites. Beneficial reuse of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end-use (e.g. in respect of sulphate content, pyrites etc.).

Any nearby sites requiring clean fill/capping material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the

European Communities (Waste Directive) Regulations 2011. Article 27 requires that certain conditions are met and that by-product decisions are made to the EPA, via their online notification form.

If the material is deemed to be a waste, removal and reuse/recycling/ recovery/disposal of the material will be carried out in accordance with the *Waste Management Acts 1996 - 2008*, the *Waste Management (Collection Permit) Regulations 2007* (*as amended)* the *Waste Management (Facility Permit & Registration) Regulations 2007 (as amended)*. The volume of waste removed will dictate whether a Certificate of Registration (COR), Waste Facility Permit or Waste Licence is required by the receiving facility.

Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will also be done in accordance with Article 27.

Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered. The option of disposal of inert natural material to landfill will only be considered once all available reuse options have been explored and where void capacity cannot be secured at appropriately permitted/licensed facilities for recycling or recovery purposes.

Any soil/subsoil that is deemed to be contaminated will be stored separately to the clean and inert soil/subsoil. The material will be appropriately tested and classified as either non-hazardous or hazardous in accordance with the EPA publication '*Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous' using the HazWasteOnline application* (or similar approved classification method). The material will then need to classified as clean, inert, non-hazardous or hazardous in accordance with the *EC Council Decision 2003/33/EC.*

The greatest volume of materials generated will be topsoil and subsoil/stones from site reprofiling to accommodate roads, footpaths and services and basement excavation to enable construction. It is worthwhile to set out the calculations in respect of same, based on a 3d ground model of the existing site and detail of the Proposed Development. Given that the development site is 6.4 hectares the following calculations have been made:

- Allowing an average depth of 200 mm, topsoil strip will generate approximately 13,640 m^3.
- Subsoil excavation for road and footpath construction and basement excavation and for future housing will generate approximately 66,205 m^3 of material;
- Excavation for watermains, foul and surface water sewers, will generate an additional 5,617 m^3 of material;
- Subsoil excavation in to provide a SuDS attenuation area and exaction for an attenuation tank amounts to 4,790 m^3;
- The total subsoil excavation therefore amounts to 72,460 m^3;
- 5,264 m^3 of fill is required on site to make up level differences and cover the attenuation tank
- If we assume that the 5,265m^3 of fill required for the northern part of the site can

be won from the subsoil then the site will generate an excess of 67,200 m^3 of subsoil;

- The assumptions here are conservative in nature, if any further topsoil can be re-used on site, ideally that will be done.

Table 2 below shows this in tabular form with units of cubic metres.

Item	Excavate	Reuse	Export
Topsoil Strip	13,640		
Topsoil Surplus for Export			13,640
Subsoil Roads & Excavation	62,974		
Fill Required		1,072	
Subsoil Surplus for Export			75,542
Total Surplus for Export Off-Site			75,542

Table 2: Cut & Fill Calculation

Based on this the information presented above Table 3 can be generated:

Construction Waste: Reuse, Recovery, Recycle & Disposal							
Waste Type	tonnes	Reuse/Recover		Recycle		Disposal	
		%	tonnes	%	tonnes	%	Tonnes
Soil & stone	161,172	0	2,251	0	0	100	158,721
Concrete, brick, tiles	183	0	0	80	146	20	37
Asphalt, tars	80	0	0	50	40	50	40
Metals	10	5	0.5	90	9	5	0.5
Miscellaneous	10	10	1	40	4	50	5
Total:	158,921	-	2,252.5	-	199	-	159,003

Table 3: Construction Waste Reuse, Recycle & Disposal Amounts

As can be seen from the table, the vast bulk of the excavation will comprise **INERT** topsoil and subsoil/stones to facilitate the construction and installation of roads and services and land reprofiling to accommodate same and the future construction of dwellings (subject to future planning applications).

SITE WASTE MANAGEMENT OPERATIONS

Waste materials generated will be segregated on site where practical. An Outline Layout Plan for a site-based waste segregation compound is shown in Figure 5 below. Where on-site segregation of certain wastes types is not practical, off- site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source. All waste receptacles leaving site will be covered or enclosed.

Figure 5 Outline Waste Segregation Compound

The appointed waste contractor will collect and transfer the wastes as receptacles are filled. Any soil removed off-site will be carried by contractors licensed under the *Waste Management Acts 1996 - 2008,* the *Waste Management (Collection Permit) Regulations 2007*(*as amended*) and Amendments and the *Waste Management (Facility Permit & Registration) Regulations 2007 (as amended)*.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring disposal off-site will be disposed of at a facility holding the appropriate licence or permit, as required. Written records will be maintained by the contractor(s) detailing the waste arising throughout the construction and demolition phases, the classification of each waste type, the contact details and waste collection permit number of all waste contactors who collect waste from the site and the end destination and waste facility permit or licence number for all waste removed and disposed off-site. **It will be the responsibility of the Waste Manager to ensure that every Waste Contractor maintains a valid Waste Collection Permit for the duration of the contract and that the waste types being collected from the site are permitted by the permit and all destination sites are also permitted by the permit.**

Dedicated bunded storage containers will be provided for hazardous wastes such as batteries, paints, oils, chemicals etc., if required

Given the limited extent of demolition works planned it is not expected that any soil/subsoils will be encountered at this stage.

Any soil removed off-site will be carried by contractors licensed under *the Waste Management Acts 1996 - 2011, the Waste Management (Collection Permit) Regulations 2007 as amended,* and the *Waste Management (Facility Permit & Registration) Regulations 2007 as amended.*

If any of the excavated spoil is found to be clean/inert, the site manager will investigate whether nearby construction sites may require clean fill material, to both minimise the costs of transport and to reuse as much material as possible. Any soil/subsoil deemed to be contaminated will be stored separately to the clean and inert soil/subsoil. The material will be appropriately classified as non- hazardous or hazardous in accordance with the www.hazwasteonline.com application and *EC Council Decision 2003/33/EC*, which establishes the criteria for the acceptance of waste at landfills, before being transported to an appropriately permitted/licensed facility by permitted contractors.

5.4.3.2 Bedrock

Based on the site investigations carried out at the site, bedrock is anticipated to be more than 8m below ground level. Therefore, it is not anticipated that bedrock will be encountered during excavation works for the building basement.

5.4.3.3 Concrete, Bricks, Tiles & Ceramics

The majority of concrete, bricks, tiles and ceramics waste generated as part of the construction works is expected to be clean, inert material and should be recycled, where possible.

5.4.3.4 Hard Plastic

Hard plastic is a highly recyclable material and the majority of the plastic generated will be from new material off-cuts. It will be recycled, where possible. All recyclable plastic will be segregated, where suitable, to improve its recovery quality.

5.4.3.5 Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc., will be segregated and stored in skips for timber recycling.

5.4.3.6 Metal

Metals will be segregated into mixed ferrous, cladding, aluminium, high grade stainless steel, low grade stainless steel etc., where practical. Metal is highly recyclable and there are numerous companies that will accept these materials. Metals will be segregated and stored in skips.

5.4.3.7 Plasterboard

There are currently a number of recycling services for plasterboard (gypsum) in Ireland. Plasterboard from the construction phase will be stored in a separate skip, pending collection for recycling. The site manager and project engineers will ensure that supply of new plasterboard is carefully monitored to minimise waste.

5.4.3.8 Glass

Glass materials will be segregated for recycling, where possible.

5.4.3.9 Organic (Food) Waste

Where a site canteen is provided in which food is prepared for the workers, organic waste will be segregated for separate collection. Segregation at source and separate collection of organic waste is required in accordance with the *Waste Management (Food Waste) Regulations 2009* (if food is prepared on the site).

5.4.3.10 Waste Electrical and Electronic Equipment (WEEE)

WEEE (if any) will be stored in dedicated covered cages/receptacles/pallets pending collection for recycling.

5.4.3.11 Other Recyclables

Where any other recyclable wastes such as cardboard, soft plastic are generated in sufficient quantities, these will be segregated into dedicated skips or other receptacles.

5.4.3.12 Non-Recyclable Waste

Construction and Demolition (C&D) waste which is not suitable for reuse or recovery will be placed in separate skips or other receptacles. This will include polystyrene, some cardboard and plastic which are deemed unsuitable for recycling (e.g. if contaminated). Prior to removal from site, the non-recyclable waste skip/receptacle will be examined by a member of the waste team to determine if any recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle and a procedure put in place to avoid a repetition.

5.4.3.13 Hazardous Wastes

On-site storage of any hazardous wastes produced (i.e. contaminated soil, if encountered and/or waste fuels) will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes on site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered wherever possible and, failing this, disposed of appropriately. It should be noted that all liquid wastes are to e stored in bunds.

5.4.4 Record Keeping

Records will be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the construction waste arisings on site.

A copy of the Waste Collection Permits, Certificates of Registration, Waste Facility Permits and IED or Waste Licences will be maintained on site at all times.

The waste manager or designate will record the following:

- Waste removed for reuse off-site;
- Waste removed for recycling;
- Waste removed for disposal;
- Recovered waste materials brought on-site for reuse; and
- By-product material brought onto site.

For each movement of waste on or off-site, a signed docket will be obtained by the waste manager from the contractor, detailing the weight and type of the material and the source and destination of the material.

This will be carried out for each material type. This system will also be linked with the delivery records. In this way, the percentage of C&D waste generated for each material can be determined.

The system will allow the comparison of these figures with the targets established for the recovery, reuse and recycling of C&D waste and to highlight the successes or failures against these targets.

5.4.5 Responsibility for Waste Audit

The appointed waste manager will be responsible for conducting waste audits at the site during the C&D phase of the development.

5.4.6 Financial Issues of Waste

An outline of the costs associated with different aspects of waste management is provided below. The total cost of implementation of this CDWMP section of the CEMP will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

5.4.6.1 Reuse/Recovery

By reusing materials on site, there will be a reduction in the transport and disposal costs associated with the requirement for a waste contractor to take the material away to landfill. Clean and inert soils, gravel, stones etc. which cannot be reused on site may be used as capping material for landfill sites, or for the reinstatement of quarries etc. This material is often taken free of charge for such purposes, reducing final waste disposal costs.

5.4.6.2 Recycling

Salvageable metals will earn a rebate which can be offset against the cost of collection and transportation of the skips. Clean uncontaminated cardboard and certain hard plastics can be recycled. Waste contractors will charge considerably less to take segregated wastes such as recyclable waste from a site than mixed waste. Timber can be recycled as chipboard. Again, waste contractors will charge considerably less to take segregated wastes such as timber from a site than mixed waste.

5.4.6.1 Disposal

Landfill charges in the Leinster region are currently at around €120/tonne (includes a €75 per tonne landfill levy introduced under the Waste Management (Landfill Levy) (Amendment) Regulations 2015). In addition to disposal costs, waste contractors will also charge a collection fee for skips. Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc. is also used as fill/capping material wherever possible.

5.4.7 Record Keeping

Records will be kept for each waste material, which leaves the site, either for reuse on another site, recycling or disposal. A system will be put in place to record the construction waste arisings on site.

The Waste Manager or a member of his team will record the following:

- Waste taken for Reuse off-site (i.e. for capping of landfill cells or at another site);
- Waste taken for Recycling;
- Waste taken for Disposal;
- Reclaimed waste materials brought on-site for reuse.

For each movement of waste on- or off-site, the Waste Manager will obtain a signed docket from the contractor, detailing the weight and type of the material and the source and destination of the material. This will be carried out for each material type. This system will also be linked with the delivery records. In this way, the percentage of construction waste generated for each material can be determined. It will also allow for the traceability of all waste arisings at the site.

The system will allow the comparison of these figures with the targets established for the recovery, reuse and recycling of construction waste and to highlight the successes or failures against these targets.

5.4.8 Review of Records and Identification of Corrective Actions

A review of all the records for the waste generated and transported on or off-site should be undertaken mid-way through the project. If waste movements are not accounted for, the reasons for this should be established in order to see if and why the record keeping system has not been maintained.

The waste records will be compared with the established recovery/reuse/recycling targets for the site.

Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Waste management costs will also be reviewed. Upon completion of the C&D phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling/reuse/recovery figures for the development.

5.5 Traffic Management and Road Safety

Chapter 12 of the EIAR and the appended Traffic and Transport Assessment (TTA) and Mobility Management Plan (MMP) prepared by ILTP Consulting has identified the following potential impacts in respect of traffic during the construction phase:

- Additional HGV traffic along the proposed designated haul route which will have a slight short-term adverse effect on the local road network during the construction works.

- Additional construction personnel car / light vehicle movements which will have an insignificant short-term adverse effect on the local road network during the construction works.

- Construction vehicle movements and works on Sybil Hill Road, such as when forming the new junction with the Proposed Development or when undergoing service connections on the public road, which will have a slight short-term adverse effect on traffic movements on Sybil Hill Road in the vicinity of the Proposed Development.

- Construction vehicle movements and works on Sybil Hill Road, which will have a slight short-term adverse effect on pedestrian and cycle movements on Sybil Hill Road in the vicinity of the Proposed Development, for example due to pedestrians and cyclists having to give way at the construction access to the Site and / or divert around construction works on Sybil Hill Road.

It is stated in the TTA that a detailed construction traffic management plan will be prepared and submitted to the Planning Authority prior to commencement of construction of the development.

Construction site vehicle incidents can and should be prevented by the effective management of transport operations throughout the construction process. By creating two crane off-loading areas within the site boundary all offloading will be possible in a manner which will minimize any risk to the public. The gate person will then assist in the entry and leaving from the site.

Key issues in dealing with traffic management on site are:

- Keeping pedestrians and vehicles apart;
- Minimising vehicle movements;
- People on site;

- Turning vehicles;
- Visibility; and
- Signs and instructions.

5.5.1 Keeping Pedestrians and Vehicles Apart/ Minimising Vehicle Movements

Inadequate planning and control is the root cause of many construction vehicle accidents. The majority of construction transport accidents result from the inadequate separation of pedestrians and vehicles. This will be avoided by careful planning, particularly at the design stage, and by controlling vehicle operations during construction work. The following actions will help be taken to keep pedestrians and vehicles apart:

- Entrances and exits - separate entry and exit gateways will be provided for pedestrians and vehicles with a gate attendant employed to interface with the traffic and public to facilitate safe access and egress of vehicles;
- Walkways - firm, level, well-drained pedestrian walkways will be provided
- where possible;
- Crossings - where walkways cross roadways, a clearly signed and lit crossing point will be provided where drivers and pedestrians can see each other clearly;
- Visibility – the site operator will ensure that drivers driving out onto public roads can see both ways along the footway before they move on to it;
- Obstructions – walkways will be maintained free of obstructions; and
- Barriers - a barrier will be installed between the roadway and walkway.

5.5.2 People on Site

The below measures will ensure that all workers are fit and competent to operate the vehicles, machines and attachments they use on site.

- Checks when recruiting drivers/operators or hiring contractors;
- Training drivers and operators; and
- Managing the activities of visiting drivers.

5.5.3 Turning Vehicles/Visibility

Any person in charge of directing vehicle movements will be trained and authorized to do so. The below measures will be implemented:

- Aids for drivers - Mirrors, CCTV cameras or reversing alarms will be provided that can help drivers can see movement all-round the vehicle;
- A gate attendant will be appointed to control manoeuvres and who are trained in the task;
- Lighting – the site will be properly lit so that drivers and pedestrians on shared routes can see each other easily. Lighting may be needed after sunset or in bad weather; and
- Clothing - Pedestrians on site will be compelled to wear high visibility clothing.

In addition to the above measures it is recommended that the proposed haul route as illustrated by Figure 6 below is implemented. The proposed route minimises impact on the nearby Howth Road / Sybil Hill Road junction, as all construction traffic can pass through the junction

via 'Straight-Ahead' movements. This negates the need to turn left and right, which can contribute to delays by swinging into adjacent traffic lanes. The proposed haul route will be agreed with the Local Authority prior to commencement on site.

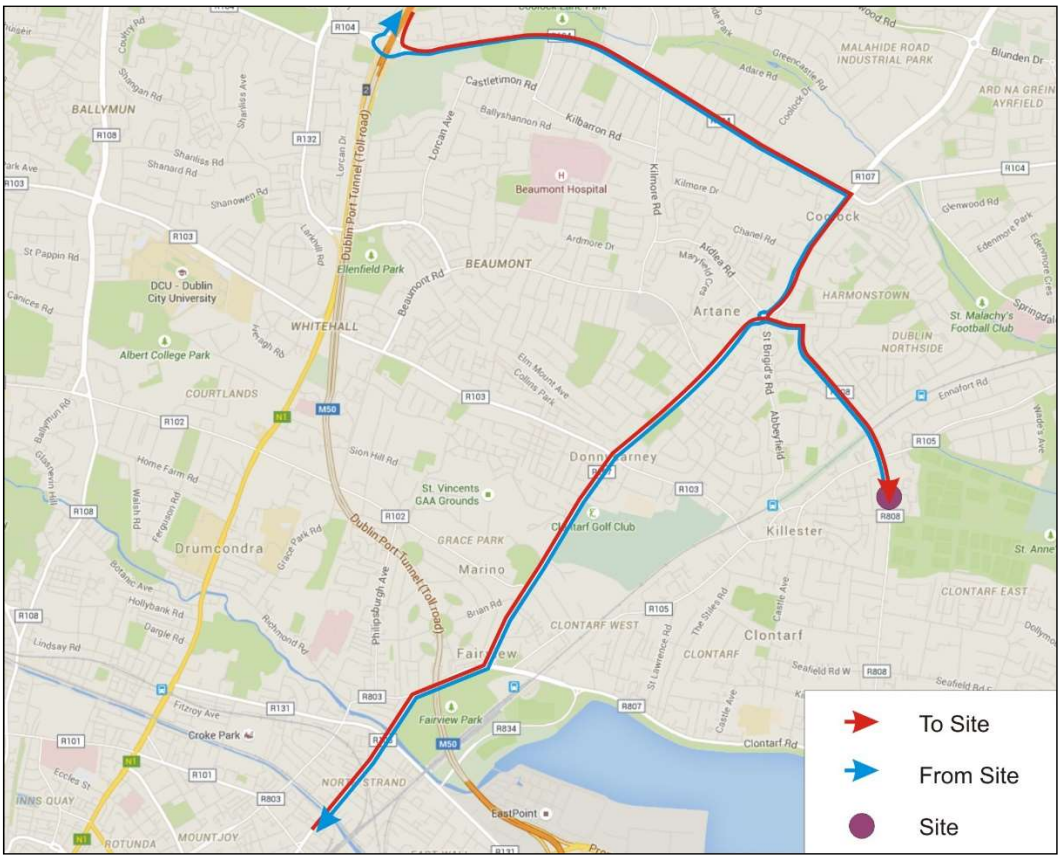


Figure 6 - Proposed Haul Route for HGV Movements during Construction Period

5.5.4 Signs and instructions

All drivers and pedestrians will be trained to understand the routes and traffic rules on site. All standard road signs will be used where appropriate. Induction training for drivers, workers, and visitors will be implemented

5.6 Ecological Receptors

Chapter 5 Biodiversity recommends the following construction mitigation measures in relation to those key ecological receptors. Detailed specific measures will be drawn up and implemented by the Construction Team under the supervision and guidance of the Project Environmental Consultant as follows:

- Measures will be implemented to address construction-related surface water discharges in order to control release of hydrocarbons, polluting chemicals, sediment/silt and contaminated waters i.e. temporary control and interceptor facilities, silt traps, silt fences, silt curtains, settlement ponds and filter materials, provision of exclusion zones and barriers, inspection and maintenance (as described in Chapter 7 Hydrology of the EIAR). These mitigation measures also ensure that there will be no impact on the downstream European sites North Dublin Bay SAC [000206], South Dublin Bay SAC

[000210], North Bull Island SPA [004006] and South Dublin Bay and River Tolka Estuary SPA [004024] as a consequence of construction-related surface water discharges;

- Measures to reduce the potential risk of impacts to retained trees via temporary protective fencing or hessian sacking wrap with arboriculture monitoring where necessary. These are addressed in Section 5.7 and will be carried out in compliance with BS: 5837:2012 *Trees in relation to design, demolition and construction. Recommendations,* under the supervision of a qualified Arborist.

- It is recommended that the relevant potential bat roost trees, located within the western section of the Site, are section-felled under the supervision of an experienced ecologist. If bats are present, all works must cease, and NPWS contacted in order to obtain a derogation licence. A suitably qualified Ecologist will supervise the installation of bat-boxes as proposed in Chapter 5 of the EIAR.

- Vegetation clearance will take place outside the breeding bird season (i.e. start of September to end of February, inclusive) to avoid any potential impact on breeding birds. Where this seasonal restriction cannot be observed, a check for active nests will be carried out immediately prior to any site clearance and repeated as required to ensure compliance to Irish wildlife law. This will be carried out under the supervision of a qualified Ecologist.

5.7 Landscape Management

During construction, site security fencing will be erected at all site boundaries and will be augmented by erecting fine grained mesh netting. However, solid hoardings will also be used where appropriate including the southern boundary of the site with the Park Avenue and the entrance road from Sybil Hill Road to the main development site. These will serve a number of purposes including restricting visibility into the site during construction, minimizing this temporary landscape and visual impacts. As recommended in Chapter 10 of the EIAR the following measures will be employed:

- Retention of trees on the boundaries of the site and retention of the majority of existing trees on site, which are incorporated into a western open space.

- All trees will be protected in accordance with BS: 5837:2012 *Trees in relation to design, demolition and construction. Recommendations.*

- A specific Aboricultural Method Statement shall be prepared for any works required within the root protection area of any tree to be retained.

- All such measures shall be prepared in consultation with a qualified Arborist, who shall also supervise works for which an Aboricultural Method Statement is required.

- The ‘Ha-Ha’-style feature at Sybil Hill House shall be protected by fencing prior to the construction of the access road and new boundary wall/railing.

- Construction activities, other than for services or landscape works, shall be set back a min. of 20m from the rear boundaries of 'The Meadows' residential development.

- Construction works associated with the provision of new pedestrian accesses to St. Anne's Park, will be fenced-off and protected from public access. These works shall be co-ordinated with the Parks Department of Dublin City Council.

- Construction works in St. Anne's Park, associated with the installation of the outfall to the Naniken River and the replacement of the existing footbridge, shall be fenced off with solid hoarding and protected from public access. These works shall be co-ordinated with the Parks Department of Dublin City Council.

5.8 Archaeology and Heritage

Prior to construction commencing the potential impact on archaeological and local heritage will be investigated and the following surveys will be undertaken if deemed appropriate at any stage during the process:

- Archaeological Investigations under license;
- Architectural Survey; and
- Retention / Reinstatement.

During the construction stage there will be an Archaeological Monitoring system in place during the stripping / initial groundwork.

Identified archaeological features will be protected during the construction phase, such as Maryville wall is to be protected from accidental damage during construction by means of a strong timber fence or hoarding.

5.9 Population and Human Health

Mitigation measures described in Section 5.1 Noise and Vibration, also have mitigating factors under population and health and can be summarised as follows:

- Ensure that this CEMP remains in effect for duration of works;
- Working hours will be from 07:00 – 18:00 Monday to Friday and 07:00 – 14:00 on Saturday (and as set by DCC by special permission if required outside these times);
- Heavy goods vehicles arrival and departure scheduled outside core times when children are entering/ leaving the school; and
- Dust and Noise Management and Minimisation plans in operation during construction.

5.9.1 Material Assets

Mitigation measures to protect the surrounding material assets, as follows:

- Appropriate management of construction traffic and waste/ spoil stockpiles (as described in Section 5.5 Traffic Management and Road Safety);
- Preparation of a Construction Management Plan by each Contractor and submission of same for approval to the Construction Director prior to commencing work;

- Testing of potable water networks and foul water sewers prior to connection; and
- Identification and protection of utilities / public services and reinstatement post construction.

6 EMERGENCY PLANNING AND RESPONSE

6.1 Environmental Emergency

An Integrated Management System will be employed for the project at the St Paul's site. This Management System will include a suite of procedures which ensure effective emergency planning and response. These procedures will be as follows:

- Emergency preparedness and response procedure;
- Incident investigation procedure;
- Nonconformity, Corrective Action and Preventative Action;
- Spillage Containment Procedure; and
- Pollution Prevention Programme

The project team appreciates that occasionally incidents arise whereby it is impossible or impractical to comply with all the requirements. In these emergency situations, as much notice as possible about the works will be given to the appropriate authorities and neighbours. Examples of such works are Crane and Hoist erection / removal or special crane lifts.

In the event of spillages or other incident steps will be taken to prevent environmental pollution, for example through protection of drains by use of drain covers or booms, use absorbent granules following an oil / chemical spill and turning off equipment or other sources of noise or dust.

Once the situation has been rectified, full details about the incident and remedial actions undertaken will be provided to the corporation and relevant authorities and recorded in the site environmental register.

This site environmental register will be a register of regulatory, legal and other requirements, and this will be developed to summarise the environmental legislation, (as well as otht Pauls.

7 INSPECTION AND MONITORING

The inspection and monitoring stage of the construction activities increase the effectiveness of environmental mitigation, as this addresses any environmental problems that may be occurring and assists in intervention and response at an early stage.

Table 4 below details the monitoring programme to be implemented:

Aspect	Requirements
Planning	Any planning condition imposed by the planning authority shall be strictly observed and monitoring requirements shall be observed as conditioned.
Biodiversity Bats	As a precautionary measure, it is recommended that the relevant potential bat roost trees, located within the western section of the Site, are section-felled under the supervision of an experienced Ecologist. If bats are present, all works will have to cease, and National Parks and Wildlife Service will have to be contacted in order to obtain a derogation licence.
Water	Monitoring shall be carried out as specified in any discharge licence associated with the construction phase of the project.
Waste	Record keeping and monitoring of import and export of materials shall be carried out in accordance with the Waste Management Act.
Dust	Construction phase dust monitoring should be put in place to ensure dust mitigation measures are controlling emissions. Dust monitoring should be conducted using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119.
Noise and Vibration	Noise monitoring will be carried out as per conditions of planning and the contractor will be required to undertake regular noise monitoring at locations representative of the closest sensitive location to ensure the relevant criteria are not exceeded.
Landscape and Biodiversity	An Arborist and Landscape Architect will be retained for the duration of the construction works. All works associated with removal, retention and protection of existing trees and woodlands and with tree surgery works shall be approved and monitored by a qualified Arborist.

Aspect	Requirements
Landscape and Biodiversity	Monitoring of landscape and tree-related works is an integral aspect of the proposed scheme, and includes monitoring of: Tree removal, retention and protection, Topsoil stripping and storage, Disturbance by site works, services etc., Excavation / alteration of ground levels, Landscape build-up; profiling and cultivation, Landscape finishing and implementation, Proposed planting and seeding, 12 months aftercare of landscape measures to ensure establishment.
Land and Soils	Planting and seeding will continue to be monitored to ensure successful establishment and appropriate management. Retained trees will be reviewed to ensure successfully incorporation into the new landscape.
Archaeology	Based on the results of archaeologically directed test trenching archaeological monitoring of all groundworks associated with the development may be recommended, with the provision for full excavation of any archaeologically significant material uncovered at this time. In the event of archaeological features or material being uncovered during construction phase monitoring, it is crucial that machine work cease in the immediate area to allow the archaeologist to assess, excavate and record any such material. Should archaeological features or material be uncovered, adequate funds to cover excavation, fencing (if required), post- excavation analysis and reporting, and conservation work should be made available. This work should be done under licence in accordance with Section 26 of the National Monuments Acts 1930 – 2014, and with a method statement agreed in advance with the National Monuments Service (Department of Culture, Heritage and the Gaeltacht) and the National Museum of Ireland.

Aspect	Requirements
Archaeology	Should the removal of vegetative root systems be required, it is recommended that this work be supervised by a suitably qualified archaeologist.
Traffic	A site liaison officer will be identified as a single contact point for the planning authority and local community to deal in a prompt and efficient manner with any issues that may arise in relation to construction traffic and activity on the public road.
Traffic	Site personnel will be present on the public road at the site access junction at all times during site operational hours to facilitate the safe movement of: Construction vehicles to and from the site Road users along Sybil Hill Road in the vicinity of the site access or any construction works on Sybil Hill Road.
Dust/Litter	Public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary. A road sweeper will be made available to ensure that public roads are kept free of debris.

Table 4 Monitoring Programme

8 CONCLUSIONS

This CEMP describes the specific environmental measures that are to be implemented for the Proposed Development at St. Pauls. It highlights the procedures to be followed for the scope of construction works for the Proposed Development and, in order to effectively manage, reduce and/or mitigate any potential environmental impacts that may arise as a result of the development.

This CEMP effectively communicates the roles and responsibilities of those in charge of the construction element of the Proposed Development and will require regular monitoring and updates post detailed design and through the construction period in order to effectively and adequately manage and control potential risks or impacts to the environment.