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O'Flynn Construction Co. Unlimited Company

LRD Old Fort Road, Ballincollig, Cork

Construction Environmental Management Plan

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1.0 INTRODUCTION

1.1 Background

JODA Engineering Consultants were appointed by O'Flynn Construction Co. Unlimited Company. to prepare an outline Construction and Environmental Management Plan (CEMP) in support of a proposed large scale residential development of 3 apartment blocks and a creche at Old Fort Road, Ballincollig, Cork.

This CEMP has been prepared to accompany the planning application for the proposed development. The proposed layout of the development is detailed in the planning drawings prepared by Wilson Architecture.

The purpose of this report is to ensure that best construction management practices are applied to the site by the main contractor and that measures are in place during construction to reduce as much as possible the impact of the works on people, property, and the environment.

The proposed activities during the construction process include site preparation, excavation, building and construction, services installation, materials delivery, materials and waste removal and any other associated engineering works.

1.2 Basis for the CEMP

This CEMP is a 'Live' document and shall be managed and updated throughout the construction phase to reflect the circumstances of the development. Changes and revisions to be made will be done so in agreement with the local authority. In particular, the CEMP is to be updated to ensure the requirements of all relevant planning conditions are incorporated.

2.0 Development Overview

2.1 Site Location

The existing site is located on Old Fort Road, north of Ballincollig town centre. Ballincollig wastewater treatment plant (WWTP) to the north, Ballincollig Community Nursing Unit adjacent to the east and Ballincollig Community School to the west.



Figure 1 Site Location

The site exits onto Old Fort Road which is connected to Ballincollig Main Street (R608) to the south which connects to the N22/N40.

2.2 Existing site

The site is a greenfield site with fill soil present for majority of the site. The site has a high point at the south-east of the site of (+25mOD) and slopes to the north to a low point of (+17mOD) along the site boundary.

2.3 Development layout

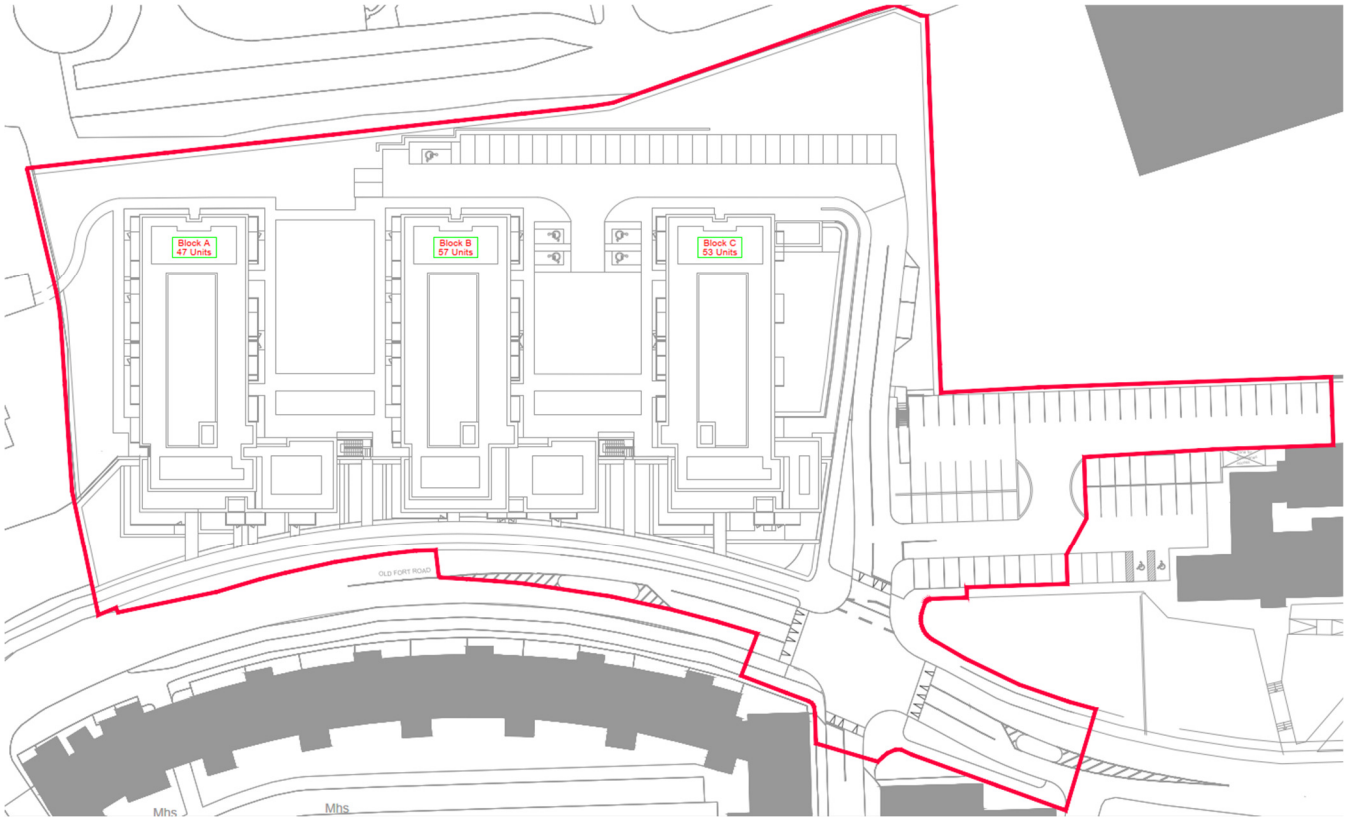


Figure 2- Development Layout

Three apartment blocks with Block A containing 47 units, Block B containing 57 units and Block C containing 53 units. The creche is located on the ground floor of Block C.

3.0 Site Logistics

3.1 General Sequence of Works

The main stages of construction will be progressed based on the following:

- Complete any necessary pre-connection surveys.
- Implement all recommended environmental mitigation measures arising from the preconstruction surveys.
- Confirm any potential utility locations and divert utilities.
- Commission the contractor's site compound and erection of site hoarding.
- Site clearance
- Installation of services (drainage networks, water supply, electricity, etc.).
- Construction of footpaths & hard/ soft landscaping.
- Installation of foundations/ footings for buildings.
- Construction of new buildings
- Connection to public services.
- Provision of proposed footpath finishes.
- Provision of landscaping finishes.
- Complete all site finishes.
- Completion of any required testing and commission services within the development.

3.2 Earthworks

The proposed development will involve excavation including removal of material from site with cut and fill varying from 0.0m-7.0m.

The development as proposed has been designed to work with the natural constraints of the site in as much as is practically feasible and consistent with the general site development requirement to achieve an accessible and integrated site layout and design.

The existing topsoil and subsoil onsite is uncontaminated and in accordance with the regulatory regime for by-products as enshrined in Article 5 of the Waste Framework Directive and as transposed into Irish legislation by Article 27 of the European Communities (Waste Directive) Regulations 2011 are considered suitable for re-use in the development.

Excavated topsoil and subsoils required for re-use on site will be temporarily stored on site for re-use otherwise it will be exported. Rock excavated on site will be crushed and re-used on site for filling where suited. Topsoil will be stored in an appropriate manner on site for the duration of the construction works.

Excavated materials in excess of those required for the site development works will be treated as a by-product (production residue) and exported off-site to be re-used at another suitable site in the first instance in accordance with the Waste Framework Directive (2008/98/EC, as amended by Directive (EU)2018/851) and as transposed in Ireland by the European Union (Waste Directive) Regulations 2011-2020. These regulations provide for uncontaminated excavated soil and stone and other naturally occurring materials (used on sites other than the one from which there were excavated) to be considered in accordance with the definition of waste and the provisions on by-products and on end-of-waste status. The Directive and Article 27of those Regulations sets out the requirements and conditions for a material to be regarded as a by-product and not as a waste. The conditions for a material to be a by-product are:

(a) Further use of the substance or object is certain.

(b) The substance or object can be used directly without any further processing other than normal industrial practice.

(c) The substance or object is produced as an integral part of the production process; and,

(d) Further use is lawful in that the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

During the demolition and construction phase, excavations and exposed sub-soils in open cuts will be blinded and protected with clean broken stone as soon as possible after exposing the subsoil to prevent erosion by surface water runoff.

3.3 Removal of Flora

There are mature trees located to the north of the site which will be retained and protected throughout construction. One young tree to the north of the site will be removed.

3.4 Protection of Existing Trees

Protective barriers shall be installed around trees to be retained prior to the commencement of works on site. The locations of tree protection barriers will as per the requirements of the Woodland Management Plan for the project and in accordance with ***BS5837*** – *Trees in Relation to Design, Demolition and Construction*. These barriers will remain in place for the duration of the works.

3.5 Site Security Fencing and Hoarding

Site hoarding and barriers will prevent unauthorised access to the work area. Heras type fencing will be used on site boundaries where appropriate to suit the works. The site compounds will be fenced to deter unauthorised access.

Controlled access points of the site, in the form of gates or doors/turnstiles, will be kept locked for any time that these areas are not monitored (e.g. outside work hours). During working hours, a gateman will control traffic movements and deliveries at any active site access to ensure safe access and egress to & from site into the public roads. All personnel working on site must have a valid Safety Pass card and by induced by the Main Contractor with regard to site specific information.

Site security fencing shall be inspected regularly and maintained throughout the duration of the works. Fencing on the site boundary at adjacent public roads and pedestrian paths shall not cause any obstruction to vehicles or persons nor shall obstruct any drainage, surface water channels or traffic signals, signs, or lights.

Fences or hoarding shall not be used for advertising purposes and shall be kept clear from advertisements for the duration of the works.

3.6 Site Facilities During Construction

3.6.1 Site Facilities

It is estimated that an average maximum of 70 persons will typically be working on site during construction. Site facilities will be provided within the extent of the proposed development.

The on-site accommodation will consist of:

- Contractor's office space
- Meeting room/ H&S Room, first aid room,
- Separate male and female toilet facilities with a minimum ratio of 1 to 20,
- Drying room,
- Site canteen with drinking water, hot water, seating, plus facilities to heat and refrigerate food,
- Storage containers and bicycle storage,
- Materials storage areas and drop off

All facilities shall have adequate heat and lighting and shall be cleaned regularly.

Temporary water supply, electricity supply and foul drainage will be required for the new facilities. Connections to electricity & water are available at the site boundary or will be extended temporarily as required from the site boundary. A temporary potable water supply will be provided. Foul drainage will be routed to the existing Uisce Éireann wastewater sewer within the development in accordance with prior agreement of Uisce Éireann.

A limited number of car parking spaces will be provided on a temporary basis for use by the contractor adjacent to the site compound. Construction parking will be managed/controlled during the works subject to the requirements of any planning conditions.

Adequate fire protection and means of escape will be in place. It will be the responsibility of the contractor to provide and maintain the required standard throughout the project and the contractor will inform all operatives of the welfare arrangements for the contract during site inductions.

3.6.2 Facility Locations and site access

The site compound is situated in the southern central section of the site. This compound serves as the central hub for project activities, overseeing operations and logistics. These facilities include parking areas for contractors, storage units for materials and temporary office for administrative tasks. The current access links to the road network within Ballincollig Town Centre. This connectivity ensures seamless transportation of supplies and personnel, facilitating efficient progress across the various stages of development.

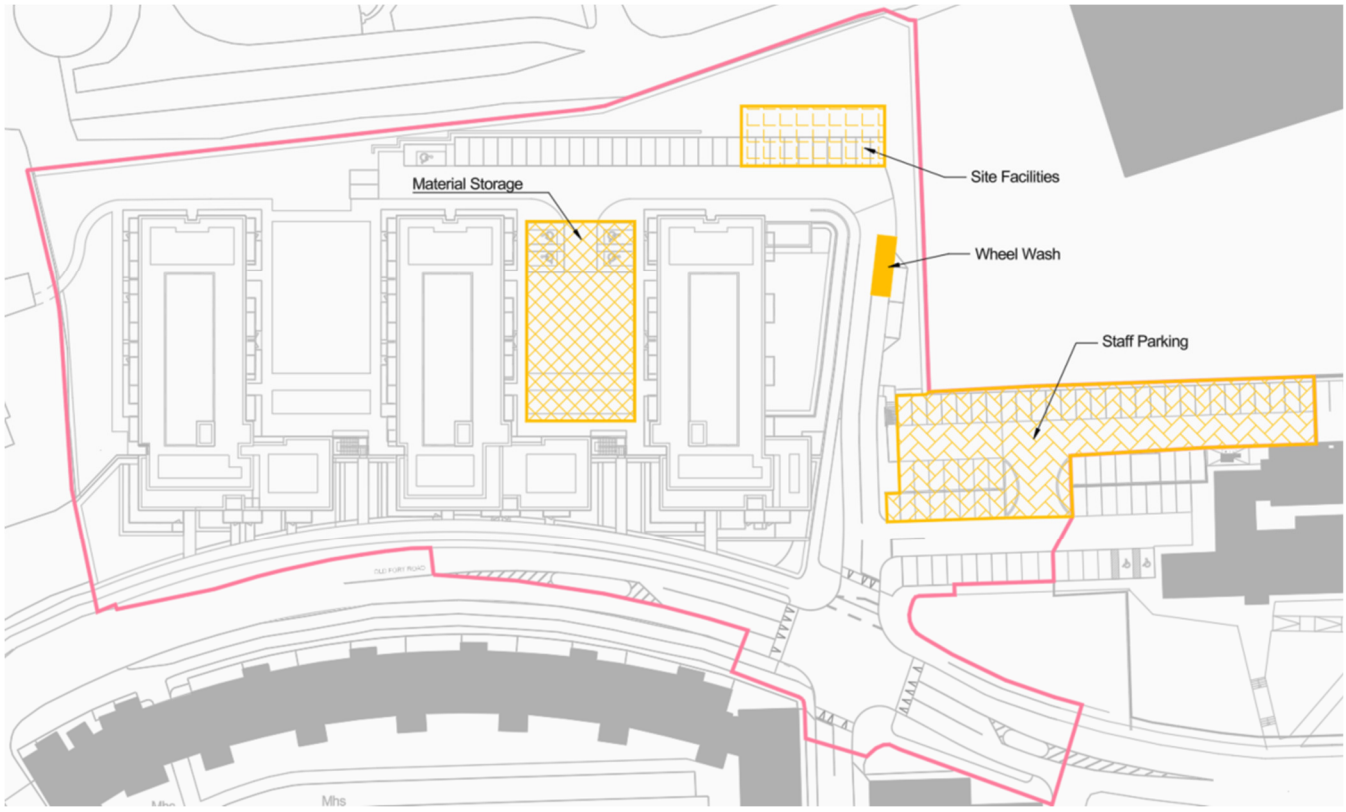


Figure 3- Site Facilities

3.7 Site Working Hours

Unless otherwise required by the requirements of the planning permission, it is proposed that standard construction working hours will apply, i.e.:

- 7am to 6pm Monday to Friday,
- 8am to 2pm on Saturdays.

Any works proposed outside of these periods shall be strictly by agreement with the Local Authority in advance.

In order to mitigate any impact of construction activities, the following measures are proposed:

- Coordination of deliveries to site within working hours,
- Scheduling of noisier activities early in the working day,
- Noise and vibration mitigation measures as per Section 6.8 of this plan.

The delivery of materials to the site during the construction phase shall be organised so that deliveries are minimised and do not cause traffic hazards, deliveries are not permitted between peak traffic 8:00am to 9:00am and 5:00pm to 6:00pm and that all construction vehicles are parked within the site.

3.8 Site Security

The Contractor will be responsible for the security of the site. The Contractor shall:

- Operate a site induction process for all site staff.
- Ensue all staff shall receive current 'safe pass' cards.
- Install adequate site hoarding to the site boundary.
- Maintain site security staff at all times.
- Ensure restricted access is maintained to the works.

3.9 Health and Safety

All construction works will be carried out under appropriate supervision. Works will be carried out by experienced contractors using appropriate and established safe methods of construction. All requirements arising from statutory obligations including the safety, Health and Welfare at Work Act and associated regulations will be met in full. The Contractor must also comply with all guidelines and procedures in accordance with UÉ specification documents.

All site works to be completed as per the Safety, Health and Welfare at Work (Construction) Regulations 2013. All personnel working on site shall have a valid Safe Pass card and have completed PTS training.

3.10 Construction Phase Lighting

Where possible, Construction Phase lighting shall be switched off during non-working hours.

During use, directional lighting will be the lighting of choice as this will minimise light spill from the site, into any surrounding areas which may be in use by bats or other nocturnal animals that may be commuting/foraging in the area.

LED luminaires possessing a warm white spectrum (2700k – 3000k) shall be used to reduce the blue light component. LED lights are also ideal due to their sharp cut-off, lower intensity, and dimming capabilities.

4.0 Traffic Management

4.1 General Requirements

The Contractor shall inform and educate all regular suppliers and all sub-contractors and delivery drivers of the basic protocols. All deliveries will be controlled at the identified. compound location. The designated storage area will be identified prior to taking delivery of the materials and the driver will be directed to the compound. Site access, and the delivery of construction materials, will be carefully planned and managed throughout the construction works. The Contractor will ensure that deliveries are coordinated on site so that trucks do not cause an obstruction on public roads. Delivery drivers will wear full PPE as per the site rules and sign the delivery rules at the controlled entrance gate. The site will be fenced and sealed with access gates secured at all times to prevent unauthorised access. A wheel washing facility for road vehicles and road sweeping facilities shall be provided to ensure that public roads are kept mud and debris free.

4.2 Construction Route and site access

Vehicles travelling to the site (outlined in yellow in Figure 4-1) from the south, west or east are to travel on the N22/N40 then approach the site travelling from Ballincollig main street (R608) to Old Fort Road shown in purple in Figure 4-1. Vehicles travelling from North of the site are to Take the R618 to the N22 then travel on to Ballincollig main street (R608) to Old Fort Road as shown in blue Figure 4.

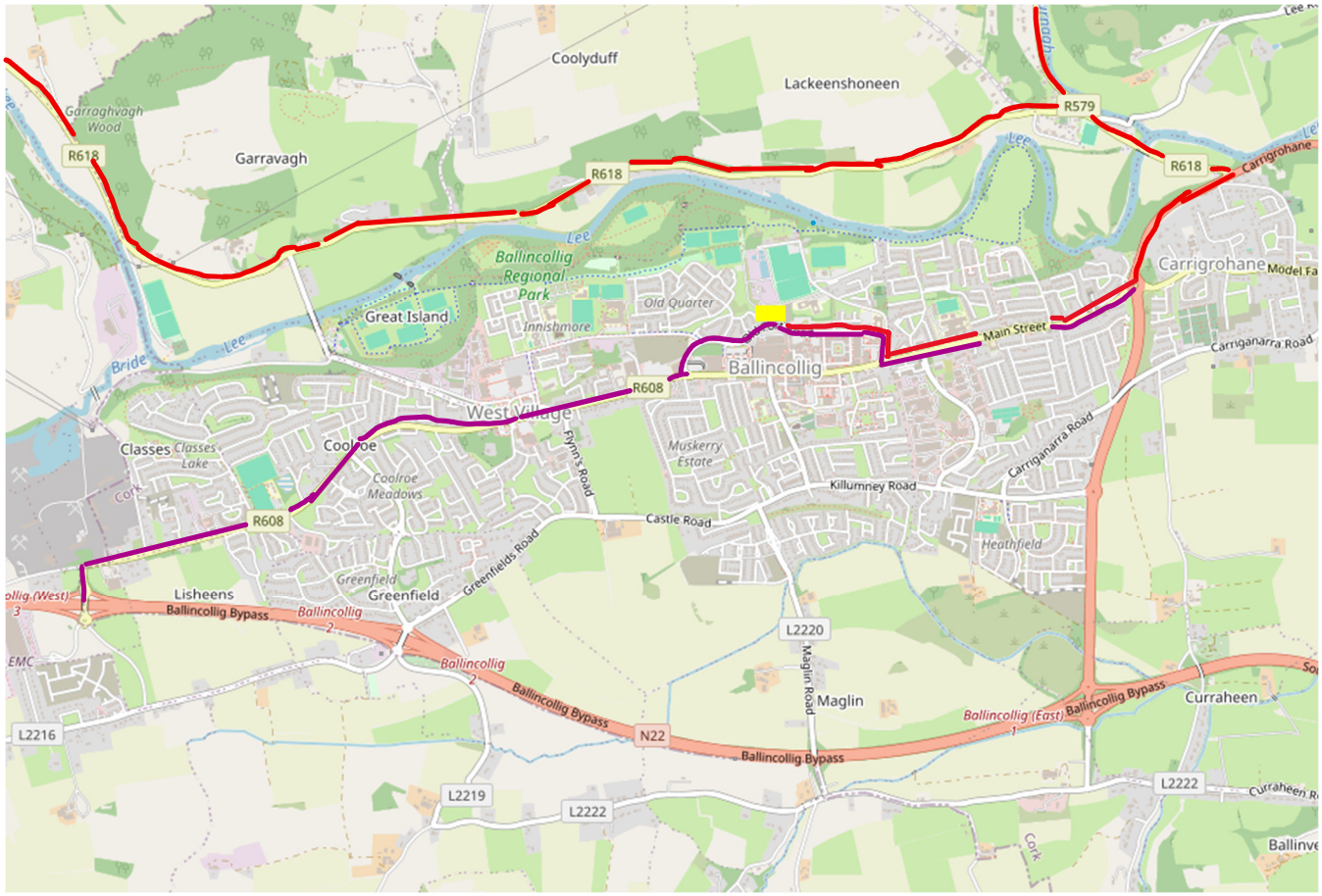


Figure 4 Construction Traffic Routes to Site

The existing roadside pedestrian path on Old Fort shall remain open to the public throughout the development process. With an unobstructed pedestrian path on these Roads the visibility splay at the vehicular access point shall achieve the equivalent of that of a normal road junction.

To provide for road safety the site access road at the approach will be finished in dense basecourse macadam with regulatory STOP road markings and text and associated signage as per DTTS Traffic Signs Manual, with additional advance signage to drivers regarding pedestrian movement at the junction.

4.3 Construction Related Traffic Movement

The site clearance, and general construction activities will generate a level of vehicle movement to and from the site as well as internally within the subject site.

The typical construction trips generated during site clearance and construction comprise:

- Construction employees arriving and leaving work.
- Deliveries and removal of machinery.
- Delivery and removal of materials.

Appropriate measures will be put in place to ensure safe access to/from the site. Measures will also be implemented on-site to ensure that safe movements can be performed within the construction site. A construction site car park will be located within the site boundary, with a dedicated pedestrian route to the site accommodation.

There will be designated areas on site for loading/unloading and a specified storage area for materials and machinery. A waste and recycling area will be established within the construction site boundary, as close to the construction access as possible, to prevent unnecessary trips through the site for collection. To ensure that the internal site routes and the public road to the construction site entrance is kept in good condition, a wheel washing operation will be established, located close to the exit from the construction area to minimize the spread of mud and dust.

The construction phase of the development is expected to generate similar vehicle movements than the operational phase. However, a greater number of Heavy Goods Vehicles (HGVs) are expected during the construction phase.

Traffic movements during the construction phase are estimated as follows:

Construction site staff movement:

Construction site staff travelling to the site typically arrive early in the morning and leave in the evening. Generally, workers travel by private vehicle. It is expected that there will be a typical a maximum average of approximately 70 no. construction employees on site during the development works. With an allowance for vehicle sharing and other modes of transport a maximum average of 40 vehicle movements to and from site per day is expected during the majority of the development period.

Soils/earthworks export from site:

Earthworks will generate excavated soils quantities in excess of the site fill requirements, due to the nature of the site and the constraints of the development. It is expected that up to 5 transport truck round trips may be expected per day during peaks of materials exports processes, reducing to zero when materials exports are not scheduled.

Materials deliveries:

Building materials deliveries during the building phase will typically be as follows:

- Concrete delivery trucks – 8 trucks deliveries per week
- Timber deliveries – 2 trucks delivery per week
- Blocks / Bricks – 2 trucks delivery per week
- Other materials 2 truck deliveries per week

Machinery delivery and removal:

Machinery deliveries and removals will be concentrated during certain site activities (especially earthworks) with 1 vehicle delivery or removal per day expected during these times.

Waste Removal

Bulk excavation at the start of the project is expected to generate 20 trucks per day.

Other waste material vehicle movement of 2 vehicles per week is expected for the remainder of the project.

4.4 Construction Stage Traffic Management Plan

A Construction Stage Traffic Management Plan will be prepared and agreed with Cork City Council Transportation Department & An Garda Siochána, to mitigate any impact of construction on the surrounding road network. The Construction Stage Traffic Management Plan will be prepared in accordance with the following guidance documents for the temporary control of traffic at road works:

- Traffic Signs Manual Chapter 8 Temporary Traffic Measures and Sign Roadworks (2019)
- Traffic Management Guidelines, Department of Transport (2003)
- Requirements of Cork City Council.

The Construction Stage Traffic Management Plan will provide for the following:

1. Making good any damage to existing roads or footpaths caused by vehicular movements to and from the site.
2. Keeping roads, footpaths free of excavated materials, debris, rubbish, provide vehicle wheel wash and thoroughly clean all wheels and arches of all vehicles as they leave the site.
3. Confinement of development activities to within the active site area, i.e. the areas occupied by the works and the builders' compound during any phase of the development.
4. Haul routes to and from the site will be defined and agreed with the Local Authority.
5. Properly designed and designated entrance an egress point to the construction site for construction traffic will be used to minimise impact on external traffic.
6. Where traffic signals are not in place, flagman must be used to control the exit of construction vehicles from the site onto a public road.
7. Existing fire hydrants are to remain accessible for the duration of the works, except by prior agreement with Cork City Council and Uisce Éireann

Due regard will be paid to minimising any impacts by construction vehicles on the surrounding area. Particular emphasis will be on the following:

- Construction and delivery vehicles shall be instructed to use only the approved and agreed means of access; and movement of construction vehicles shall be restricted to these designated routes.
- Warning signs / Advanced warning signs are to be installed at appropriate locations in advance of the construction access locations.
- Speed limits of construction vehicles are to be managed by appropriate signage, to promote low vehicular speeds within the site.
- Appropriate vehicles are to be used to minimise environmental impacts from transporting construction material, for example the use of dust covers on trucks carrying dust producing material.

- Parking of site vehicles shall be managed to ensure that there is no parking on the public road.
- A road sweeper shall be employed to clean the public roads adjacent to the site of any residential debris that may be deposited on the public roads leading away from the construction works.
- On site wheel washing will be undertaken for construction trucks and vehicles to prevent any debris prior to leaving the site, to remove any potential debris on the local roads.
- All vehicles are to be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol or diesel. Spill kits must be available on site. All scheduled maintenance shall be performed out off-site and not on the public road.
- Safe and secure pedestrian facilities shall be provided where construction works obscure the existing pedestrian footway. Pedestrian facilities must cater for vulnerable users including mobility impaired persons.

4.5 Measures to minimise Construction Vehicle Movements

Construction vehicle movements shall be minimised through:

- Consolidation of delivery loads to/from the site and scheduling of large deliveries to site to occur outside of peak periods.
- Use of precast/prefabricated materials where possible.
- 'Cut' material generated by construction works is to be re-used on site where possible.
- Adequate storage space on site will be provided.
- Car sharing will be promoted to site staff.
- Public Transport: An information leaflet to all staff as part of their induction on site highlighting the location of the public transport services in the vicinity of the construction site.

5.0 Environmental Management

5.1 Site Control Measures

The designated and operational on-site control measures, which will be established and maintained at this site, will include:

- Designated hard routes through the site.
- Each departing vehicles to be checked by banksman.
- Wheel wash facility at egress point.
- Provision and facilities to cover lorry contents as necessary.
- Controlled loading of excavated material to minimise risk of spillage of contents.
- Spraying/ damping down of excavated material on site.
- Facility to clean roads if mud or spillage occurs.

5.2 Material Handling and Storage

Within the site compounds, a section within the area will be identified for material storage only. It is proposed that unloading bays are provided for deliveries to the site within the hoarding perimeter. Appropriately demarcated storage zones will be used to separate and segregate materials.

Means to ensure that surface water run-off is controlled such that no silt or other pollutants enter local surface water sewers or drains shall be provided.

5.3 Spill Control Measures

It is not proposed to store any oils/fuels for the purpose of refuelling on the site. Onsite plant will be refuelled by an external contractor who will call to site as required. Road vehicles shall not be refuelled at the site. Minor spills and leaks may occur from road vehicles and the onsite plant. Any oils or fuels onsite will be removed by an experienced and authorised contractor.

The following steps provide the procedure to be followed in the event of any significant spill or leak.

- Stop the source of the spill and rase the alarm to alert people working in the vicinity of any potential dangers.
- Eliminate any sources of ignition in the immediate vicinity of the incident.
- Contain the spill using the spill control materials, track mats or other suitable material. Do not spread or flush away the spill.
- Cover or bund of any vulnerable areas where appropriate such as drains or watercourses.
- Clean up as much as possible using the spill control materials.
- Contain and used spill control material and dispose of used materials appropriately using a fully licenced waste contractor with the appropriate permits so that further contamination is limited.
- Notify the site manager immediately giving information on the location, type, and extent of the spill so that they can take appropriate action and further investigate the incident to ensure it has been contained adequately.
- The site manager will inspect the site and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.

5.4 Water supply and wastewater drainage.

Welfare facilities will be provided within the site compound. These facilities shall be connected to the public water supply and wastewater systems as noted in Section 3.6.1 above.

5.5 Surface Water Drainage

Surface water management on site will comply with the following guidelines from CIRIA:

- C532 Control of Water Pollution from construction Sites, Guidance for Consultants and Contractors,
- C741 Environmental Good Practice on Site – 4th Edition.

Surface water run-off control measures during the works period shall include the following:

Excavation, Erosion and Sediment control measures:

- The area of ground stripped of topsoil or otherwise open to rainwater runoff will be minimised and as much vegetation as possible will be retained for as long as is practical.
- Clearing and topsoil stripping of each area will be delayed until work is ready to proceed.
- Surface water runoff shall be directed away from trenches and excavations.
- Trenches shall remain open for the minimum practical period, with backfilling and reinstatement to be performed as soon as practically possible.
- Earthworks temporary stockpile areas shall have silt fencing installed with specialised silt-trapping fabric to capture silts from surface water run-off.
- Surface water runoff from the works area shall be directed to the lowest point of the working area with one or more stilling ponds to allow settlement out of entrained silts with measures to capture and treat sediment laden including runoff prior to discharge at a controlled rate directed to over original undisturbed ground without causing erosion of the ground.
- Stilling ponds shall include the following features:
    - 1m depth with a staff gauge installed to identify when sediment is at 10% of the pond depth at which time the stilling pond shall be cleaned out of the pond.
    - Sloped sides stabilised with topsoil mats recovered from the site of the stilling pond.
    - Fan-shaped rock apron at the outlet to create diffuse sheet flow over original undisturbed ground or temporary swales that direct water ultimately to undisturbed ground
- Silt Fencing shall be constructed with high-quality permeable filter fabric specifically designed as an entrenched vertical entrapment fence to capture and detain silt via a combination of settlement and filtration. The silt fence design shall be in accordance with CIRIA document ref. C648 "*Control of Water Pollution from Linear Construction Projects*", 1990.
- Temporary control measures shall be inspected weekly with subsequent follow-up maintenance as required.
- Landscaped area shall be reseeded and planted as soon as possible after completion of the works.
- For groundwater encountered during construction phase, mitigation measures will include
    - Dewatering measures only to be employed where there are no other alternatives.
    - Dewatering by pumping to a soakaway.
- Existing surface drainage channels within the site that serve adjacent lands will be retained unless by prior approval.
- Surface water drain connections to existing public networks will be made under the supervision of the local Authority/ Irish Water and checked prior to commissioning.
- Wastewater sewer connections to existing public networks will be made under the supervision of Uisce Eireann and checked prior to commissioning.
- New onsite surface water drains will be tested and surveyed prior to commissioning to prevent any possibility of ingress of ground water.
- All surface water manholes and pipework will be inspected and tested after construction to ensure that uncontrolled ground water inflow does not occur.

Concrete:

- If concrete mixing is carried out on site, the mixing plant will be sited in a designated area with an impervious surface and with runoff directed to stilling ponds.
- Wash-out of concrete trucks shall be performed in areas designated specifically for wash-down with discharge directed to stilling ponds.

- Excess concrete shall be deposited in a designated area with soil bunding and run-off directed to stilling ponds, with hardened excess concrete crushed for re-use as sub-base material for pedestrian and cycle paths.

Accidental Spills and leaks:

- Bunded areas shall be created for the storage or use of any fuels, oils, greases, cement, etc.
- Refuelling and servicing of construction machinery shall be performed in a designated hard standing area remote from any surface water drainage inlets.
- A response procedure will be put in place to deal with any accidental pollution events.
- Spillage kits will be available at bunded areas and refuelling areas and construction staff will be made familiar with response procedures and use of equipment.

5.6 Water Supply

A water supply will be required for various activities on site. Water will be required for:

- Site compound welfare facilities.
- Wheel wash and vehicle wash-down (use recycled water where feasible).
- Dust suppression (as applicable).
- Curing of concrete in warm weather.
- General construction cleaning materials/equipment etc.

A temporary potable water supply will be provided from the existing 250mm public water supply at Old Fort Road, subject to prior consent by Uisce Éireann.

5.7 Noise & Vibration

5.7.1 Significant construction sources of noise and vibration

Particular significant sources of noise and vibration that may be expected during construction activities on this site are listed in Table 1 below:

Table 1 Potential construction sources of significant noise and vibration

Activity Type	Activity expected on this site?	Details
Rock blasting	No	-
Rock excavation by pneumatic hammering	Yes	Isolated hard strata may require rock hammering to loosen
Earthworks compaction by vibratory rollers	Yes	Typical smooth wheeled vibratory rollers shall be used to compact earthworks fill materials
Heavy demolition	No	-
Piling by percussive methods	No	-
Other	-	-

Table 1 Potential Construction Sources of Significant Noise and Vibration

Rock breaking:

There is expected to be some rock breaking on site. The rock in this area is typically limestone and is mostly excavatable using tracked excavators with toothed buckets and pneumatic rock breakers. It is estimated that approximately 10% of the overall rock excavation remaining on site may be of sufficient hardness to require pneumatic hammering to loosen prior to excavation, requiring approximately 48 hours of rock hammering activity during the course of the works.

Earthworks compaction by vibratory roller:

Smooth wheeled vibratory rollers will be used to compact earthworks materials and granular fill materials throughout the course of the works period.

5.7.2 Noise and vibration control and mitigation measures

Local Authority requirements with regard to the control of noise and vibration shall be observed during the works.

Ground vibrations shall be monitored at selected locations to the approval of the Employer's Representative during the progress of the works.

Each vibrograph shall be certified as being in proper working order and calibrated and shall unless otherwise approved, record vibrations in three directions simultaneously with print-out showing the amplitude and frequency of the vibrations.

The noise will comply with the following:

- BS 5228-1: 2009+A1:2014 Code of Practice for Noice Vibration Control on Construction and Open Sites: Noise.
- BS 5228-2:2009 Code of Practice for Noise and Vibration control on Construction and Open Sites: Vibration.
- Environmental Protection Agency Act 1992 Sections 106-108, Local Authority's specific requirements depending on the location of the site, and
- Safety, Health and Welfare at Work (Control of Noise at Work) Regulations 2006 SI 371 (2006).

Noise will be minimised, as far as practicable, by the selection of appropriate methods and equipment, and by the use of silencing devices wherever necessary. All compressors, percussion tools and vehicles will be fitted with effective silencers of a type recommended by their manufacturers. Measures shall be taken to minimise noise such turning off any machinery not in use.

Site staff shall not use radios or other audio equipment in ways or at times. which may cause nuisance and cause a Health and Safety risk.

All works shall be performed such that the effect of vibration on the surroundings. is minimised and does not cause any damage.

Vibration levels used for the purposes of evaluating building. protection and human comfort shall be expressed in terms of Peak Particle Velocity (PPV) in mm/s.

BS 5228 and BS 7385 define the following thresholds for cosmetic damage to residential or light commercial buildings: PPV should be below 15 mm/s at 4 Hz to avoid cosmetic damage. This increases to 20 mm/s at 15 Hz and to 50 mm/s at 40 Hz and above. At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded. This is summarised in Table 2 below.

Table 2 Vibration Limits (PPV)		
Types of Building	**Transient Vibration**	**Continuous Vibration**
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s	25 mm/s
Unreinforced or light framed structures Residential or light commercial-type buildings	15 mm/s	7.5 mm/s
Protected and Historic Buildings (Ref Note 1)	6 mm/s - 15 mm/s	3 mm/s - 7 mm/s
Identified Potentially Vulnerable Structures, Buildings with Low Vibration Threshold	3 mm/s	3 mm/s
Note 1: The relevant threshold value to be determined on a case-by-case basis. Where sufficient structural information is unavailable at the time of assessment, the lower values within the range will be used, depending on the specific vibration frequency		

Table 2 Vibration Limits

Furthermore, BS 5228-2 and BS 7385 state that minor structural damage can occur at vibration magnitudes greater than twice those in Table 2 and major structural damage can occur at vibration magnitudes greater than four times those in Table 2.

BS 5228-2 also provides guidance relating to the human response to vibration. Guidance is again provided in terms of PPV in mm/s since this parameter is routinely measured when monitoring the structural effects of vibration. The potential human response at different vibration levels, as set out in BS 5228-2, is summarised in Table 3 below:

Table 3 Guidance on human response to vibration levels	
Vibration Level (mm/s) (Ref Notes A,B,C below)	**Effect**
0.1	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3	Vibration might be just perceptible in residential environments.
1.0	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10.0	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.
Note A: The magnitudes of the values presented apply to the measurement position that is representative of the point of entry into the recipient	
Note B: A transfer function (Which relates an external level to an internal level) needs to be applied if only external measurements are available	
Note C: Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects, and where these values are routinely measured or expected then an assessment in accordance with BS 6472-1 or -2, and/or other available guidance, might be appropriate to determine whether the time varying exposure is likely to give rise to any degree of adverse comment	

Table 3 Guidance on Human Response to Vibration Levels

In the absence of more onerous requirements, the limits set out in Table 3 will apply. These values will only be modified with the express written agreement of the Employer's Representative.

5.8 Dust & Air Quality

Dust control measures shall be implemented in accordance with best practice and with reference to the following:

- Air Pollution Act 1987,
- BS 6187: Code of Practice for Demolition

In order to ensure that adverse air quality impacts are minimised during the construction phase and that the potential for soiling of property and amenity and local public roads is minimised, the following mitigation measures shall be implemented during the course of all construction activities:

- Avoid unnecessary vehicle movements and manoeuvring and limit speeds on site to minimise the generation of airborne dust.
- Use of rubble chutes and receptor skips during construction activities.
- During dry periods, dust emissions form heavily trafficked locations (on and off sites) will be controlled by spraying surfaces with water and wetting agents.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic only.
- Re-suspension in the air of spillages material from tanks entering or leaving the site will be prevented by limiting the speed of vehicles within the site to 10kmh and by use of a mechanical road sweeper.
- The overloading of tipper trucks exiting the site shall not be permitted.
- Aggregates will be transported to and from the site in covered trucks.
- Where the likelihood of windblown fugitive dust emissions is high and dry weather where conditions, dusty site surfaces will be sprayed by mobile tanker bowser;
- Wetting agents shall be utilised to provide a more effective surface wetting procedure.
- Exhaust emissions from vehicles operating within construction sites, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles and plant, rather than just following breakdowns, the positioning of exhaust at a height to ensure adequate local dispersal of emissions, the avoidance of engines running unnecessarily and the use of low emission fuels;
- All plant not in operation shall be turned off and idling engines shall not be permitted for excessive periods.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- Material stockpiles containing fine or dusty elements including top soils shall be covered with tarpaulins.
- Where drilling or pavement cutting, grinding or similar types of stone finishing operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers.
- Concrete cutting equipment shall be fitted with a water dampening system.
- A programme of air quality monitoring shall be implemented at the site boundaries for the duration of construction phase activities to ensure that the air quality standards relating to dust deposition of construction phase activities to ensure that the air quality standards relating to dust deposition and PM10 are not exceeded. Where levels exceed specified air quality limit values, dust gathering activities shall immediately cease and alternative working methods shall be implemented.
- A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.
- Dust netting and site hoarding shall be installed along site boundaries with adjacent properties as necessary to minimise fugitive wildblows dust emissions falling in third party lands and existing residential areas.

A Dust Management Plan shall be implemented.

Key aspects of controlling dust are listed below.

- Drop heights from conveyers, loading shovels, hoppers, and other loading equipment will be minimised, if necessary fine water sprays will be employed.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.
- When conditions are such that there is a risk of track out dust (i.e., very dry, or muddy), vehicles exiting the site shall make use of a wheel wash facility prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted through speed limit implementation, and this speed restriction will be enforced rigidly. On any site roads, this will be 20 kmph.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust and other dust generating activities will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

5.9 Fire and Explosion

Suitable precautions to prevent the risk of fire or explosion caused by gas or vapour shall be implemented during the works period. Suitable portable fire extinguishers shall be kept at all times in working areas and areas not protected by other fire services.

Containers of flammable liquids or gases shall be handled in accordance with the recommendations of the Fire Services Department, Local Authority and Statutory Regulations.

5.10 Disposal of Materials

Where material is to be stockpiled on site prior to disposal, surface water run-off shall be controlled to prevent contamination of surrounding watercourses. Materials surplus to requirements will be removed off site at the earliest reasonable opportunity. Contaminated soil will be assessed to determine its constituents and disposed of offsite in accordance with Irish Waste Management Legislation.

Where site topsoil is to be reused on site for planting / landscaping it will be appropriately stored and approved for use prior to spreading in the required locations.

5.11 Communication

The types of relevant communication and training required to ensure that all parties take responsible steps to ensure waste and environmental duty of care is complied with and that materials are handled efficiently, and waste is managed appropriately:

- Construction Management Plan
- Site Waste and Environmental Management Plan
- Roles and responsibilities,

- Toolbox Talks,
- Waste procedures on site,
- Duty of care / responsibilities,
- Material storage.

Waste and environmental management will be included on the agenda for all site meetings and monitoring statistics will be provided for review.

5.12 Sustainability

An embodied carbon footprint assessment of materials to be included in the Works shall be performed in accordance with international best practice / standards. The scope of the assessment shall as a minimum include cradle / source to site and construction activity related emissions. Product type-specific Environmental Product Declarations (in accordance with I.S. EN15804), where these are available, can be consulted to assist in developing embodied carbon footprints of construction products.

6.0 Monitoring & Protection of Neighbouring Properties

6.1 General Requirements

A monitoring regime will be put in place to protect neighbours & neighbouring properties with a full and detailed vibration, noise, dust, and groundwater monitoring regime put in place for the duration of the works.

6.2 Monitoring Works Specialist

A competent person to be referred to as the Surveying, Instrumentation and Monitoring Subcontractor (MSC) shall be appointed where necessary and will prepare and maintain the vibration, noise, dust, and groundwater monitoring plan, for the agreement/approval of the Client, Employers Representative, and the Technical Advisors.

6.3 Condition Schedules

The MSC will be responsible for preparing or organising the preparation of condition surveys of surrounding buildings, walls, hardstanding area etc. prior to the carrying out of any works on site. Extent of surveys to be agreed. The condition surveys shall be carried out to a level of detail, suitable to the nature and extent of conditions encountered in order to obtain an understanding of the general structural condition of the property/structure and/or external environments.

6.4 Movement & Vibration

Monitoring Movement & vibration monitoring of adjoining areas are not deemed to be required given the nature of the works and the site location.

6.5 Noise & Dust Monitoring / Control

Refer to Sections 5.7 and 5.8 of this report,

6.6 Recording

The MSC will monitor, collate, and report on noise & dust in report format, on a monthly basis, increased to weekly during critical activities.