

If any plant setups are required outside the site, a road lane closure may be required. The road closure license will be obtained from Dublin City Council and an agreed traffic management plan will be implemented as required. Any traffic management measures will be designed by qualified personnel in accordance with Chapter 8 of the Traffic Signs Manual and implemented by Signing, Lighting & Guarding (SLG) trained operatives.

The logistics plan will be presented to workers during the site induction. Refresher training in the logistics plan will be presented in toolbox talks.

### 3.1.5 Proposed Craneage Strategy

The use of tower cranes will not be required.

### 3.1.6 Power, Waste & Drainage

A power supply from ESB Networks to power both the compound and the construction site will be applied for by the Contractors. The size of supply will be calculated to ensure it is sufficient to power both the site compounds and construction site activities. A dedicated power supply will be provided for task lighting, power tools and charging stations for plant such as electric hoists.

In the event of any delays securing the required power supply to power offices and hoists, generators may be required. Diesel generators will have sound enclosures and will be regularly serviced to prevent noise and odour pollution and setup in a spill tray to prevent any spillage contaminating the ground. Temporary site lighting will be installed to provide safe and well-lighted walkways around the site and task lighting to the construction sites.

Water and drainage will be required to service the site toilets and canteen facilities, these will be accommodated within the existing building using the existing drainage network. It will be the Contractor's responsibility to apply to Irish Water for connections to the water main and foul drain, ideally they will utilise the existing connections.

### 3.1.7 Working Hours

The working hours will be dictated by the planning conditions and are expected to be as follows:

Days	Start Time	Finish Time
Monday-Friday	08:00	19:00
Saturday	08:00	13:00
Sunday	No work permitted	No work permitted
Bank or Public Holiday	No work permitted	No work permitted

Working times will be within the hours permitted by the Planning Decision for the development. It may be necessary to work outside these hours at times, for example for early morning concrete pours and late evening concrete finishing. The Contractor will consult Dublin City Council regarding out of hours working and local residents and businesses will be informed of any out of hours works required. A planning derogation will be applied for to Dublin City Council when out of hours working is required. The terms and conditions of the planning derogation will be strictly adhered to at all times.

### 3.1.8 Car Parking

In general, there will not be car parking for operatives on site. Personnel will be encouraged and informed of the numerous public transport options available to access the works.

### 3.1.9 Expected Vehicle Movement

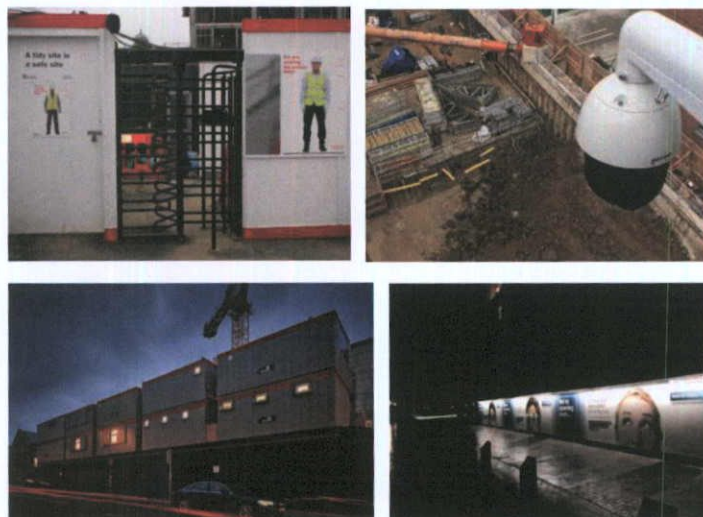
An Outline Construction Traffic Management Plan has been prepared and details access routes, site signage, haulage license protocols and environmental control procedures. Reference should be made to the Construction Traffic Management Plan submitted as part of the planning documents.

Once the construction programme is finalised by the appointed Contractor, a detailed breakdown of the expected vehicle movements will be available.

### 3.1.10 Security

In addition to the perimeter hoard to the site, the following measures will be adopted by the Contractor for site security:

- A dedicated site security team with 24hr access to the site and direct contact with the local An Garda Siochana station.
- Each person on site will have been inducted and fingerprint access control will be used for site entry and exit. The Contractor will know who is on site at all times.
- There will be a site CCTV system which may be extended to cover the footpaths and roads around the site at access points (depending on the GDPR regulations).
- Hoarding lighting will be incorporated to increase the general illumination levels around the site with the exception of boundaries to residential gardens and houses.
- Siting the cabins behind the hoarding with windows overlooking the streets will provide a greater degree of natural surveillance to the area to ward against anti-social behaviour.



**Figure 4** | Typical Site Security Measures

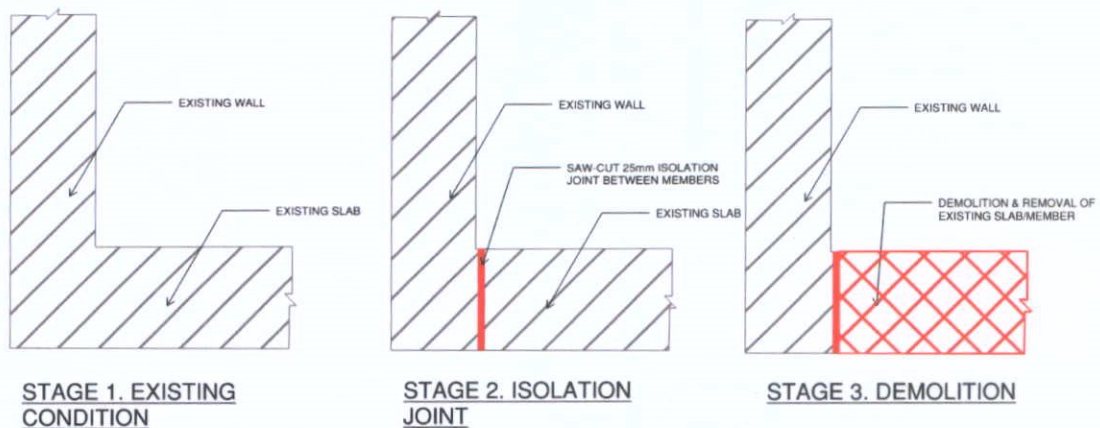
## 4. Construction Methodology:

### 4.1 Enabling Works

Scaffolding will be required for the repair works to the front and rear facades. All scaffolding will conform to the HSA Code of Practice for Access and Working Scaffolds.

### 4.2 Demolition Works

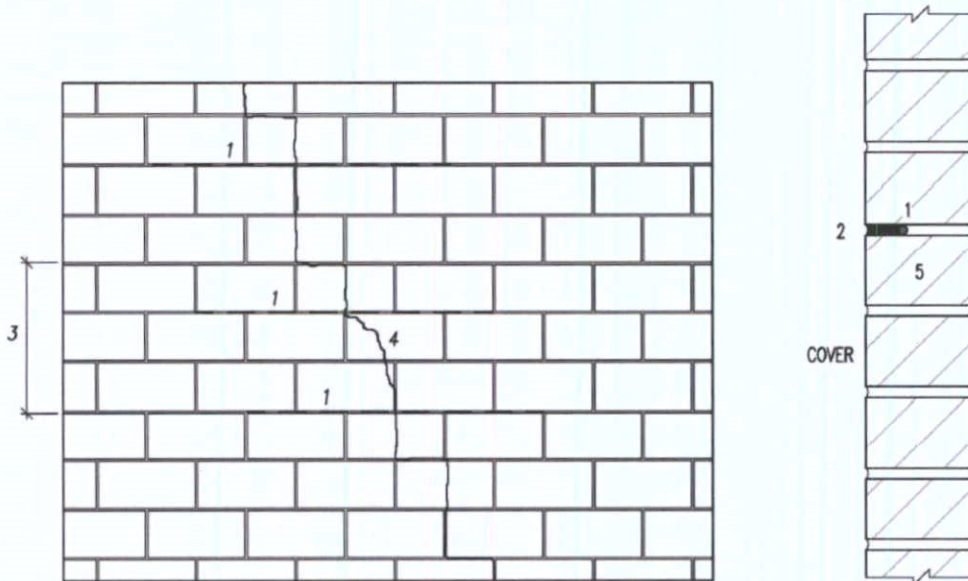
Demolition of the building structures shall extend to the lines and levels indicated on the drawings. All demolition works shall employ low vibration methods to minimise the risk of damage to the existing building fabric. Isolation saw-cut joints shall be first installed to detach members/areas requiring demolition from other retained members/areas. The recommended method of demolition is outlined in Figure 5.



**Figure 5 | Isolation Joint Sequence of Works**

### 4.3 Repair Works to Existing Walls

The repair works to the existing masonry will typically involve repointing, the replacement of damaged brickworks and the repair of cracks. The remedial works to cracks will involve the installation of stainless steel bed-joint reinforcement. The recommended method of installation is outlined in Figure 6.



### **REMEDIAL WORKS TO CRACKS:**

LEGEND – (FOLLOWING RAKING OUT OF BED JOINTS/CRACK)

1. TIES ACROSS CRACKS TO BE IN 8mm $\phi$ , 750mm LONG, GRADE 304, STAINLESS STEEL, DEFORMED BARS.
2. TIES TO BE EMBEDDED IN BED JOINTS WITH "SBD 5 STAR" NON-SHRINK GROUT OR SIMILAR APPROVED. CRACKS TO BE INFILLED WITH SBD EPOXY PLUS INJECTION RESIN OR SIMILAR APPROVED.
3. TIES TO BE INSERTED AT 3 COURSED VERTICAL CENTRES.
4. RENEW BADLY BROKEN BLOCKS AND FILL CRACKS WITH NON-SHRINK GROUT (SEE 2. ABOVE)
5. COVER/DEPTH OF EMBEDMENT TO BE 30mm.
6. PRIOR TO RE-PLASTERING OR RENDERING, 225mm. WIDE STAINLESS STEEL MESH TO BE FIXED ACROSS CRACKS.

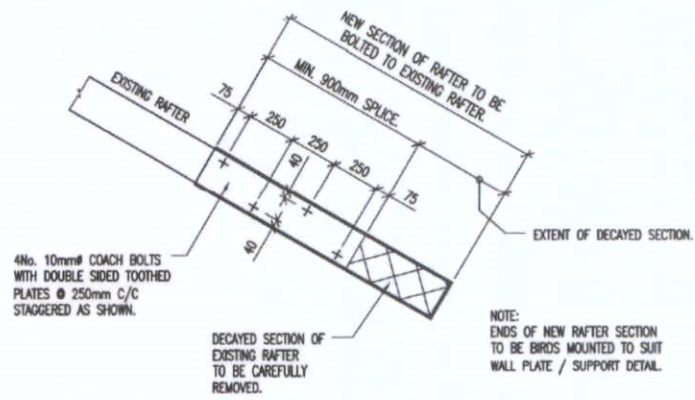
**Figure 6 | Typical Repair Works to Masonry Cracks**

## **4.4 Repair Works to Existing Floors**

The strengthening works to the existing floors will typically involve additional timber joists placed in between the existing members. In areas, strengthening works will involve fitch beams comprising of steel plates fixed to the existing timber joists.

## **4.5 Repair Works to Existing Roof**

The repair works to the existing roofs will typically involve the replacement of damaged rafters. The extent of damage to the existing rafters will be determined by the Contractor and timber specialist. The method of replacing the ends of the existing rafters will involve splicing a new timber sections to the existing members. The recommended repair details is shown in Figure 7.



**TYPICAL DETAIL WHERE ENDS OF EXISTING RAFTERS ARE DECAYED.**

*Figure 7 | Typical Repair Works to Timber Rafters*

## 5. Construction and Demolition Waste Management

The following preliminary Construction and Demolition (C&D) Waste Management guideline provides information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with the current legal and industry standards including:

- The Waste Management Acts 1996 - 2011 and associated Regulations.
- Protection of the Environment Act 2003 as amended.
- Litter Pollution Act 1997 as amended.
- Eastern-Midlands Region Waste Management Plan 2015 – 2021.

These preliminary C&D Waste Management guidelines will be incorporated into the requirements for the Contractor and the Plan will be developed by the Contractor as the construction and demolition works progress.

Of particular importance, the C&D Waste Management Plan will aim to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water). The hierarchy of waste management sets out the guiding principles in order of importance as follows:-

- Reduction of the amount of waste generated by the construction process.
- Segregation of waste is a key concept that will be implemented during the course of the construction phase of the development to enable ease in re-use and recycling, wherever appropriate.
- Recycle waste material where feasible, including the use of excess excavations as fill material, recycling of various waste fractions such as metals, packaging etc.

### 5.1 Non-Hazardous Construction Waste

There will be waste materials generated from the demolition and removal of the existing fabric and demolition material on site. The volume of waste generated from demolition will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated i.e. plasterboard on timber ceiling joists, steel embedded in concrete etc.

There will be excavated material comprising gravel and made ground excavated to facilitate construction of new lift pit. There is limited opportunities for the reuse of excavated material onsite and it is envisaged that all material, will need to be removed offsite. This will be taken for appropriate offsite reuse, recovery, recycling and/or disposal.

During the construction phase there may be a surplus of building materials, such as timber off-cuts, broken concrete blocks, cladding, plastics, metals and tiles generated. There may also be excess concrete during construction which will need to be disposed of. Plastic and cardboard waste from packaging and supply of materials will also be generated. The contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Waste will also be generated from construction workers e.g. organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided on site during the

construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

## **5.2 Potential Hazardous Wastes Arising**

### **5.2.1 Contaminated Material**

In the event that hazardous material, or historically deposited waste is encountered during the works the contractor will notify Dublin City Council and provide a Hazardous/Contaminated Soil Management Plan, to include estimated tonnages, description of location, any relevant mitigation, destination for disposal/treatment, in addition to information on the authorised waste collector(s).

### **5.2.2 Fuel/Oils**

Fuels and oils are classed as hazardous materials; any on-site storage of fuel/oil, and all storage tanks and all draw-off points will be bunded and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and the site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil waste generated at the site.

### **5.2.3 Asbestos**

Reference shall be made to the Asbestos Demolition Survey Report for Asbestos Containing Materials (ACM) noted within the existing building.

Removal of asbestos or ACMs will be carried out by a suitably qualified contractor and ACM's will only be removed from site by a suitably permitted/licenced waste 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.

### **5.2.4 Other known Hazardous Substances**

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.

In addition, 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 from during C&D activities or temporary site offices. These wastes, if generated, will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

## **5.3 Appointment of C&D Waste Manager**

The Contractor will appoint a C&D Waste Manager. The C&D Waste Manager will have overall responsibility for the implementation of the project Waste Management Plan (WMP) during the construction phase.

Copies of the Waste Management Plan will be made available to all relevant personnel on site. All site personnel and sub-contractors will be instructed regarding the objectives of the Waste Management Plan and informed of the responsibilities which fall upon them as a consequence of its provisions. Where source segregation, selective demolition and material reuse techniques apply, each member of staff will be given instructions on how to comply with the Waste Management Plan. Posters will be designed to reinforce the

key messages within the Waste Management Plan and will be displayed prominently for the benefit of site staff.

## 5.4 C&D Record Keeping

It is the duty of the C&D Waste Manager to ensure that necessary licenses have been obtained as needed. Each consignment of C&D waste taken from the site will be subject to documentation which will conform with *Table 3* along with Transportation Dockets to ensure full traceability of the material to its final destination.

Detail	Particulars
Project of Origin	<i>61 O'Connell Street Upper</i>
Material being Transported	<i>To be completed by C&amp;D Waste Manager</i>
Quantity of Material	<i>To be completed by C&amp;D Waste Manager</i>
Date of Material Movement	<i>To be completed by C&amp;D Waste Manager</i>
Name of Carrier	<i>To be completed by C&amp;D Waste Manager</i>
Destination of Material	<i>To be completed by C&amp;D Waste Manager</i>
Proposed Use	<i>To be completed by C&amp;D Waste Manager</i>

**Table 2** | *Details of materials taken from site*

## 5.5 Surface Water Protection

The existing surface water drainage system to the site shall be maintained during the works.

The following measures will be undertaken to protect the existing surface water network:

- All containment and treatment facilities will be regularly inspected and maintained.
- Refuelling of plant during the Construction Phase will only be carried out at designated refuelling station locations on site. Each station will be fully equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works on site.
- Only emergency breakdown maintenance will be carried out on site. Drip trays and spill kits will be available on site to ensure that any spills from vehicles are contained and removed off site.
- All personnel working on site will be trained in pollution incident control response.
- Any other diesel, fuel or hydraulic oils stored on site will be stored in bunded storage tanks- the bunded area will have a volume of at least 110% of the volume of the stored materials as per best practice guidelines (Enterprise Ireland, BPGCS005).
- If portaloos and/or containerised toilets and welfare units will be used to provide facilities for site personnel, all associated waste will be removed from site by a licenced waste disposal contractor.
- Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released into nearby drains.



## 6. Movement Monitoring

### 6.1.1 Overview

Prior to demolition works commencing an external survey control system is to be established around the site, including all adjacent structures and boundary conditions.

This will be carried out using either traditional closed traverse surveying techniques or continuous automated total station (AMTS) monitoring of movement, depending on the sensitivity of the site boundary.

The monitoring regime shall have co-ordinates which are directly correlated to the building grids and datum levels related to those shown on the Land Survey drawings, issued by the Architect. An initial control survey is to be carried out by the Contractor and may be independently checked and verified by the appointed survey contractor.

The target locations shall be agreed with the relevant parties, including the architect, structural engineer, survey contractor and Contractor, and the target adhesive shall be tested to demonstrate that no damage will be caused to the existing building fabric or surface upon removal of the targets.

The targets will consist of reflective optical survey targets (typically prisms) that shall be adhered to the external surface of the retained structures and neighbouring buildings. The target locations shall be agreed with the relevant parties and the target adhesive shall be tested to demonstrate that no damage will be caused to the existing building fabric surface upon removal of the targets.

### 6.1.2 Proposed Monitoring Regime

The retained structures and neighbouring buildings shall be continuously monitored for changes in vertical and lateral movement. The monitoring of movement will be measured against trigger levels with direct alerts (via email/SMS text) sent from the system to nominated persons.

The results shall be measured with co-ordinates in eastings, northings and elevation (E, N, Z) established. A minimum number of baseline co-ordinates shall to be recorded and checked for control purposes 2 weeks prior to commencement of the demolition works. The results are to be recorded and the directional change and quantum movement from the controls and previous readings calculated.

Proposed Trigger Level	Movement (mm)
Green	Less than 12
Amber	Between 12 and 15
Red	Greater than 15

Unless otherwise agreed, movements of any target position equal to or greater than 12mm from baseline readings shall trigger 'amber' and shall be addressed by the Contractor. The Contractor shall advise the Engineer on the reason for the movement and advise his proposals to control further movement.

Movements of any target equal to or greater than 15mm from baseline readings shall trigger 'red' where immediate action is required by the Contractor. The Engineer and Contract Administrator shall be notified immediately.

## **7. Control and Monitoring of Noise, Vibration and Dust on site**

### **7.1 Condition Surveys**

It will be necessary to carry out a detailed condition survey of all adjoining lands and properties prior to any works commencing on site, with particular attention paid to the protected structures noted previously in this report. In addition, baseline movement monitoring will be carried out in line with best practice.

### **7.2 Noise Monitoring**

The Contractor will deal with the immediate dangers to hearing etc. associated with high noise levels and the impact of same on construction operatives by means of risk assessment and mitigation / precautionary measures and equipment, all in full compliance with the current Health and Safety legislation.

Noise on site shall comply with Safety, Health and Welfare at work (construction) Regulations 2006 to 2013, Safety, Health and Welfare at Work Act 2005, BS 6187:2011 - Code of Practice for full and partial demolition, BS 5228:2009+A1:2014 Parts 1 & 2 - Code of Practice for noise and vibration control on construction and open sites – Vibration, Environmental Protection Agency Act 1992 Sections 106-108, including all Local Authority specific requirements for this specific site.

A survey of baseline noise and vibration will be undertaken to gain an understanding of the typical range of the existing conditions in the surrounding area. Methods of minimising construction noise and vibration will be implemented where possible. The Contractor is to implement these recommendations and utilise the most efficient construction methods to reduce the impact on the neighbouring environment.

The nature of construction activities means that a certain level of noise is inevitable, but the appointed Contractor must endeavour to minimise this as far as practically possible and reduce the effect and any nuisance to the surrounding environment and neighbours.

Work methods are to be reviewed to ensure minimal noise and vibration are created; methods should include:

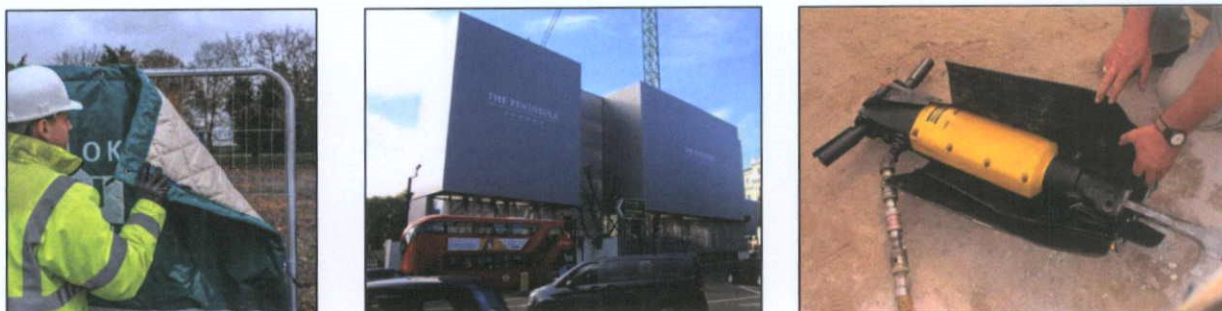
- Each item of plant used on site complies with the noise limits quoted in the relevant European Commission Directive 2000/14/EC/ [S.I. No. 632 of 2001].
- All plant and equipment liable to create noise whilst in operation will, as far as reasonably practicable, be located away from sensitive receptors and neighbouring occupied buildings.
- The use of barriers and hoarding to absorb and/or deflect noise away from noise sensitive areas, such as the adjacent residential buildings, will be employed where required and reasonably practicable.
- All plant, equipment and noise control measures applied to plant and equipment shall be maintained in good and efficient working order and operated such that noise emissions are minimised as far as reasonably practicable. Any plant, equipment or items fitted with noise control equipment found to be defective shall not be operated until repaired.
- Fixed items of construction plant shall be electrically powered in preference to diesel or petrol driven. The Contractor shall ensure that vehicles and mechanical plant employed for any activity associated with the construction works will, where reasonably practicable, be fitted with effective exhaust silencers.
- Machines in intermittent use shall be shut down or throttled down to a minimum during periods between works. Static noise emitting equipment operating continuously will be housed within suitable acoustic enclosures, where appropriate.

- Noise suppression hammers and shields will be used on rock breaking equipment.
- Working hours will be confined to those stipulated in the grant of planning permission.
- Site deliveries will be confined to working hours and allocated offloading location will be utilized for all deliveries.
- The Site Manager will also continually review and monitor the noise / dust / vibration levels / risk throughout the duration of the project and if necessary, adjust / add to the control measures to be employed to reduce nuisance.

### 7.2.1 Measures to Mitigate Noise

Of particular consideration, is the noise from construction activities adjacent to the public footpaths, commercial areas and the nearby residential properties. Noise mitigation measure will be proposed by the Contractor and may include:

1. The installation of a solid timber hoarding to provide noise insulation.
2. A high-level acoustic wrap applied to the scaffolding to provide some degree of noise barrier.
3. Particularly noisy works can have an acoustic noise control barrier put around them when the works are being carried out.
4. When jack hammers are used a “no racket” jacket will be applied which reduced the noise by up to 10db when 50ft away.



**Figure 8 | Typical Noise Mitigation Measures**

## 7.3 Vibration

During the course of the work proposed, ground borne vibrations could give rise to adverse effects to the nearby buildings. The following control measures are to be put in place during the works to ensure protection of these boundaries.

### 7.3.1 Proposed works and potential risks

Potential risks arising from Demolition and Construction Works identified:

- (a) Vibration induced damage from demolition, piling and excavation works.
- (b) Physical impact from machinery and /or swing of material deliveries

(c) General implementation of works such as landing shutters / reinforcement / steelwork deliveries in close proximity to the historic / protected structures.

(d) Works to the historic / protected structures themselves.

### 7.3.2 Vibrations Standards

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV). Guidance relevant to acceptable vibration within buildings is contained in the following documents:

- British Standard *BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration* (hereinafter referred to as BS7385:1993).
- British Standard *BS5228-2: 2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites – Vibration* (hereinafter referred to as BS 5228-2 2009+A1:2014).

### 7.3.3 Impact of ground borne vibrations arising from Proposed works

Peak particle velocity (PPV) is commonly used to assess the structural response of buildings to vibration. Reference to the following documents has been made for the purposes of this assessment in order to discuss appropriate PPV limit values:

- British Standard *BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration*.
- British Standard *BS5228-2: 2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites – Vibration*

BS7385-2:1993 and BS5228-2:2009+A1:2014 advise that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above for transient vibration. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table B.2 might need to be reduced by up to 50%. On a cautious basis, therefore, continuous vibration limits are set as 50% of those for transient vibration across all frequency ranges.

The documents note that minor structural damage can occur at vibration magnitudes which are greater than twice those presented in Table 6. Major damage to a building structure is possible at vibration magnitudes greater than four times the values set out in the Table. It should be noted that these values refer to the vibration at base of the building.

The vibration limit range for protected and historical buildings are equal to or up to 50% of those for light framed, depending on their structural integrity. Where no structural defects are noted, the same limit to those for light framed buildings apply. For other structures and buildings that are determined to be potentially vulnerable to vibration due to significant structural defects, a further stringent criteria has been applied for transient vibration. It is assumed that known buildings and structures of this kind, will be subject to condition surveys well in advance of the works, and any defects identified repaired. The results of conditions surveys will determine whether a building or structure is classed as “vulnerable”.

Table 6 sets out the limits as they apply to vibration frequencies below 4Hz where the most conservative limits are required. At higher frequencies, the limit values for transient vibration within Table B.2 of BS5228-

2:2009+A1:2014 will apply, with similar reductions applied for continuous vibration and those for protected structures.

Structure Type	Allowable Vibration (in terms of PPV) at the Closest Part of Sensitive Property to the Source of Vibration, at a Frequency of 4Hz and less:	
	Transient Vibration	Continuous Vibration
Reinforced or framed structures. Industrial and heavy commercial buildings	50mm/s	25mm/s
Unreinforced or light framed structures. Residential or light commercial-type buildings	15mm/s	7.5mm/s
Protected and Historic Buildings	6mm/s – 15mm/s	3 mm/s – 7.5mm/s
Identified Potentially Vulnerable Structures and Buildings with Low Vibration Threshold	3mm/s	

**Table 7 | Thresholds relating to Transient and Continuous Vibrations in Buildings & Structures**

For the avoidance of doubt, due to the sensitive nature of the existing protected buildings, the lowest permissible vibration criteria in Table 6 shall apply relating to “Identified Potentially Vulnerable Structures” or an Allowable Vibration PPV of 3mm/s.

The relevant threshold values for all other existing buildings and structures adjacent to the site, shall be determined on a case-by-case basis following the dilapidation surveys ahead of works commencing on site. Where sufficient structural information is unavailable at the time of assessment, the lower value within the range in Table 6 will be used.

### 7.3.4 Mitigation Measures to be put in place prior to works

For controlling vibration reference should be made to BS 5228:2009+A1:2014 which offers detailed guidance on the control of vibration from demolition and construction activities. In general, BS5228:2009+A1:2014 advises the following:

- Use rubber linings in, for example, chutes and dumpers to reduce impact noise.
- Minimize drop height of materials.
- Regular and effective maintenance by trained personnel should be carried out to reduce vibration from plant and machinery.
- Hand demolition, cutting of the separation joints of the buildings in advance and small robotic breakers and ‘munchers’

Toolbox talks should also be carried out with personnel in respect to managing vibration on site. Exposure limits as set out in Regulation 4 of BS 5228:2009+A1:2014 will be reviewed, risk assessments carried out, detecting signs of injury, safe working practices and suppression techniques will all be incorporated. Methods of construction should be adopted to omit and or control vibration at the source, utilize lower levels of vibration; use vibration pads and gloves where possible. Any activity which will generate vibration should

as far as practicable be isolated from sensitive receptors. Level of protection and procedure put in place will be dictated by potential risk resulting from work to be carried out.

### 7.3.5 Monitoring and Mitigation for Ground borne Vibrations during Construction Works

Detailed monitoring will be used to control the proposed works and to ensure compliance with the proposed control limits outlined in Table 6.

Vibrations movements will be actively measured during the works with a pre-determined plan of action ready to be put in place should actual measurements vary from the expected levels.

The works will have appropriate level of site management, on site monitoring and supervision. A site representative will be present during the works to ensure the levels are as expected and to supervise any measures should the levels be exceeded.

In the event that control limit is approached the contractor for the works will explore a revised approach for completion of the works.

In accordance with established good practice, baseline monitoring will be undertaken in advance of the proposed works in order to establish the existing environment around the historic structures and to verify the correct operation of the proposed instruments.

A series of trigger limits will be set for the works following what is commonly called a 'traffic light' system.

- For measurements below an 'amber limit' works can continue.
- For measurements between an 'amber/red limit' and below the 'red limit' operations will be suspended immediately. The construction methodology will be reviewed and adjusted as required to allow works to proceed on a manner that maintains the integrity of the historic structures.
- Works can continue between the amber and maximum red limit but only when methodologies have been revised to attempt to bring vibrations back below the amber level and also with a greater level of monitoring and control.
- Should vibrations go above the red limit works will be suspended for a full review of the exceedance event(s); revision of works procedures and approval by the clients' representatives before operations can proceed again.

## 7.4 Air & Dust Management

A dust management plan will be compiled by the Contractor for the development.

The following precautions to minimise nuisance to the public and neighbouring occupiers caused by dust and dirt will be carried out by the contractor.

- Netting is to be provided to enclose scaffolding to mitigate escape of air borne dust from the existing buildings.
- Engines and exhaust systems should be maintained so that exhaust emissions do not breach stationary emission limits set for the vehicle / equipment type and mode of operation.
- Dust emission over the site boundary should be minimised using static sprinklers or other watering methods as necessary.
- No burning of materials to be permitted on site.

- Demolition waste should be removed from site as quickly as possible to minimise risk of dust generation and any fine material should be covered with a tarpaulin or similar material and tied down.
- Prior to commencement, the Contractor should identify the construction operations which are likely to generate dust and to draw up action plans to minimise emissions.
- In areas of poor natural ventilation, dust capture/extraction methods should be employed by the Contractor.
- The Contractor should allocate suitably qualified and experienced personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled.
- The Contractor will be required to appoint a senior member of its site management team to act as the liaison with third parties in respect of complaints regarding dust and or site activities.
- Monitoring of dust deposition should be undertaken at nominated boundary locations to ensure that dust levels comply with the TA Luft limit value of  $350\text{mg}/(\text{m}^2/\text{day})$  based on a 30-day average using Bergerhoff gauges (Limits to be agreed with local authority).

## **8. Building Control Amendment Regulations**

### **8.1 Quality Assurance during Construction and BC(A)R Compliance**

The Contractor will need to demonstrate how they will be providing quality in construction. They shall comply fully with all requirements of the Amended Building Control regulations to the satisfaction of the Ancillary and Assigned certifiers.

The Contractor will be responsible for the preparation of benchmark samples of each new element of the works to the satisfaction of the Assigned and Ancillary Certifiers under the Building Control regulations (BCAR). Each benchmark sample will be considered a 'hold point' under the Preliminary Inspection Plan (PIP) and will be required to be offered up to the Certifiers involved ahead of the works starting - with a minimum of two days' notice (in writing).

The Contractor will be required to keep pre- and post-pour check sheets for submission to the assigned and ancillary certifiers where required.

Written acceptance will be required from the Certifiers after inspection of the benchmark samples before the rest of the works proceed.

Where 'specialist' suppliers are noted by the design team to have design responsibility, they will be required to provide Certificates of Design (Sd), Certificates of Inspection (Si) and Certificates of Completion (Sc). Ahead of appointment of the 'specialist' suppliers / designers - evidence of competency and Professional Indemnity insurance cover will be required for the approval of the Contract Administrator and Waterman Moylan.

This is to be confirmed by the Contractor once appointed and will include a quality check regime.



## **9. Liaison with Third Parties**

It is imperative that the Contractor engages in discussions with local residents, businesses and the general public well in advance of work commencing on site. Formal communication should be provided to immediate neighbours regarding activities or possible disruptions.

The appointed contractor will be required to adopt the practices covered under the 'Considerate Constructors Scheme' for establishing a good neighbour strategy and maintaining good relationships with neighbouring communities. The ideas described within this scheme will be implemented on site where applicable to minimize negative impact on local community and the environment.

Handling of any complaints must be logged and actioned quickly by the Contractor.



# UK and Ireland Office Locations







## APPENDIX 6.1 PROTECTED SITES FOR NATURE CONSERVATION IN THE VICINITY OF THE PROPOSED DEVELOPMENT AND THE MASTERPLAN

European sites in the vicinity of the proposed development and the Masterplan are listed below in Table 1, along with their qualifying/special conservation interests, reference to the most recent conservation objectives document, and their location relative to the proposed development site.

Other nationally protected sites for nature conservation in the vicinity of the proposed development are listed below in Table 2, along with the nature conservation interests for which they are designated, and their location relative to the proposed development site and the Masterplan.

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site and the Masterplan
<b>Special Area of Conservation (SAC)</b>	
<p><b>South Dublin Bay SAC [000210]</b>            [1140] Mudflats and sandflats not covered by seawater at low tide            [1210] Annual vegetation of drift lines            [1310] <i>Salicornia</i> and other annuals colonising mud and sand            [2110] Embryonic shifting dunes</p> <p><i>S.I. No. 525/2019 - European Union Habitats (South Dublin Bay Special Area of Conservation 000210) Regulations 2019</i>            NPWS (2013) <i>Conservation Objectives: South Dublin Bay SAC 000210</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	<p>c.3.5km south east of the proposed development site and the Masterplan</p> <p style="text-align: right; color: grey; font-weight: bold;">DCC PLAN NO 5126/22 RECEIVED: 26/10/2022</p>
<p><b>North Dublin Bay SAC [000206]</b>            [1140] Mudflats and sandflats not covered by seawater at low tide            [1210] Annual vegetation of drift lines            [1310] <i>Salicornia</i> and other annuals colonising mud and sand            [1330] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)            [1395] Petalwort <i>Petalophyllum ralfsii</i>            [1410] Mediterranean salt meadows (<i>Juncetalia maritimi</i>)            [2110] Embryonic shifting dunes            [2120] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes)            [2130] Fixed coastal dunes with herbaceous vegetation (grey dunes)            [2190] Humid dune slacks</p> <p><i>S.I. No. 524/2019 - European Union Habitats (North Dublin Bay Special Area of Conservation 000206) Regulations 2019</i>            NPWS (2013) <i>Conservation Objectives: North Dublin Bay SAC 000206</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	<p>c. 5.3km north east of the proposed development and the Masterplan</p>

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site and the Masterplan
<p><b>Baldoye Bay SAC [000199]</b></p> <p>[1140] Mudflats and sandflats not covered by seawater at low tide            [1310] Salicornia and other annuals colonising mud and sand            [1330] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)            [1410] Mediterranean salt meadows (<i>Juncetalia maritimi</i>)</p> <p><i>S.I. No. 472/2021 - European Union Habitats (Baldoye Bay Special Area of Conservation 000199) Regulations 2021</i></p> <p>NPWS (2012) <i>Conservation Objectives: Baldoye Bay SAC 000199</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	<p>c. 10.4km north east of the proposed development site and the Masterplan</p>
<p><b>Howth Head SAC [000202]</b></p> <p>[1230] Vegetated sea cliffs of the Atlantic and Baltic coasts            [4030] European dry heaths</p> <p><i>S.I. No. 524/2021 - European Union Habitats (Howth Head Special Area of Conservation 000202) Regulations 2021</i></p> <p>NPWS (2016) <i>Conservation Objectives: Howth Head SAC 000202</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	<p>c. 11km east of the proposed development site and the Masterplan</p>
<p><b>Wicklow Mountains SAC [002122]</b></p> <p>[1355] Otter <i>Lutra lutra</i>            [3110] Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>)            [3130] Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i>            [3160] Natural dystrophic lakes and ponds            [4010] Northern Atlantic wet heaths with <i>Erica tetralix</i>            [4030] European dry heaths            [4060] Alpine and Boreal heaths            [6130] Calaminarian grasslands of the <i>Violetalia calaminariae</i>            [6230] Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)            [7130] Blanket bogs (* if active bog)            [8110] Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>)            [8210] Calcareous rocky slopes with chasmophytic vegetation            [8220] Siliceous rocky slopes with chasmophytic vegetation            [91A0] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles</p>	

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site and the Masterplan
NPWS (2017) Conservation Objectives: Wicklow Mountains SAC 002122. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.	
<p><b>Glenasmole SAC [001209]</b></p> <p>[6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)</p> <p>[6410] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)</p> <p>[7220] Petrifying springs with tufa formation (Cratoneurion)</p> <p><i>S.I. No. 345/2021 - European Union Habitats (Glenasmole Valley Special Area of Conservation 001209) Regulations 2021</i></p> <p>NPWS (2021) Conservation objectives for Glenasmole Valley SAC [001209]. Version 1. Department of Culture, Heritage and the Gaeltacht.</p>	c. 12.5km south west of the proposed development site and the Masterplan
<p><b>Malahide Estuary SAC [000205]</b></p> <p>[1140] Mudflats and sandflats not covered by seawater at low tide</p> <p>[1310] Salicornia and other annuals colonising mud and sand</p> <p>[1320] Spartina swards (<i>Spartinion maritimae</i>)</p> <p>[1330] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)</p> <p>[1410] Mediterranean salt meadows (<i>Juncetalia etanus</i>)</p> <p>[2120] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes)</p> <p>[2130] Fixed coastal dunes with herbaceous vegetation (grey dunes)</p> <p><i>S.I. No. 91/2019 - European Union Habitats (Malahide Estuary Special Area Of Conservation 000205) Regulations 2019</i></p> <p>NPWS (2013) Conservation Objectives: Malahide Estuary SAC 000205. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	c. 13.1km north east of the proposed development site and the Masterplan
<b>Special Protection Area (SPA)</b>	
<p><b>South Dublin Bay and River Tolka Estuary SPA [004024]</b></p> <p>[A046] Light-bellied Brent Goose <i>Branta bernicla hrota</i></p> <p>[A130] Oystercatcher <i>Haematopus ostralegus</i></p> <p>[A137] Ringed Plover <i>Charadrius hiaticula</i></p> <p>[A141] Grey Plover <i>Pluvialis squatarola</i></p> <p>[A143] Knot <i>Calidris canutus</i></p> <p>[A144] Sanderling <i>Calidris alba</i></p> <p>[A149] Dunlin <i>Calidris alpina</i></p> <p>[A157] Bar-tailed Godwit <i>Limosa lapponica</i></p> <p>[A162] Redshank <i>Tringa totanus</i></p> <p>[A179] Black-headed Gull <i>Croicocephalus ridibundus</i></p>	c.3.5km south east of the proposed development site and the Masterplan



European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site and the Masterplan
<p>[A192] Roseate Tern <i>Sterna dougallii</i>  [A193] Common Tern <i>Sterna hirundo</i>  [A194] Arctic Tern <i>Sterna paradisaea</i>  [A999] Wetland and Waterbirds</p> <p><i>S.I. No. 212/2010 - European Communities (Conservation of Wild Birds (South Dublin Bay and River Tolka Estuary Special Protection Area 004024)) Regulations 2010</i></p> <p>NPWS (2015) <i>Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	
<p><b>North Bull Island SPA [004006]</b></p> <p>[A046] Light-bellied Brent Goose <i>Branta bernicla hrota</i>  [A048] Shelduck <i>Tadorna tadorna</i>  [A052] Teal <i>Anas crecca</i>  [A054] Pintail <i>Anas acuta</i>  [A056] Shoveler <i>Anas clypeata</i>  [A130] Oystercatcher <i>Haematopus ostralegus</i>  [A140] Golden Plover <i>Pluvialis apricaria</i>  [A141] Grey Plover <i>Pluvialis squatarola</i>  [A143] Knot <i>Calidris canutus</i>  [A144] Sanderling <i>Calidris alba</i>  [A149] Dunlin <i>Calidris alpina</i>  [A156] Black-tailed Godwit <i>Limosa limosa</i>  [A157] Bar-tailed Godwit <i>Limosa lapponica</i>  [A160] Curlew <i>Numenius arquata</i>  [A162] Redshank <i>Tringa totanus</i>  [A169] Turnstone <i>Arenaria interpres</i>  [A179] Black-headed Gull <i>Croicocephalus ridibundus</i>  [A999] Wetlands &amp; Waterbirds</p> <p><i>S.I. No. 211/2010 - European Communities (Conservation of Wild Birds (North Bull Island Special Protection Area 004006)) Regulations 2010</i></p> <p>NPWS (2015) <i>Conservation Objectives: North Bull Island SPA 004006</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	c. 5.4km north east of the proposed development site and the Masterplan
<p><b>Baldoyle Bay SPA [004016]</b></p> <p>[A046] Light-bellied Brent Goose <i>Branta bernicla hrota</i>  [A048] Shelduck <i>Tadorna tadorna</i>  [A137] Ringed Plover <i>Charadrius hiaticula</i>  [A140] Golden Plover <i>Pluvialis apricaria</i></p>	c. 10.4km north east of the proposed development site and the Masterplan

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site and the Masterplan
<p>[A141] Grey Plover <i>Pluvialis squatarola</i>  [A157] Bar-tailed Godwit <i>Limosa lapponica</i>  [A999] Wetland and Waterbirds</p> <p>S.I. No. 275/2010 - European Communities (Conservation of Wild Birds (Baldoyle Bay Special Protection Area 004016)) Regulations 2010</p> <p>NPWS (2013) Conservation Objectives: Baldoyle Bay SPA 004016. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	
<p><b>Malahide Estuary SPA [004025]</b></p> <p>[A005] Great Crested Grebe <i>Podiceps cristatus</i>  [A046] Light-bellied Brent Goose <i>Branta bernicla hrota</i>  [A048] Shelduck <i>Tadorna tadorna</i>  [A054] Pintail <i>Anas acuta</i>  [A067] Goldeneye <i>Bucephala clangula</i>  [A069] Red-breasted Merganser <i>Mergus serrator</i>  [A130] Oystercatcher <i>Haematopus ostralegus</i>  [A140] Golden Plover <i>Pluvialis apricaria</i>  [A141] Grey Plover <i>Pluvialis squatarola</i>  [A143] Knot <i>Calidris canutus</i>  [A149] Dunlin <i>Calidris alpina</i>  [A156] Black-tailed Godwit <i>Limosa limosa</i>  [A157] Bar-tailed Godwit <i>Limosa lapponica</i>  [A162] Redshank <i>Tringa totanus</i>  [A999] Wetland and Waterbirds</p> <p>S.I. No. 285/2011 - European Communities (Conservation of Wild Birds (Malahide Estuary Special Protection Area 004025)) Regulations 2011.</p> <p>NPWS (2015) Conservation Objectives: Malahide Estuary SPA 004025. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	<p>c. 13.1km north east of the proposed development site and the Masterplan</p> <p>DCC PLAN NO 5126/22  RECEIVED: 26/10/2022</p>
<p><b>Wicklow Mountains SPA</b></p> <p>[A098] Merlin <i>Falco columbarius</i>  [A103] Peregrine <i>Falco peregrinus</i></p> <p>S.I. No. 586/2012 - European Communities (Conservation of Wild Birds (Wicklow Mountains Special Protection Area 004040)) Regulations 2012.</p> <p>NPWS (2022) Conservation objectives for Wicklow Mountains SPA [004040]. Generic Version 9.0. Department of Housing, Local Government and Heritage.</p>	<p>c. 12.7km south west of the proposed development site</p>
<p><b>Howth Head Coast SPA [004113]</b></p> <p>[A188] Kittiwake <i>Rissa tridactyla</i></p>	<p>c. 13.7km north east of the proposed development site</p>

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site and the Masterplan
<p><i>S.I. No. 185/2012 - European Communities (Conservation of Wild Birds (Howth Head Coast Special Protection Area 004113)) Regulations 2012.</i></p> <p>NPWS (2022) Conservation objectives for Howth Head Coast SPA [004113]. Generic Version 9.0. Department of Housing, Local Government and Heritage</p>	

**Table 1:** European sites in the vicinity of the proposed development.

Designated Site Name [Code] and its nature conservation features	Location Relative to the Proposed Development Site
<b>proposed Natural Heritage Area (pNHA)</b>	
<p><b>Royal Canal pNHA [002103]</b></p> <p>Diversity of flora and fauna species the canal ecosystem supports and the presence of legally protected plant species, opposite-leaved pondweed <i>Groenlandia densa</i>.</p>	c. 1.3km north east of the proposed development and the Masterplan
<p><b>South Dublin Bay pNHA [000210]</b></p> <p>Diversity of coastal, estuarine, intertidal and marine habitats, and the flora and fauns species they support – <i>see also South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA</i></p>	c. 3.5km south east of the proposed development site and the Masterplan
<p><b>Dolphins, Dublin Docks pNHA [000201]</b></p> <p>Nesting common terns – <i>see also South Dublin Bay and River Tolka Estuary SPA in Table 1 above</i></p>	c. 4.4km east of the proposed development and the Masterplan
<p><b>North Dublin Bay pNHA [000206]</b></p> <p>Diversity of coastal, estuarine, intertidal and marine habitats, and the flora and fauns species they support – <i>see also North Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA in Table 1 above</i></p>	c. 5.3km north east of the proposed development and the Masterplan
<p><b>Santry Demesne pNHA [000178]</b></p> <p>The site comprises the remnants of a former demesne woodland. The remaining woods are generally good quality. Hairy St. John's wort (<i>Hypericum hirsutum</i>), a species legally protected under the Flora (Protection) Order (2015), was recorded here in 1991. The primary importance of this site is that it contains a legally protected plant species. The woodland, however, is of general ecological interest as it occurs in an area where little has survives of the original vegetation.</p>	c. 5.8km north of the proposed development site and the Masterplan
<p><b>Boosterstown Marsh pNHA [001205]</b></p> <p>An enclosed area of saltmarsh and muds that is cut off from the sea by the Dublin/Wexford railway line, being linked only by a channel to the east, the Nutley stream. Sea water incursions into the marsh occur along this stream at high tide.</p> <p>- <i>see also South Dublin Bay and River Tolka Estuary SPA</i></p>	c. 5.9km south east of the proposed development site and the Masterplan

Designated Site Name [Code] and its nature conservation features	Location Relative to the Proposed Development Site
<p><b>Liffey Valley pNHA [000128]</b></p> <p>Diversity of flora and fauna species the river ecosystem supports, including rare and/or legally protected plant species (hairy St. John's wort <i>Hypericum hirsutum</i>, green figwort <i>Scrophularia umbrosa</i> and yellow archangel <i>Lamiastrum galeobdolon</i>)</p>	<p>c. 5.9km east of the proposed development and the Masterplan</p>
<p><b>Dodder Valley pNHA [000991]</b></p> <p>This site represents the last remaining expanse of natural river bank of the Dodder in the built up Greater Dublin Area with the proposed designation extending for approximately 2km between Firhouse Bridge and Old Bawn Bridge. The Dodder Valley supports riparian woodland and scrub mainly of Willow (<i>Salix</i> spp.) Along the banks are wild flower meadows with a good diversity of plant species. The Valley also supports several riparian bird species of conservation interest.</p>	<p>c. 8.2km south west of the proposed development site and the Masterplan</p>
<p><b>Fitzsimons Wood pNHA [001753]</b></p> <p>Fitzsimons Wood is a semi-natural woodland located west of Sandyford Village. Birch dominates the woodland with Alder and Holly distributed throughout. Some Oak, Beech and Sycamore also occur. Woodland birds are abundant, with Long-eared Owls, newts, foxes, badgers and deer also present. The woodland is a valuable wildlife reserve at the edge of the suburban landscape.</p>	<p>c. 9.1km south of the proposed development site and the Masterplan</p>

**Table 2:** Nationally protected sites in the vicinity of the proposed development

## APPENDIX 6.2 DESK STUDY FLORA AND FAUNA RECORDS

Desktop records of protected, rare, or other notable plant species are listed below in **Table 1**. These are plant species which are legally protected under the Flora (Protection) Order, 2022 and/or are listed as Critically Endangered, Endangered or Vulnerable on the relevant national Red Data list for Ireland<sup>1</sup>.

Common Name/ Scientific name	Legal Status <sup>2</sup>	Red List Status	Source
Opposite-leaved Pondweed <i>Groenlandia dena</i>	FPO	Endangered	NBDC online database record
Round-leaved Crane's bill <i>Geranium rotundifolium</i>	None	Endangered	NBDC online database record
Fringed Heartwort <i>Ricciocarpos natans</i>	None	Near threatened	NBDC online database record
Common extinguisher-moss <i>Encalypta vulgaris</i>	None	Near threatened	NBDC online database record
Lance-leaved Pottia <i>Torula lanceola</i>	None	Critically endangered	NBDC online database record
Tall aloe-moss <i>Aloina ambigua</i>	None	Endangered	NBDC online database record
Tiny feather-moss <i>Amblystegium confervoides</i>	None	Near threatened	NBDC online database record
Twisting thread-moss <i>Bryum torquescens</i>	None	Vulnerable	NBDC online database record

**Table 1:** Records of protected, red-listed or notable flora recorded from the desk study in the vicinity of the study area.

Desktop records of protected, rare, or other notable fauna species are listed below in Table 2. In relation to amphibian, reptile and mammal species those which are protected under the Wildlife Acts, the Habitats Directive and/or are listed as threatened (Vulnerable to Critically Endangered) on the relevant national Red Lists are included. In the case of bird species, only those species listed in Annex I of the Birds Directive or on the Birds of Conservation Concern in Ireland (BoCCI) Red List are included in the table below. For invertebrate species, those which are listed as threatened (Vulnerable to Critically Endangered) on the relevant national Red List are included.

<sup>1</sup> Vascular flora from Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016) *Ireland Red List No. 10: Vascular Plants*. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

Bryophytes from Lockhart, N., Hodgetts, N. & Holyoak, D. (2012) *Ireland Red List No.8: Bryophytes*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

<sup>2</sup> HDII/IV/V = Habitats Directive Annexes II/IV/V; FPO = Flora (Protection) Order, 2022; WA = Wildlife Acts

Common Name/ Scientific Name	Legal Status <sup>3</sup>	Red List Status <sup>4</sup>	Source
<b>Amphibians</b>			
Common frog <i>Rana temporaria</i>	HD_V, WA	Least concern	NBDC online database record
Smooth newt <i>Triturus vulgaris</i>	WA	Least concern	NBDC online database record
<b>Mammals (Terrestrial)</b>			
Badger	WA	Least concern	NBDC online database record
Otter <i>Lutra lutra</i>	HD_II & IV, WA	Least concern	NBDC online database record
Nathusius's Pipistrelle <i>Pipistrellus nathusii</i>	HD_IV, WA	Least concern	NBDC online database record
Leisler's bat <i>Nyctalus leisleri</i>	HD_IV, WA	Least concern	NBDC online database record
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	HD_IV, WA	Least concern	NBDC online database record
Common pipistrelle <i>Pipistrellus pipistrellus</i>	HD_IV, WA	Least concern	NBDC online database record
Pygmy shrew	WA	Least concern	NBDC online database record
Red squirrel <i>Sciurus vulgaris</i>	WA	Least concern	NBDC online database record

**Table 2:** Records of protected, red-listed or notable fauna from the desktop study in the vicinity of the study area.

<sup>3</sup> HD\_II/IV/V = Habitats Directive Annexes II/IV/V; WA = Wildlife Acts; BD\_I/II/III = Birds Directive Annex I/II/III; OSPAR = Convention for the protection of the marine environment of the North-east Atlantic 1992

<sup>4</sup> Mammal Red-list from Marnell, F., Kingston, N. & Looney, D. (2009) *Ireland Red List No. 3: Terrestrial Mammals* and Marnell, F., Looney, D. & Lawton, C. (2019) *Ireland Red List No. 12: Terrestrial Mammals*.

Birds from Colhoun, K. & Cummins, S. (2013) Birds of Conservation Concern in Ireland 2014-2019. *Irish Birds* 9:523-544.

Amphibians, reptiles and fish from King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., Fitzpatrick, Ú., Gargan, P.G., Kelly, F.L., O'Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. (2011) *Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish*.

Non-Marine Molluscs from Byrne, A., Moorkens, E.A., Anderson, R., Killeen, I.J. & Regan, E.C. (2009) *Ireland Red List No. 2 – Non-Marine Molluscs*.

Butterflies from Regan, E.C., Nelson, B., Aldwell, B., Bertrand, C., Bond, K., Harding, J., Nash, D., Nixon, D., & Wilson, C.J. (2010) *Ireland Red List No. 4 – Butterflies*.

Moths from Allen, D., O'Donnell, M., Nelson, B., Tyner, A., Bond, K.G.M., Bryant, T., Crory, A., Mellon, C., O'Boyle, J., O'Donnell, E., Rolston, T., Sheppard, R., Strickland, P., Fitzpatrick, U., & Regan, E. (2016) *Ireland Red List No. 9: Macro-moths (Lepidoptera)*.

Damselflies and dragonflies from Nelson, B., Ronayne, C. & Thompson, R. (2011) *Ireland Red List No.6: Damselflies & Dragonflies (Odonata)*.

Water beetles from Foster, G. N., Nelson, B. H. & O Connor, Á. (2009) *Ireland Red List No. 1 – Water beetles*.

Common Name/ Scientific Name	Legal Status	Red List Status	Source
<b>Birds</b>			
Barn owl <i>Tyto alba</i>	WA	Red	NBDC online database record
Black-headed gull <i>Larus ridibundus</i>	WA	Red	NBDC online database record
Curlew <i>Numenius arquata</i>	BD_II (II), WA	Red	NBDC online database record
Dunlin <i>Calidris alpina</i>	BD_I	Red	NBDC online database record
Golden plover <i>Pluvialis apricaria</i>	BD_I, II (II), III (III), WA	Red	NBDC online database record
Goldeneye <i>Bucephala clangula</i>	BD_II (II), WA	Red	NBDC online database record
Herring gull <i>Larus argentatus</i>	WA	Red	NBDC online database record
Lapwing <i>Vanellus vanellus</i>	BD_II (II), WA	Red	NBDC online database record
Pochard <i>Aythya ferina</i>	BD_II (I), III (II), WA	Red	NBDC online database record
Redshank <i>Tringa totanus</i>	WA	Red	NBDC online database record
Shoveler <i>Anas clypeata</i>	BD_II (I), III (III), WA	Red	NBDC online database record
Tufted duck <i>Aythya fuligula</i>	BD_II (I), III (II), WA	Red	NBDC online database record
Twite <i>Carduelis flavirostris</i>	WA	Red	NBDC online database record
Wigeon <i>Anas penelope</i>	BD_II (I), III (II), WA	Red	NBDC online database record
Woodcock <i>Scolopax rusticola</i>	BD_II (I), III (III), WA	Red	NBDC online database record
Yellowhammer <i>Emberiza citrinella</i>	WA	Red	NBDC online database record
Arctic tern <i>Sterna paradisaea</i>	BD_I, WA	Amber	NBDC online database record
Bar-tailed godwit <i>Limosa lapponica</i>	BD_I, WA	Amber	NBDC online database record
Common tern <i>Sterna hirundo</i>	BD_I, WA	Amber	NBDC online database record

Great northern diver <i>Gavia immer</i>	BD_I, WA	Amber	NBDC online database record
Hen harrier <i>Circus cyaneus</i>	BD_I, WA	Amber	NBDC online database record
Kestrel <i>Falco tinnunculus</i>	BD_I, WA	Amber	NBDC online database record
Kingfisher <i>Alcedo atthis</i>	BD_I, WA	Amber	NBDC online database record
Little egret <i>Egretta garzetta</i>	BD_I, WA	Green	NBDC online database record
Little tern <i>Sterna albifrons</i>	BD_I, WA	Amber	NBDC online database record
Mediterranean gull <i>Larus melanocephalus</i>	BD_I, WA	Amber	NBDC online database record
Peregrine <i>Falco peregrinus</i>	BD_I, WA	Green	NBDC online database record
Red-throated diver <i>Gavia stellata</i>	BD_I, WA	Amber	NBDC online database record
<b>Invertebrates</b>			
Marsh fritillary butterfly <i>Euphydryas aurinia</i>	HD_II	Vulnerable	NBDC online database record
Wall butterfly <i>Lasiommata megera</i>	None	Endangered	NBDC online database record
Dark green fritillary butterfly <i>Argynnis aglaja</i>	None	Vulnerable	NBDC online database record
Grayling butterfly <i>Hipparchia semele</i>	None	Near threatened	NBDC online database record
Small heath butterfly <i>Coenonympha pamphilus</i>	None	Near threatened	NBDC online database record
Scarce Blue-tailed damselfly <i>Ischnura pumilio</i>	None	Vulnerable	NBDC online database record
Barbut's Cuckoo bee <i>Bombus (Psithyrus) barbutellus</i>	None	Endangered	NBDC online database record
Great yellow bumble bee <i>Bombus distinguendus</i>	None	Endangered	NBDC online database record
Hill Cuckoo bee <i>Bombus rupestris</i>	None	Endangered	NBDC online database record
Large red tailed bumble bee <i>Bombus lapidarius</i>	None	Near threatened	NBDC online database record
Moss carder-bee <i>Bombus muscorum</i>	None	Near threatened	NBDC online database record



Common shelled slug <i>Testacella haliotidea</i>	None	Vulnerable	NBDC online database record
Ear pond snail <i>Radix auricularia</i>	None	Vulnerable	NBDC online database record
Globular pea mussel <i>Pisidium hibernicum</i>	None	Near threatened	NBDC online database record
Glutinous snail <i>Myxas glutinosa</i>	None	Endangered	NBDC online database record
Heath snail <i>Helicella itala</i>	None	Vulnerable	NBDC online database record
Lake orb mussel <i>Musculium lacustre</i>	None	Vulnerable	NBDC online database record
Mauge's shelled slug <i>Testacella maugaei</i>	None	Near threatened	NBDC online database record
Mollusc <i>Pisidium pseudosphaerium</i>	None	Endangered	NBDC online database record
Mollusc <i>Pisidium pulchellum</i>	None	Endangered	NBDC online database record
Silky snail <i>Ashfordia granulata</i>	None	Near threatened	NBDC online database record
Smooth grass snail <i>Vallonia pulchella</i>	None	Vulnerable	NBDC online database record
Smooth ramshorn <i>Gyraulus laevis</i>	None	Endangered	NBDC online database record
Swan mussel <i>Anodonta cygnea</i>	None	Vulnerable	NBDC online database record

**Table 2:** Records of protected, red-listed or notable fauna from the desktop study in the vicinity of the study area.

## APPENDIX 6.3 EXAMPLES OF VALUING IMPORTANT ECOLOGICAL FEATURES

### International Importance:

- 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.
- Proposed Special Protection Area (pSPA).
- Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).
- Features essential to maintaining the coherence of the Natura 2000 Network.<sup>5</sup>
- Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.
- Resident or regularly occurring populations (assessed to be important at the national level)<sup>6</sup> of the following: -
  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
- Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).
- World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
- Biosphere Reserve (UNESCO Man & The Biosphere Programme).
- Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).
- Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
- Biogenetic Reserve under the Council of Europe.
- European Diploma Site under the Council of Europe.
- Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 1988).<sup>7</sup>

### National Importance:

- Site designated or proposed as a Natural Heritage Area (NHA).
- Statutory Nature Reserve.
- Refuge for Fauna and Flora protected under the Wildlife Acts.
- National Park.
- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.

<sup>5</sup> See Articles 3 and 10 of the Habitats Directive

<sup>6</sup> It is suggested that, in general, 1% of the national population of such species qualifies as an internationally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

<sup>7</sup> Note that such waters are designated based on these waters' capabilities of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*)

- Resident or regularly occurring populations (assessed to be important at the national level)<sup>8</sup> of the following: -
  - Species protected under the Wildlife Acts; and / or
  - Species listed on the relevant Red Data list.
- Site containing 'viable areas'<sup>9</sup> of the habitat types listed in Annex I of the Habitats Directive.

#### County Importance:

- Area of Special Amenity.<sup>10</sup>
- Area subject to a Tree Preservation Order.
- Area of High Amenity, or equivalent, designated under the County Development Plan.
- Resident or regularly occurring populations (assessed to be important at the County level)<sup>11</sup> of the following: -
  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive.
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
- County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local Biodiversity Action Plan, if this has been prepared.
- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

#### Local Importance (higher value):

- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared.

<sup>8</sup> It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

<sup>9</sup> A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

<sup>10</sup> It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.

<sup>11</sup> It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

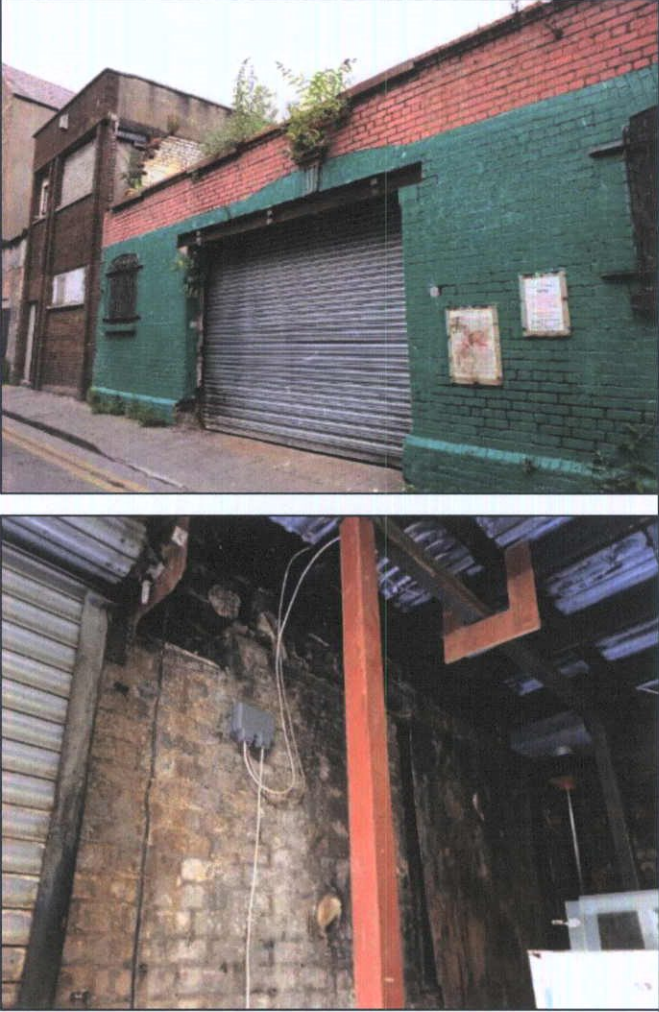
- Resident or regularly occurring populations (assessed to be important at the Local level)<sup>12</sup> of the following: -
  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive.
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality.
- Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

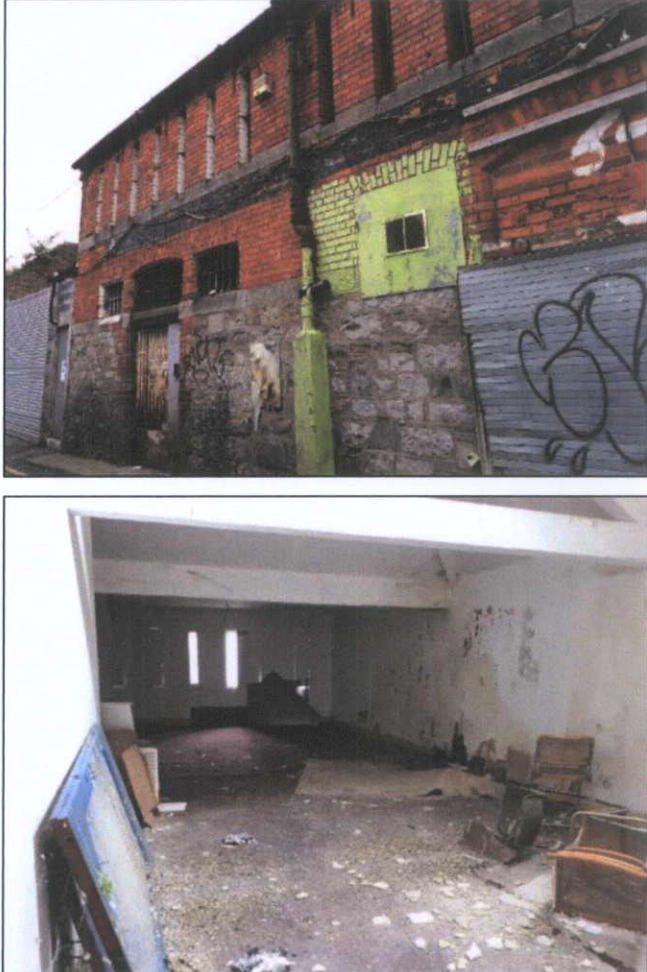
**Local Importance (lower value):**

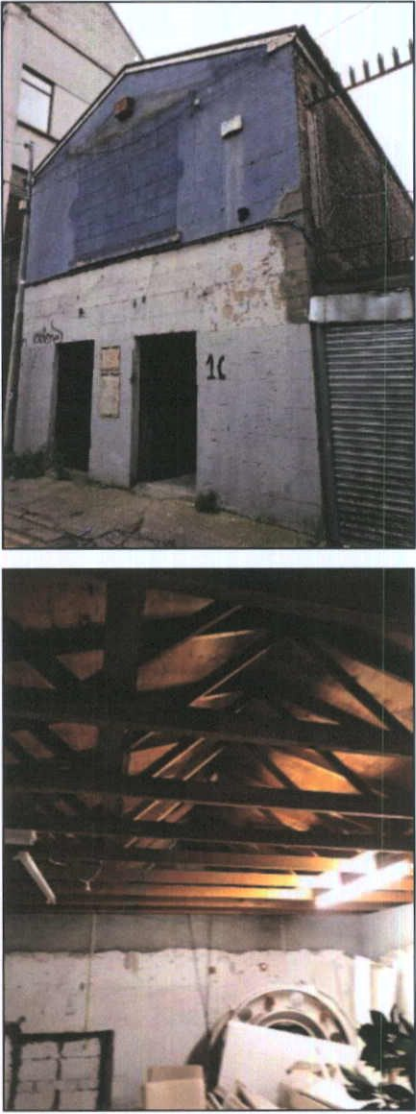
- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife.
- Sites or features containing non-native species that are of some importance in maintaining habitat links.


<sup>12</sup> It is suggested that, in general, 1% of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

**APPENDIX 6.4 POTENTIAL ROOST FEATURE (PRF) PHOTOS FROM BUILDING INSPECTIONS (MASTERPLAN)**

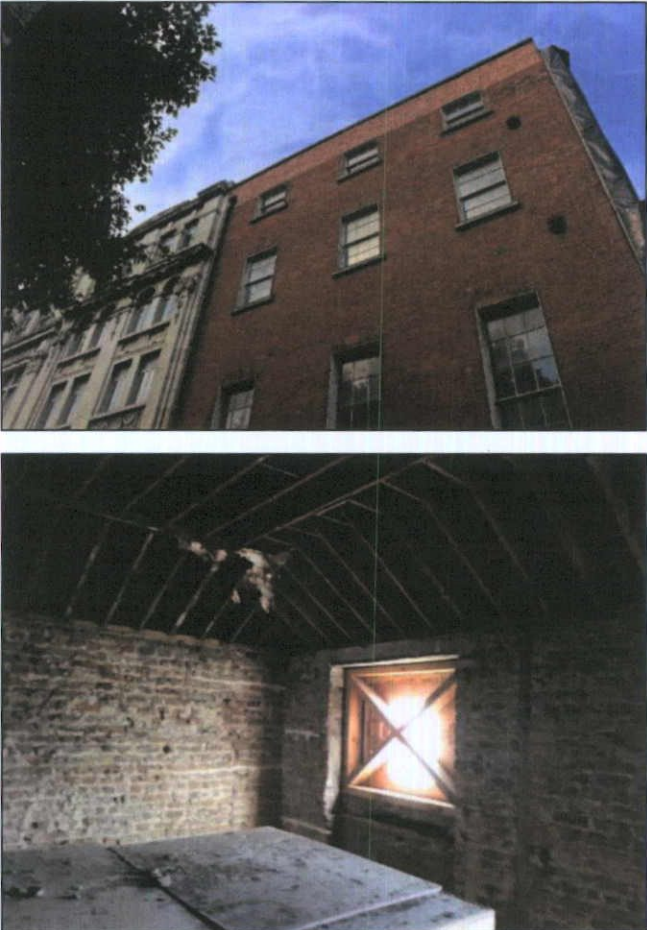
Building	PRFs	PRF Suitability	Photograph
<p><b>10-11 Moore Lane</b></p>	<p>Flat roofed building, with gaps on external wall between brick work and roof, and access into building above sliding door at entrance.</p>	<p>Low</p>	

Building	PRFs	PRF Suitability	Photograph
<p><b>6-8 Moore Lane</b></p>	<p>Pitched roof building with open grated buildings allowing access within, also gaps between brickwork on external walls.</p>	<p>Low</p>	

Building	PRFs	PRF Suitability	Photograph
<p><b>10 Henry Place</b></p>	<p>Pitched roof building with attic space, PRFs on external walls between brickwork and soffits where they join the external walls.</p>	<p>Low</p>	

Building	PRFs	PRF Suitability	Photograph
<p><b>37 Henry Street</b></p>	<p>No attic space within this building (flat roof), but PRFs on external walls and above window lintels .</p>	<p>Low</p>	

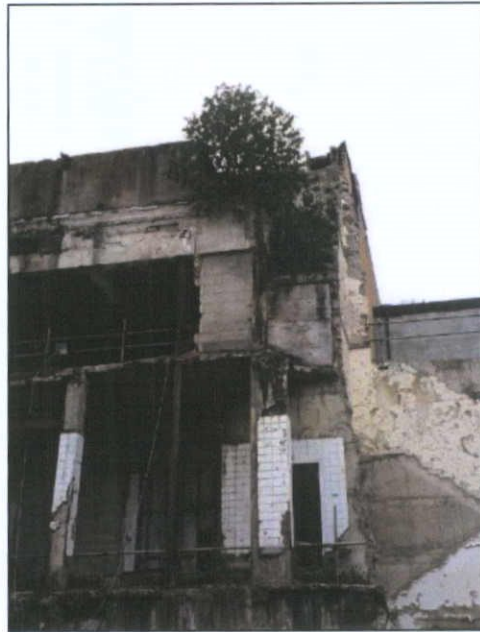


<b>42 O'Connell Street</b>	Attic Space within this building, Potential gaps where brick wall joined roof, and on rear of building where windows were missing providing access into pitched roof attic space.	Low	
------------------------------------	---	-----	---

**43  
O'Connell  
Street**

No PRFs as no building exists here anymore, however PRFs visible from this site on adjacent properties where walls etc. have come away leaving potential gaps/crevices.

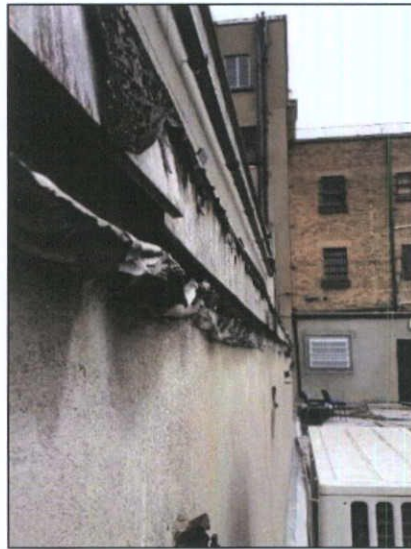
Negligabl  
e




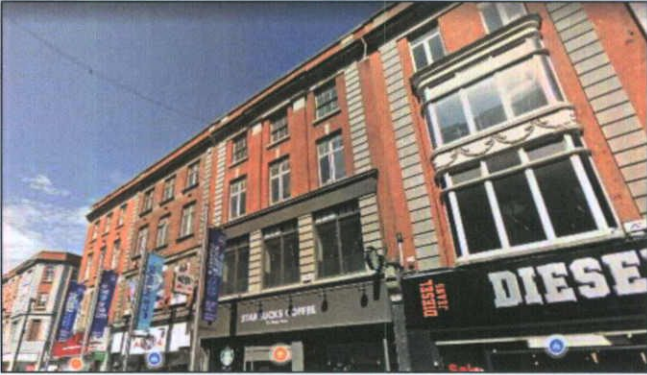

**58 O'Connell Street (Site 2)**

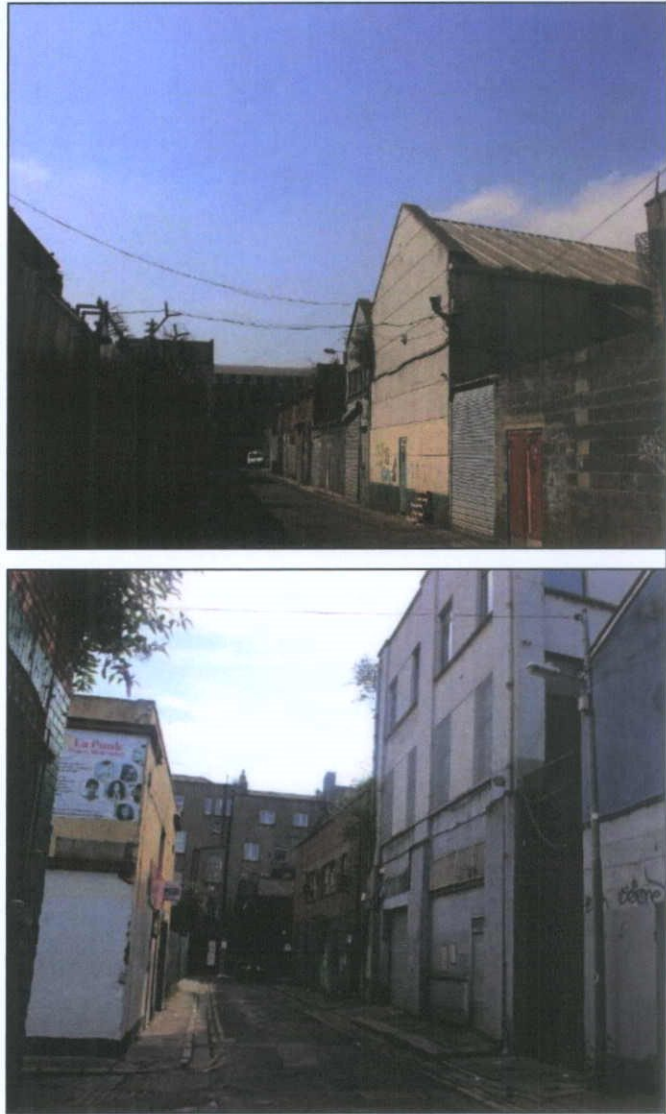
Roof access was permitted here as no attic space. Missing bricks and crevices under soffits and plywood boards on adjoining buildings was evident.

Low



<p><b>61 O'Connell Street</b></p>	<p>No attic space in this building, flat roofed. PRFs at top of windows, and possibly between brickwork.</p>	<p>Low</p>	
---	--	------------	---

Building	PRFs	PRF Suitability	Photograph
<p><b>Henry Street</b></p>	<p>Flat roofed, well-sealed retail units, no surrounding vegetation suitable for commuting/foraging.</p>	<p>Negligible</p>	
<p><b>Moore Street</b></p>	<p>Red brick flat-roofed buildings with very little gaps or crevices suitable for roosting bats. No surrounding vegetation for commuting/foraging bats.</p>	<p>Negligible</p>	

Building	PRFs	PRF Suitability	Photograph
<p><b>Moore Lane</b></p>	<p>Mostly dilapidated, run-down buildings, some with low potential as described above. Largely unsuitable for bats with no PRFs, or too exposed to be suitable for roosting bats. No surrounding vegetation for commuting/foraging.</p>	<p>Negligible</p>	







## APPENDIX 7.1 ENVIRONMENTAL ASSESSMENT (SITE INVESTIGATION)

DCC PLAN NO 5126/22  
RECEIVED: 26/10/2022

Granary House  
Rutland Street  
Cork



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## **ENVIRONMENTAL ASSESSMENT**

### **DUBLIN CENTRE**

#### **Prepared For: -**

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Corrig Road,  
Sandyford,  
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#### **Prepared By: -**

O'Callaghan Moran & Associates,  
Granary House,  
Rutland Street,  
Cork.

**January 2009**

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# TABLE OF CONTENTS

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	<u>PAGE</u>
<b>1. INTRODUCTION</b> .....	<b>1</b>
1.1 INVESTIGATION SCOPE .....	1
1.1.1 Limitations .....	3
<b>2. SITE DESCRIPTION</b> .....	<b>4</b>
2.1 LOCATION .....	4
2.2 SITE LAYOUT AND CURRENT USE.....	4
2.3 SERVICES.....	7
<b>3. PHYSICAL SETTING</b> .....	<b>9</b>
3.1 GEOLOGY .....	9
3.1.1 Bedrock .....	9
3.1.2 Subsoils/Quaternary Geology.....	9
3.2 HYDROGEOLOGY .....	11
3.2.1 Aquifer Classification and Vulnerability.....	11
3.2.2 Hydrogeological Risk Assessment .....	11
<b>4. SITE INVESTIGATION</b> .....	<b>13</b>
4.1 SAMPLE LOCATIONS .....	13
4.2 BOREHOLE INSTALLATION .....	13
4.3 SOIL .....	15
4.3.1 Sampling.....	15
4.3.2 Laboratory Analysis .....	15
4.3.3 Results .....	16
4.4 GROUNDWATER.....	22
<b>5. DISCUSSION</b> .....	<b>24</b>
5.1 DISCUSSION.....	24
5.2 SOILS.....	24
5.3 GROUNDWATER.....	25
<b>6. CONCLUSIONS AND RECOMMENDATIONS</b> .....	<b>26</b>
6.1 CONCLUSIONS .....	26
6.2 RECOMMENDATIONS .....	26

- APPENDIX 1 - Site Map**
- APPENDIX 2 - Borehole Logs**
- APPENDIX 3 - Soil Sampling Protocol**
- APPENDIX 4 - Groundwater Sampling Protocol**
- APPENDIX 5 - Laboratory Results**

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# 1. INTRODUCTION

---

In 2006 O' Callaghan Moran & Associates (OCM) conducted a preliminary environmental assessment of the proposed Dublin Centre site located between Upper O'Connell Street and Moore Street and between Parnell Street and Henry Street, Dublin. The proposed development comprises a mixed retail and commercial development over deep basement.

The assessment involved a desk study of available information on historic land use and a site inspection, based on which OCM prepared a Map outlining areas of potential high, moderate and low risk of contamination (Ref.: Figure 1).

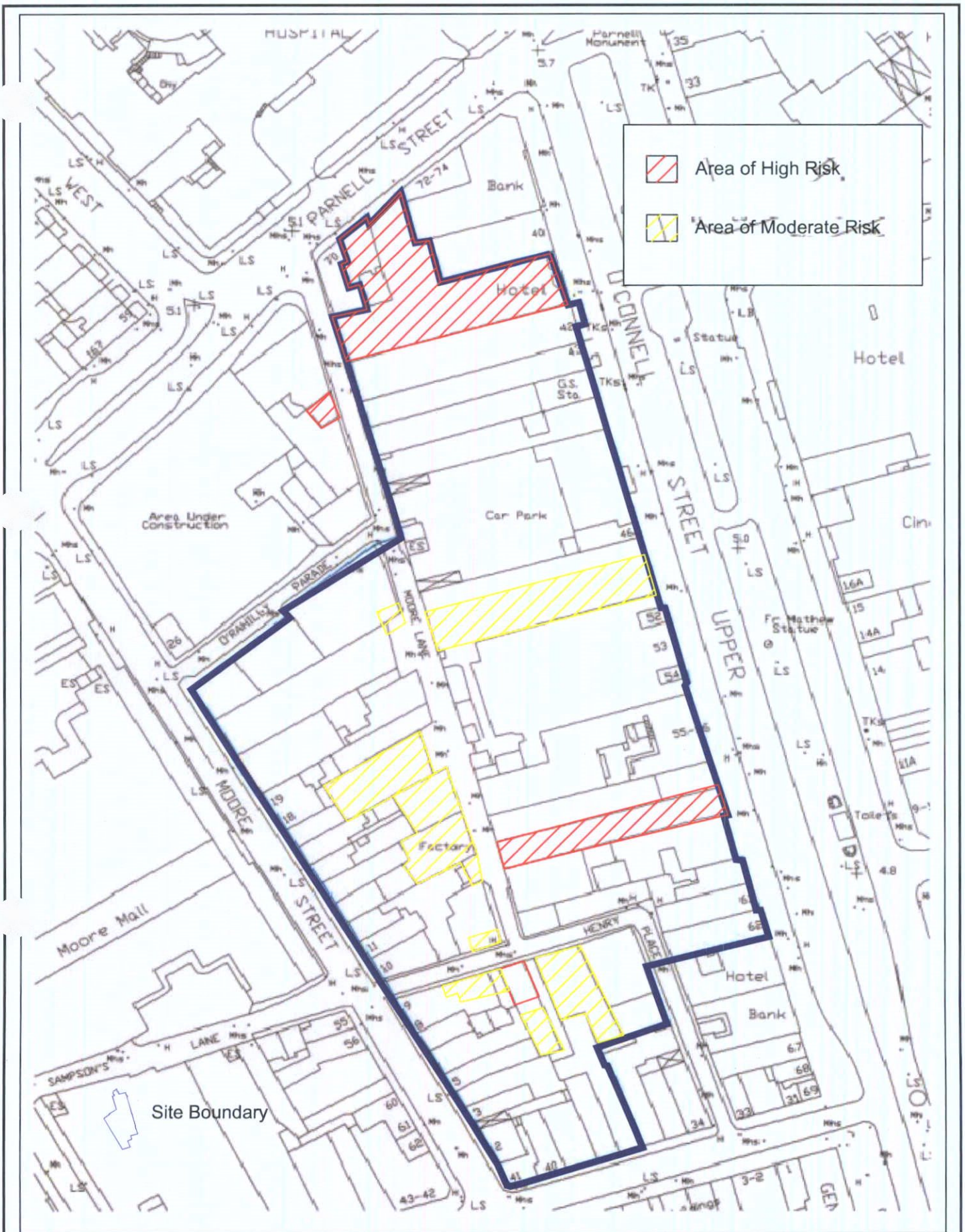
In 2008 a joint geotechnical and environmental site investigation was undertaken comprising the excavation of trial pits, the installation of boreholes in the subsoils and bedrock and the collection and testing of soil and groundwater samples. The geotechnical investigations were supervised by AGL while the environmental elements of the investigation were supervised by OCM.

The purpose of the environmental investigation was to identify if there was contamination in the subsoils or groundwater; identify appropriate management options for any contaminated subsoils that may have to be removed from the site during the redevelopment; and establish the status of groundwater quality. This report presents the findings of the environmental investigation.

## 1.1 Investigation Scope

The scope comprised: -

- Collection of samples of the fill material and the underlying subsoils for laboratory analysis to establish if these materials have been impacted by historical activities;
- Characterisation of the impacted soils, based on the laboratory testing, to identify suitable off-site disposal/recovery outlets for any soils that have to be removed;
- Collection and analysis of groundwater samples from the subsoils and bedrock to provide data for an application to Dublin City Council for a trade effluent discharge license for dewatering during the construction of the basement.



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DETAILS

Figure No.  
 1

TITLE  
 Areas of Risk from 2006

SCALE	REV.
NTS	REV

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### *1.1.1 Limitations*

While every effort was made to target the areas of concern identified in OCM 2006 Report, the intrusive investigations were confined to open areas in the middle of the site and around the site parameter. This was due to the fact that most of the premises within the development footprint were either still occupied, or in the case of those that had been vacated, had not yet been demolished. Therefore it is possible that there areas of localized contamination at the site that have not been identified in this assessment.

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## **2. SITE DESCRIPTION**

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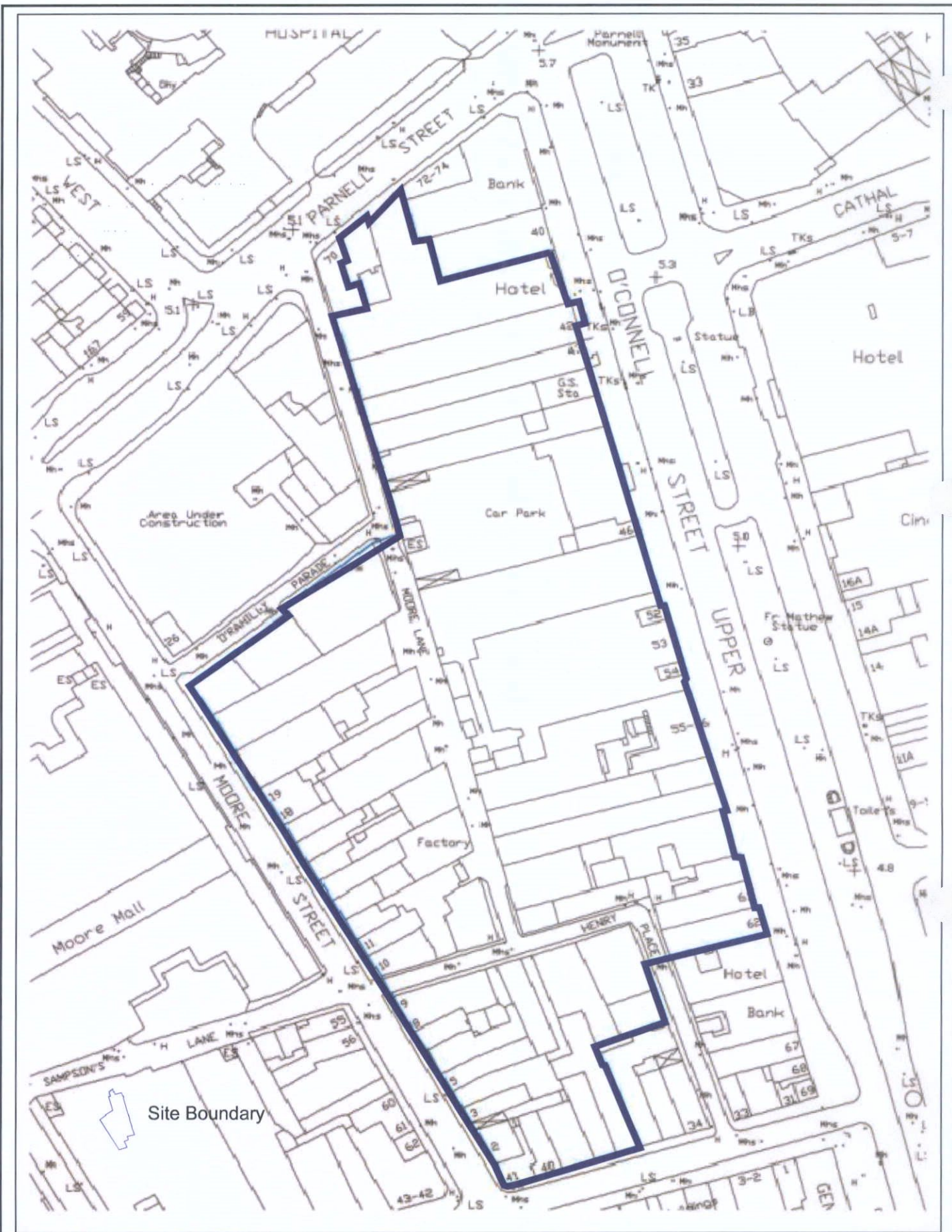
### **2.1 Location**

Dublin Centre is bounded to the east by O'Connell Street Upper, to the North by Parnell Street and O'Rahilly Parade, to the south by Henry Street and to the west by Moore Street and Moore Lane. Henry Place is also part of the development area as shown on Figure 2.1.

### **2.2 Site Layout and Current Use**

In 2006 OCM conducted a site walkover to determine the use of the buildings at that time. The occupier of each building and type of activity carried out therein are listed in Table 2.1.





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DETAILS

Figure No.  
 2.1

TITLE  
 Site Location

SCALE	REV.
NTS	REV

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**Table 2.1** Name and Address of Occupiers within the subject area

Address	Name	Type of Activity
41 – 42 O’Connell Street Upper	Royal Dublin Hotel	Hotel
43 O’Connell Street Upper	Ned Kelly’s	Snooker Hall
44 O’Connell Street Upper	An Garda Síochana	Offices
	Vacant	
	Vacant	
	Londis	Grocery/Newsagent
	Dr. Quirkey’s	Amusement Arcade
52 O’Connell Street Upper	Slattery’s	Camera Shop
52 – 54 O’Connell Street Upper	Carlton Cinema (Closed)	Cinema
55 – 56 O’Connell Street Upper	Dr. Quirkey’s	Amusement Arcade
57 – 58 O’Connell Street Upper	Carroll’s	Irish Gift Shop
58 O’Connell Street Upper	Profiles (Above Carroll’s)	Ladies Gym
59 – 60 O’Connell Street Upper	Dublin Bus (Closed)	Office
61 O’Connell Street Upper	Flanagan’s	Restaurant
62 O’Connell Street Upper	McDonalds	Fast Food Restaurant
37 Henry Street	The Card Company	Card shop
38 Henry Street	NoName	Clothes shop
39 Henry Street	Game	Electronic Game Shop
40 Henry Street	Simon Hart	Shoe Shop
41 Henry Street	McGiveney’s	Optician & Jewellers
4 Henry Place	Unknown possibly The Mint	Tattoo parlour
5 – 9 Henry Place	Han Yang Asian Market	Asian Food Shop
1 Moore Street	Everyday Seafood & Grocery	Grocery shop
1 Moore Street (upstairs)		Hairdresser
3 Moore Street	Paddy Power	Bookmaker
4 Moore Street	Bryan’s (Closed)	Shoe Repair/Key Cutting
5 Moore Street	Doyle’s (Closed)	Bingo/ Hardware
6 Moore Street	Talk Cents	Internet/Phone Shop
7 Moore Street	Troy’s Butchers	Butcher’s Shop
8 – 9 Moore Street	Hair Extension Master / Central Supermarket (Closed)	Supermarket and Hairdressers
10 Moore Street	Rong Xing	Chinese Supermarket
11 Moore Street	Home Store	Hardware/Homeware shop
12 Moore Street	Oceanic Superstore	Asian Food Shop
13 Moore Street	Pat’s Household	Homeware shop
14 Moore Street	Charity Hair Studio	Hairdressers
15 Moore Street	Larmints Paylink	Money Transfer shop
16 Moore Street	Plunketts	Closed
17 Moore Street	Mobile Phone Centre	Phone / electronic shop
18 Moore Street	Crystal Superstores	Afro-Caribbean shop
19 Moore Street	American Design Wears	Basketball & sports shop
20 Moore Street	Unknown	Chinese Restaurant & Hairdressers upstairs
21 Moore Street	Madina Asian Food Co.	Asian Food Market
22 Moore Street	China House	Restaurant
23 Moore Street	Vacant	Possibly offices upstairs
1 – 2 O’Rahilly Parade	Dublin City Council	Waste management equipment storage
3 – 8 O’Rahilly Parade	Dublin City Council	Storage Containers for the Moore St. Traders

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### **O'Connell Street Upper**

The lots on Upper O'Connell Street were occupied by eight retail outlets; the Royal Dublin Hotel and two restaurants (Flanagan's and McDonalds).

### **Parnell Street**

The Royal Dublin Hotel was the only lot on Parnell Street.

### **Henry Street**

There were 5 No. retail outlets in 37 to 41 Henry Street.

### **Henry Place**

Two buildings on Henry Place were being used for retail purposes (one Asian food market and one tattoo parlour). The remaining area was occupied by derelict buildings. The rear gardens or yard areas of the lots on O'Connell Street form the eastern and northern boundary of Henry Place.

### **Moore Street**

All of the buildings on Moore Street where occupied were retail outlets, which include restaurants, general shops and food markets. Of the 23 buildings 4 were vacant.

### **Moore Lane**

The rear of the buildings on O'Connell Street Upper form the eastern boundary of Moore Lane. Derelict buildings and yards and the rear of the buildings on Moore Street form the western boundary of Moore Lane.

### **O'Rahilly Parade**

O'Rahilly Parade is occupied by two yards. 1 – 2 which are used by Dublin City Council as a storage area for bins and street cleaning equipment. 3 to 8 O'Rahilly Parade was being used by Dublin City Council as a storage area for the Moore Street Traders.

## **2.3 Services**

OCM understand that heating for all of the buildings is either by gas supplied by Bord Gais and/or individual electric heating systems. OCM did not observe any heating oil storage tanks

in the rear of any of the premises. While it is unlikely that oil is widely used for heating purposes, it is possible that there may be some individual heating oil storage tanks in use.

Water is supplied from the Dublin City Council mains supply. OCM did not identify the presence of any supply wells and a review of Geological Survey of Ireland records indicates that there are no water supply wells in the area.

Sanitary wastewater discharges to the Dublin City Council foul sewer, while storm water is discharged to the municipal Storm Sewer. No records of any Trade Effluent Discharge Licences were identified in the review of Dublin City Council files, the details of which are discussed in Section 3.

An ESB transformer station was identified in the basement of 40 and 41 O'Connell Street Upper during OCMs 2006 assessment. It is understood that the transformer was installed in the mid 1960's, but OCM could not establish either the exact installation time or whether it is still in place. This transformer, if present, may have coolants containing PCBs , which would require specialist handling.

---

## 3. PHYSICAL SETTING

---

### 3.1 Geology

Information on the local and regional geology was obtained from the GSI databases and the geotechnical investigation, which comprised the installation of cable tool percussion (shell & auger) and rotary cores boreholes. The site investigation findings are discussed in detail in Section 4.

#### 3.1.1 Bedrock

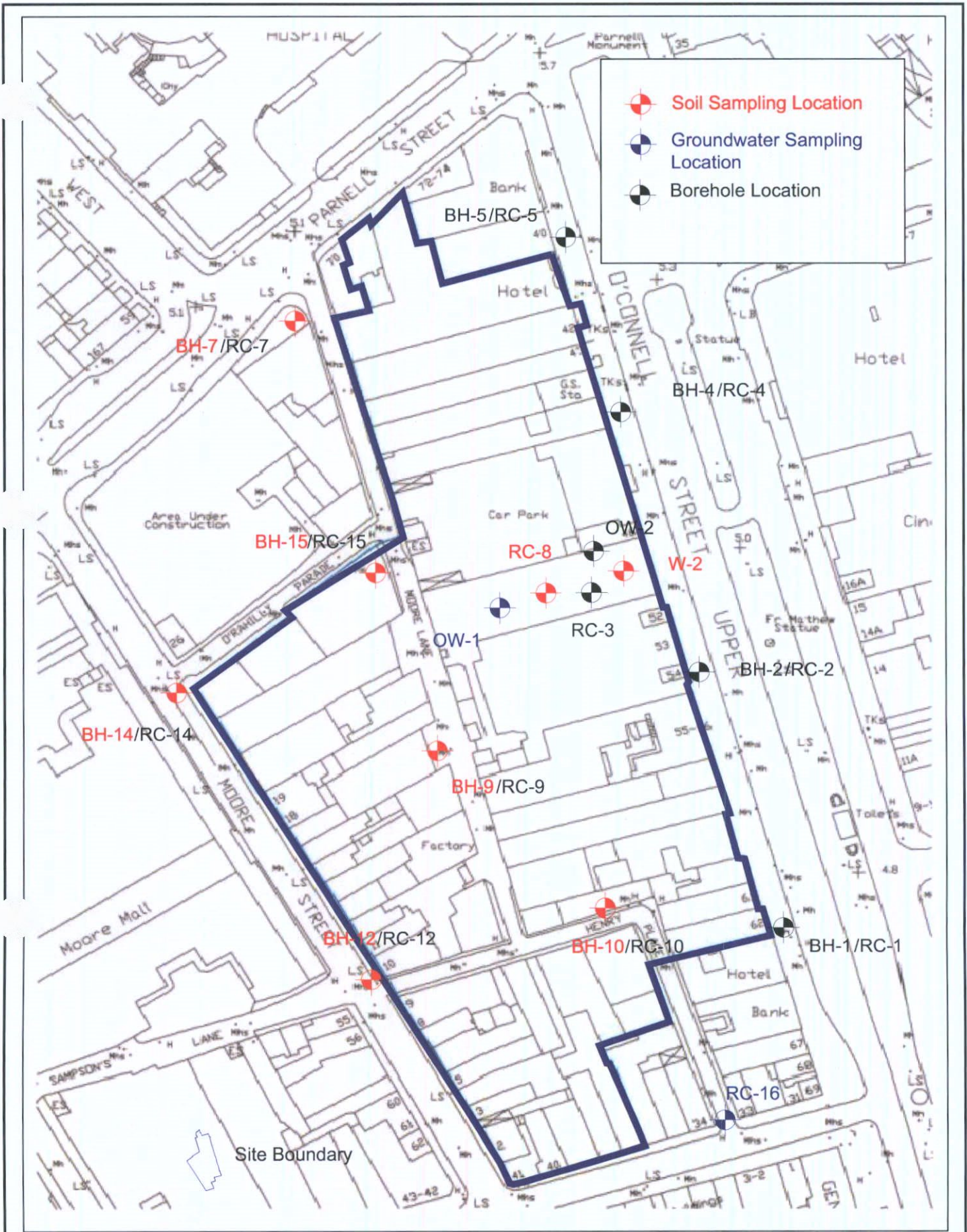
The GSI bedrock “Geology of Kildare – Wicklow”, Map 1994 states that the subject area is underlain by dark grey to black limestones and shales of the Calp Limestones. Calp units typically consist of dark grey, fine grained, graded limestone with interbedded black, poorly fossiliferous shales. The limestone bed thickness, grain size, colour and proportion of shale vary widely.


The borehole locations used for environmental sampling purposes are shown on Figure 3.1 and the complete map showing all the site investigation locations is included in Appendix 1. The borehole logs are included in Appendix 2.

The rotary core borehole logs indicate that the bedrock is mostly interbedded black calcareous shale, argillaceous limestone and siliceous limestone. In OW-1 and OW-2, located in the centre of the site, the bedrock is described as limestone. In BH-5 the bedrock encountered was interbedded limestone and shale and grey blue limestone. The depth to bedrock ranged from 12.6 m below ground level (bgl) for RC-16 to 27.3 m bgl for RC-4 in the northeast of the site.

#### 3.1.2 Subsoils/Quaternary Geology

According to the quaternary map of Dublin, the area is underlain by made ground, alluvium deposits close to the Liffey and glacial till. Much of the central Dublin area is underlain by fill material comprising gravels and clays interspersed with glass pottery and in some cases ash, which was deposited in the 17<sup>th</sup> and 18<sup>th</sup> century particularly in the low lying areas close to the Liffey.



 <p>O' Callaghan Moran &amp; Associates. Granary House, Rutland Street, Cork, Ireland. Tel. (021) 321521 Fax. (021) 321522 email : info@ocallaghanmoran.com</p>	<p>CLIENT Chartered Land Ltd.</p>	<p>DETAILS</p>	<p>Figure No. 3.1</p>
	<p>TITLE Borehole Locations</p>	<p>SCALE NTS</p>	<p>REV. REV</p>
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The borehole logs indicate that the subsoils range in thickness from between 12.6 m to 27.3 m across the site and comprises fill material underlain by natural ground. The fill material ranges from 2 m thick at RC-8 to 5 m at BH-4 and is thickest at the O'Connell Street, eastern side of the site. The fill is described as brown grey slightly gravelly clay with cobbles and fragments of brick and concrete. Underneath the fill material, the natural ground comprises mostly gravels underlain by a brown clay.

## 3.2 Hydrogeology

### 3.2.1 *Aquifer Classification and Vulnerability*

The bedrock aquifer beneath the site is classified locally by the GSI as a locally important aquifer (LI) which is moderately productive only in local zones, indicating that water movement through the bedrock is very slow and along short flow paths. The limited groundwater movement within the rock tends to be restricted to the surficial weathered horizons (top 1-3m) or to non-extensive fractured zones. These zones tend to have a limited hydraulic continuity, low storage capacity and potential yield.

It is likely that groundwater flow locally is from north to south toward the River Liffey which is approximately 500 m to the south of the site.

Vulnerability is defined by the GSI as the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. The GSI uses four groundwater vulnerability categories – extreme (<3m), high (3-5m), moderate (5-8m) and low (>10m) - for mapping purposes and in the assessment of risk to groundwaters. Groundwater is most at risk where the subsoils are either absent or thin. The data from the borehole logs indicates that the vulnerability of the bedrock aquifer is moderate to low.

### 3.2.2 *Hydrogeological Risk Assessment*

The development site is predominantly covered by paved areas, roofs roads and pavement, but there may be some very small unpaved areas to the rear of some of the buildings. Most of the incident rainfall runs off to storm sewer, with infiltration to ground limited to open green or unpaved yard areas.

Beneath the site the subsurface materials comprise made ground, gravels and clay. The thickness of these materials above the bedrock according to the borehole logs ranges from 12.6 – 23.3 m. It is likely therefore that any impacts on the subsurface associated with historical landuse are localised as vertical migration of contamination to the bedrock aquifer will have been greatly inhibited by the type and thickness of the subsoils and in particular the brown clay underlying the gravels.

The development will involve deep excavation into the bedrock will be opened at the site. OCM understand that groundwater pumping tests have been undertaken separately by AGL Consulting Engineers to assess the impacts of dewatering on the local hydrogeological conditions. The impact of dewatering is not therefore been discussed in this report, except in relation to the quality of the groundwater that will be discharged during the dewatering activities.

Post development, the extent of hard standing will be similar to the existing conditions. Therefore the amount of direct recharge as a result of rainfall will be very low and similar to the existing situation.



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## 4. SITE INVESTIGATION

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### 4.1 Sample Locations

The geotechnical investigation comprised the installation of eleven (11) shell and augur boreholes and fifteen (15) rotary core boreholes. The locations are shown on Figure 3.1. The environmental investigation involved the collection of samples of the fill material and underlying natural ground and groundwater samples from selected boreholes identified by OCM.

Fill and subsoil samples were collected from eight boreholes, BH-7, 9, 10, 12, 14, 15, RC-8 and W-2. Groundwater samples were collected at both RC-16 and OW-1, where two standpipes were located with one in the subsoil and one in the bedrock aquifer.

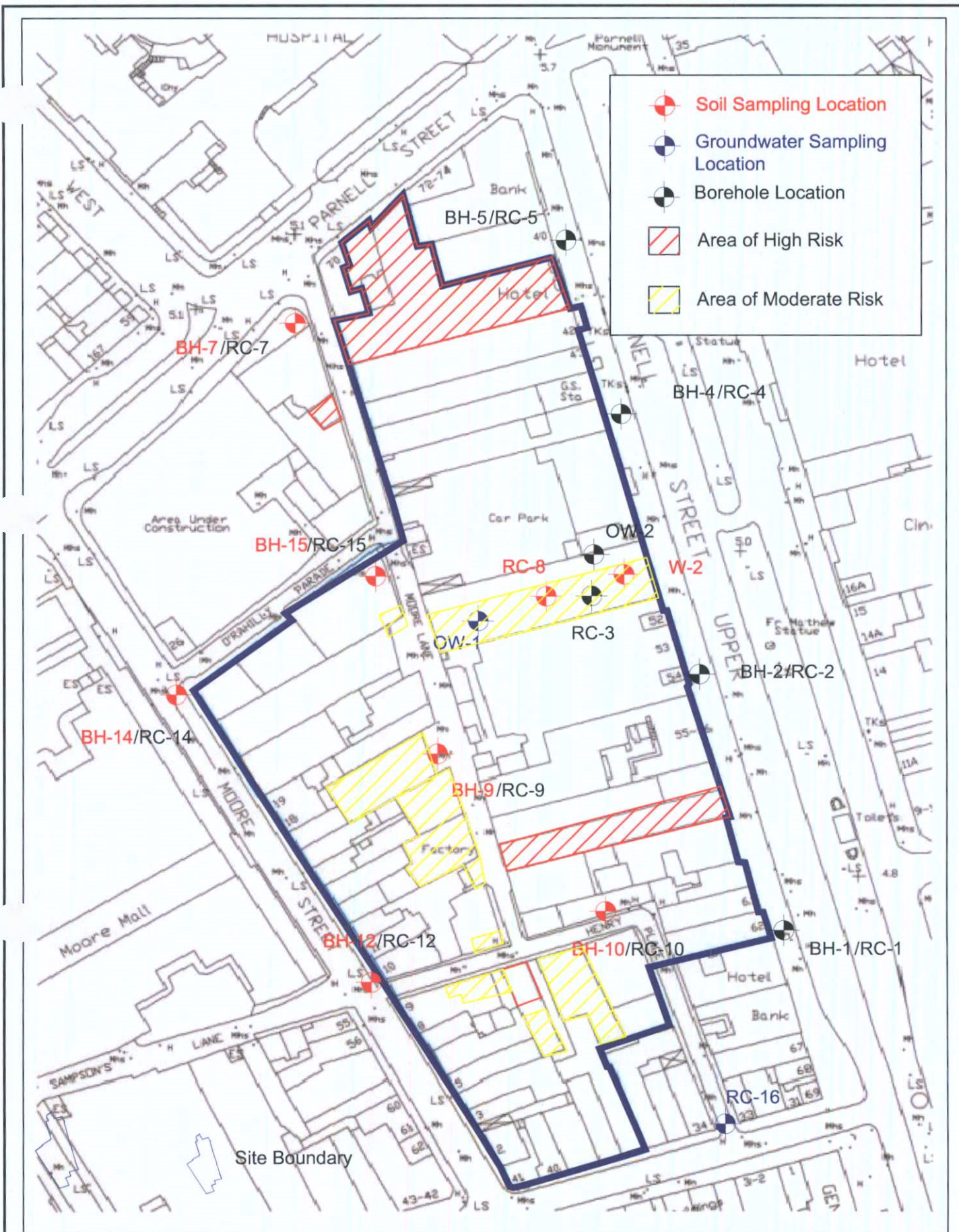
As none of the buildings identified in the 2006 assessment had been demolished, the boreholes had to be positioned in open areas and around the site perimeter and could not be located in all of the risk areas identified in the 2006 assessment. Figure 4.1 shows the location of the boreholes and the areas of risk identified in the assessment. This meant that only W-2 and RC-8 were located directly in an area identified in 2006 assessment as being at risk. Both were in an unpaved area used as a staff car park and storage area for Dr. Quirke's Emporium, which had been identified as being at moderate risk.

BH-7 was located on Parnell Street within 10 m of the rear entrance of the Royal Dublin Hotel which was considered an area of high risk in the 2006 site assessment. BH-9 was located directly beside buildings on Moore Lane, which had been designated at moderate risk. On Henry Place BH-10 was located across the lane from areas that had been designated at moderate and high risk. The remainder of the boreholes BH-12, 14 and 15, were considered to provide a representative spread of samples throughout the site.

### 4.2 Borehole Installation

The subsoil boreholes were drilled using a shell and augur (cable tool percussion) drill rig. The rotary core boreholes were drilled using a rotary core drill rig. All boreholes were drilled by IGSL and were logged for geotechnical purposes by IGSL personnel.

The installation of the boreholes from which samples for environmental testing purposes were collected were supervised by an OCM scientist and logged in accordance with BS5930. The Borehole logs are included in Appendix 2.




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DETAILS

Figure No.  
 4.1

TITLE  
 Sample Locations and Areas of Risk

SCALE	REV.
NTS	REV

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## 4.3 Soil

### 4.3.1 Sampling

The purpose of the soil sampling was to establish the presence or absence of contamination and to characterise the fill and subsoils. The samples were collected in accordance with OCM soil sampling protocol, a copy of which is included in Appendix 3.

### 4.3.2 Laboratory Analysis

All samples were sent to the STL laboratory in Blanchardstown, Dublin for analysis. The range of parameters tested was based on the nature of the historical site activities. In addition selected samples were tested for a range of parameters specified in the EU Council Decision establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.

The Decision specifies Waste Acceptance Criteria (WAC) for a range of inorganic and organic parameters that define whether a waste is suitable for disposal to an inert, non-hazardous or hazardous waste landfill. Materials that comply with the inert WAC are deemed to be essentially inert and present a minimal environmental risk.

Three (3) samples of the fill material from BH-7, 9 and 10 were analysed for Total Petroleum Hydrocarbons (TPH), BETX (benzene, toluene, ethylbenzene and xylene), PAH (polycyclic aromatic hydrocarbons) and metals (arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, tin, selenium and zinc).

Nineteen (19) samples, of the fill and natural ground from, BH-7, 9, 10, 12, 14, 15, RC-8 and W-2, were tested for the WAC, which included Total Organic Carbon (TOC), BETX, PCBs (polychlorinated biphenyls, 7 congeners), Mineral Oil (C10 to C40) and PAH sum of 17. They were also subjected to leach testing at a liquid to solid ratio of 10:1 and the leachate analysed for arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, tin, selenium, zinc, chloride, fluoride, sulphate, phenols, dissolved organic carbon and total dissolved solids.

Details of the sample points, sample depth, nature of the sample and analytical tests are presented in Table 4.1

**Table 4.1**

Summary of Soils Samples				
Borehole Name	Sample Type	Sample Type	Sample Depth	Type of Subsoil
BH-7	Fill Material	Soil	0.5-1 m	
	Natural Ground	WAC	4-5 m	Gravel
	Natural Ground	WAC	12-13m	Gravel
BH-9	Fill Material	Soil	0.4-0.8m	
	Natural Ground	WAC	4-5m	Gravel
BH-10	Fill Material	Soil	1.7.2.5m	
BH-12	Fill Material	WAC	0.5-1m	
	Fill Material	WAC	3-4m	
	Natural Ground	WAC	4-5m	Clay
	Natural Ground	WAC	8-10m	Clay
BH-14	Fill Material	WAC	0.5-1m	
	Fill Material	WAC	1-2m	
	Fill Material	WAC	2-3m	
	Natural Ground	WAC	3-4m	Clay
	Natural Ground	WAC	8-10m	Gravel
RC-8	Fill Material	WAC	0.5-1m	
	Fill Material	WAC	1-2m	
W-2	Fill Material	WAC	0.5-1m	
	Fill Material	WAC	1-2m	

#### 4.3.3 Results

The results of analysis of three solid samples of the fill material are shown in Table 4.2. The Table includes, for comparative purposes, the EU Council Decision WAC and the Dutch Government Soil Quality Standards commonly referred to as the Dutch List. These guidelines specify two categories, a target level (D) and an intervention level (I). The (D) level is considered representative of background conditions. The (I) level is one at or above which remedial action may be considered necessary depending on the potential environmental exposure risk. Many Irish Local Authorities use these standards to assess the potential for contamination. These samples were also compared with the EPA typical range for non-polluted soils for major elements and trace elements.

TPH was detected in BH-7 (180 mg/kg) and in BH-9 (150 mg/kg). Although this is above the Dutch D limit of 50 mg/kg they are considerably below the Dutch I limit of 5000 mg/kg and also below the inert WAC of 500 mg/kg.

Cadmium was detected in BH-9 and BH-10 at levels of 1.2 mg/kg and 1.6 mg/kg respectively. These are slightly above the Dutch D limit of 0.8 mg/kg, but below the I limit of 12 mg/kg. In BH-9, the mercury level (0.34 mg/kg) is marginally above the Dutch D limit of 0.3 mg/kg. All the remaining heavy metals were below the Dutch D limit and within the EPA range for non-polluted soils.