

Arup Consulting Engineers

Dublin City Council and  
Dong A/S

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**Dublin Waste to Energy  
Project, Ringsend,  
Dublin**

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Brief of Evidence of Séan  
Mason BA BAI MSc  
CEng FIEI MASCE

**FINAL**

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## **1. QUALIFICATIONS AND EXPERIENCE**

My name is Sean Mason. I have a Bachelor of Engineering (Civil) degree from Trinity College Dublin, and a Master's degree in Geotechnical Engineering from the Ohio State University, U.S.A. I am a chartered engineer and Fellow of the Institution of Engineers of Ireland, and a registered Professional Engineer in the United States as a Member of the American Society of Civil Engineers.

I am a Director of Arup Consulting Engineers, based in the Dublin office, and am head of the Ground Engineering group. I have over 24 years experience working as a consulting engineer, including international work experience.

I have broad experience in civil engineering, covering environmental engineering, traffic and transportation, roads, bridges and building works, with particular expertise in geotechnical engineering, and the management of civil engineering projects.

## **2. ASSESSMENT METHODOLOGY**

The assessment of the impacts of the proposed facility on the soils and geology at the site has been carried out based on the Institute of Geologists of Ireland document 'Geology in Environmental Impact Statements – A Guide'. This is consistent with the EPA publication, 'Guidelines on the information to be contained in Environmental Impact Statements' (2002).

## **3. EXISTING ENVIRONMENT**

The existing ground and groundwater conditions underlying the site are fully described in Chapter 11 of the Environmental Impact Statement. Extensive site investigation works have been undertaken on the site over several years to provide data on ground conditions, both within the area of proposed facility and adjacent to it.

The Site is located on the Poolbeg Peninsula, on a reclaimed area that was formerly the foreshore. The area of the site was predominantly reclaimed in the early 1970's and as such fill covers all remnants of the natural ground on site.

The bedrock geology at the site comprises Calp Limestones. The bedrock is generally overlain by glacially and glacio-marine deposited boulder clays and silts, overlain by outwash sands and gravels. Recent marine deposits and made ground (fill) overlie the glacial sands and gravels. Bedrock levels are in excess of 30 metres below ground level at the site.

Reclamation of the site was predominantly undertaken between 1970 and 1976. Recent site investigations have shown that the reclamation fill ranges in thickness from 1.6-5.6 m. The fill consists of a mixture of gravels, sands, silts and clays, and includes rubble, bricks, concrete, glass, timber and cinders.

The made ground is variable in composition and environmental testing indicates low level hydrocarbon and heavy metal contamination present. Recorded metal concentration levels are classified as non hazardous for disposal in Ireland. Generally recorded hydrocarbon concentrations are classified as non hazardous for disposal in Ireland, although localised concentrations above these limits were recorded. Most hydrocarbon concentrations detected in soils are below Dutch intervention levels except for occasional elevated occurrences associated with localised hotspots of soil contamination.

The limestone bedrock underlying the site has been classified as a poor aquifer by the Geological Survey of Ireland. The limited groundwater movement within the rock tends to be restricted to fractured zones.

The low permeability fine grained glacial soils above bedrock represent “aquitards” that limit infiltration and restrict percolating water from reaching the bedrock aquifer. The overlying sand and gravel deposits represent material with a significantly higher permeability. Consequently these deposits have a high potential recharge and storage capacity and therefore represent an aquifer of potential local importance. However, given the proximity to the sea these sand and gravel deposits do not represent a potable source of groundwater. Groundwater levels within the sands and gravels are generally close to the upper horizon and mean sea level (3-4mbgl). Environmental analyses of groundwater samples have shown only trace concentrations of hydrocarbons, all of which are below levels protective of seawater aquatic life.

#### 4. POTENTIAL IMPACTS ON THE ENVIROMENT

During the construction and operation of the facility there are a number of activities that if not properly implemented and controlled have the potential to adversely impact on the soils and geology at the site. Principally these are:

##### **Construction:**

- Demolition and site clearance works (i.e. enabling works);
- Bulk excavation of soil for disposal off site or retention on site;
- Leakages / spillages;
- Installation of retaining walls (e.g. driven sheet piles);
- Importation of suitable engineering fill;
- General earthworks \ preparation of formations;
- Construction of deep foundation;
- Flooding of the site.

**Operation:**

- Contamination from sewage, leachate or residue leakage;
- Spillages from operational traffic;
- Contamination from fill excavated and retained on site;
- Flooding of the site.

**5. IMPACTS MITIGATION MEASURES**

The forecasted impacts of the proposed scheme on the receiving soils and geology are described in sections 11.5 & 11.6 of the EIS.

The mitigation measures proposed have been described in detail in section 11.7 of the environmental impact statement and are summarised below.

**5.1 Bedrock Geology**

The proposed facility will not involve the removal of bedrock from within the site, and given the depth to the top of the bedrock the construction or operation of the proposed facility will not impact on the local bedrock geology.

**5.2 Natural Soils**

Good site management practices will be employed for the use, storage and disposal of any possible contaminated soils on site. Any increased soil erosion as a result of construction activities will be minimised by ensuring that all ground disturbances are completed and capped as soon as is practical. Through good construction practice and the use of appropriate retention / barrier systems the construction and operation phase of the proposed facility will have a negligible effect on the natural soils beneath the site.

### 5.3 Existing Made Ground ( Fill)

Hydrocarbon contamination has been identified within the made ground, however concentrations are generally below levels of concern (Dutch Intervention values). Concentrations that exceed Dutch Intervention values are likely to be associated with localised “hotspots” of contaminated soils. Elevated concentrations of metals (lead, copper and zinc) were detected at a number of locations within the fill material above the Dutch Intervention values. As there are no Irish or EU criteria, the Dutch values are commonly used in Ireland for guidance, and where limits are exceeded, a risk assessment of potential environmental effects is required. The risk assessment considers the risk of contamination by reference to the contaminant sources, the available pathways, and the potential receptors, to ensure protection of human health and the environment.

Our design approach has been to minimize the disturbance and excavation of the ground, and where required, to maximize the re-use of the excavated soils within the site development works as engineering fill. The qualitative risk assessment concluded that the bulk of the excavated materials are suitable for re-use on-site for filling, once covered over with a layer of natural soil. This physical separation eliminates potential pathways for contact. Should the project proceed, as part of the site development works, further sampling and testing of the soils to be excavated would be undertaken. The results of the additional testing will be incorporated into the risk assessment to further define any potential hotspots of excavated materials that would require off-site disposal. The actual excavation works will also be monitored by an experienced and qualified engineer/scientist, who will identify any contamination which may pose an environmental risk, for sampling and analysis for removal to a suitable disposal facility, as required.

This approach is considered to represent the Best Practicable Environmental Option (BPEO), and is in accordance with EPA policy. There are many precedents of such an approach having being undertaken in Dublin, for example, Dublin Port Tunnel (Fairview Park), N11 interchange at Greystones/Delgany and Pfizer Deansgrange. In these cases, it had to be shown that the proposed re-use would not create a risk to human health or the environment either during construction or in the final development. Hotspots of contaminated soils encountered during these excavations

were isolated and assessed separately. We will adopt the same approach on this site.

Once full design and construction details have been prepared, should An Bord Pleanála's approval for the facility be granted, the relevant details will be submitted to the Environmental Protection Agency to confirm the need or otherwise for any permit or licence in relation to handling and retaining the spoil within the site.

During construction appropriate site specific excavation protocols will be implemented to minimise the generation of runoff and dust. Where spoil is used as landscaping, an inert soil layer will be used to cap the material to prevent dermal contact and dust generation during the operation phase. Through good construction practice and the use of appropriate retention / barrier systems to prevent runoff and dust the retention of the spoil derived from made ground will have a neutral impact during the construction and operation phases of the facility.

#### **5.4 Hydrogeology and Groundwater**

During construction, temporary dewatering will be required to construct parts of the facility. The proposed option is to discharge the abstracted groundwater to sewer. Given that bulk excavations are limited to the waste bunker, to levels of approximately -1mOD Malin, there is likely to be limited groundwater infiltration. Prior to construction trials will be carried out to quantify potential pumping rates, and disposal requirements will be defined. If required some on-site storage can be provided to allow discharge to sewer over non-peak times each day.

General construction activities have the potential to impact on groundwater quality. This could occur due to leakage or spillage of construction related materials. These impacts will be mitigated against by ensuring good site management practices are employed for the use, storage and disposal of any possible pollutants. Through good construction practice and the use of appropriate retention / barrier systems to prevent runoff and dust the construction and operation phases of the proposed facility will have a neutral effect on the groundwater.

## 6. RESIDUAL EFFECTS

With the implementation of appropriate mitigation measures as detailed in the EIS, the construction and operation of the facility will have an overall neutral impact on the bedrock geology, natural soils, existing made ground and the hydrogeology and groundwater at the site.

The construction of the proposed facility will not contaminate the soils and groundwater at the site. The entire port area is built on reclaimed land, much of it, including the proposed site, comprising historic uncontrolled fill material that contains some contaminants.

During the construction up to approx. 13,000m<sup>3</sup> of the existing fill material is to be excavated, and re-deposited within the site boundaries to assist in the creation of landscaped bunds around the building. This relocated material will be covered over by a layer of inert soil and then be top-soiled and planted, ensuring no possible surface exposure.

During the operation of the facility the by-products of the waste to energy process will be fully contained ensuring no pollution of the soils and groundwater at the site.