

Preliminary Site Assessment

Site 68 Francis Street - Inchicore 110 kV (August -
November 1993)

Electricity Supply Board

Project number: PR-427640_ACM_RP_ENV_063_1

05 May 2020

Quality Information

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The site reconnaissance consisted of a general external inspection of the site aimed at identifying potential sources of ground contamination affecting the site. An environmental compliance audit and/or detailed structural inspection of existing buildings were outside the project brief. Similarly, the site visit excluded detailed consideration of the ecological or archaeological aspects of the site, and if such are believed to be of potential significance then it is recommended that specialist advice is sought.

Any risks identified in this Report are perceived risks, based on the information reviewed during the desk study and therefore partially based on conjecture from available information. The study is limited by the non-intrusive nature of the work and actual risks can only be assessed following a physical investigation of the site.

It should be noted that the effects of ground and water borne contamination on the environment are constantly under review, and authoritative guidance values are potentially subject to change. The conclusions presented

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Reference to historical Ordnance Survey (OS) maps and/or data provides invaluable information regarding the land use history of a site. However, it should be noted that historical evidence will be incomplete for the period pre-dating the first edition and between the release of successive maps and/or data.

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ABBREVIATIONS

AECOM	AECOM Ireland Limited
APEC	Area of Potential Environmental Concern
bgl	Below Ground Level
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CSM	Conceptual Site Model
ESB	Electricity Supply Board
EPA	Environmental Protection Agency
GSI	Geological Survey Ireland
IEL	Industrial Emissions Licence
IPC	Integrated Pollution Control
ITM	Irish Transverse Mercator
km	Kilometre
kV	Kilovolt
LAB	Linear Alkyl Benzene
m OD	Metres above Ordnance Datum
NHA	Natural Heritage Areas
NAPL	Non-Aqueous Phase Liquid
NPWS	National Park and Wildlife Service
NWCPO	National Waste Collection Permit Office
OECD	Organisation for Economic Co-operation and Development
OPW	Office of Public Works
OSI	Ordnance Survey Ireland
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PCOC	Potential Constituents of Concern
pNHA	Proposed Natural Heritage Area
PSA	Preliminary Site Assessment
RFP	Request for Proposal
SAC	Special Area of Conservation
SDS	Safety Data Sheet
SIDS	Screening Information Datasets
SPA	Special Protection Area
TPH	Total Petroleum Hydrocarbons
WAC	Waste Acceptance Criteria
WFD	Water Framework Directive

EXECUTIVE SUMMARY

Introduction

AECOM Ireland Limited (AECOM) completed a Preliminary Site Assessment (PSA) of a cable fluid leak location on the Grand Canal (Davitt Road), Drimnagh, Dublin 12 (the site).

ESB Networks operates and maintains a network of High Voltage (HV) underground cables of over 1,600 kilometres (km) across Ireland, of which approximately 175 km are insulated by a cable fluid. The majority of the fluid filled cables are located in urban settings across Dublin City and Cork City. The remainder are located outside these areas, with limited numbers of fluid filled cables in other counties.

The length of each cable route varies and cable routes frequently extend across county boundaries. The cable fluid acts as an electrical insulator and aids the conduction of heat away from the conductor allowing the cable to be run more efficiently. Fluid filled cables are largely located in urban/suburban areas and so are particularly vulnerable to third party interference or damage. Over time cables can develop leaks due to corrosion/fracture/defects in the cable sheath and in joints and terminations. When such leaks occur, there is potential for pollution to occur to surface water, groundwater, soils and ecology.

A leak was identified and repaired by Electricity Supply Board (ESB) at this location in August 1993 and it was repaired November 1993. AECOM understands that the fluid type lost from the cable was a mixture of linear alkyl benzene (LAB) and mineral oil based products.

Objective

The assessment reported herein comprises the first step of Stage 1: Site Characterisation & Assessment – Preliminary Site Assessment (PSA) and was carried out in accordance with *EPA Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (July 2013)*, and specifically the Guideline Template for Preliminary Site Assessment Report. This guidance draws on the *EPA Code of Practice (CoP)*, *Code of Reference for Unregulated Waste Disposal Sites (2007)* and *UK Environment Agency, Model Procedures for the Management of Land Contamination, Contaminated Land Report (CLR) 11 (September 2004)*.

In terms of the data requirement for PSA reports, both the EPA CoP and CLR 11 outline that the findings of this initial risk assessment stage are largely based on desk-study information and a site walkover to identify potential pollutant linkages, which are then evaluated using appropriate criteria.

As such, the objective of the PSA reported herein is to:

- Identify potential contamination sources (i.e. the cable fluid), pathways (i.e. breathing in vapours, movement through made ground / soil) and receptors (i.e. who/what will be affected) and the likely interactions between each element;
- Assess the potential severity of the hazard and the sensitivity of the receptor (ranging from minor to severe);
- Assess the likelihood that a risk will occur (ranging from unlikely to high likelihood); and
- Develop a preliminary conceptual site model (CSM) based on an overall assessment of each of these elements above.

The preliminary CSM will then be used to identify potential risks to human health (site users and/or nearby residents) and controlled waters (i.e. groundwater and surface water) which may be associated with a fluid leak from the identified location. It should be noted that this stage of the risk assessment process is based mostly on qualitative information sources and identification of a potential risk at this stage does not necessarily indicate the presence of a risk, but rather the need for further assessment.

A table cross referencing the template headings from the EPA Guidance Template and where the corresponding information is reported herein is presented in Appendix B.

Assessment Findings

Based on the findings of the desktop study, the overall environmental sensitivity of the site is considered to be moderate. Identified sensitive receptors within 1 km of the site include:

- The Grand Canal located immediately north of the site, although this may be protected by low permeability clay (natural and/or engineered when the canal was constructed);

- The River Camac located approximately 1 km west of the site, although this may be protected by low permeability clay deposits which are likely to be encountered beneath the site; and
- The groundwater aquifer beneath the site, although this may also be protected by low permeability clay deposits which are likely to be encountered beneath the site.

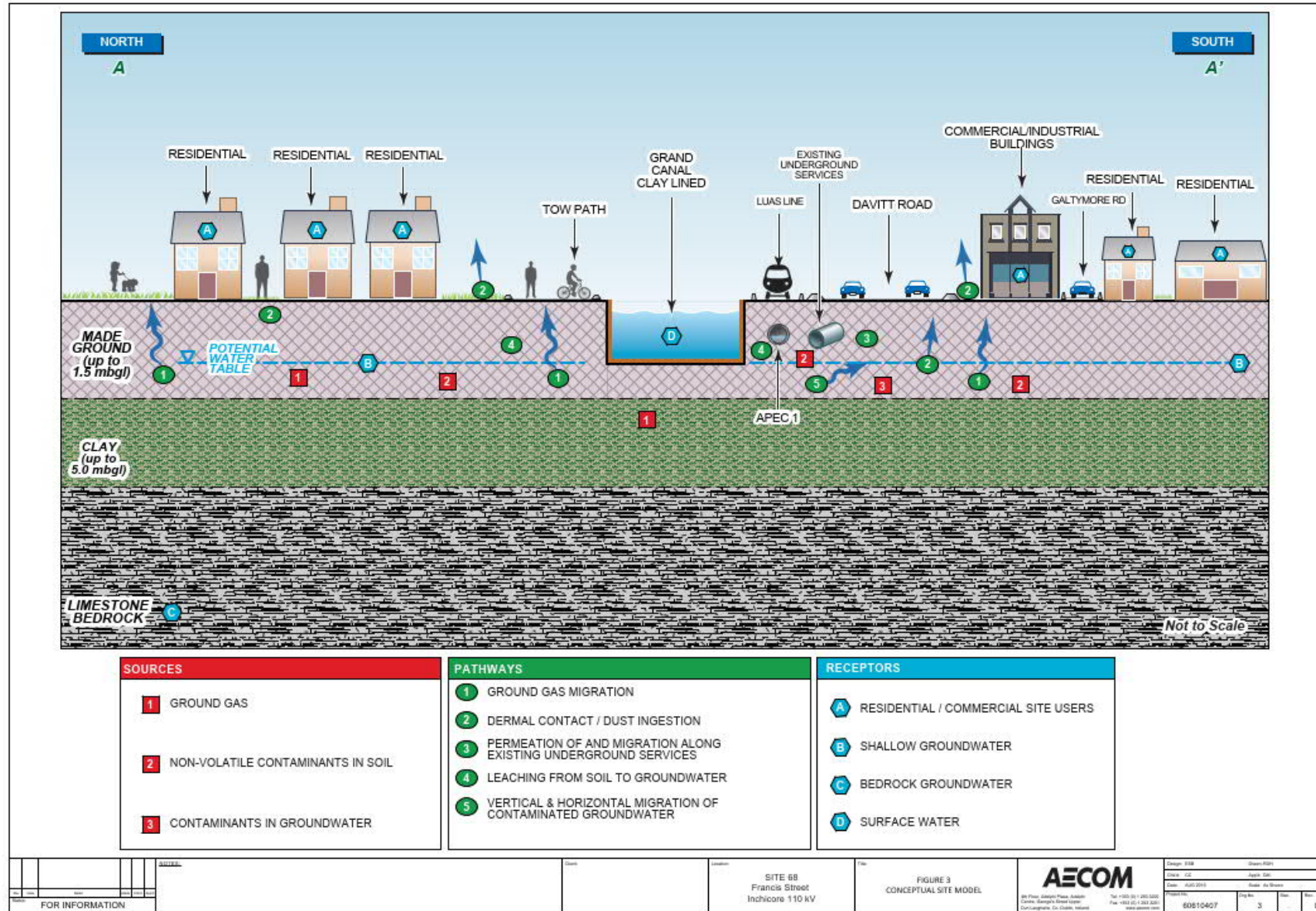
It is estimated that 1,000 litres of cable fluid was released between August 1993 and November 1993. It is assumed, based on information provided to AECOM by ESB, that the fluid lost was a mixture of LAB and mineral oil based products. Due to its high biodegradability, lower volatility and low solubility, it is considered that LABs are of less concern for adverse environmental impact than mineral oil based products. Given that there is potential for a mixture of both types of cable fluids to have been used at this site, potential contaminants of concern have been identified.

A summary of the source audit findings is as follows:

Area of Potential Environmental Concern

Number	APEC	Potential Contaminants of Concern	Potential Media Impacted
1	Leak at (68) Francis Street - Inchicore 110 kV (August – November 1993)	LABs TPH BTEX VOCs SVOCs PCBs	Soil Groundwater Soil Vapour Ground Gas

The preliminary CSM developed for the site looked at potential source-pathway-receptor linkages identified during the assessment works and risks associated with potential source-pathway-receptor linkages were considered to be low. Based on these findings, further assessment is not considered to be required as no viable SPR linkages have been identified.



EPA Contaminated Land and Groundwater Risk Assessment Methodology

Table 1. EPA Methodology

Stage	Methodology	Report Reference	Report Date	Status
Stage 1: Site Characterisation and Assessment				
1.1	Preliminary Site Assessment	PR-427640_ACM_RP_ENV_063	05 May 2020	Final
1.2	Detailed Site Assessment			
1.3	Quantitative Risk Assessment			
Stage 2: Corrective Action and Feasibility Design				
2.1	Outline Corrective Action Strategy			
2.2	Feasibility Study and Outline Design			
2.3	Detailed Design			
2.4	Final Strategy and Implementation Plan			
Stage 3: Corrective Action Implementation and Aftercare				
3.1	Enabling Works			
3.2	Corrective Action Implementation and Verification			
3.3	Aftercare			

Source: EPA Guidance on the Management of Contaminated Land at EPA Sites

1. Introduction

AECOM Ireland Limited (AECOM) is pleased to present this preliminary site assessment (PSA) completed on behalf of Electricity Supply Board (ESB) for a site on Davitt Road, Dublin 12, Ireland (the site).

This report was commissioned by ESB under a request for proposal (RFP) issued on 26 June 2019 (Ref. Qd-354120-01R460_002-001-001) and carried out in accordance with AECOM proposal reference: PR-427640_ACM_PL_ENV_001_3, dated 03 July 2019. AECOM understand that ESB has undertaken these works on behalf of ESB Networks.

1.1 Project Background

ESB Networks operates and maintains a network of High Voltage (HV) underground cables of over 1,600 kilometres (km) across Ireland, of which approximately 175 km are insulated by a cable fluid. The majority of the fluid filled cables are located in urban settings across Dublin City and Cork City. The remainder are located outside these areas, with limited numbers of fluid filled cables in other counties.

The length of each cable route varies and cable routes frequently extend across county boundaries. The cable fluid acts as an electrical insulator and aids the conduction of heat away from the conductor allowing the cable to be run more efficiently. Fluid filled cables are largely located in urban/suburban areas and so are particularly vulnerable to third party interference or damage. Over time cables can develop leaks due to corrosion/fracture/defects in the cable sheath and in joints and terminations. When such leaks occur, there is potential for pollution to occur to surface water, groundwater, soils and ecology.

A leak was identified by ESB at the site in August 1993 and repaired in November 1993. AECOM understands that the fluid type lost from the cable was a mixture of linear alkyl benzene (LAB) and mineral oil based products.

The site location is presented in Figure 1 and the site layout showing the site is presented in Figure 2.

1.2 Project Objective

The assessment reported herein comprises the first step of Stage 1: Site Characterisation & Assessment – Preliminary Site Assessment (PSA) and was carried out in accordance with *EPA Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (July 2013)*, and specifically the Guideline Template for Preliminary Site Assessment Report. This guidance draws on the *EPA Code of Practice (CoP)*, *Code of Reference for Unregulated Waste Disposal Sites (2007)* and *UK Environment Agency, Model Procedures for the Management of Land Contamination, Contaminated Land Report (CLR) 11 (September 2004)*.

In terms of the data requirement for PSA reports, both the EPA CoP and CLR 11 outline that the findings of this initial risk assessment stage are largely based on desk-study information and a site walkover to identify potential pollutant linkages, which are then evaluated using appropriate criteria.

As such, the objective of the PSA reported herein is to:

- Identify potential contamination sources (i.e. the cable fluid), pathways (i.e. breathing in vapours, movement through made ground / soil) and receptors (i.e. who/what will be affected) and the likely interactions between each element;
- Assess the potential severity of the hazard and the sensitivity of the receptor (ranging from minor to severe);
- Assess the likelihood that a risk will occur (ranging from unlikely to high likelihood); and
- Develop a preliminary conceptual site model (CSM) based on an overall assessment of each of these elements above.

The preliminary CSM will then be used to identify potential risks to human health (site users and/or nearby residents) and controlled waters (i.e. groundwater and surface water) which may be associated with a fluid leak from the identified location. It should be noted that this stage of the risk assessment

process is based mostly on qualitative information sources and identification of a potential risk at this stage does not necessarily indicate the presence of a risk, but rather the need for further assessment.

A table cross referencing the template headings from the EPA Guidance Template and where the corresponding information is reported herein is presented in Appendix B.

2. Scope of Work

To achieve the above objective, the following scope of work was undertaken:

- A site walkover by AECOM staff (completed on 02 November 2019);
- A desktop review of site history to identify areas of potential environmental concern (APEC);
- A desktop review of publicly available information regarding the site's environmental setting and sensitivity, including:
 - Geological Survey of Ireland (GSI) Groundwater Public Viewer Maps (<https://dcenr.maps.arcgis.com/apps/MapSeries>), accessed 25 October 2019
 - EPA Geoportal Site (<https://gis.epa.ie/EPAMaps>), accessed 25 October 2019
 - EPA Incidents Database (<https://www.epa.ie/newsandevents/incidents/recent/>), accessed 25 October 2019
 - Ordnance Survey of Ireland (OSI) (<http://geohive.ie>), accessed 25 October 2019
 - Glucksman Map Library, Trinity College Dublin, accessed 06 August 2019
 - Office of Public Works (OPW) Flood Maps (<http://www.floodinfo.ie>), accessed 25 October 2019
 - National Parks and Wildlife Service (NPWS) (<http://webgis.npws.ie/npwsviewer/>), accessed 25 October 2019
 - National Waste Collection Permit Office (NWCPO) website (<http://www.nwcpo.ie/>), accessed 25 October 2019
- A review of information provided by ESB in the RFP; and
- Data assessment and reporting.

3. Environmental Setting

3.1 Topography

The site is located on the tow path adjacent to the Grand Canal along the Davitt Road and LUAS walkway, Dublin 12 (ITM 712419.68 733085.14) at an elevation of approximately 30 m above Ordnance Datum (m OD). The surrounding topography slopes away from the Davitt Road to the north, but in general is relatively flat.

3.2 Geology

The Teagasc Soils Map indicates the site locality comprises urban sediment. Immediately underlying the site and along the route of the Grand Canal to the east and west of the site, the Quaternary geology is classified as urban. The surrounding areas to the north and south are classified as till derived from the underlying limestone bedrock.

The GSI Bedrock Geology Map (scale 1:100,000) indicates the site is underlain by marine basalinal facies, a dark fine-grained limestone and shale of the Lucan formation. No geological features are noted within the surrounding area.

A number of geotechnical records are located within the vicinity of the site. Southwest of the site, adjacent to the banks of the Grand Canal the stratigraphic sequence was recorded as overburden to 3.96 meters below ground level (m bgl) directly overlying bedrock. A site investigation northwest of the site recorded topsoil to approximately 0.4 m bgl, overlying fill to approximately 1.4 m bgl, which was underlain by clay to a maximum depth of 5 m bgl where the investigation terminated.

3.3 Hydrology

3.3.1 Surface Water Features

The site lies within the lower catchment of the River Liffey and Dublin Bay, which covers an area of 1,624 km².

The closest surface water body to the site is the Grand Canal (a proposed Natural Heritage Area (pNHA), Site Code 002104) located immediately north of the leak location. The canal flows to the east and discharges to the River Liffey Estuary approximately 5.6 km northeast of the site, which flows into South Dublin Bay (an SAC). This comprises the following protected sites:

- South Dublin Bay Special Area of Conservation (SAC) (Site Code 000210);
- South Dublin Bay and River Tolka Special Protection Area (SPA) (Site Code 004024); and
- South Dublin Bay proposed Natural Heritage Area (pNHA) (Site Code 000210).

As impervious materials are generally used to line canals during construction, it is not considered likely that the Grand Canal is in hydrological continuity with groundwater in the area.

The Camac River flows from south to north and is the closest natural waterbody to the site; located approximately 1 km west of the site. The Camac River crosses (by culvert) the Grand Canal immediately east of the Blackhorse Bridge and discharges to the River Liffey approximately 1.9 km northeast of the site.

Given their proximity to the site, both the Grand Canal and the Camac River are considered to be sensitive surface water receptors.

3.3.2 Surface Water Quality

The Grand Canal, which bounds the site to the north, is referred to as an Artificial Water Body (AWB) by the EPA under the Water Framework Directive (WFD). Waterways Ireland assess the biological quality of the Grand Canal, which along the section adjacent to the site during the period 2015 – 2017 was classified as ‘Good’ quality¹.

The most significant natural surface water feature in the wider area is the Camac River. The most recent reported EPA water quality status of the Camac River (monitoring station below Blackhorse Bridge) is a Q Value of 3 and a rating ‘Poor’. The WFD ecological status of the Camac River is characterised as being at risk of not meeting its WFD objectives.

The most significant surface water feature in the wider area is the River Liffey Estuary. The WFD status of both the upper and lower sections of the estuary (classified as a Transitional Water Body) is classified as ‘Moderate’ and characterised as being at risk of not meeting its WFD objectives.

3.3.3 Flooding

According to OPW Flood Maps, the site does not lie within the “River – Low Probability”, “River – Medium Probability” or “River – High Probability” modelled extent of land that might be flooded by rivers in a moderate to very extreme event.

Parts of the surrounding area located within a 1 km radius to the west and east of the site lie within the “River – Low Probability”, “River – Medium Probability” and “River – High Probability” indicating that flooding by rivers may occur during moderate to very extreme event in these areas.

The site is not in close proximity to the extent of land affected by coastal flood events.

3.4 Hydrogeology

3.4.1 Aquifer Classification

According to the GSI, the bedrock aquifer beneath the site is classified as a Locally Important Aquifer. The bedrock underlying the site is moderately productive in local zones. The soil permeability in the

¹ EPA, *Water Quality in 2017, An Indicators Report*, 2018

surrounding area is low; consequently the groundwater recharge in this aquifer is estimated by the GSI to be approximately 70 millimetres/year (mm/yr).

Regional groundwater flow direction is likely to be to the north and west towards the River Liffey and Camac River. A more detailed site assessment would be required to assess the local groundwater flow regime.

According to the GSI wells and springs database, there are no recorded wells or springs located within 1 km of the site. In addition, the site is not mapped as being located within a Source Protection Area for either a public water supply or a group water supply scheme.

3.4.2 Groundwater Vulnerability

The GSI National Groundwater Vulnerability Mapping identified that groundwater vulnerability associated with the site is “Moderate”. However, some spatial variation in groundwater vulnerability is seen in the greater surrounding area of the site, with areas of high to extreme vulnerability noted in the vicinity of the site.

3.4.3 Groundwater Quality

Groundwater beneath the site is part of the Dublin Groundwater Body (IE_EA_G_008) which, according to the EPA website, is classified as having ‘Good’ status and is characterised as being not at risk.

3.5 Natural Habitats and Protected Species

The Grand Canal is located immediately north of the site and is a pNHA.

The River Liffey is located approximately 1.2 km north of the site. The River Liffey flows easterly into South Dublin Bay (an SAC, SPA and pNHA). Site Codes for each of these protected areas are provided in Section 3.3.1.

There are no other protected areas within 1 km of the site.

3.6 Regulatory Database Search

3.6.1 National Waste Collection Permit Office

The National Waste Collection Permit Office (NWCPO) website was reviewed to identify authorised waste facilities within the jurisdiction of Dublin City Council near the site. The NWCPO website indicated that there are a number of Waste Permitted Facilities within 1 km of the site as summarised in Table 2 below.

Table 2. Dublin City Council Permitted Waste Facilities within 1 km of the Site

Authorisation Number	Facility Name	Location	Waste Activity
WFP-DC-09-0008-02	Martin Services (Industrial) Limited	Unit 11 Bluebell Business Park Bluebell Dublin 12	Wastes whose collection and disposal is not subject to special requirements in order to prevent infection (for example dressings, plaster casts, linen, disposable clothing, diapers)
WFP-DC-11-0025-02	Rehab Enterprises Limited	The Rehab Building Kylemore Road Ballyfermot Dublin 10	Photographic film, mixed packaging and waste electronic equipment

3.6.2 Storm Water Discharges

Several Irish Water storm water overflow discharge locations have been identified within 1 km of the site, as summarised in Table 3 below.

Table 3. Storm Water Discharges

Emission ID	Name	Register No.
TPEFF0700D0034SW215	Ringsend	D0034-01
TPEFF0700D0034SW039	Ringsend	D0034-01
TPEFF0700D0034SW032	Ringsend	D0034-01
TPEFF0700D0034SW073	Ringsend	D0034-01
TPEFF0700D0034SW077	Ringsend	D0034-01
TPEFF0700D0034SW024	Ringsend	D0034-01
TPEFF0700D0034SW100	Ringsend	D0034-01
TPEFF0700D0034SW104	Ringsend	D0034-01
TPEFF0700D0034SW030	Ringsend	D0034-01
TPEFF0700D0034SW044	Ringsend	D0034-01
TPEFF0700D0034SW201	Ringsend	D0034-01
TPEFF0700D0034SW057	Ringsend	D0034-01
TPEFF0700D0034SW058	Ringsend	D0034-01
TPEFF0700D0034SW059	Ringsend	D0034-01
TPEFF0700D0034SW028	Ringsend	D0034-01
TPEFF0700D0034SW075	Ringsend	D0034-01
TPEFF0700D0034SW076	Ringsend	D0034-01

3.6.3 EPA Licensing

The EPA database of Industrial Emissions (IE) and Integrated Pollution Control (IPC) and Waste licences was consulted and no active licensed facilities were identified within 1 km of the site.

There have been no reported environmental incidents within 1 km of the site since at least 2010.

3.7 Environmental Sensitivity

The overall environmental sensitivity of the site is considered to be moderate. Identified sensitive receptors within 1 km of the site include:

- The Grand Canal located immediately north of the site, although this may be protected by low permeability clay (natural and/or engineered when the canal was constructed);
- The River Camac located approximately 1 km west of the site, although this may be protected by low permeability clay deposits which are likely to be encountered beneath the site; and
- The groundwater aquifer beneath the site, although this may also be protected by low permeability clay deposits which are likely to be encountered beneath the site.

4. Source Audit Findings

4.1 Site Description

The site is located adjacent to the Grand Canal along the Davitt Road and LUAS tracks Dublin City. The leak site was located on a 400 m long section of a 110 kV cable running from Francis Street to Inchicore. The cable was installed in 1964 and the location of the leak (at cable joint No. 1 – UG0822) is located beneath the tow path along the Davitt Road and LUAS tracks. It is estimated that loss of fluid from the cable occurred between August and November 1993 with an estimated fluid volume loss of 1,000 litres during that period.

No evidence of impact from the cable fluid release was noted during the site walkover.

4.2 Surrounding Land Use

Land use in the immediate vicinity of the site is mixed commercial and residential. Land use in the vicinity of the site is summarised in Table 4 below.

Table 4 Adjacent Land Use

Site Boundary	Land Use
North	The Grand Canal is located immediately north of the site, on the adjacent side of the canal bank residential houses are located. The Goldenbridge Graveyard is located 240m northwest from the location of the leak.
East	Land use to the east of the site is predominantly commercial land use with large warehouse. Residential properties with gardens. The Goldenbridge LUAS stop is located to the east.
South	The Marble Arch pub is located immediately south of the site and is surrounded by residential housing.
West	Commercial units and light industry units run along the Davitt Road to the west.

4.3 Historic Site Review

A review of historical maps and aerial photographs available from OSI, Glucksman Map Library (Trinity College Dublin) and Google Earth was carried out. A summary of the findings is presented in Table 5.

Table 5 Historic Map and Aerial Photograph Review

Year	Description
1829 to 1841 (OSI)	The site and immediate surrounding area appears to be predominantly agricultural. The Grand Canal is immediately north of the site and the lock along the canal to the east. Mount Shannon Mills are located to the south of the site.
1898 to 1913 (OSI)	No significant changes have occurred.
1908 (1:2,500) Trinity Maps	The site remains surrounded by predominately agricultural land. Mount Shannon Mills remains to the west of the site however Harcourt Mills to the immediate west (south of the first lock) has been redeveloped into a brick works. The brick works has associated clay pit, kiln and chimneys.
1935 (1:1,250) Trinity Maps	An increase in residential development has occurred to the north of the site and immediately south, with a number of small cottages noted. Mount Shannon Mills has been replaced by a Paint and Varnish Factory while the brick works remains to the east.
1968 (1:1,000) Trinity Maps	Immediately south of the site is a store and to the southwest is a factory. Immediately north is Millview Cottages.
1989 (1:1,000) Trinity Maps	There are no major changes from the previous map. There is an electrical substation located to the northwest of the site beside Goldenbridge Cemetery.
1994 (1:1000) Trinity Maps	A large increase in commercial units and factories. To the east of the site, commercial units include; Dublin Corporation Cleansing Department, SCR Motor Garages and Knights Cleaning contractors. West of the site, moving past Benbulbin Road units include HGW Paint and Varnish Manufacturers. High density residential buildings characterise the north of the site.
1995 (OSI)	Development of the surrounding area is shown on the 1995 aerial photograph. High density residential buildings are to the north of the site with commercial units and residential buildings to the south of the site.
2000 (OSI)	No significant changes
2005 (OSI)	The LUAS tracks now run parallel to the Grand Canal, no significant changes to the residential and commercial areas.
2012	No changes have appeared to have occurred since 2005.

Year	Description
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(Google Earth)	
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4.4 Potential Sources

4.4.1 Cable Fluid Source

Information on the potential fluids released was provided in the ESB RFP document. Typically, fluid filled cables are installed in trenches approximately 1.2 m deep, 1.1 m wide and the depth to the top of the cable is typically 0.9 m – 1 m. The cables are typically surrounded by 0.35 m of sand and then the trench is backfilled with either clause 804 fill or trench arisings.

Based on information from the GSI, it is likely that the cable on this site is installed within sand and backfilled with made ground, therefore leaked fluid is likely to have migrated through either the sand surround or made ground (if sufficient permeability).

It is estimated that 1,000 litres of cable fluid was released between August and November 1993.

It is assumed, based on records and Safety Data Sheets (SDS) provided to AECOM by ESB, that the fluid lost was a mixture of the following cable fluid products:

- 'T 3788' manufactured by H&R ESP Ltd of Milton Keynes in the UK;
- 'Masse 106' produced by Felten & Guillaume Energietechnik AG in Germany; and
- Shell Diala Cable Oil.

T 3788 is a low viscosity blend of linear alkyl benzenes (LABs) (CAS # 67774-74-7). Shell Diala Cable Oil has the same CAS # as T 3788, so is essentially the same product but made by a different manufacturer. The SDS for Masse 106 does not give its CAS # or details of its composition but states that it is a blend of highly refined mineral oils and additives.

4.4.1.1 Linear Alkyl Benzenes

Physical and Chemical Properties

LABs have side alkyl chains of 10-13 carbon atoms in length attached to a benzene ring. The alkyl chain may be attached to the benzene ring at any position except the terminal (end) position. As LABs are a mixture, their precise physio-chemical properties are dependent upon the components of the mixture, but they are generally colourless, oily liquids, less dense than water, with very low aqueous solubility and low volatility. Their potential spreading in the ground will therefore be similar to other light non-aqueous phase liquids (LNAPL) but with very little mass loss due to volatilisation or dissolution.

Information relating to the nature and toxicity of linear alkyl benzenes has been primarily sourced from the following documents:

- Safety Data Sheet (SDS) for T 3788;
- European Union Risk Assessment Report, Benzene, C10-13 alkyl derivatives, 20 June 1997; and
- Organisation for Economic Co-operation and Development (OECD) Screening Information Datasets (SIDS) Initial Assessment Reports for High Production Volume Chemicals, United Nations Environment Programme, Chemicals Branch, May 2002.

The table below summarises the basic physical and chemical properties of LABs.

Table 6 Linear Alkyl Benzene Physical and Chemical Properties

Property	Description
Molecular Weight	239-243 g/mol
Melting Point	<-70°C
Boiling Point	251-320°C @ 1 atm (OECD)

Property	Description
Vapour Pressure @ 25°C	6.5 x 10 ⁻⁵ kPa (OECD)
Aqueous Solubility	0.041 mg/L (OECD)
Henry's Law Constant	9.34 x 10 ⁻⁴ atm-m ³ /mol (OECD)
Density	0.86 @ 20°C
Flash Point	140°C
Explosive Properties	None

LAB (C12) has a calculated octanol-water partition coefficient (K_{oc}) of 2.2x10⁴ and is classified by the EU risk assessment as a high adsorptive substance.

Degradation

The OECD SIDS (2002) review concluded that LABs undergo “rapid primary biodegradation in natural waters and complete mineralisation by micro-organisms under aerobic conditions”. A measured half-life in water of four to nine days was reported. Microorganisms in sewage sludge and soil were reported to rapidly and completely biodegrade LABs. Anaerobic biodegradation was inferred to occur, but at a slow rate.

Degradation in soil is expected to occur but to be slower than in surface water due to the much slower mixing and the limited availability of oxygen. Where oxygen is available, aerobic degradation would occur at the fringes of a body of LNAPL in the soil/groundwater, producing elevated carbon dioxide levels in the soil and potentially elevated alkalinity in the groundwater. In the absence of oxygen, anaerobic degradation may occur by methanogenesis or by reduction of sulphate, nitrate, ferric iron (Fe³⁺) and manganese (Mn³⁺). These processes could lead to reducing conditions in the groundwater, with depleted concentrations of sulphate (SO₄⁻) and nitrate (NO₃⁻) and increased concentrations of dissolved methane (CH₄), ferrous iron (Fe²⁺) and dissolved manganese (Mn²⁺). Such conditions would be expected to occur close to the LNAPL body and locally downgradient. With increased distance from the LNAPL, mixing with the surrounding groundwater and aeration from seasonal fluctuations and groundwater recharge would gradually allow ambient (most likely oxidised) conditions to be re-established.

Toxicity

According to the OECD review, LABs were assessed to be not acutely toxic to human health. Data from repeat exposure, reproductive and genotoxicity studies also indicated a low potential for toxic effects. The OECD concluded that “Linear alkyl benzenes do not present any significant acute or sub-chronic health effects by various exposure routes. LAB is not teratogenic (i.e. causing birth defects) and does not produce selective reproductive toxicity.”

Laboratory studies have shown that repeated exposure to LABs may be irritating to the skin, and the SDS recommends the use of gloves when handling LABs. The low vapour pressure of LABs limits the potential for exposure via inhalation, and this is not expected to be a significant exposure route at normal temperatures.

Eco-toxicity studies reviewed by the OECD found no acute toxic effects on aquatic species tested at concentrations up to and exceeding solubility limits. The only exception to this was for the water flea *Daphnia magna*. No data was available regarding terrestrial eco-toxicity studies.

Due to its high biodegradability and rapid metabolism, the OECD concluded that LABs were of little concern for adverse environmental impact. The OECD and EU reviews of LABs both concluded that LABs were a low priority for further investigation.

4.4.1.2 Masse 106 Mineral Oil

Information on Masse 106 has been obtained from a Safety Data Sheet (SDS) dated 1995 provided by ESB.

Physical and Chemical Properties

Masse 106 is understood to be a blend of highly refined mineral oils and additives. The SDS does not provide information on the identity of the mineral oils or additives, or on their proportions within the oil.

The SDS states that containers of Masse 106 should be kept tightly closed and in a well-ventilated space and that it should be used only in well-ventilated areas. This suggests that Masse 106 may contain volatile components.

The table below summarises information from the SDS for Masse 106.

Table 7 Masse 106 Physical and Chemical Properties

Property	Description
Vapour Pressure @ 20°C	<0.01 hPa
Aqueous Solubility	negligible
Density	888 kg/m ³
Flash Point	145°C
Flammability range	0.6% volume to 6.5% volume
Kinematic viscosity @ 40°C	8.5 mm ² /s

Based on these properties, Masse 106 would behave as a relatively viscous LNAPL in the ground. The SDS states that if the product enters soil it will be adsorbed to soil particles and not be mobile.

Degradation

The SDS for Masse 106 indicates that it is not readily biodegradable. Nevertheless, as it is expected to be comprised mainly of petroleum hydrocarbon compounds, gradual degradation is expected to occur, especially in water. The rate of biodegradation is likely to depend on the availability of oxygen and of favourable geochemical conditions. As with LABs and with other petroleum hydrocarbons, where oxygen is available, aerobic degradation would be expected to occur at the fringes of a body of LNAPL in the soil/groundwater, producing elevated carbon dioxide levels in the soil and potentially elevated alkalinity in the groundwater. In the absence of oxygen, anaerobic degradation may occur by methanogenesis or by reduction of sulphate, nitrate, ferric iron (Fe³⁺) and manganese (Mn³⁺). These processes could lead to reducing conditions in the groundwater, with depleted concentrations of sulphate (SO₄⁻) and nitrate (NO₃⁻) and increased concentrations of dissolved methane (CH₄), ferrous iron (Fe²⁺) and dissolved manganese (Mn²⁺). Such conditions would be expected to occur close to the LNAPL body and locally downgradient. With increased distance from the LNAPL, mixing with the surrounding groundwater and aeration from seasonal fluctuations and groundwater recharge would gradually allow ambient (most likely oxidised) conditions to be re-established.

Toxicity

The 1995 SDS for Masse 106 states that the components of the preparation are not expected to impart hazardous properties to the product. Whilst this suggests the product is not hazardous, it is noted that standards for hazard assessment and SDS production have evolved since 1995 and therefore the information cannot be relied upon with full confidence in relation to current standards for hazard assessment.

The SDS indicates that Masse 106 is expected to be practically non-toxic to aquatic organisms.

In relation to human toxicity, the SDS gives the following information:

- It is expected to be slightly irritant, so all forms of skin contact should be minimised. It is not expected to be a skin sensitiser.
- Respiratory protection is not normally required but it should be used only in well-ventilated spaces. It is based on mineral oils and other components not known to be carcinogenic.

4.4.1.3 Conclusion

Based on the above, underground leakage of LABs is not likely to lead to significant issues from dissolved hydrocarbons or vapours. Although the components of Masse 106 are not known and its aqueous solubility is stated on the SDS as “negligible”, it is unclear what this means in the context of dissolution of components from a NAPL. Based on the requirement for it to be used only in well-ventilated spaces, it appears that Masse 106 contains some relatively volatile components.

The main concern from LABs and a concern also for mineral oils such as Masse 106 is the potential for them to migrate and spread as a LNAPL, downwards through unsaturated soil that is present and then laterally in the vicinity of the groundwater table. The extent of LNAPL migration will depend on the properties of the surrounding soil and on the saturation and pressure distribution within the LNAPL. These in turn would depend on the quantity of cable fluid lost and the timescale over which the leakage occurred.

Vapour impacts are considered to be unlikely from LABs but could be of concern for Masse 106.

Degradation of the cable fluid may lead to the generation of ground gas (including carbon dioxide and methane) and affect groundwater chemistry in the vicinity and locally downgradient of the LNAPL.

Given that a mixture of LABs and a mineral oil based cable fluid have been used in the past, potential contaminants of concern associated with mineral oil based fluids would include the following:

- Total Petroleum Hydrocarbons (TPH);
- Benzene, toluene, ethylbenzene and xylene (BTEX) compounds;
- Volatile organic compounds (VOCs);
- Semi volatile organic compounds (SVOCs); and
- Polychlorinated biphenyls (PCBs).

4.4.2 Potential Off-Site Sources of Contamination

Based on a review of historic maps and the current site setting, land use surrounding the site has been principally residential and commercial. The following potential off-site sources of contamination have been identified as part of the assessment works completed:

- Fill materials (understood to be up to 1.5 m bgl) present in the surrounding area;
- Historic industrial land uses in the vicinity of the site, including a brick works and paint factory;
- Goldenbridge Graveyard; and
- Fuel / chemicals (e.g. for back-up generators) present in commercial buildings around the site.

4.5 Source Audit Summary

Based on the assessment works completed, the primary APEC for this site comprises the leak location identified by ESB. This is presented in Figure 2 and a description is provided in Table 8.

Table 8 Area of Potential Environmental Concern

Number	APEC	Potential Contaminants of Concern	Potential Media Impacted
1	Leak at (68) Francis Street - Inchicore 110 kV (August – November 1993)	LABs TPH BTEX VOCs SVOCs PCBs	Soil Groundwater Soil Vapour Ground Gas

Other potential off-site sources have also been identified based on the type of activity. However, no information is available for these sites therefore the only APEC assessed herein is the leak site beneath Davitt Road.

5. Conceptual Site Model

A preliminary Conceptual Site Model (CSM) has been developed identifying potential contaminant sources, contaminant migration pathways and potential receptors.

In the context of land contamination, there are three essential elements to any risk:

1. A **source** – a substance that is in, on or under the land and has the potential to cause harm or to cause pollution of controlled waters;
2. A **receptor** – in general terms, something that could be adversely affected by a contaminant, such as people, an ecological system, property, or a water body; and
3. A **pathway** – a route or means by which a receptor can be exposed to, or affected by, a contaminant.

Each of these elements can exist independently, but they create a risk only where they are linked together, so that a particular contaminant affects a particular receptor through a particular pathway. This kind of linked combination of contaminant–pathway–receptor is described as a pollutant linkage. The preliminary CSM was developed to describe viable source-pathway-receptor (SPR) linkages for the site, which are presented in Table 13 below.

By considering potential SPR linkages, an assessment of the human health and controlled water risks is made with reference to the significance and degree of the risk. The risk assessment has been undertaken with reference to BS10175-2011 + A2 2017 and CIRIA Document C552: 'Contaminated Land Risk assessment - A Guide to Good Practice' (2001).

The preliminary risk assessment completed for this site is based on consideration of whether a potential source of contamination can reach a receptor, and hence whether it is of major or minor significance. Considering that assessment works are still at preliminary stage and no intrusive investigation work has been completed, development of the preliminary CSM and assessment of potential risk is based on information provided by ESB on the nature of the leak, and on the AECOM site reconnaissance and desk based study. As such, only a qualitative assessment can be made around potential risks to receptors. This means that identification of potential risk does not necessarily indicate a risk to a receptor, rather that further assessment may be required to investigate assumptions made in the CSM and quantify whether a potential risk actually exists.

5.1 Qualitative Risk Assessment Methodology

A qualitative risk assessment has been carried out by assessing the severity of the potential consequence, taking into account both the potential severity of the hazard and the sensitivity of the target, based on the categories given in Table 9 below.

Table 9 Potential Hazard Severity Definition

Category	Definition
Severe	Acute risks to human health, catastrophic damage to buildings/property, major pollution of controlled waters.
Medium	Chronic risk to human health, pollution of sensitive controlled waters, significant effects on sensitive ecosystems or species, significant damage to buildings or structures.
Mild	Pollution of non-sensitive waters, minor damage to buildings or structures.
Minor	Requirement for protective equipment during site works to mitigate health effects, damage to non-sensitive ecosystems or species.

The likelihood of an event (probability) takes into account both the presence of the hazard and target and the integrity of the pathway and has been assessed based on the categories given in Table 10 below.

Table 10 Probability of Risk Definition

Category	Definition
High likelihood	Pollutant linkage may be present, and risk is almost certain to occur in long term, or there is evidence of harm to the receptor.
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term.
Low likelihood	Pollutant linkage may be present, and there is a possibility of the risk occurring, although there is no certainty that it will do so.
Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are improbable.

The potential severity of the risk and the probability of the risk occurring have been combined in accordance with the following matrix in order to give a level of risk for each potential hazard as shown in the table below.

Table 11 Level of Risk for Potential Hazard Definition

Probability of Risk	Potential Severity			
	Severe	Medium	Mild	Minor
High	Very high	High	Moderate	Low/Moderate
Likely	High	Moderate	Low/Moderate	Low
Low	Moderate	Low/Moderate	Low	Very low
Unlikely	Low/Moderate	Low	Very low	Very low

A description of the levels of risk outlined in Table 11 is provided in the following table:

Table 12 Description of the Classified Risks and Likely Action Required

Level of Risk	Description
Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, or there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in substantial liability. Urgent investigation and remediation are likely to be required.
High Risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over the long term.
Moderate Risk	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild, if realised.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very Low Risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

5.2 Preliminary CSM Assumptions

Based on the findings of the desktop study and information provide in the RFP by ESB, the following assumptions were made in development of the CSM:

- The fluid assumed (based on records provided) to have leaked from the cable is a mixture of LAB and a mineral oil based cable fluid;
- The geology beneath the site is assumed to comprise approximately 1.5 m of made ground underlain by clay up to a depth of 5 m bgl. Limestone bedrock is assumed to be present at a depth of approximately 5 m bgl;
- Groundwater is assumed to be present at relatively shallow depths within the made ground;
- It is assumed that the Grand Canal adjacent to the site is lined with an impermeable material such as clay, as was commonly used from the 1700s to early 20th Century to prevent leakage from the canal and thus loss of water level restricting navigation;
- It is assumed that is no direct connection between the site and surface water bodies;
- Other below ground utilities including mains water are assumed to be present in the vicinity of the site; and
- It is assumed that industrial/commercial and residential buildings adjacent to the site have no basements.

The preliminary CSM is presented graphically in Figure 3.

Table 13 Conceptual Site Model

Source	Pathway	Receptor	Severity	Likelihood	Potential Risk	Discussion
LAB / Volatile TPH and VOC concentrations in soils	Inhalation of vapours which have migrated from the ground to above ground buildings and basements.	Site users in an industrial/commercial/low to high density residential scenario.	Medium	Unlikely	Low	Based on records provided, a mixture of LAB and mineral oil is assumed to be the cable fluid used. The low vapour pressure of LABs limits the potential for exposure via inhalation, and this is not expected to be a significant exposure route at normal temperatures. However, given that the fluid lost is a mixture, there is a potential for vapours to be generated from the mineral oil fraction. Based on the time elapsed since the leak was repaired (27 years), it is considered that there is a low risk from the inhalation of vapours from potential mineral oil-based products present beneath the site in this scenario.
NAPL and non-volatile TPH, VOC, SVOC and PCB concentrations in soils	Soil and dust ingestion from near surface soils. Dermal contact with near surface soils. Inhalation of fugitive dust from near surface soils.	Site users in an industrial/commercial/low to high density residential with plant uptake scenario.	Medium	Unlikely	Low	Given the likely depth to the cable, surface soils are unlikely to be affected and exposure via this pathways is not considered likely.
	Ingestion of soils via consumption of vegetables grown in near surface soils.	Intrusive site workers.	Minor	Likely	Low	Workers carrying out intrusive works adjacent to the site may come into contact with mineral oil based NAPL and impacted soil, meaning there will be a requirement to wear personal protective equipment to mitigate against potential impacts. Given the relatively low toxicity of LABs (assessed to be not acutely toxic), exposure to LABs is not considered to represent a significant risk.
NAPL and TPH, VOC, SVOC and PCB concentrations in soils	Migration of ground gas generated from the degradation of the cable fluid to above ground buildings.	Site users in an industrial/commercial/low to high density residential scenario.	Medium	Unlikely	Low	If a significant source of NAPL (LAB or mineral oil) is present on groundwater, there is potential for ground gas to be generated from degradation processes. However, given the time elapsed since the leak occurred (27 years), it is unlikely that ground gas is being generated in significant quantities and potential risk from this pathway is considered to be low.

Source	Pathway	Receptor	Severity	Likelihood	Potential Risk	Discussion
NAPL and TPH, VOC, SVOC and PCB concentrations in soils	Permeation of LAB NAPL through plastic water supply pipes.	Site users in an industrial/commercial/low to high density residential with plant uptake scenario.	Medium	Unlikely	Low	<p>Public water mains likely to be present in the vicinity of the leak, servicing commercial and residential properties have the potential to be impacted. With respect to LABs, the WHO drinking water guideline (DWG) for the relevant aromatic fraction² is 0.09 mg/l and as the solubility limit of LAB is 0.041 mg/L (OECD) i.e. less than the DWG, LAB cannot dissolve into the water supply above this level. Furthermore, water will be moving rapidly in the pipe under pressurised conditions making it unlikely to reach the solubility limit.</p> <p>In respect of the potential presence of mineral oil, the aqueous solubility of the known product used (Masse 106) is stated on the SDS as "negligible". It is unclear what this means in the context of dissolution of components from a NAPL.</p> <p>ESB has consulted with Irish Water (statutory body responsible for water supply) regarding the potential risk for cable fluid present in the vicinity of water supply pipes. Following review of their records, AECOM understands that Irish Water do not have concerns regarding impact of water supplies from cable fluid leaks. It is therefore considered that the potential risk of a pollutant linkage being present is low.</p>
NAPL and TPH, VOC, SVOC and PCB concentrations in soils	Migration of potential contaminants along preferential flow pathways such as underground services and permeable backfill around the electricity cable.	Nearby surface water bodies including the Camac River and Grand Canal.	Medium	Unlikely	Low	<p>It is understood that the leak (1,000 litres) at this location was repaired in 1993. Given that there is no evidence of impact in the Grand Canal or Camac River during the site walkover and no reported incidents of oil release, it is likely that NAPL released from the cable has stabilised over the 27-year period since the leak was repaired. Consequently, the risk to nearby surface waters is considered to be low.</p>
NAPL and TPH, VOC, SVOC and PCB concentrations in soils	Migration of potential contaminants along preferential flow pathways such as underground services and permeable backfill around the electricity cable.	Site users in an industrial/commercial/low to high density residential with plant uptake scenario.	Medium	Unlikely	Low	<p>Likely to be a high concentration of services present in the vicinity of the leak given the urban setting. If the soil / made ground around the leak is generally clay, the leaking fluid will likely have migrated mainly along any permeable backfill around the cable. Consequently, the potential for migration over significant distances is considered to be low.</p>

Source	Pathway	Receptor	Severity	Likelihood	Potential Risk	Discussion
NAPL	Migration in saturated and unsaturated soil.	Groundwater beneath the site.	Medium	Unlikely	Low	Extent of NAPL migration will depend on the characteristics of the receiving soil. However, given the time elapsed since the leak was repaired (27 years) the potential risk of NAPL being present is considered to be low.
Dissolved phase leaching from NAPL or from soils containing elevated concentrations of TPH, VOCs, SVOCs and PCBs	Leaching from soil to groundwater.	Groundwater in superficial deposits beneath the site.	Medium	Unlikely	Low	Considering the 27-year period since the cable was repaired, it is considered that the risk of shallow groundwater being significantly impacted is low.
LAB, TPH, VOC, SVOC and PCB concentrations in groundwater	Vertical and horizontal migration of contaminants through groundwater. Horizontal migration of contaminants through groundwater to nearby surface water receptors.	Groundwater in limestone bedrock aquifer beneath the site.	Medium	Unlikely	Low	Information on the local geology indicates the presence of underlying stiff clay, which would reduce vertical migration of groundwater to the bedrock aquifer.
		Nearby surface water bodies including the Camac River and Grand Canal.	Medium	Unlikely	Low	The potential risk to surface water bodies is considered low given the leak occurred 27 years ago. The Grand Canal is likely lined with impermeable material. No evidence of impact from the cable fluid release was noted during the site walkover, with strong vegetation growth observed along the canal banks.

6. Conclusions

AECOM completed a Preliminary Site Assessment of the site located on the south bank of the Grand Canal on Davitt Road, Drimnagh, Dublin 12. The objective of the works was to identify potential risks to human health and controlled waters that may be associated with a fluid leak from the identified location.

Based on the findings of the desktop study, the overall environmental sensitivity of the site is considered to be moderate. Identified sensitive receptors within 1 km of the site include:

- The Grand Canal located immediately north of the site, although this may be protected by low permeability clay (natural and/or engineered when the canal was constructed);
- The River Camac located approximately 600 m northwest of the site, although this may be protected by low permeability clay deposits which are likely to be encountered beneath the site; and
- The groundwater aquifer beneath the site, although this may also be protected by low permeability clay deposits which are likely to be encountered beneath the site.

It is estimated that 1,000 litres of cable fluid (Linear Alkyl Benzene (T 3788)) was between August and November 1993. It is assumed, based on information provided to AECOM by ESB, that the fluid lost was a mixture of LAB and mineral oil based products. Due to its high biodegradability, lower volatility and low solubility, it is considered that LABs are of less concern for adverse environmental impact than mineral oil based products. Given that there is potential for a mixture of both types of cable fluids to have been used at this site, potential contaminants of concern have been identified. A summary of the source audit findings is as follows:

Table 14 Area of Potential Environmental Concern

Number	APEC	Potential Contaminants of Concern	Potential Media Impacted
1	Leak at (68) Francis Street – Inchicore 110 kV (August – November 1993)	LABs TPH BTEX VOCs SVOCs PCBs	Soil Groundwater Soil Vapour Ground Gas

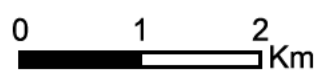
The preliminary CSM developed for the site looked at potential source-pathway-receptor linkages identified during the assessment works and risks associated with potential source-pathway-receptor linkages were considered to be low. Based on these findings, further assessment is not considered to be required as no viable SPR linkages have been identified.

Figures

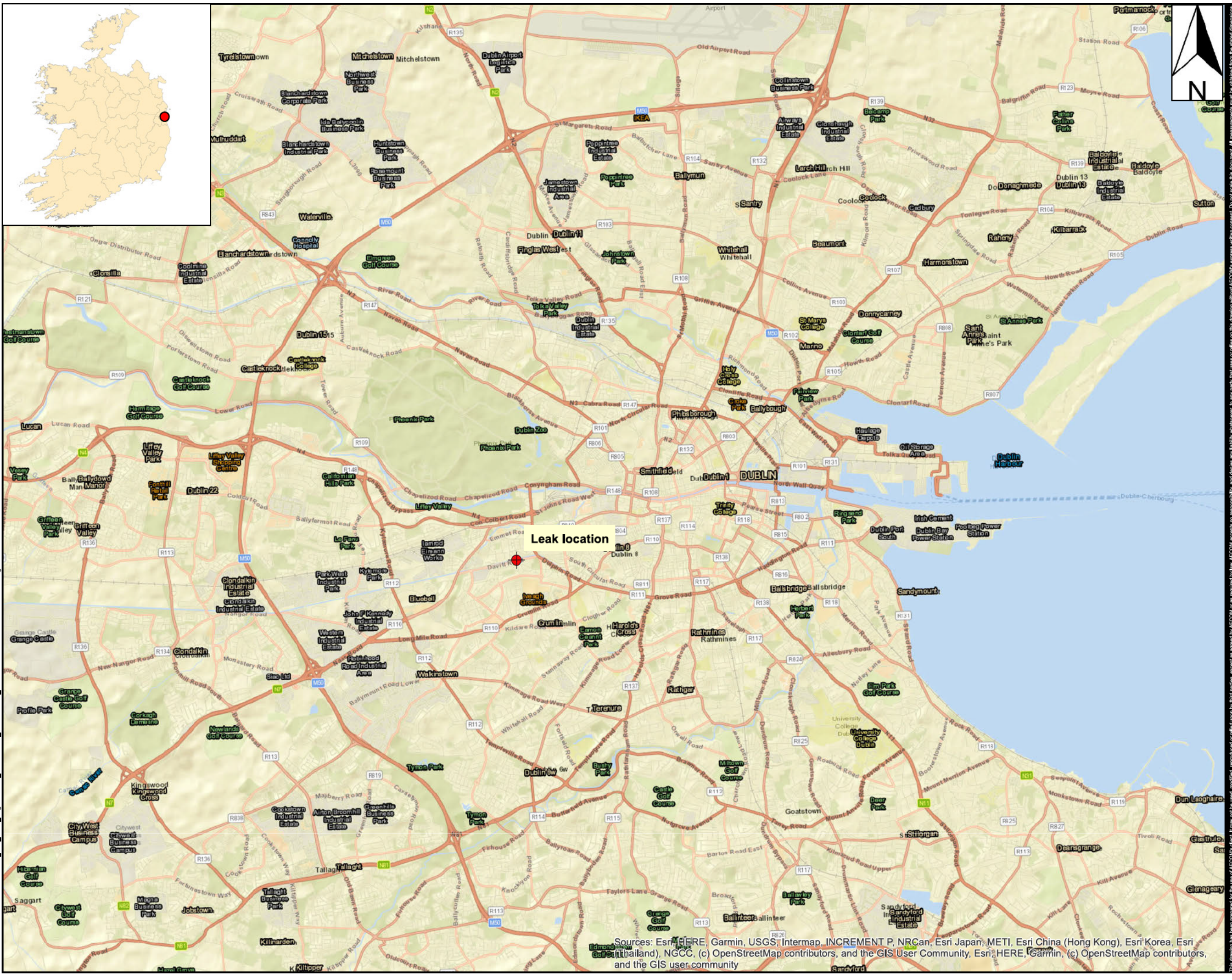
Figure 1. Site Location Plan

Figure 2. Areas of Potential Environmental Concern

Figure 3. Conceptual Site Model



Notes:

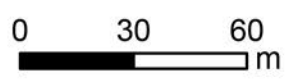


Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri
and the GIS user community



LEGEND

 Leak Location

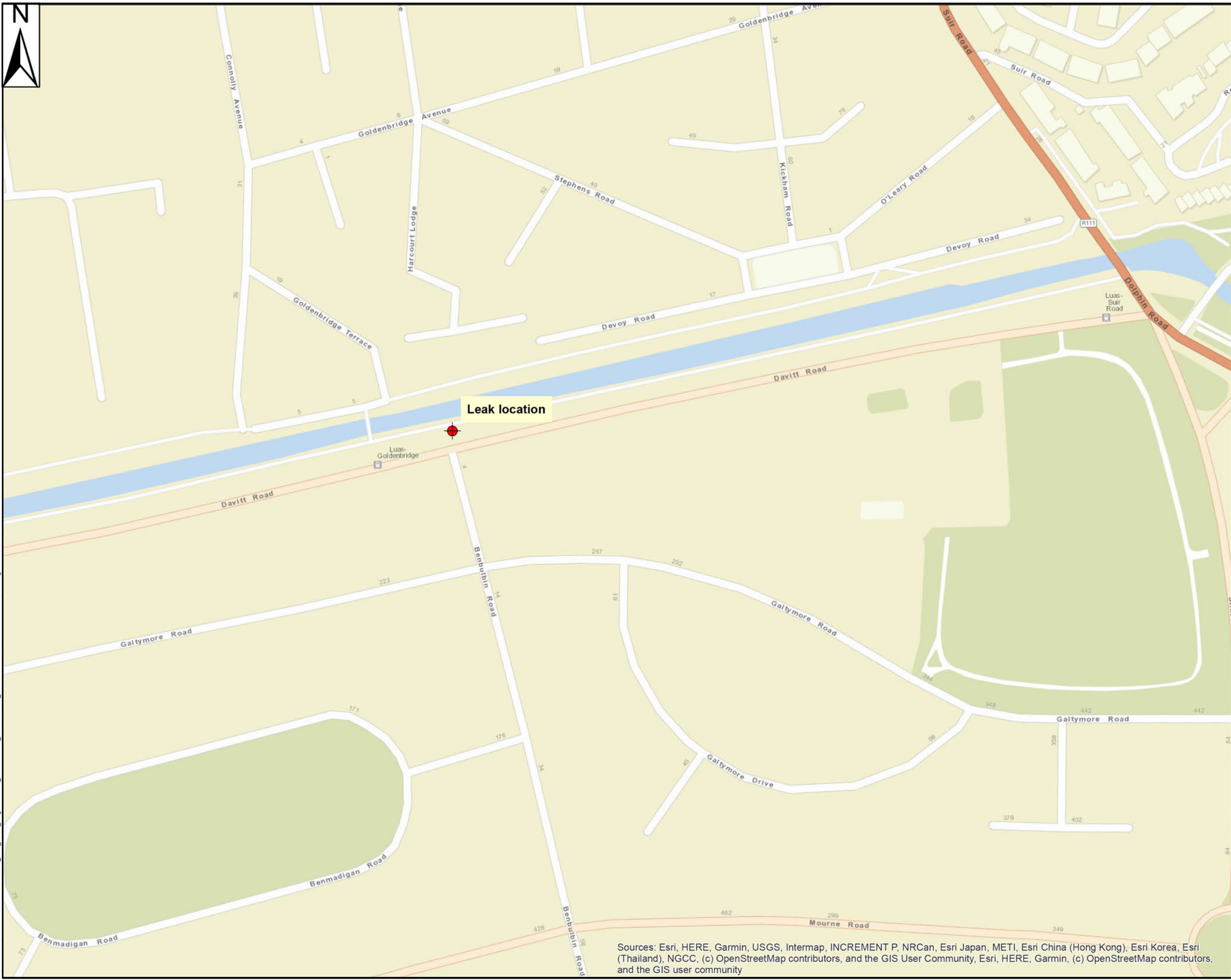


Notes:

AECOM Internal Project No:
60610407
Drawing Title:

FIG.2 - SITE LAYOUT PLAN

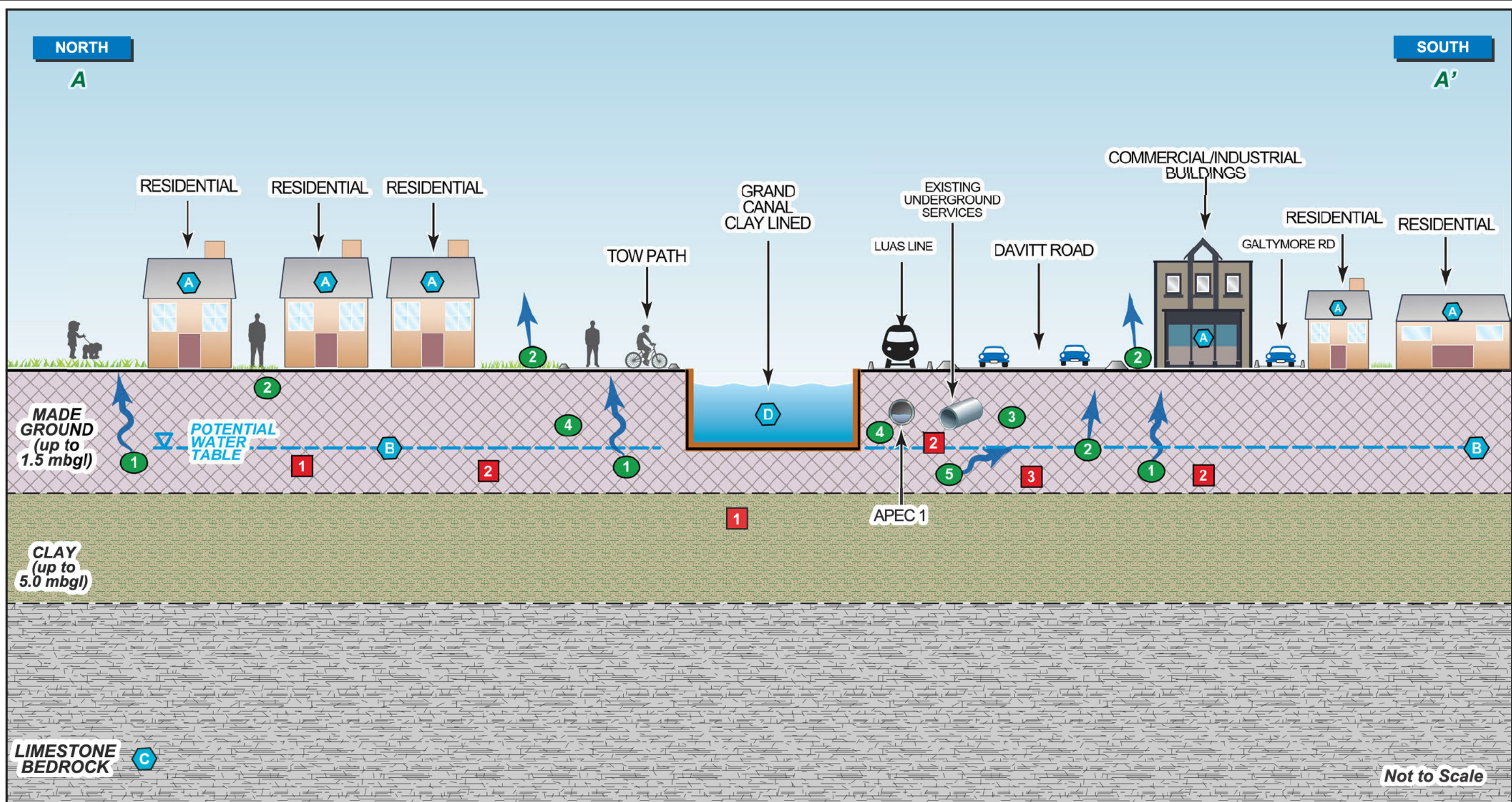
Drawing No:
FIG.2
Drawn: Chk'd: App'd: Date:
RE DM SF 18/10/19



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Filename: Z:\UK\IE\DL2\Jobs\PR-427640_ESB_Cable_Allignment\400_Technical\430_Technical\Area_X\Additional Site Info Oct 2019\Locations\Fig.1 Site 38.mxd

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SOURCES	
1	GROUND GAS
2	NON-VOLATILE CONTAMINANTS IN SOIL
3	CONTAMINANTS IN GROUNDWATER

PATHWAYS	
1	GROUND GAS MIGRATION
2	DERMAL CONTACT / DUST INGESTION
3	PERMEATION OF AND MIGRATION ALONG EXISTING UNDERGROUND SERVICES
4	LEACHING FROM SOIL TO GROUNDWATER
5	VERTICAL & HORIZONTAL MIGRATION OF CONTAMINATED GROUNDWATER

RECEPTORS	
A	RESIDENTIAL / COMMERCIAL SITE USERS
B	SHALLOW GROUNDWATER
C	BEDROCK GROUNDWATER
D	SURFACE WATER

Rev	Date	Drawn	Made	Checked	Approved
Status: FOR INFORMATION					

NOTES:

Client:

Location: SITE 68 Francis Street Inchicore 110 kV

Title: FIGURE 3 CONCEPTUAL SITE MODEL

AECOM


4th Floor, Adelphi Plaza, Adelphi Centre, George's Street Upper, Dun Laoghaire, Co. Dublin, Ireland. Tel: +353 (0) 1 293 3200 Fax: +353 (0) 1 293 3201 www.aecom.com

Design: ESB	Drawn: RDH
CHK'd: CC	App'd: DM
Date: AUG 2019	Scale: As Shown
Project No. 60610407	Dwg No. 3
Stat. .	Rev: 0

Appendix A Site Photographs

Facility Name: ESB Cable Assessment	Site Location: Site 68 – Davitt Road	Project No. 427640
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Photo No. 1	Date: 01/11/19	
Direction Photo Taken: East		
Description: East facing view showing leak location (intersection between Belbulbin Rd and Davitt Rd).		

Photo No. 2	Date: 01/11/19	
Direction Photo Taken: Northeast		
Description: Photo shows the stretch of Grand Canal in front of leak location.		

Facility Name:
ESB Cable Assessment**Site Location:**
Site 68 – Davitt Road**Project No.**
427640**Photo No.**
3**Date:**
01/11/19**Direction Photo Taken:**

Notheast

Description:

Residential houses lying beyond the north bank of Grand Canal, in front of the leak location.



Facility Name:
ESB Cable Assessment**Site Location:**
Site 68 – Davitt Road**Project No.**
427640**Photo No.**
4**Date:**
01/11/19**Direction Photo Taken:**

North

Description:

North facing view showing the intersection between Belbulbin Rd and Davitt Rd.



Facility Name: ESB Cable Assessment	Site Location: Site 68 – Davitt Road	Project No. 427640
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Photo No. 5	Date: 01/11/19
Direction Photo Taken: South	
Description: Presence of construction work along the pedestrian walkway beyond the north bank of Grand Canal. Pedestrian walkway was closed during the site visit.	



Facility Name: ESB Cable Assessment	Site Location: Site 68 – Davitt Road	Project No.: 427640
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Photo No.: 6	Date: 01/11/19	
Direction Photo Taken: South		
Description: Presence of substations on Galtymore Rd, about 80 m south of leak location.		

Photo No.: 7	Date: 01/11/2019	
Direction Photo Taken: East		
Description: Old disused petrol station about 150 m east of leak location. There was no staining on the surface and no other signal of contamination		

Appendix B PSA Template Report Table of Contents Cross Reference

EPA Template Table of Contents

Production Area Preliminary Site Assessment Report

Executive Summary	Executive Summary
1. Introduction	Section 1
1.1 Project Contractual Basis & Personnel Involved	Section 1
1.2 Background Information	Section 1.1
1.3 Project Objectives	Section 1.2
1.4 Scope of Works	Section 2
2. Source Audit Findings	Section 4
2.1 Current Site Operations	Section 4.1 to Section 4.2
2.2 Previous Site Operations	Section 4.3
2.3 Chemicals of Potential Concern	Section 4.4
3. Site Environmental Setting	Section 3
3.1 General Introduction	Section 3
3.2 Regional Geology and Hydrogeology	Section 3.2 and Section 3.4
3.3 Site Geology and Hydrogeology	Section 3.2 and Section 3.4
3.4 Summary of Previous Site Sampling and Monitoring Data	Not Applicable
4. Summary and Conclusions	Section 6
4.1 Summary and Conclusions	Section 6
4.2 Recommended Way Forward	Separate Cover Letter
5. References	Throughout Text

