

# Appendix 7.3

Client

**Ardstone Capital**

Project Title

**Cornelscourt Site – Dublin 18**

Report Title

**Environmental Assessment  
Executive Summary**



**Project Title:** Cornelscourt Site, Dublin 18

**Report Title:** Ground Investigation Executive Summary

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## **1. INTRODUCTION**

DBFL Consulting Engineers have been retained by Ardstone Capital to provide an executive summary of the Environmental Assessment Report by Ground Investigations Ireland Ltd. (GII) dated 28 March 2019, in relation to a greenfield site located in Cornelscourt, Dublin 18.

The Report by GII has five stated objectives:

1. Assess the environmental setting and historical use of the site;
2. Assess the nature of the materials underlying the site;
3. Assess an area of hydrocarbon impacted material on the site, as determined by AWN Consulting in their 2018 Environmental Due Diligence Report;
4. Assess the groundwater quality;
5. Classify any subsoils that may require disposal following excavation, in accordance with the relevant Codes of Practice and industry best practice.

Methods of investigation and testing are outlined in Section 3 of this Executive Summary.

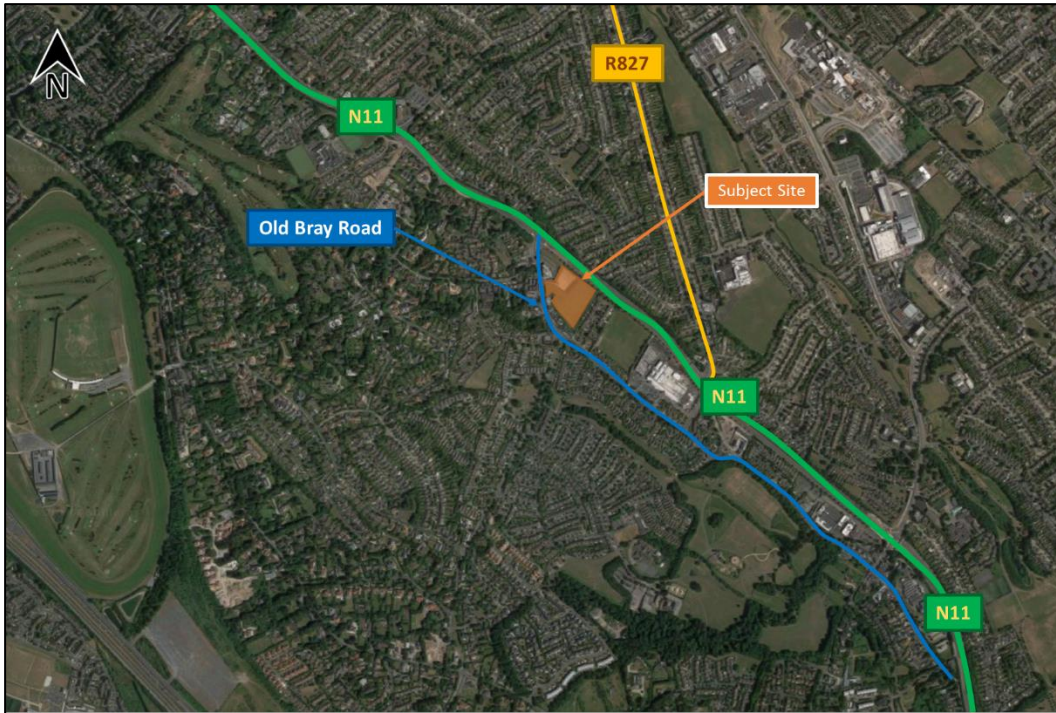
For more exhaustive results and descriptions of testing procedures, please refer to the GII Report referenced above. The site investigation works carried out by GII is informed by the results of environmental testing carried out by AWN for the previous landowner back in 2018. The findings of the Ground Investigations report have taken precedence for this executive summary.

## **2. SITE DESCRIPTION**

The site is located along the R842 Old Bray Road and is bound to the north by the N11 Stillorgan Road and the adjoining AIB Cornelscourt property. To the southeast and southwest, the site is bounded by residential properties. The site is located to the southeast of Dublin City Centre, with direct site access onto the R842 Old Bray Road on the site's western boundary. There is an existing filling station adjacent to the western boundary of the site. The site slopes up from east to west by several metres. The adjacent filling station is located at an elevation higher than the site and is therefore deemed to be hydraulically upgradient of the site.

A review of historical maps held by the Ordnance Survey of Ireland concluded that the site is undeveloped, except for a small building adjacent to the existing filling station. A review of aerial imagery indicates a temporary area for parking installed sometime between 1995 and present.

Note this area was in the northern corner of the site, away from the area of focus with respect to the presence of hydrocarbon impacted material.



**Figure 2.1: Site Location (Source: Google Maps)**

### **3. SUMMARY OF GEOTECHNICAL INVESTIGATIONS**

Investigations were carried out by GII between January and March 2019. The work undertaken is as follows:

- Trial Pits: 16 in total, to a maximum depth of 4.5m BGL (Below Ground Level);
- Window Sample Boreholes: 14 in total;
- Cable Percussion Boreholes: 9 in total, to a maximum depth of 6m BGL;
- Rotary Boreholes: 10 in total, to a maximum depth of 17.4m BGL;
- Groundwater Monitoring Wells: 4 in total;
- Collection and analysis of subsoil samples;
- Collection and analysis of groundwater samples.

Full details of what each test above involves is provided in the GII Environmental Assessment Report Section 8, and associated logs as appendices.

By utilising in-situ testing and laboratory test results, existing ground conditions were determined and are described in detail in the GII Environmental Assessment Report. The sequence of strata across the site varied, but can be generally described as follows, in order:

- Topsoil / Surfacing;
- Made Ground;
- Cohesive Deposits;
- Granular Deposits;
- Bedrock.

Results of note include topsoil being found in all exploratory holes to a maximum depth of 0.3m BGL. Made Ground was encountered only occasionally to a depth of between 0.5m and 1.1m BGL. Bedrock was encountered in all rotary boreholes at depths ranging from 2.6m to 12.0m BGL. Bedrock was shallowest in the area in question, immediately southwest of the filling station.

#### **4. SUMMARY OF RESULTS**

Groundwater samples were collected from 4 wells in the vicinity of the hydrocarbon affected area. Wells were located both downgradient and upgradient of the affected area in order to assess any impact on groundwater from the historical contamination. Hydrocarbon odours were noted from two of the four wells. Laboratory testing was carried out by Exova Jones Environmental, and results compared to Interim Guideline Values (IGV) published by the EPA and also the Groundwater Threshold Values (GTV) described in the European Communities Environmental Objectives (Groundwater) Regulations. IGVs are not statutory and were only presented for parameters not covered by GTVs.

Elevated levels of manganese were detected in all wells, suggesting it is naturally occurring. Elevated levels of TPH (Total Petroleum Hydrocarbons) were detected in BH-11. The data indicates a limited plume of hydrocarbon impacted groundwater downgradient of the filling station. Contamination appears to be confined to the area of impacted subsoils.

Samples of subsoils were collected from the Trial Pits (TP) to determine the classification of waste materials to be removed from the site. Due to the proposal to construct a basement as part of the development, along with the necessary excavations for foundations, it is expected that material will need to be disposed of during the construction phase. Subsoil samples were collected from the area adjacent to the filling station in order to refine the extent of the hydrocarbon impacted area highlighted in the AWN Report.

Of 49 samples tested, five were deemed to be classified as hazardous. This hazardous classification is due to elevated levels of hydrocarbons. All remaining samples were non-hazardous.

Window Sample (WS) results were tested against the LQM/CIEH 'Suitable 4 Use Levels' (S4ULs). These are assessment criteria derived for a range of generic land uses such as Public Open Space, by the Land Quality Management (LQM) and the Chartered Institute of Environmental Health (CIEH) in the UK. For the purposes of these tests, GII applied the 'Residential with Homegrown Produce' S4ULs.

Levels of TPH detected in WS-11 and TP-14 exceeded the hazardous threshold. Levels of benzene (a BTEX compound) in WS-11 also exceeded the S4UL. All other levels were within the relevant S4UL.

It was noted that the concentrations of TPH and BTEX reduce with distance downgradient from the filling station. The detection of elevated levels of TPH, MTBE and BTEX at lower levels (between 1m and 3m BGL) in TP-14 and WS-11 is believed to be related to leaking petroleum and diesel tanks in the filling station. Laboratory results identify a diesel source at WS-04, -08 and -10, and a petroleum source at WS-08 and -11.

The presence of MTBE, an anti-knocking additive in petroleum, was detected at elevated levels in TP-14 and several Window Samples. This indicates a direct relationship to the neighbouring filling station.

Further testing by the laboratory was carried out to establish the age of the hydrocarbon samples. Whilst not an exact science it is conclusive in its findings that the samples are over 20 years old:

- 145/147: Diesel (>20 years old)
- 178/180: Diesel (>20 years old)
- 190/192: Diesel (>20 years old)
- 212/213: Diesel (>20 years old)
- 217/219: Diesel (>20 years old) & Gasoline Residues (too degraded to test for age)
- 220/222: Diesel (>20 years old) & Gasoline Residues (too degraded to test for age)

## 5. CONCLUSIONS

Ground sampling was carried out on a regular grid throughout the site, but the area of contamination is limited to the west of the site in the vicinity of the adjoining petrol station on the Old Bray Road.

In this area, the results for TP-14 and WS-11 have demonstrated that the material in these locations is hazardous. The affected material is at between 1m and 3m BGL, and assuming a 5m radius from each testing point results in approximately 315m<sup>3</sup> of hazardous material. Only disturbed material needs to be removed from the site. This amounts to approximately 95m<sup>3</sup> of hazardous material. Note that bedrock in this area is at 3m BGL.

It is estimated that the total area which has a level of contamination to any degree is over a footprint of 1800m<sup>2</sup>. The total volume of materials which has been impacted by either TPH and/or BTEX and MTBE is 2060m<sup>3</sup>. The vertical extent of the contamination varies from finished grade to the top of bedrock, located at 3m BGL.

## 6. RECOMMENDATIONS

Based on the information provided in the GII Environmental Assessment Report, the following recommendations and findings can be made.

It is our opinion that the location, type and depth of the contaminated material is consistent with leakage from fuel tanks in the neighbouring filling station site. It is not possible to establish if the leaking has stopped, but the ages of the samples tested suggest that it has ceased. Furthermore, petrol stations in Ireland were reviewed in the late 1990s and repairs made where necessary. A request of the current Owners regarding certification from this time could prove useful in this regard.

The disturbed hazardous material as outlined above should be removed from the site (approximate volume 95m<sup>3</sup>). See Figure 6.1 below.

There are two other areas of contaminated material that coincide with the basement structure, outlined in Figure 6.1. The volume of these areas is approximately 300m<sup>3</sup>. Note that this material is classified as non-hazardous for the purposes of disposal to a licenced facility.

There are two areas of contaminated material outside the proposed structural footprint of the basement, at depths of 0m-1m BGL, that will be public areas or residential structures/gardens. As the proposed development has significant basement excavation and no ground level areas requiring



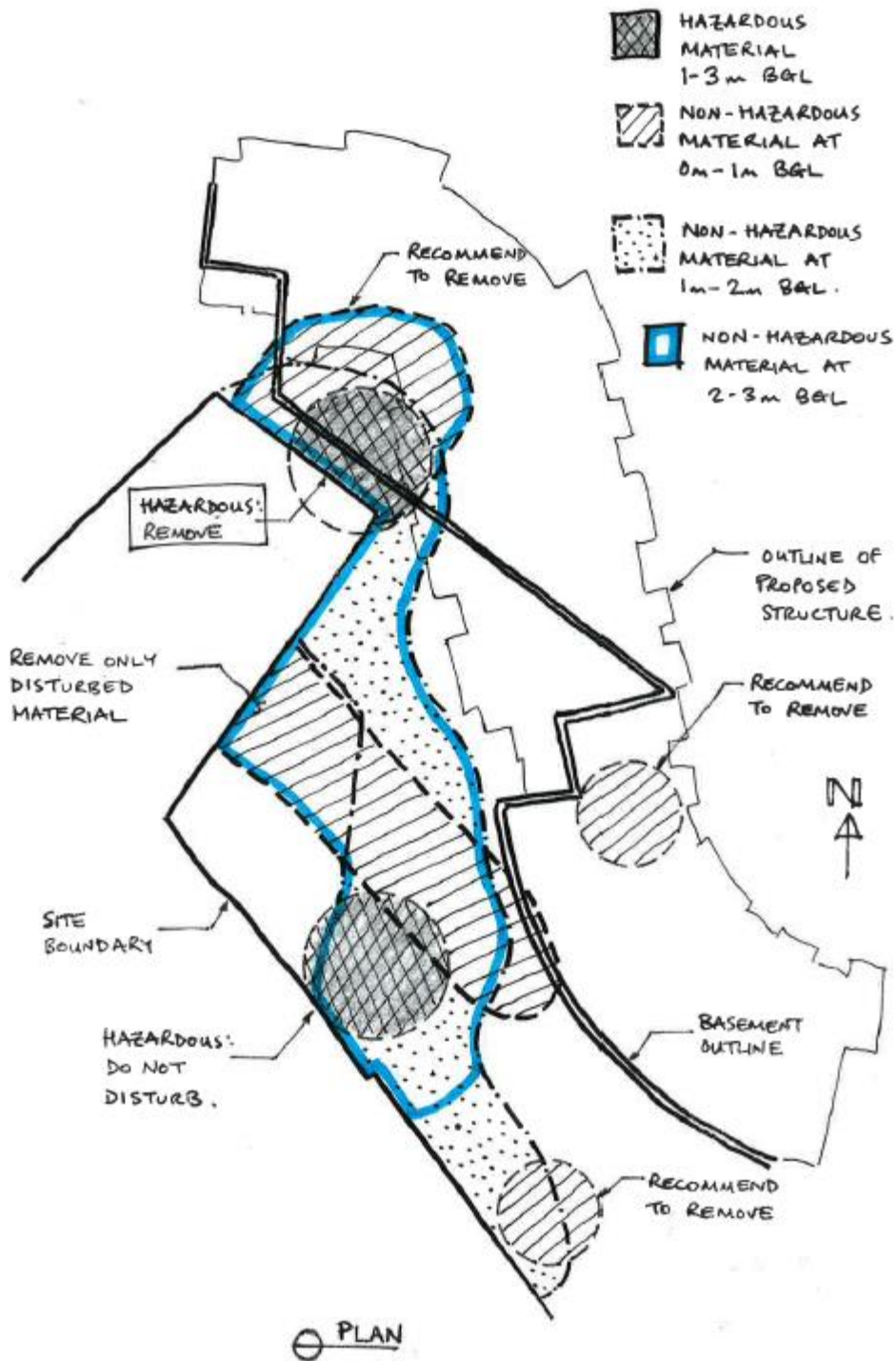
build-up, this material will require removal from the site. The approximate volume of these areas is 130m<sup>3</sup>.

Therefore, in summary, approximate quantities to be removed from site are as follows:

- Hazardous Material: 95m<sup>3</sup> (excavated for basement);
- Contaminated Non-Hazardous Material: 320m<sup>3</sup> (excavated for basement);
- Contaminated Non-Hazardous Material: 210m<sup>3</sup> (excavated for houses/gardens);

The presence of groundwater at bedrock level will necessitate dewatering during the construction stage. Control measures will be required to remove any hydrocarbons from groundwater prior to discharge. This should be included in a performance specification to the General Contractor.

Finally, there are no structural issues with bearing foundations directly on contaminated soil, provided it is virgin undisturbed and of adequate bearing capacity. Also, normal radon protection measures adopted on the detached residential units in this area should suffice to address residual airborne particles from contaminated material below ground.



**Figure 6.1: Location of Hazardous & Contaminated Material**