OCSC

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MULTIDISCIPLINARY CONSULTING ENGINEERS

W370: WICKLOW FIRE STATIONS

SITE REPORT - DUNLAVIN

For

Wicklow County Council

19 June 2023

NOTICE

DOCUMENT CONTROL & HISTORY

OCSC Job No: W370	Project Code	Originator	Zone Volume	Level	File Type	Role Type	Number	Status / Suitability Code	Revision
	W370	OCSC	DL	XX	RP	C	0001	S4	P01

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1 LOCATION & DESIGN STATEMENT

LOCATION & TOPOLOGICAL SURVEY

The site for the proposed Dunlavin Fire Station was selected by Wicklow Fire Service adjacent to Dunlavin wastewater treatment plant.

The site location map below is included in the Stage 1 document pack Drg No 22119-DL_PA_01-01.

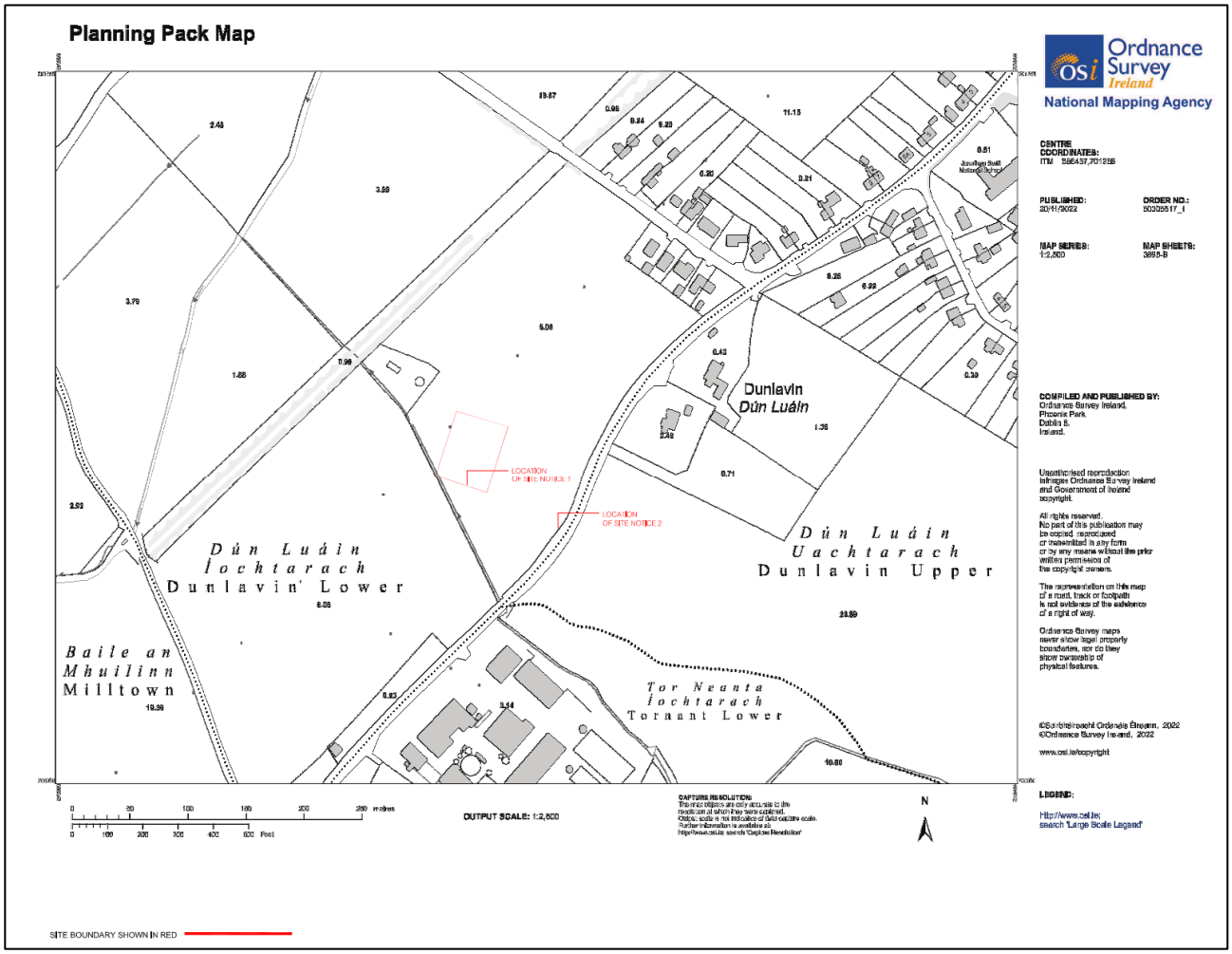

Figure 1: Extract from NODE Site Location Plan Drg No 22119-DL_PA_01-01

Causeway Geotech were engaged by OCSC on behalf of WCC to carry out a topographical survey; details are included in the Stage 1 pack, Drg No 2217_T_Dunlavin_Rev0.

Figure 2: Causeway Geotech Topographical survey, Drg 2217_T_Dunlavin_Rev0, p1/2

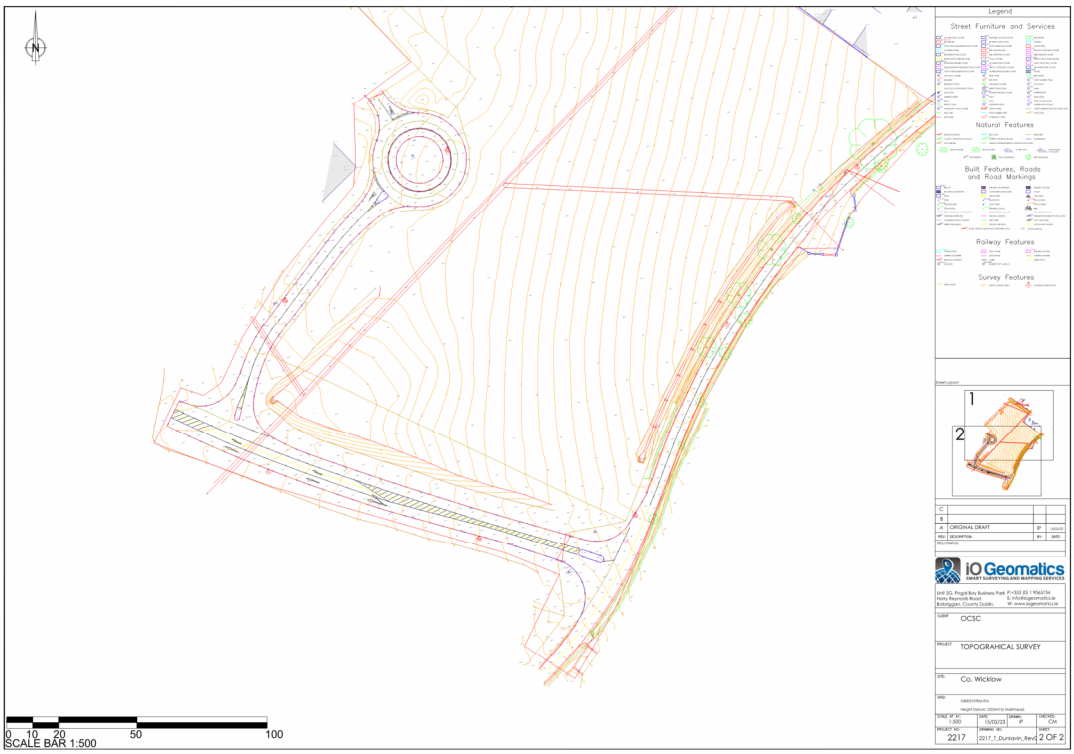

Figure 3: Causeway Geotech Topographical survey, Drg 2217_T_Dunlavin_Rev0, p2/2

DESIGN STATEMENT

The Stage 1 information includes a Design Statement from NODE Architecture including sections on Site Appraisal, Design Principles and Building Design. This statement includes a number of 3D visualisations/renderings.

Figure 4: Extract from NODE Architecture Design Statement, Doc No 22119-DL_PA_Design Statement

2 INITIAL RISK SCREENING

ECOLOGY AND ENVIRONMENT

The following screening reports have been carried out and are included in the Stage 1 submission documents:

- Appropriate Assessment (AA) screening report, document W370-OCSC-BG-ZZ-RP-YE-800. The conclusion of the report is:

  "The nearest European sites or qualifying habitat features is located 6.5 kilometres from the proposed development site while the nearest hydrologically connected European site is located 30.2 km downstream from the proposed site. However, given the nature of the development, its scale, and the localised and temporary nature of the construction effects identified as potential sources, the project is not foreseen to give rise to any significant adverse effects on any designated European sites, alone or in combination with other plans or projects. This evaluation is made in view of the conservation objectives of the habitats or species for which these sites have been designated. Consequently, a Stage Two AA is not required for the project."
- Ecological Impact Assessment (EclA) report, document W370-OCSC-BG-ZZ-RP-YE-801. The conclusion of the report is:

  "The proposed construction of a new fire station, a fire training tower, a concrete water tank for fire training and associated lighting, drainage, and entrance infrastructure in Dunlavin, County Wicklow will have no significant impacts on both the immediate vicinity and protected areas such as SACs and SPAs.

  There will be a permanent loss of some habitat within the site, but as these are commonly occurring and widespread habitats within the area, the loss will not be significant. Given the nature of the development, its scale, and the localised and temporary nature of the construction effects identified as potential sources, it is concluded that the proposed project is not foreseen to give rise to any significant adverse effects on any designated European sites, alone or in combination with other plans or projects."
- Environmental Impact Assessment (EIA) screening report, document W370-OCSC-BG-ZZ-RP-YE-802

  "Based on the size, nature and scale of the proposed project, it is considered that the overall impact on the receiving environment will be low subject to implementation of all mitigation measures detailed in the CEMP (Construction Environmental Management Plan)."

Table 1: Environmental Impact Assessment of Projects - Screening Checklist

Checklist	Response
Will there be a large change in environmental conditions?	No
Will new features be out-of-scale with the existing environment?	No
Will the impact be unusual in the area or particularly complex?	No
Will the impact extend over a large area?	No
Will there be any potential for transboundary impact?	No, subject to implementation of the CEMP.
Will many people be affected?	Minor, short-term impacts. Overall positive impact in creating this essential service.
Will many receptors of other types (fauna and flora, businesses, facilities) be affected?	There will be a short time impact on flora and fauna during the works; however, this will be reduced subject to implementation of an appropriate CEMP.
Will valuable or scarce features or resources be affected?	No
Is there a risk that environmental standards will be breached?	No, subject to implementation of an appropriate CEMP.
Is there a risk that protected sites, areas, and features will be affected?	No, subject to implementation of mitigation measures.
Is there a high probability of the effect occurring?	No
Will the impact continue for a long time?	Temporary to short term.
Will the effect be permanent rather than temporary?	No
Will the impact be continuous rather than intermittent?	Temporary to short-term during construction.
If it is intermittent, will it be frequent rather than rare?	-
Will the impact be irreversible?	No
Will it be difficult to avoid, or reduce or repair or compensate for the effect?	No

HAZAEDOUS MATERIALS

A review of OSI and other historical maps suggests that the site has remained undeveloped for at least the past 150 years.

The ground investigation included assessment and testing of samples for waste classification which is covered in section 7.5 and Appendix I of the report. It concludes that the soil can be classified as non-hazardous material and that "the laboratory results of the WAC testing indicate that the soils from the site are suitable for disposal as inert waste to an appropriate licenced facility". This comes with the usual proviso that "potential areas of localised contamination outside the areas of the investigation cannot be discounted".

ARCHEOLOGY

A review of OSI and other historical maps suggests that the site has remained undeveloped for at least the past 150 years.
The Baltinglass town plan 2022-2028 zones the site category E – Employment, the objective being "to provide for the development of enterprise and employment".
It is not considered that an archaeological assessment will be required.

FLOOD

A stage 1 Flood Risk Assessment has been carried out and the report, W370-OCSC-DL-XX-RP-C-0010, is included in the stage 1 submission pack.
It concludes that the site is not at risk of flooding from Fluvial, Coastal, Pluvial or Groundwater sources.

Table 3.2 of the PSFRM Guidelines, reproduced in *Figures 5* below, illustrates the types of development that are considered appropriate to each flood zone, and those that would be required to meet the criteria of a Justification Test, which establishes the criteria under which desirable development of a site within a floodplain may be warranted.

Table 3: Matrix of Vulnerability Vs. Flood Zone

	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable Development	Justification Test	Justification Test	Appropriate
Less Vulnerable Development	Justification Test	Appropriate	Appropriate
Water-compatible Development	Appropriate	Appropriate	Appropriate

Therefore, based on the table above, *Highly Vulnerable Development*, such as the essential infrastructure like Fire Stations is classified as **'appropriate'** if it is located within Flood Zone C.

Figure 5: Extract from Flood Risk Assessment Report, W370-OCSC-DL-XX-RP-C-0010

3 Ground Investigation

FIELD WORK

A geotechnical and ground investigation of sub-soil conditions in the proposed development area has been carried out by Causeway Geotech Ltd under the instruction of OCSC, on behalf of Wicklow County Council. The fieldwork conducted between the 20th and 26th of April 2023 comprised the following.

- Six dynamic probes (DP)
- Six machine-dug trial pits (TP).
- Infiltration test performed in two trial pits.
- Indirect California Bearing Ratio (CBR) test at six locations.

Figure 1 shows the location of the DP and TP.

Figure 6: Trial Pit and Dynamic Probe locations

LABORATORY WORK

Samples from the fieldwork investigations were laboratory tested which comprised.

- 3 No. The moisture content of the soil.
- 3 No. Liquid and plastic limits of soil.
- 3 No. Particle size grading – wet sieving.
- 3 No. Particle size grading – sedimentation hydrometer method.
- 2 No. California Bearing Ratio (CBR).
- 3 No. pH value of soil.
- 3 No. Sulphate content water extract.

FINDINGS

The full ground investigation report is included in the Stage 1 information but what follows is a synopsis of the main findings.
"Made ground was encountered in TP03 – TP05 and in SA01 to a depth of 0.80 – 3.80 m consisting of reworked sandy gravelly clay fill or sandy gravelly silt fill or sandy clayey/silty gravel fill. The two locations undertaken in the bund comprised entirely of made ground.

Fluvial deposits were encountered, typically sandy gravelly clay or silt, frequently with low cobble content, typically firm or stiff in upper horizons, becoming very stiff with increasing depth.

The suitable bearing stratum depths are suggested based on the dynamic probe test. The findings suggest that spread foundations are considered suitable with estimated allowable bearing pressure (ABP) between 80kpa and 100 kpa achievable at depths between 1.2m and 2.5m on a firm to stiff silt. The strata in TP03 and TP04 comprised most of the made ground, therefore it may be necessary to implement an element of excavation and replace it with engineered fill to provide a suitable bearing stratum.

The material in TP01 encountered is soft to firm silty and very low probe blow was encountered to the depths of 4m, therefore shallow foundations are not suitable alternatively piling or raft foundation should be considered. dynamic probe.
TP02, TP03, and TP04 indicate a weaker stratum beneath the foundation levels provided in Table 1, at 1.6 – 3.2m, 2.5-3m, and 3.1-3.6m respectively. Foundation sizes should be designed such that any structural loading applied does not affect this stratum. Construction recommendations on the foundation type and corresponding ABP, and suitable stratum depths are stated in Table 2. A suspended floor may be required over the parts of the site given the depth of the made ground and the relatively low strength of upper soil layers.

BEARING CAPACITY

Table 2: Ground Investigation Report - Construction Recommendations

Borehole	Depth below EGL* to suitable bearing stratum	Estimated ABP (kPa)	Strata description	Foundation type	Ground floor construction	Groundwater
TP/DP01	>4.00m**	>150	Assumed firm to stiff SILT	Piled	Ground bearing	Strike at 2.40m
TP/DP02	1.20m	80-100	Firm SILT	Strip & Pad	Ground bearing	Not encountered to 4.00m
TP/DP03	1.20m	80-100	MADE GROUND	Strip & Pad	Suspended	Not encountered to 3.80m
TP/DP04	2.50m	80-100	MADE GROUND	Trench fill (with trench support and possible sump pumping)	Suspended	Not encountered to 3.35m
TP/DP05	1.20m	80-100	Firm SILT	Strip & Pad	Suspended	Not encountered to 2.30m
TP/DP06	1.20m	80-100	Firm SILT	Strip & Pad	Ground bearing	Strike at 0.80m

*Existing Ground Level
**Strata assumed to be silt based on geological mapping

Given the above, the proposed solution includes:

- a suspended ground floor slab in the accommodation area but a ground supported slab in the appliance bay.
- Strip and pad foundations generally.

There is significant cut and fill required by site levels; the proposal is to have the foundations at the reduced level to avail of better ground. However, a more detailed study will be carried out during stage 2 and potentially additional ground investigations will be required to optimise the foundation designs.

Findings from the CRB test reveal that the upper start across the site would be suitable for the placement of road makeup layers as most areas across the site have CBR values excess of 3.8% at the depth below topsoil or made ground, except TP06, which indicated a CBR value of 1.8% at a depth of 0.5mbgl. also, it is recommended that further testing should be undertaken during the course of construction, and if any area indicates a lower CBR value than expected then the plot in Figure 8 should be used to determine the capping layer and sub-base layer thickness.

TABLE 1: CAPPING LAYER DEPTH

THE MINIMUM REQUIRED THICKNESS OF NON-FROST SUSCEPTIBLE CAPPING MATERIAL IS SHOWN HEREUNDER:

CBR SUBGRADE (%)	<2.5	2.5	3	4	5-15	>15
THICKNESS OF CAPPING LAYER (mm)	SPECIALIST GEOTECHNICAL ADVISE REQUIRED	600	350	300	250	150

A TOTAL OF 4 CBR TESTS ARE TO BE CARRIED OUT UNDER ROAD SURFACES AT LOCATIONS SPECIFIED BY THE ENGINEER

Figure 7: Capping layer depth v CBR Test Results, see Drg W370-OCSC-DL-XX-DR-C-0701

SOIL PERMEABILITY

The findings from the soakaway test indicate that the low permeability fine-grained soils in TP05 are considered to be poor infiltration media and would be deemed unsuitable for the implementation of infiltration drainage systems.

HAZARDOUS MATERIALS

The laboratory test of the waste classification indicates that the soils from the site are suitable for disposal as inert waste to an appropriately licensed facility. CBR test undertaken on samples at 1.00 m indicates relatively low values of 0.7%,2.1%, and 1.2% within natural firm silt indicating that these soils will not be suitable for re-use as fill without further processing, i.e. moisture reduction and soil stabilisation. Seasonal variation in the groundwater table will affect the natural moisture content of these soils and will affect their suitability for re-use.

GROUNDWATER

Groundwater was encountered during the ground investigation as water strikes as shown in Table 2.

Table 2: Groundwater strikes encountered during the ground investigation.

Location	Depth (mbgl)	Comments
SA01	0.50	Water rose from 0.50m to 0.25m
TP01	2.40	Slow seepage at 2.40m
TP06	0.80	Fast flow at 0.80m

4 SERVICES

WATER, DRAINAGE AND SEWAGE DISPOSAL

Existing records for the local area have been obtained from Irish Water and additional site investigation works were commissioned.

The full report W370-OCSC-DL-XX-RP-C-0011 is part of the Stage 1 submission but based on the received data and the conducted site investigation, it is established that there is:

- An existing wastewater network running north-west of the site and in the immediate vicinity of the Dunlavin Wastewater Treatment Plant (WWTP). The said existing network is 150mm diameter and drains to the Dunlavin WWTP.
- An existing 100 mm diameter watermain running approximately 120m east of the site running along the Church Road.
- An existing surface water pipe located approximately 100 m away along the church road. However, the pipe discharges into a local ditch and is also located on the higher elevation thus gravity connection from the development is not feasible.
- The proposed site is not suited for infiltration solution for the surface water drainage.

Further information regarding the proposed design is available in the report.

ELECTRICITY

Contact has been made with ESB and ESB Network maps obtained for the site.
From review of the ESB maps, Dunlavin has ESB infrastructure in the vicinity of the site with overhead lines as shown below. An ESB connection will be made to local ESB substation; this will be agreed with ESB when the Application is made. The site will have an ESB incoming connection point.

Figure 8: ESB Network Infrastructure

GAS

Contact has been made with GNI and Gas Network maps obtained for the site.

From review of the GNI map, there is a medium pressure gas line adjacent to the site, shown in light blue below.

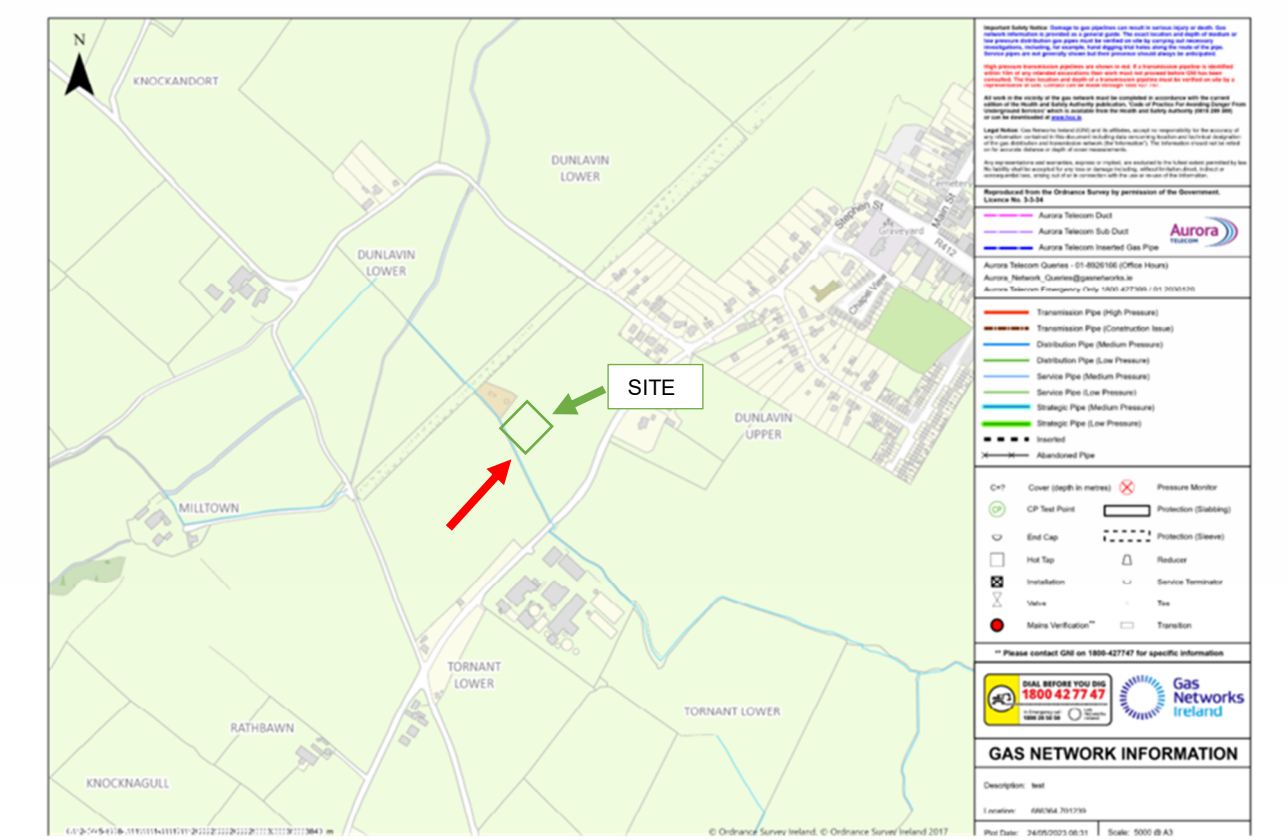

Figure 9: GNI map showing gas line adjacent to site.

OTHER SERVICES

We have engaged with telecommunications providers and can confirm the availability of broadband infrastructure adjacent to the site as shown below in Figure 8.

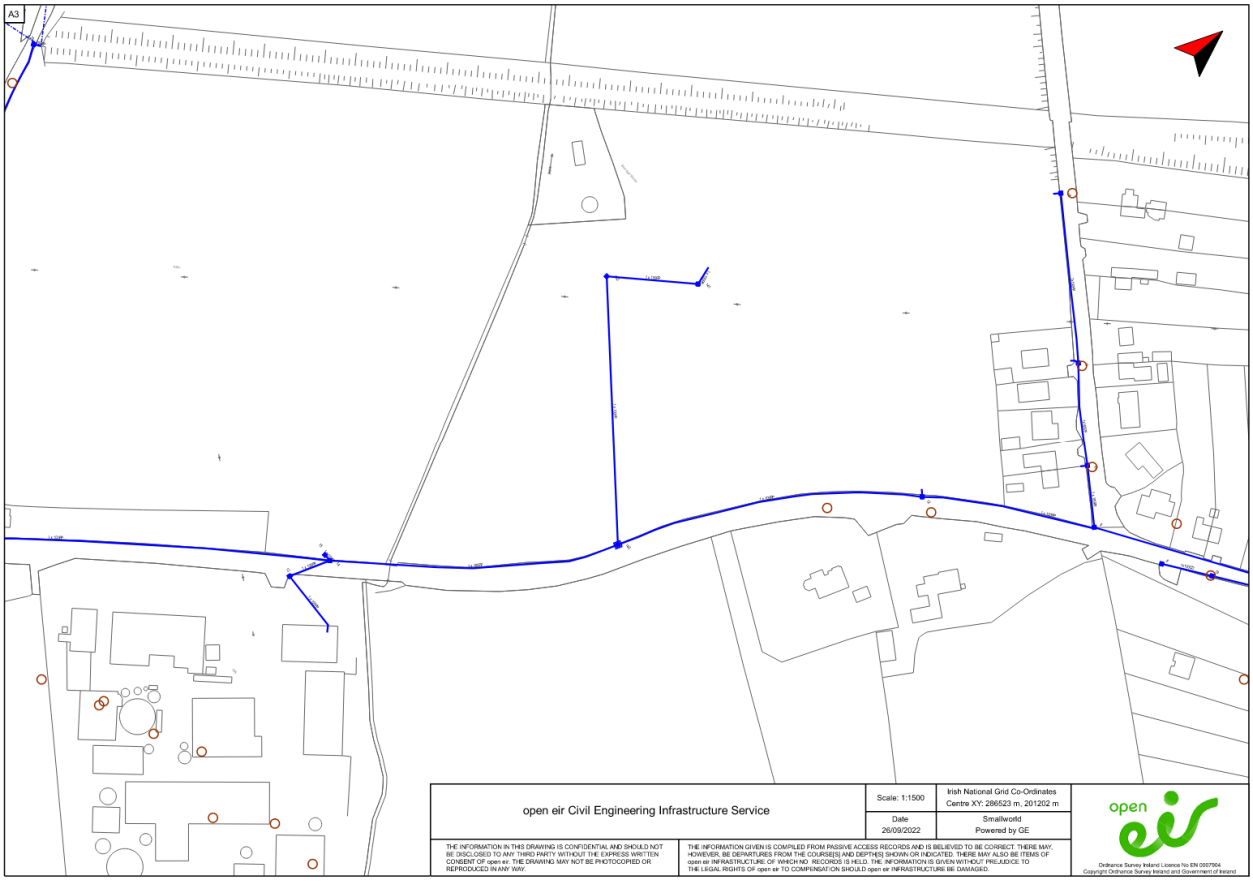

Figure 10: Open EIR Civil Engineering Infrastructure

5 ACCESS

ROAD DESIGN

The extent of roads associated with the project are limited in scale and have been designed in accordance with the key standards including the Design Manual for Urban Roads and Streets (DMURS). The key design aspects are summarised following.

The proposed development includes 2 no. new entrances on the bordering access area, to facilitate access to the proposed parking area, hardstanding area to the rear and proposed structure where the fire tenders will be stored. This will involve provision of a new section of footpath bordering the site along the public road. Corner radii at the proposed entrances are reduced to between 1-3m in line with Section 4.3.3 of DMURS.

An assessment of visibility splays for the proposed entrances has been carried out in accordance with Section 4.4.5 of DMURS which confirms there is sufficient visibility from each.

The internal road is short in length, facilitating access to car parking and the training yard. As a result, its width is 6m to allow sufficient space to manoeuvre to and from the perpendicular spaces proposed. Swept path analysis has been carried out for a typical fire tender to confirm it can access, egress and manoeuvre within the site appropriately.

Refer to the following drawings for further detail:

- W370-OCSC-DL-XX-DR-C-0700 (General Arrangement of Proposed Roads);
- W370-OCSC-DL-XX-DR-C-0701 (Roads Details & Sections);
- W370-OCSC-DL-XX-DR-C-0730 (Swept Path Analysis – Fire Tender);

In terms of traffic impact, the trips associated with the proposed facility will be low given the expected workforce. Emergency vehicle movements, while essential, will be similarly low relative to typical traffic levels on the wider public road network. On that basis, the associated traffic impact is considered to be negligible.

6 COST REPORT

A preliminary budget has been produced by Murray & Gillespie Quantity Surveyors.

This is summarised in the Cost Plan on form FSC2 attached in Appendix A: Cost Plan – Form FSC2.

7 VERIFICATION

This report was compiled and verified by:

Fintan Molloy CEng MIEI

Senior Engineer

O'Connor Sutton Cronin & Associates

Appendix A COST PLAN – FORM FSC2

FORM FSC 2 **FIRE STATION CONSTRUCTION - COST PLAN**

FIRE AUTHORITY _____

FIRE STATION Donegal Fire Station

SUMMARY COST PLAN

Element Groups	Element Group Cost €	Element Group Cost per m² of floor area €	Comments
(19) Building Substructure	159,611.20	513.22	
(29) Building Structure / CONTINGENCY	303,309.00	975.27	INCLS 50K CONTINGENCY
(39) Building Structure Completion	125,478.00	403.47	
(49) Building Finishes	449,511.70	1445.38	
(59) Building Services (Piped and Ducted)	124,500.00	400.32	
(69) Building Services (Mainly Electrical)	134,500.00	432.48	
(79) Building Fittings	127,050.00	408.52	
(90) Siteworks / TRAINING TOWER	700,990.50	2,253.99	INCLS TRAINING TOWER
(0-) Project - indirect costs (preliminaries, insurance, etc.)	225,000.00	723.47	
Sub Total	2,349,950.40	7,556.11	
Add for VAT	317,243.30		
Total Building Cost	2,697,193.70		
Other Costs: (I) Consultants' Fees			
(ii) Site Acquisition			
(iii) Legal Costs			
(iv) Miscellaneous Costs (Specify)			
Total Project Cost			

Return this form with Standard Cost Plan (National Standard Building Elements)

Signed _____ **County Secretary/Town Clerk**

Date _____

Contact Person _____

Tel. No. _____

OCSC

O'CONNOR · SUTTON · CRONIN

MULTIDISCIPLINARY CONSULTING ENGINEERS

Head Office

9 Prussia Street
Dublin 7
Ireland
D07KT57
T: +353 (0)1 8682000
E: ocsc@ocsc.ie | W: www.ocsc.ie

Civil | Structural | Mechanical | Electrical | Sustainability | Environmental