



Kildangan National School, Co. Kildare Site Investigation

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Client: Dooley Cummins Architects + Engineers

Client's Representative: Kildangan N.S. Board of Management

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Job Name: Kildangan N.S.
Job Number: 24-033

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Document Control Sheet

Report No.: OCB24-033

Project title: Kildangan National School, Kildangan, Co. Kildare

Client: Dooley Cummins Architects + Engineers

Client's Representative: Kildangan National School Board of Management

Revision	Status	Report prepared by:	Report reviewed by:	Report approved by:	Issue date
000	Draft Interpretative	Mark Nyhan	Glen Byrne	Michael O'Connell	25 th June 2024

The works were conducted in accordance with:

Engineers Ireland (Geotechnical Society of Ireland) (2016), Specification and Related Documents for Ground Investigation in Ireland, 2nd edition 2016.

IS EN 1997-2:2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing.

British Standards Institute (2015) BS 5930:2015+A1:2020, Code of practice for ground investigations.



METHODS OF DESCRIBING SOILS AND ROCKS

Soil and rock descriptions are based on the guidance in Section 6 of BS 5930:2015+A1:2020, Code of Practice for Ground Investigations. However, the following terms are used in the description of fine-grained soils, where applicable:

- Soft to Firm: fine-grained soil with consistency description close to the boundary between soft and firm soil (Table 7 of BS5930).
- Firm to Stiff: fine-grained soil with consistency description close to the boundary between firm and stiff soil (Table 7 of BS5930).

Abbreviations used on exploratory hole logs	
U	Nominal 100mm diameter undisturbed open tube sample
P	Nominal 100mm diameter undisturbed piston sample
B	Bulk disturbed sample
D	Small disturbed sample
W	Water sample
ES / EW	Soil sample for environmental testing / Water sample for environmental testing
SPT	Standard penetration test using a split spoon sampler (small disturbed sample obtained)
SPT (C)	Standard penetration test using 60-degree solid cone
x,x/x,x,x,x,x	Blows per increment during the standard penetration test. The initial two values relate to the seating drive (150mm) and the remaining four to the 75mm increments of the test length. The length achieved is stated (mm) for any test increment less than 75mm
N=X	SPT blow count 'N' given by the summation of the blows 'X' required to drive the full test length (300mm)
N=X/Z	Incomplete standard penetration test where the full test length was not achieved. The blows 'X' represent the total blows for the given test length 'Z' (mm)
V VR	Shear vane test (borehole) Hand vane test (trial pit) Shear strength stated in kPa V: undisturbed vane shear strength VR: remoulded vane shear strength
dd/mm/yy: 1.0 dd/mm/yy: dry	Date & water level at the borehole depth at the end of shift and the start of the following shift
Abbreviations relating to rock core	
TCR (%)	Total Core Recovery: Ratio of rock/soil core recovered (both solid and non-intact) to the total length of core run.
SCR (%)	Solid Core Recovery: Ratio of solid core to the total length of core run. Solid core has a full diameter, uninterrupted by natural discontinuities, but not necessarily a full circumference and is measured along the core axis between natural fractures.
RQD (%)	Rock Quality Designation: Ratio of total length of solid core pieces greater than 100mm to the total length of core run.
FI	Fracture Index: Number of natural discontinuities per metre over an indicated length of core of similar intensity of fracturing.
NI	Non-Intact: Used where the rock material was recovered fragmented, for example as fine to coarse gravel size particles.
AZCL	Assessed zone of core loss: The estimated depth range where core was not recovered.
DIF	Drilling induced fracture: A fracture of non-geological origin brought about by the rock coring.

Kildangan National School, Kildangan, Co. Kildare

1 AUTHORITY

On the instructions of Dooley Cummins Architects + Engineers, acting on the behalf of Kildangan National School Board of Management, a ground investigation was undertaken at the above location to provide geotechnical information for input to the design and construction of a proposed school extension and a soakaway area.

This report details the work carried out both on site and in the geotechnical testing laboratory; it contains a description of the site and the works undertaken, the exploratory hole logs and the laboratory test results. A discussion on the recommendation for construction is also provided.

All information given in this report is based upon the ground conditions encountered during the site investigation works, and on the results of the laboratory and field tests performed. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata, contaminant concentrations, and water conditions between or below exploratory holes. It should be noted that groundwater levels usually vary due to seasonal and/or other effects and may at times differ to those measured during the investigation.

This report was prepared by OCB Geotechnical Ltd for the use of Kildangan National School Board of Management and Dooley Cummins Architects + Engineers in response to particular instructions. Any other parties using the information contained in this report do so at their own risk and any duty of care to those parties is excluded.

2 SCOPE

The extent of the investigation, as instructed by Dooley Cummins Architects + Engineers, included dynamic probes, a dynamic cone penetrometer (indirect CBR) test, a trial pit with an infiltration test, laboratory testing, and the preparation of a report on the findings.

3 DESCRIPTION OF SITE

As shown on the site location plans in Appendix A, the village of Kildangan (Cill Daingin) is located approximately 5km southeast of Monasterevein and 13km north-northwest of Athy in mid-west Co. Kildare. Kildangan National School is located on the east side of the village on the west side of the north-northwest to south-southeast orientated Richardstown Road (L7063-1), approximately 60m south of its T-junction with the west-southwest to east-northeast orientated L3010 road (Kildangan to Kildare Town).

The site is bordered by the Church of Our Lady of Victories at the southwest corner of the L3010/Richardstown Road junction to the north, by a narrow woodland strip and then agricultural grassland at Kildangan Stud across Richardstown Road to the east, and by agricultural grassland to the south and west.

The site consists of a rectangular shaped property measuring approximately 88m long (NNW-SSE) by 60m wide (WSW-ENE). The existing school building is located at the southern portion of the property and is bordered by a bituminous asphalt / tarmacadam-paved playing area to the north with smaller concrete-paved areas located between the school building and a boiler house to the west-northwest and between the school building and a play shelter to the east-southeast. An astroturf strip and a small grass lawn are located at the rear / southwest side of the school building. The northern portion of the site consists mainly of a grass playing field bordered by concrete footpaths. A small pump house and septic tank are located at the northwest corner of the property.

The existing school building, constructed in 1963 with two extensions added between 2007 and 2013, consists of a T/L-shaped one-and-a-half-storey dormer-style structure measuring approximately 46m long (WNW-ESE) by 10m to 31m wide (NNE-SSW). Historic maps show that a former school building, dating from the 1870s, was located at the northern portion of the site. Several underground services traverse the property.

Ground surface in the site vicinity slopes very gently to the southwest towards a tributary of the River Barrow, the Oghil River, which flows to the south at approximately 300 metres to the west-southwest of the site. Ground elevation within the site ranges from 75.2m MSL in the northeast to 74.1m MSL at the small grass lawn in the southwest. Ground elevations at exploratory hole locations ranged from 74.56m MSL at TP1 in the north to 74.24m MSL at DP3 in the south.

There are no noted environmentally designated areas in the site vicinity. The Church of Our Lady of Victories (built in 1792) to the north is listed on the National Inventory of Architectural Heritage database.

The existing site is presented on the site and exploratory hole location plans in Appendix A.

4 SITE OPERATIONS

Site operations, which were conducted between 18th June and 20th June 2024, included:

- Three (3) Dynamic Probes
- One (1) Indirect CBR Test using a Dynamic Cone Penetrometer
- One (1) Trial pit with an Infiltration Test.

The exploratory holes and in situ tests were located as instructed by the Dooley Cummins Architects + Engineers as shown on the exploratory hole location plan in Appendix A.

4.1 Dynamic Probes

Three (3) dynamic probes (DP1 through DP3) were put down to refusal at the paved area on the northeast / front side of the existing school building using a Dando Terrier rig using the DPH method as described in BSEN ISO 22476-2. This method entails a 50kg hammer falling 500mm onto a 90° cone of 50.5mm diameter.

Dynamic probing was conducted from ground surface to effective refusal at depths between 2.8m and 3.0m BGL. Soil samples were collected at DP3 from 0.16m to 0.37m BGL and from 0.37m to 0.80m BGL.

Appendix B provides the dynamic probe logs in the form of plots, against depth, of the number of blows per 100mm penetration.

4.2 Indirect CBR Test

An indirect CBR test (DCP1) was conducted using a Dynamic Cone Penetrometer (DCP) on 20th June 2024. The equipment was developed in conjunction with the UK Transport Research Laboratory, is used widely throughout the world, and is referred to in the UK Highway Agency Interim Advice Note 73/06.

The test results are presented in Appendix C together with a plot of the variation with depth of the cumulative blow count. A CBR value has been estimated for the 50th percentile of a selected data range using the following relationship, as proposed by DTP Interim Advice Note 73/06 (Design Guidance for Road Pavement Foundations):

$$\text{Log CBR} = 2.48 - 1.057 \text{ Log (mm/blow)}$$

4.3 Trial Pit

A trial pit (TP1) was excavated for infiltration testing at the grass lawn area to the northeast of the existing school building on 20th June 2024. The pit was excavated using a 3-tonne excavator, fitted with a 600mm wide bucket, to depths between 1.5m and 1.7m BGL.

Disturbed (small tub and bulk bag) samples were also taken at standard depth intervals and at change of strata. Groundwater was not encountered in the trial pit.

Appendix D presents the trial pit log with photographs of the pit and arisings provided in Appendix E.

4.4 Infiltration Testing

Infiltration testing was conducted on 20th June 2024. A 50mm diameter slotted standpipe was placed in the test pit and a Rugged TROLL 100 data logger, manufactured by In-Situ Inc., was installed in the standpipe prior to adding water to the pit.

Water was added to the pit using an off-site water hydrant, filling the pit to the level of the topsoil in order to conduct infiltration/soakaway testing in the native soils in general accordance with BRE Digest 365 -

Soakaways (BRE, 2016). Water level readings were recorded from a fixed point at ground surface.

Appendix F presents the results and analysis of the infiltration test. Analysis of the test data indicates that the soil strata have an infiltration coefficient of $2.3\text{E-}05$ m/s.

4.5 Surveying

A broad survey of the site using a handheld CAT scanner to identify any existing buried services or old foundations/obstructions to excavation was carried out before commencement of excavation works.

The as-built exploratory hole positions were surveyed following completion of site operations by a Site Engineer from OCB Geotechnical. Surveying was carried out using a Trimble R6 GPS system employing VRS and real time kinetic (RTK) techniques.

The plan coordinates (Irish National Grid) and ground elevation (mOD Malin) at each location are recorded on the individual exploratory hole logs.

5 LABORATORY WORK

Upon their receipt in the laboratory, all disturbed samples were carefully examined and accurately described and their descriptions incorporated into the borehole logs.

5.1 Geotechnical laboratory testing of soils

Laboratory testing of soils will comprise:

- **soil classification:** moisture content, Atterberg Limits and particle size distribution;
- **soil compaction:** California Bearing Ratio on recompacted disturbed sample
- **soil chemistry:** pH and water-soluble sulphate content.

Laboratory testing of soils samples was carried out in accordance with I.S. EN 1997-2:2007: *Eurocode 7: Geotechnical design - Part 2 Ground investigation and testing* and British Standards Institute (2022) *BS 1377-2, Methods of test for soils for civil engineering purposes – Part 2: Classification tests and determination of geotechnical properties*. Dry sieving provides a measure of the coarser fractions of a soil.

Geotechnical test results will be presented in Appendix G.

5.2 Environmental Laboratory Testing of Soils

In addition, environmental testing, as specified by Dooley Cummins Architects + Engineers, was conducted on a selected environmental soil sample (DP3 0.16-0.37m) to assist in basic characterization of potential waste from the site. The sample will be analysed for a Waste Acceptance Criteria (WAC) suite.

Environmental test results will be presented in Appendix H.

6 GROUND CONDITIONS

6.1 General geology of the area

The Geological Survey of Ireland (GSI) database indicates that the mid-west Co. Kildare area where the site is located has a flat to gently undulating ice-moulded topography with interspersed bog plains along the east side of the north-south orientated fluvial plain of the River Barrow.

The GSI soils database indicates that this area is underlain by both Glacial Till derived from limestones and granular Glaciofluvial Deposits. The glacial soils are locally blanketed by cut-over raised peat. Alluvium also occurs locally along rivers and streams. Subglacial lineations such as crag and tail landforms, drumlins and esker ridges commonly indicate a northwest-southeast ice flow direction. GSI mapping shows Glacial Till beneath the site and Glaciofluvial Deposits immediately to the east and west. To the east, an irregular Glaciofluvial sand and gravel deposit extends from the eastern part of Kildangan southeast to Nurney. To the west, a relatively narrow esker ridge of sands and gravels extends south and then southeast for approximately 2.5km in the direction of Eskerhill and Pullagh townlands. The poorly sorted Glacial Till (diamict) was deposited under and at the margins of an ice body mainly during the last (c. 115,000 to 13,000 years ago) of multiple glacial periods in the Pleistocene epoch (2.58 million to 11,700 years ago) of the Quaternary period. The well sorted bedded Glaciofluvial Deposits were deposited by meltwaters during ice-sheet retreat prior to 11,700 years ago and the overlying peat and alluvium were deposited during the subsequent Holocene epoch.

The GSI bedrock database indicates that soils at the site are underlain by limestone bedrock of the early Carboniferous / Mississippian (Viséan-age, c. 347-331 Ma) Milford Formation which consolidated from carbonate sediments deposited in a tropical shallow marine shelf environment. The Milford Formation bedrock commonly consists of moderately dark grey graded peloidal calcarenitic / pelsparite limestones (i.e. spherical/round sand-sized grains composed of fine-grained carbonate in a sparry calcite matrix) with subordinate shales (McConnell & Philcox, 1994). Algal deposits (e.g. laminar stromatolite or clotted thrombolite) and birdseye micrites occur occasionally. Fossil faunas are limited and in parts of the succession consist only of serpulids (worms). McConnell & Philcox (1994) reported that cores through the Milford Formation in Co. Kildare are mainly dolomitized, for example: 'A borehole 6km east of Monasterevin penetrated over 200m of fine moderately dark grey-brown dolomite with subordinate mudstones and occasional oncolite beds and argillaceous micrites'. Oncolite is a spheroidal algal mass preserved in shallow-water limestones.

The limestone strata were deposited in an extensional (transtensional) regime and were later subjected to minor deformation (minor open style folding and block faulting) during subsequent tectonic events including a compressional/dextral shear (transpression) phase of deformation during the Variscan Orogeny (a mountain building event to the south) in Late Carboniferous and Early Permian times (318-297 Ma) and also north-south Alpine-Pyrenean compression and east-west North Atlantic extension during the

Paleogene period (c. 66-23 Ma) of the Cenozoic era.

The Viséan-age limestone strata in Co. Kildare occur in a northeast-southwest trending synclinal area that is locally transected by northeast-southwest trending dip-slip faults which are locally offset by strike slip faults with a northwest-southeast orientation. In addition to displacement faults, the bedrock strata are also pervaded by a network of tectonic joints, brittle fractures across which there is no discernible displacement parallel to the fracture plane.

According to GSI database, the Milford Formation strata form part of a regionally important Karstified (diffuse) aquifer. The Kildangan area has a high groundwater vulnerability index, locally becoming extreme such as in an area with karstified bedrock at or near ground surface to the west-southwest of the site.

The limestone bedrock strata have been subjected to karstification by the action of weakly acidic rainwater percolating through fractures and chemically decomposing the rock over millions of years. Karstification produces a complex network of open cavities in the limestone bedrock that can extend up to several metres in width and can penetrate downwards for several tens of metres. Numerous Karst features such as enclosed depressions, sinkholes, springs and voids have been recorded in the area underlain by limestone in Co. Kildare.

6.2 Ground types encountered during investigation of the site

A summary of the ground types encountered in the exploratory holes is listed below, in approximate stratigraphic order:

- TOPSOIL at trial pit TP1 was 200mm thick.
- BITUMINOUS ASPHALT forms the surface cover material on the northeast side of the school building.
- MADE GROUND consisting of light greyish brown slightly clayey silty Sand and Gravel size fragments mostly of crushed mortar with medium to high cobble content of angular to subangular dark grey limestone and occasional tile fragments was encountered from 0.16m to 0.37m BGL at dynamic probe DP3.
- Shallow Cohesive Soils: Beneath Topsoil, brown slightly gravelly sandy silty CLAY with occasional cobbles and small boulders and occasional rootlets was encountered from 0.2m to 0.8m BGL at TP1. Similar material at dynamic probe DP3 contained a little intermixed Made Ground indicating that it had been partially disturbed. Blow counts in dynamic probes indicated material with strengths equivalent to very soft to soft in the upper metre.
- GLACIAL TILL consisting of yellowish brown slightly gravelly to gravelly sandy silty CLAY with medium to high cobble content and low small boulder content was encountered from 0.8m to 1.35m BGL. Gravel, cobbles and boulders consist predominantly of limestone.

- GLACIOFLUVIAL DEPOSITS: Greyish brown slightly silty very sandy GRAVEL with high cobble content and low small boulder content was encountered from 1.35m BGL to the penetrated depth of 1.70m BGL in TP1.
- Beneath a thin surface cover of bituminous asphalt/tarmacadam and subbase / granular Made Ground, dynamic probes encountered very loose or very soft material in the uppermost metre. Blow counts in DP1 indicated material with strengths equivalent to firm below 1m BGL and equivalent to medium dense or stiff to very stiff below 2.1m BGL. Blow counts in DP2 suggest material with a strength equivalent to at least firm below 1m BGL, but DP2 may have encountered a cobble or boulder between depths of 1.3m and 1.8m BGL, with blow counts below that indicating material equivalent to medium dense or stiff becoming denser below 2.3m BGL. Blow counts in DP3 indicated material with strengths equivalent to medium dense or stiff to very stiff below 1.1m BGL
- Dynamic probes DP1, DP2 and DP3 met effective refusal on obstructions at depths of 3.0m BGL, 2.9m BGL and 2.8m BGL respectively.

6.3 Groundwater

Groundwater was not encountered at TP1 on 20 June 2024.

However, groundwater elevation likely varies seasonally and in response to precipitation events.

7 DISCUSSION

7.1 Proposed construction

It is proposed to construct an extension and a soakaway at Kildangan National School in Co. Kildare.

No further details were available to OCB Geotechnical at the time of preparing this report.

7.2 Recommendations for construction

Beneath a surficial cover of Topsoil or Bituminous Asphalt over granular Made Ground / subbase, exploratory holes encountered very soft to soft shallow cohesive soils over cohesive Glacial Till over granular Glaciofluvial Deposits. Dynamic probes met effective refusal at depths ranging from 2.8m BGL to 3.0m BGL. Groundwater was not encountered above the penetrated depth of 1.7m BGL at TP1.

It is recommended that excavations for building foundations and associated infrastructure be taken to below Topsoil, Made Ground and very soft to soft Cohesive Subsoil in order to minimize the possibility of excessive settlement. The proposed structure could be founded within Glaciofluvial Deposits at a depth below 1.5m BGL with a maximum allowable bearing value of 100kPa based on dynamic probe blow counts. Based on the presence of Karstified limestone bedrock reported by the GSI at relatively shallow depth beneath the overburden and the lack of any geophysical investigation at the site, it is recommended that the structure be constructed on a reinforced concrete raft foundation. A rotary borehole may be warranted to conduct standard penetration testing in the overburden soils, to investigate depth to bedrock and depth to groundwater and to conduct rotary coring to determine the quality of the bedrock beneath the site.

The base of foundation excavations should be thoroughly inspected by an experienced engineer and the required bearing capacity verified in-situ. Any soft/loose soils should be removed with the resultant void backfilled with leanmix concrete or granular engineering fill (Class 6 or similar approved material). A consistent bearing stratum should be provided across the structure in order to limit differential settlements.

The use of ground bearing floor slabs is appropriate following the removal of any Topsoil, Made Ground or loose/soft material and their replacement using well-graded well-compacted granular fill. However, a suspended floor slab should be adopted where the difference in levels of the proposed floor and the base of loose/soft soils is greater than 600mm.

Given the generally fine grained/cohesive nature of the soils at most of the proposed formation levels, excavations for foundations are likely to be relatively stable. However, any instability can be minimised by battering the side slopes at two vertical to one horizontal (2V:1H) and by limiting the duration that the excavation is open. Groundwater control, if required, should be possible by pumping from sumps formed in the base of excavations.

Surface water should be managed during construction works to ensure any exposed soil is not compromised. Any precipitation runoff should be diverted away from the construction site. In order to mitigate against the possibility of karst development beneath the site, all existing and proposed drainage pipes should also be fully sealed. Any soakaway areas should be placed as far from the building as possible and down gradient of the buildings to minimize any dissolution of limestone bedrock.

7.2.1 Access roads, car parks and hard standing

Based on the strata descriptions and the results of an in-situ testing, the following design CBR value is considered appropriate.

- A value of 4% below a depth of about 0.5m is appropriate where native cohesive soil is encountered at sub-formation level, requiring a 300mm thick capping.

Although the CBR value obtained from the in-situ tests suggests better construction conditions, caution is advised due to the testing method and the presence of obstructions (coarse gravel and occasional cobbles and small boulders) within the shallow cohesive soils. The use of geosynthetics in the construction of paved areas may be beneficial. These could include a geosynthetic (e.g., a geogrid) at subgrade level with further benefit gained by incorporating further layer(s) within the capping/sub-base layer.

7.3 Re-use of Site Won Material

The results of the ground investigation for the recovered soils have been compared with Table 6/1 of Acceptable Earthworks Materials presented in Volume 1 of the Specification for Highway Works – Series 0600 – Earthworks. The shallower material that may be excavated falls into Class 2C – General Cohesive Fill (stony cohesive material). This material would be suitable for general earthworks fill but would not be suitable for use as structural fill for foundations, road pavements or floors due to an excessive fines content and hence imported granular material would be required. The deeper Glaciofluvial Deposits would be classified as General Granular Fill. This material would be suitable for general earthworks fill but may not be suitable for use as structural fill for unless cobbles and boulders were removed.

8 REFERENCES

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I.S. EN ISO 14688-1:2018: *Geotechnical investigation and testing — Identification and classification of soil — Part 1: Identification and description (ISO 14688-1:2017)*

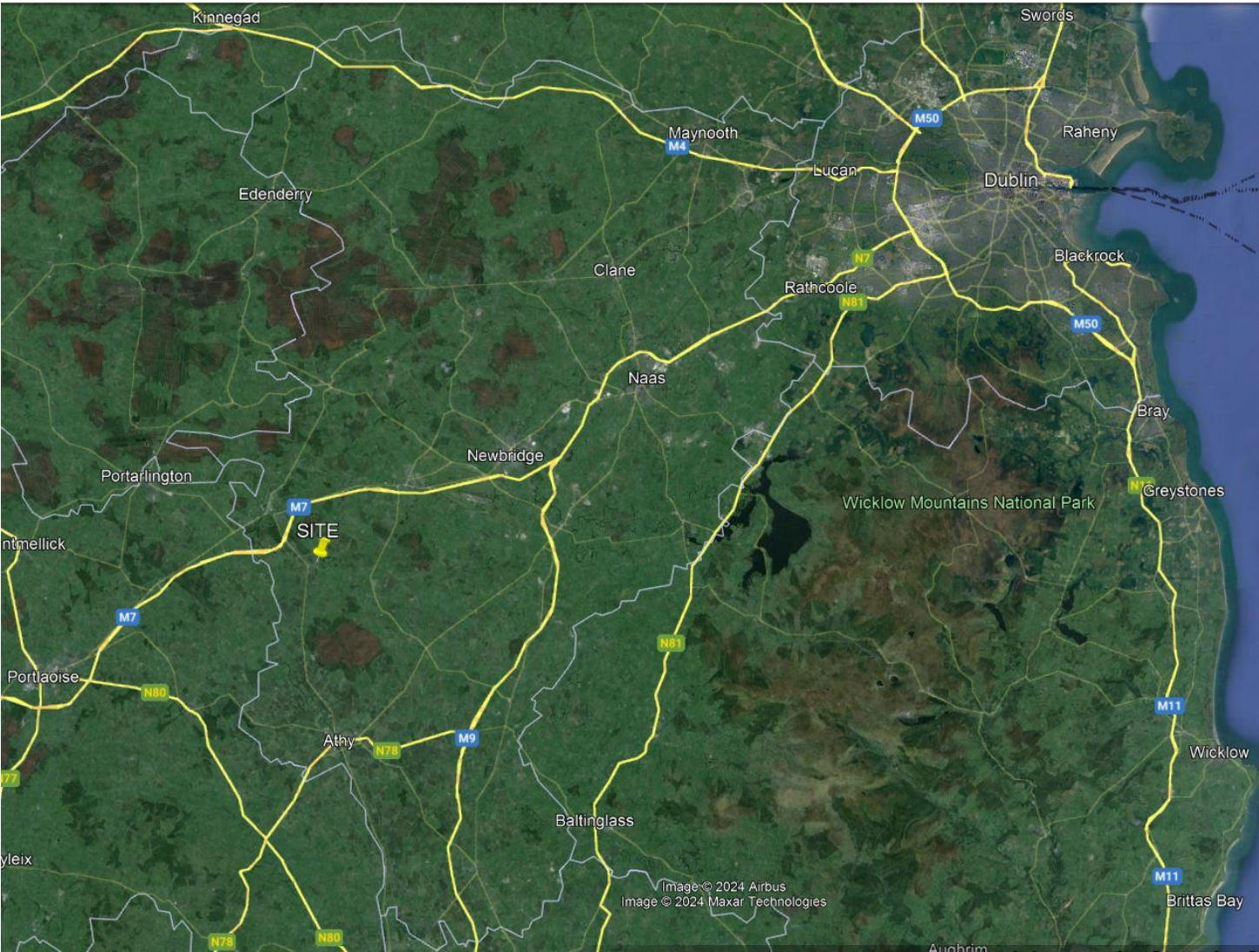
I.S. EN ISO 14688-2:2018: *Geotechnical investigation and testing — Identification and classification of soil — Part 2: Principles for a classification (ISO 14688-2:2017)*

I.S. EN ISO 14689:2018: *Geotechnical investigation and testing - Identification, description and classification of rock (ISO 14689:2017)*

McConnell, B and Philcox, M.E. 1994. Geology of Kildare - Wicklow: A geological description to accompany the bedrock geology 1:100,000 scale map series, Sheet 16, Kildare - Wicklow. Geological Survey of Ireland.

Appendix A

Site and Exploratory Hole Location Plans



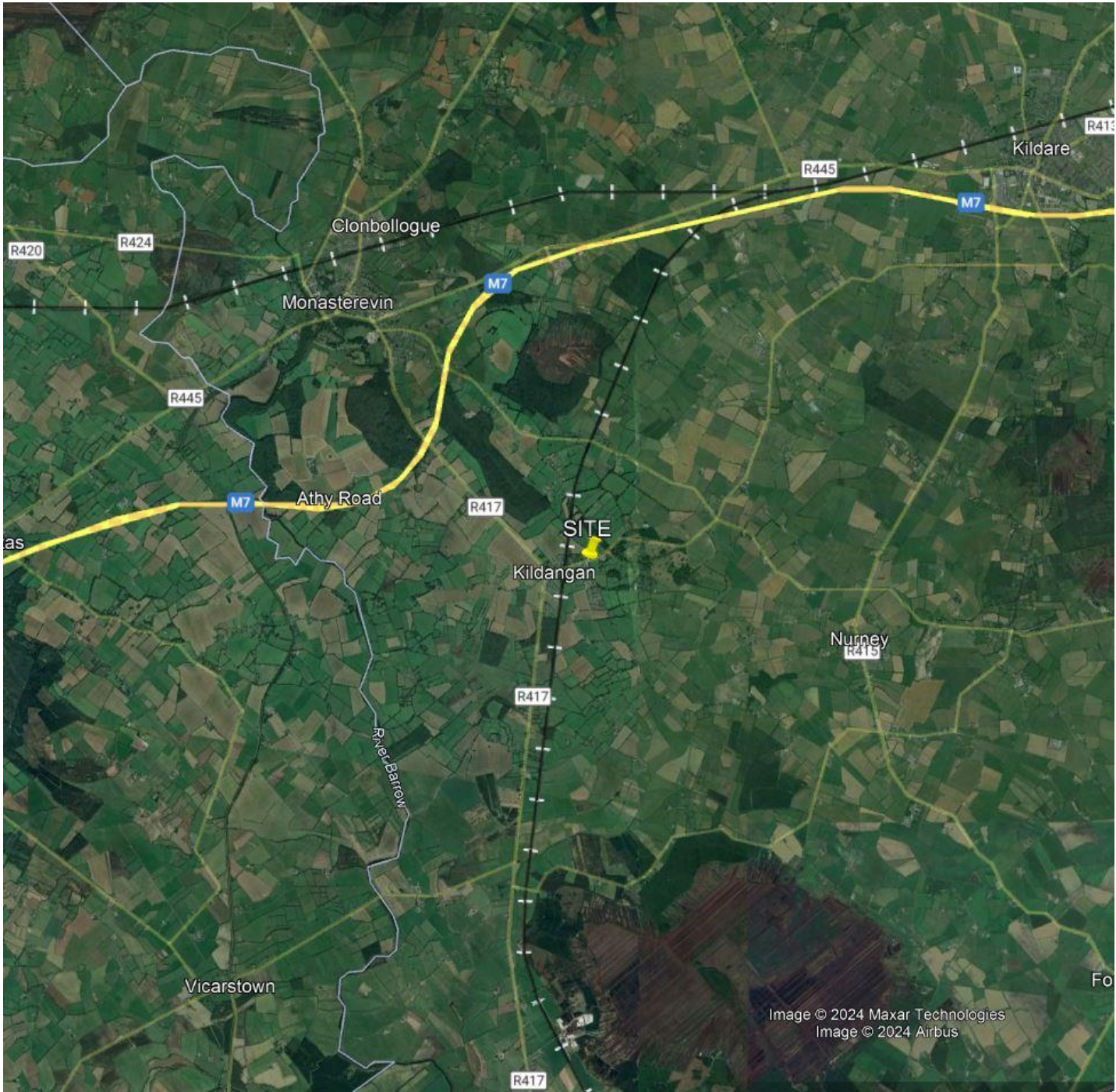
Kildangan National School, Kildangan, Co. Kildare

Site Location Plan	
CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National School, Kildangan, Co. Kildare

Site Location Plan	
CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National
School, Kildangan,
Co. Kildare

Site Location Plan

CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National School, Kildangan, Co. Kildare

Site Location Plan	
CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National School, Kildangan, Co. Kildare

Site Location Plan

CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National School, Kildangan, Co. Kildare

Exploratory Hole Locations Plan	
CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National
School, Kildangan,
Co. Kildare

**Exploratory Hole
Locations Plan**

CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024

Appendix B

Dynamic Probe Logs



Probe Log

Borehole No.

DP1

Sheet 1 of 1

Project Name: Kildangan National School

Project No.
24-033

Co-ords: 666495.45 - 706623.48

Hole Type
DP

Location: Kildangan National School, Kildangan, Co. Kildare

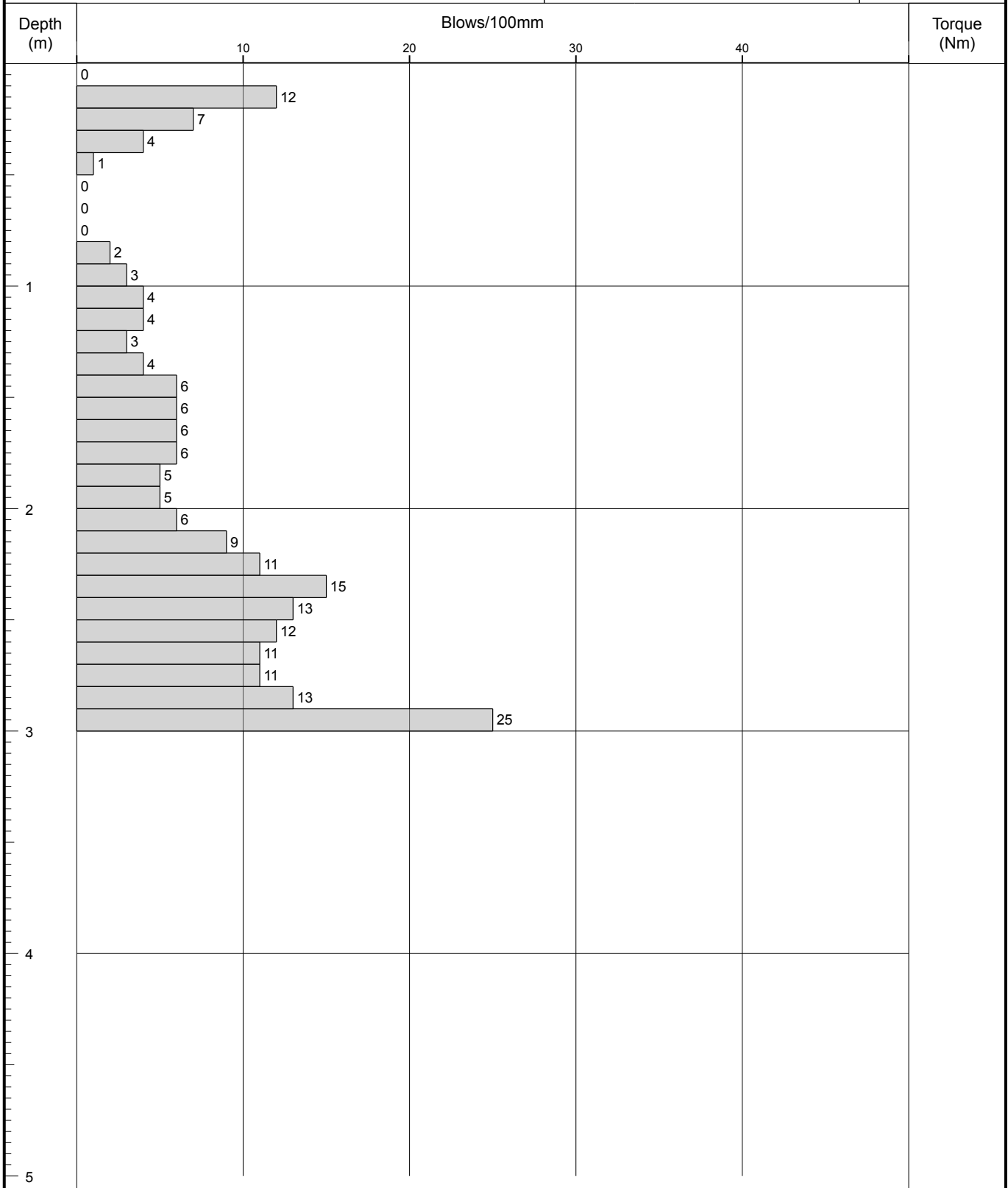
Level: 74.34

Scale
1:25

Client: Kildangan National School Board of Management

Dates: 18/06/2024 -

Logged By



Remarks

Fall Height 500

Cone Base Diameter 50

Hammer Wt 50

Final Depth 3.00

Probe Type DPH

Log Scale 1:25





Probe Log

Borehole No.

DP2

Sheet 1 of 1

Project Name: Kildangan National School

Project No.
24-033

Co-ords: 666512.35 - 706614.56

Hole Type
DP

Location: Kildangan National School, Kildangan, Co. Kildare

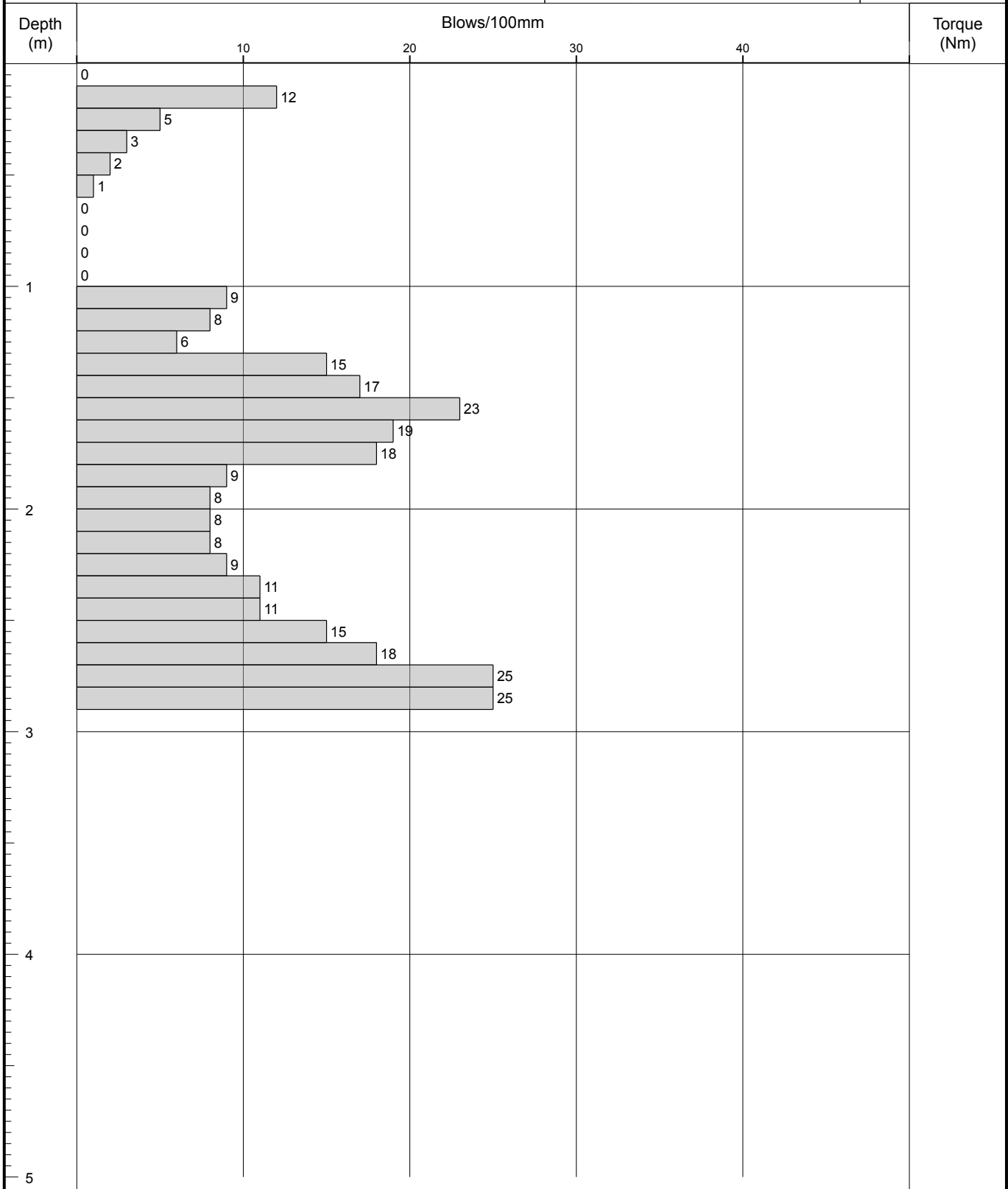
Level: 74.44

Scale
1:25

Client: Kildangan National School Board of Management

Dates: 18/06/2024 -

Logged By



Remarks

Fall Height 500

Cone Base Diameter 50

Hammer Wt 50

Final Depth 2.90

Probe Type DPH

Log Scale 1:25





Probe Log

Borehole No.

DP3

Sheet 1 of 1

Project Name: Kildangan National School

Project No.
24-033

Co-ords: 666520.20 - 706594.89

Hole Type
DP

Location: Kildangan National School, Kildangan, Co. Kildare

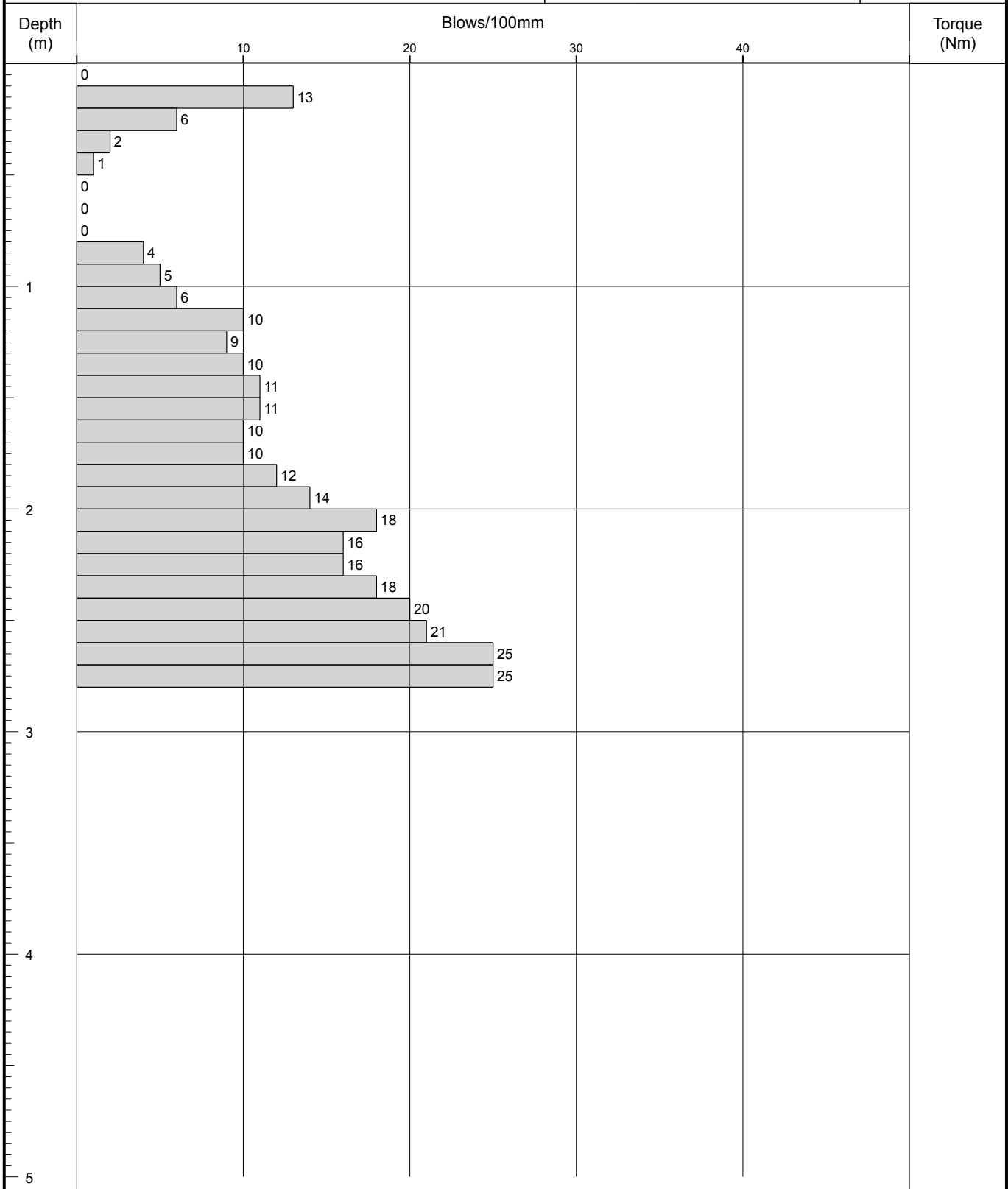
Level: 74.24

Scale
1:25

Client: Kildangan National School Board of Management

Dates: 18/06/2024 -

Logged By



Remarks

Fall Height 500

Cone Base Diameter 50

Hammer Wt 50

Final Depth 2.80

Probe Type DPH

Log Scale 1:25



Appendix C Dynamic Cone Penetrometer (Indirect CBR) Test

Location: DCP1				Easting	Northing	Elevation	Date: 20/06/24
Blows	Reading	Penetration mm	mm/blow	666502.2	706631.5	74.489	
0	1100	0	0				
1	1020	80	80				
2	970	130	65				
3	920	180	60				
4	890	210	53				
5	860	240	48				
6	830	270	45				
7	820	280	40				
8	810	290	36				
9	800	300	33				
10	795	305	31				
11	790	310	28				
12	780	320	27				
13	760	340	26				
14	730	370	26				
15	690	410	27				
16	640	460	29				
17	610	490	29				
18	580	520	29				
19	560	540	28				
20	540	560	28				
21	510	590	28				
22	490	610	28				
23	460	640	28				
24	440	660	28				
25	410	690	28				
26	380	720	28				
27	350	750	28				
28	330	770	28				
29	320	780	27				
30	300	800	27				
31	280	820	26				
32	270	830	26				
33	260	840	25				
34	250	850	25				
35	245	855	24				
36	240	860	24				
37	235	865	23				
38	230	870	23				
39	225	875	22				
40	220	880	22				
41	210	890	22				
42	205	895	21				
43	200	900	21				
44	195	905	21				
45	190	910	20				
46	185	915	20				
47	180	920	20				
48	175	925	19				
49	170	930	19				
50	160	940	19				
51	150	950	19				
52	145	955	18				
53	140	960	18				
54	135	965	18				

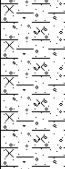
CBR8.4 %

DCP Blows vs Penetration

Cumulative blows per 100mm	Penetration (mm)
0	0
1	80
2	130
3	180
4	210
5	240
6	270
7	280
8	290
9	300
10	305
11	310
12	320
13	340
14	370
15	410
16	460
17	490
18	520
19	540
20	560
21	590
22	610
23	640
24	660
25	690
26	720
27	750
28	770
29	780
30	800
31	820
32	830
33	840
34	850
35	855
36	860
37	865
38	870
39	875
40	880
41	890
42	895
43	900
44	905
45	910
46	915
47	920
48	925
49	930
50	940
51	950
52	955
53	960
54	965

Appendix D

Trial Pit Log

			Project No.: 24-033		Project Name: Kildangan National School		Trial Pit No.: TP1	
			Co-ordinates: 666510.07 E 706633.59 N		Client: Kildangan National School Board of Management Client's Representative: Dooley Cummins Architects + Engineers		Sheet 1 of 1	
Method: Excavation			Ground Level: 74.56 mOD		Date: 20/06/2024		Scale: 1:22	
Plant: 3-tonne							Driver: SOC	
							Logger: GOC	
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	
0.00 - 0.20 0.00 - 0.20	B1 D2		74.36	(0.20)		TOPSOIL: Darker brown slightly sandy to sandy silty CLAY with occasional gravel and frequent rootlets, moist.		
0.20 - 0.80 0.20 - 0.80	B3 ES4			(0.60)		Brown slightly gravelly sandy silty CLAY with occasional cobbles and small boulders and occasional rootlets, moist. Sand fine to coarse. Gravel fine to coarse. Gravel and cobbles subangular to subrounded predominantly grey to dark grey limestone.		0.5
0.80 - 1.30 0.80 - 1.30	B5 D6		73.76	0.80 (0.55)		Yellowish brown slightly gravelly to gravelly sandy silty CLAY with medium to high cobble content and low small boulder content, moist. Sand fine to coarse. Gravel fine to coarse. Gravel and cobbles subangular to subrounded predominantly grey to dark grey limestone.		1.0
1.30 - 1.70 1.30 - 1.70	B7 D8		73.21	1.35 (0.35)		Greyish brown slightly silty very sandy GRAVEL with high cobble content and low small boulder content, moist. Sand fine to coarse. Gravel fine to coarse. Gravel and cobbles subangular to subrounded predominantly grey to dark grey limestone and occasional black chert.		1.5
			72.86	1.70		End of trial pit at 1.700m		2.0
								2.5
								3.0
								3.5
								4.0
Remarks						Water Strikes:		Stability: Slight spalling near base
						Struck at (m):	Remarks:	
							None	Width: 0.65 Length: 2.00

Appendix E Trial Pit Photographs



Kildangan National
School, Kildangan,
Co. Kildare

TP1

CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National
School, Kildangan,
Co. Kildare

TP1

CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National
School, Kildangan,
Co. Kildare

TP1

CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National
School, Kildangan,
Co. Kildare

TP1

CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National
School, Kildangan,
Co. Kildare

TP1

CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National
School, Kildangan,
Co. Kildare

TP1

CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National
School, Kildangan,
Co. Kildare

TP1

CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National
School, Kildangan,
Co. Kildare

TP1

CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National
School, Kildangan,
Co. Kildare

TP1

CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024



Kildangan National
School, Kildangan,
Co. Kildare

TP1

CLIENT Kildangan National School Board of Management	
ENGINEER Dooley Cummins Architects + Engineers	
DATE	June 2024

Appendix F

Infiltration Test Data

INFILTRATION TEST DATA

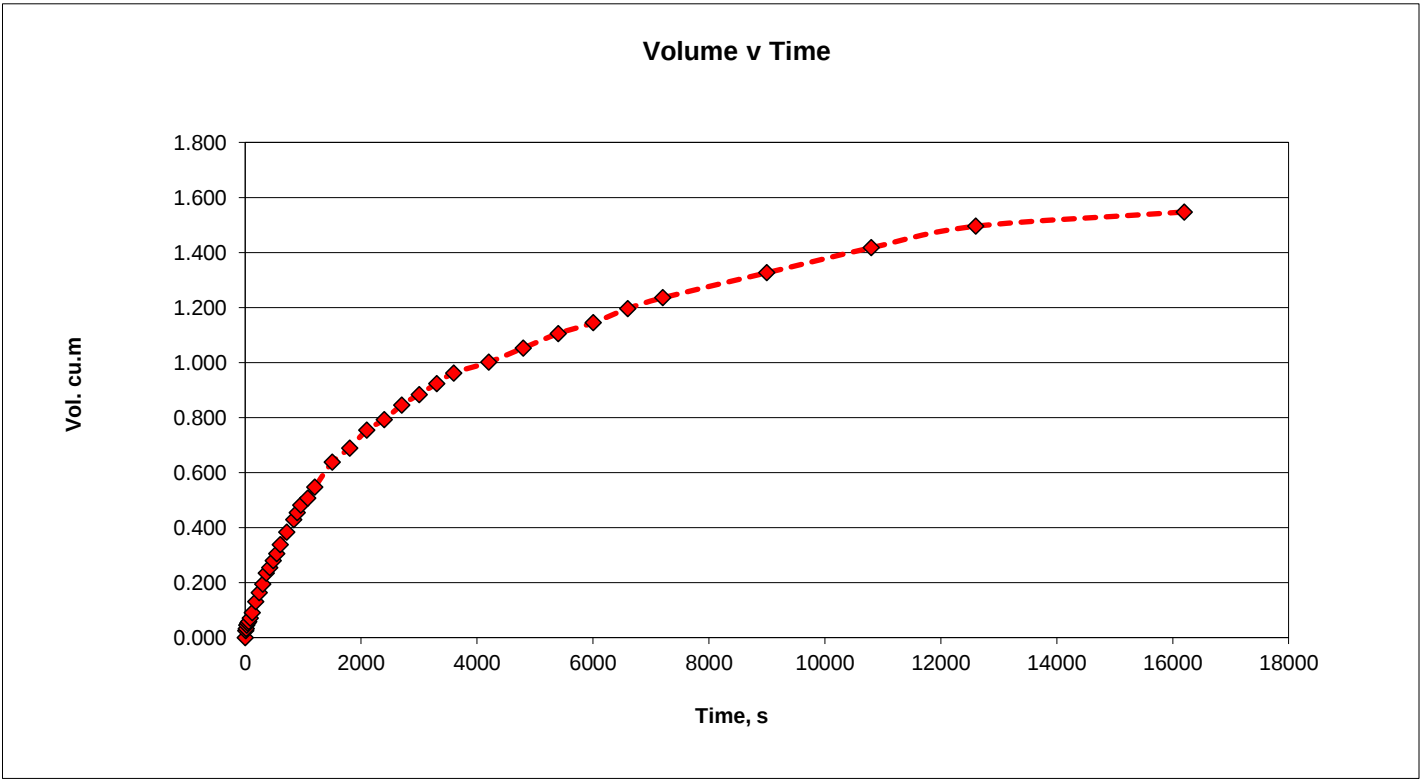
OCB Geotechnical Ltd

Project Name	Kildangan National School, Kildangan, Co. Kildare	Date	20/06/24
Project No.	24-033	Location	TP1

Length (m)	2.0	Width (m)	0.65	Depth (m)	1.6
Length Base (m)	2.0			Effective Depth (m)	1.50
Effective Length (m)	2.0				

Start	Time (min)	Measure (m)	Time (s)	Depth (m)	Fall (m)	Volume (m^3)
	0	0.100	0	1.500	0.000	0.000
	0.17	0.120	10	1.480	0.020	0.026
	0.25	0.125	15	1.475	0.025	0.033
	0.5	0.135	30	1.465	0.035	0.046
	0.75	0.140	45	1.460	0.040	0.052
	1	0.145	60	1.455	0.045	0.059
	1.5	0.155	90	1.445	0.055	0.072
	2	0.170	120	1.430	0.070	0.091
	3	0.200	180	1.400	0.100	0.130
	4	0.225	240	1.375	0.125	0.163
	5	0.250	300	1.350	0.150	0.195
	6	0.280	360	1.320	0.180	0.234
	7	0.295	420	1.305	0.195	0.254
	8	0.315	480	1.285	0.215	0.280
	9	0.335	540	1.265	0.235	0.306
	10	0.360	600	1.240	0.260	0.338
	12	0.395	720	1.205	0.295	0.384
	14	0.430	840	1.170	0.330	0.429
	15	0.450	900	1.150	0.350	0.455
	16	0.470	960	1.130	0.370	0.481
	18	0.490	1080	1.110	0.390	0.507
	20	0.520	1200	1.080	0.420	0.546
	25	0.590	1500	1.010	0.490	0.637
	30	0.630	1800	0.970	0.530	0.689
	35	0.680	2100	0.920	0.580	0.754
	40	0.710	2400	0.890	0.610	0.793
	45	0.750	2700	0.850	0.650	0.845
	50	0.780	3000	0.820	0.680	0.884
	55	0.810	3300	0.790	0.710	0.923
	60	0.840	3600	0.760	0.740	0.962
	70	0.870	4200	0.730	0.770	1.001
	80	0.910	4800	0.690	0.810	1.053
	90	0.950	5400	0.650	0.850	1.105
	100	0.980	6000	0.620	0.880	1.144
	110	1.020	6600	0.580	0.920	1.196
	120	1.050	7200	0.550	0.950	1.235
	150	1.120	9000	0.480	1.020	1.326
	180	1.190	10800	0.410	1.090	1.417
	210	1.250	12600	0.350	1.150	1.495
	270	1.290	16200	0.310	1.190	1.547

Area	1.3 m ²	V _{p75-25 theory}	volume	0.97500 m ³
50% Area_eff, a _{p50}	5.275 m ²	V _{p75-25}	volume	0.78 m ³
		t _{p 75-25}	time	6300 s
		Infiltration Coefficient	<i>f</i>	2.3E-05 ms ⁻¹



NOTES:
Weather: Dry, partly cloudy

Appendix G Geotechnical Soil Laboratory Test Results

Appendix H Environmental Laboratory Test Results