NSP Geotechnics Pty Ltd

GEOTECHNICAL INVESTIGATION FOR CATHOLIC LADIES COLLEGE, ELTHAM

Creo Consultants
Lvl 7, 176 Wellington Pde EAST MELBOURNE 3002

N1881
24 September 2020

NSP Geotechnics Pty Ltd ABN 48 340 751 834
9/40 Abbotts Road Dandenong South VIC 3175 Australia

NSP Geotechnics Pty Ltd

24 September 2020

Creo Consultants
Level 7, 176 Wellington Parade
EAST MELBOURNE VIC 3002

Attention: Scott Chancellor

Dear Scott

RE: GEOTECHNICAL INVESTIGATION for CATHOLIC LADIES COLLEGE, ELTHAM

We have pleasure in submitting herein our report detailing the results of the geotechnical investigation conducted at the above site

If you have any questions relating to this report or if we can be of further assistance, please do not hesitate to contact the undersigned.

For and on behalf of

NSP GEOTECHNICS PTY LTD

PETER NOONAN

Principal Geotechnical Engineer

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1 INTRODUCTION

At the request of Creo Consultants Pty Ltd, a geotechnical investigation has been conducted at the site of two new proposed buildings within the existing Catholic Ladies College located at 19 Diamond Street, Eltham.

The investigation has been conducted for the purpose of assessing typical subsurface conditions at the site, and consequently providing comments and recommendations on foundation and pavement design parameters.

2 FIELD INVESTIGATION

The field investigation and sampling was conducted on 16th September 2020 and involved the drilling of 6 boreholes to refusal depths ranging from 0.13m to 5.8 metres and exposure of existing foundations at 2 locations. Insitu testing was conducted at regular intervals during borehole advancement.

The approximate locations of the boreholes are shown on Figure 1 whilst the engineering borehole logs are included in Appendix 1.

The field work was performed by a Geotechnical Engineer who logged the subsurface materials encountered and supervised sampling and testing.

3 SITE CONDITIONS

The site is located at 19 Diamond Street, Eltham. The western half of site 2A has a steep slope to the east, the eastern half of site 2A is relatively flat as the result of previous levelling works and is currently occupied by existing carpark. The site 2B is relatively flat and is currently unoccupied.

The Geological Survey Map of Victoria, Melbourne Sheet show the site to be located on Silurian aged deposits, with this being generally confirmed by the field data.

The typical soil profile encountered at the site is as follows:

- **FILL: 30mm ASPHALT, Mulch, SANDY/SILTY/CLAYEY GRAVEL, SILTY SAND, GRAVELLY CLAY and/or TOPSOIL: CLAYEY SILT and natural GRAVELLY CLAYEY SILT,** fine to coarse sands and gravels, low plasticity silts, medium to high plasticity clays, brown, dark brown, grey and pale brown, dry to moist, loose to medium dense or stiff and typically extending to depths ranging from 0.10 to 3.80m.

Overlying (BH2, BH4 & FE2 Only)

- **SILTY CLAY (CH);** high plasticity, pale brown, brown and red brown, moist, very stiff and extending to depths ranging from 0.7 to 2.7 metres.

Overlying

- **SILTSTONE: Extremely to Moderately Weathered**, pale brown, dry, low to high strength rock and extending to the borehole refusal depths.

Some variations to the above typical soil profile were encountered at the site and reference should be made to the appended borehole logs for a full description of subsurface conditions at each borehole location.

A groundwater table or seepage inflows were not encountered during the investigation,

4 ENGINEERING RECOMMENDATIONS

4.1 Building Foundations

It is understood that the proposed development will include two new buildings and new carpark/access road pavements.

Details of the proposed footing systems are unknown, however, for the purpose of this report it is assumed that the construction will be founded on either a stiffened raft slab, pad and strip footings or bored pier foundation. Based on the results of the field investigation, foundations for the proposed buildings should be founded as follows:

- **SILTSTONE, Extremely to Moderately Weathered**, pale brown, dry, low to high strength and typically encountered at depths ranging from 0.10 to 3.80 metres below existing surface levels.

Edge and loadbearing beams of a stiffened raft slab founded as above may be proportioned for an allowable bearing pressure of 100kPa. Pad and strip footings founded in this manner may be proportioned for an allowable bearing pressure of 500 kPa.

In regard to the bored pier foundation system, it is assumed that the bored piers will be founded in the Moderately Weathered SILTSTONE materials. Bored piers founded a minimum of 2D into the MW SILTSTONE materials, where D is the pier diameter, may be proportioned for an allowable base bearing pressure of 750kPa. An allowable skin friction of 75kPa would be available for that section of the pier located in the MW SILTSTONE materials.

For the above founding conditions and subsequent allowable bearing pressures, settlements are expected to be less than 10mm.

Insofar as a Site Classification in accordance with the AS2870 – 2011 is applicable, this site would be strictly classified as **CLASS P** (AS2870 – 2011) due to the depth of FILL material on the site, however subject to the above recommendations on founding depth and media, footings may be designed in accordance with a **CLASS A** (AS2870 – 2011).

The base of all footing excavations should be carefully inspected to ensure that the founding materials are both naturally occurring and undisturbed and that they meet the requirements referenced herein with respect to both type and strength.

The exposure of the existing buildings foundations revealed that these footings are founded in the above mentioned EW/MW SILTSTONE materials at depths ranging from 0.1m to 0.8m+ below existing surface levels and may therefore be proportioned for allowable bearing pressures as recommended earlier. Full details of the existing footings dimensions are shown on the attached Footing Exposure logs.

4.2 Earthquake Loading

The subsurface profile consists of predominately Extremely to Moderately Weathered SILTSTONE rock materials. As such a site sub-soil classification, Class B_e can be adopted for this site in accordance with AS 1170.4- 2007 "Structural Design Actions Part 4: Earthquake actions in Australia".

4.3 Pavement Recommendations

As part of the development it is understood that flexible and rigid pavements may be constructed at the site and that they will be subject to both light and medium duty traffic corresponding to assumed design traffic loadings (DTL's) of 1 x 10^4 and 1 x 10^5 ESAs respectively. Light duty pavements would be applicable for carparking areas only whilst medium duty pavements would be applicable for access roads.

Based on the field data and subject to the following recommendations on subgrade preparation, a design CBR value of 3.0 is considered appropriate for the subgrade **FILL** materials at this site. The CBR value relates to the current minimum insitu value and previous experience with similar materials.

Pavement designs considered suitable for the projected traffic loadings and a design subgrade CBR value of 2 are as follows:

- **Flexible Pavements**

Design Traffic Loading (ESA's)	1 x 10^4	1 x 10^5
Asphalt (mm)	40	40
Base Course (mm)	100	100
Sub-base course (mm)	160	260
Total Thickness (mm)	**300**	**400**

- **Concrete Pavements**

Design Traffic Loading (ESA's)	1 x 10^4	1 x 10^5
Concrete Thickness (mm)	150	175
Sub-base Course (mm)	100	100

The above recommendations for concrete pavements assume a characteristic 28-day flexural concrete strength of 3.5 MPa.

Compaction standards applied to the above pavement construction should be as follows:

- Basecourse 100% Modified (AS 1289.5.2.1)
- Subbase 98% Modified (AS 1289.5.2.1)
- Subgrade 97% Standard (AS 1289.5.1.1)

Prior to pavement construction the exposed subgrade should be proofrolled to ensure a relatively uniform strength subgrade is achieved. Any obviously softened areas detected during the proofrolling process should be removed and replaced with a suitably compacted granular material.

The existing SANDY GRAVEL FILL materials may be reused in new pavement construction and would be suitable as Subbase type materials.

It should be noted that the SILTY SAND FILL and CLAYEY SILT materials encountered in some locations may become unworkable and untrafficable if they become saturated as the result of prolonged exposure to periods of rainfall and their removal may be required if saturation of these materials occurs.

4.4 Suitability of site won materials for use as fill

The natural and fill materials on site typically consist of SANDY/CLAYEY/SILTY GRAVEL, SILTY SAND, GRAVELLY CLAY FILL materials and natural CLAYEY/GRAVELLY SILT, SILTY CLAY and EW/MW SILTSTONE materials. The GRAVELS and CLAYS materials would generally be suitable for use as engineered fill provided they are properly moisture conditioned and compacted. The SILTS and SANDS are considered unsuitable for use as engineered fill materials due to their perceived sensitivity to changes in moisture content and subsequent difficulties in compaction. The excavated EW SILTSTONE materials should also be suitable for use as engineered fill provided they are properly moisture conditioned and compacted whilst the HW/MW SILTSTONE materials would not be suitable for use as engineered fill due to the presence of oversized rock pieces within these materials. It is recommended that the fill materials are compacted in accordance with Australian standards AS 3798 – 2007. It is recommended that the fill materials are compacted in accordance with Australian Standard AS 3798 – 2007.

4.5 Retaining Walls

It is understood that the construction of new retaining walls may be required and in this regard it is assumed they will comprise cantilever type retaining walls. Assuming the retaining walls are to be backfilled using a granular (Φ = 30°) material, retaining wall design should be based on an active earth pressure coefficient, K_A, of 0.3.

This earth pressure distribution assumes that adequate drainage is provided behind the walls such that no hydrostatic pressure build up occurs. If drainage is not provided behind the walls, then hydrostatic pressures will need to be added to the above earth pressure distribution for the full height of the retained ground.

The earth pressure distribution presented above applies where there are no buildings or other structures (such as underground services) located within the zone of influence of the excavation. Where adjacent building footings or underground services are located within the zone of influence of the excavation further information should be sought from NSP.

4.6 Excavation Conditions

Excavation of the FILL, natural CLAYEY/GRAVELLY SILT and SILTY CLAY materials will be readily achievable using conventional earthmoving equipment. Excavation of the EW/MW SILTSTONE materials will require the use of large earthmoving equipment and possibly ripping attachments especially in confined spaces such as footing excavations.

Temporary batter slopes excavated in the natural SILTY CLAY should not be steeper than 1H:1V and permanent cut batter slopes of up to 3m in height should not be steeper than 2H:1V in the natural clays. Temporary and permanent batter slopes in the FILL and natural CLAYEY/GRAVELLY SILT materials should not be steeper than 3H:1V. Temporary and permanent batter slopes in the EW to MW SILTSTONE rock materials should not be steeper than 1H:2V (70°).

As there was no ground water encountered during the investigation, and in the absence of major rain events, the excavated material should be trafficable during construction. As there were no soft areas identified by the geotechnical investigation any soft spots found during the construction period would be localised and not impact the entire site.

Some minor seepage inflows associated with surface runoff can be expected at the interface of the overlying FILL materials and the underlying SILTY CLAY or SILTSTONE; however these inflows are expected to be minimal and should not hamper excavation works.

It should be noted that as the excavation proceeds, inspections should be carried out by an NSP geotechnical engineer to confirm that there are no unfavourably aligned soil structures, for example fissures with slickensides or similar, in which case, a flatter batter or more substantial shoring would be required.

5 APPLICABILITY

Recommendations and opinions contained in this report are based on the interpretation of borehole logs at point locations and information from published geological maps. The nature and continuity of the subsoil away from the test locations are inferred, but it must be appreciated that actual conditions could vary from the assumed geotechnical model. If conditions other than those described are encountered, NSP should be engaged to assess whether the recommendations should be revised. The attached “Limitations of Report” provides additional information in the uses and limitations of this report.

6 REFERENCES

1. AS2870 – 2011 Residential Slabs and Footings Construction
2. Geological Survey of Victoria (1997), Melbourne 1:250,000 map sheet, Department of Natural Resources and Environment, Victoria

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Limitations of report

These notes have been prepared to assist in the interpretation and understanding of the limitations of this report.

Project specific criteria

The report has been developed on the basis of unique project specific requirements as understood by NSP and applies only to the site investigated. Project criteria are typically identified in the Client brief and the associated proposal prepared by NSP and may include risk factors arising from limitations on scope imposed by the Client. The report should not be used without further consultation if significant changes to the project occur. No responsibility for problems that might occur due to changed factors will be accepted without consultation.

Subsurface variations with time

Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. In the event of significant delays in the commencement of a project, further advice should be sought.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and at the time they are taken. All available data is interpreted by professionals to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, as it is virtually impossible to provide a definitive subsurface profile which includes all the possible variabilities inherent in soil and rock masses.

Report recommendations

The report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until earthworks and/or foundation construction is almost complete and therefore the report recommendations can only be regarded as preliminary. Where variations in conditions are encountered, further advice should be sought.

Specific purposes

This report should not be applied to any project other than that originally specified at the time the report was issued.

Interpretation by others

NSP will not be responsible for interpretations of site data or the report findings by others involved in the design and construction process. Where any confusion exists, clarification should be sought from NSP.

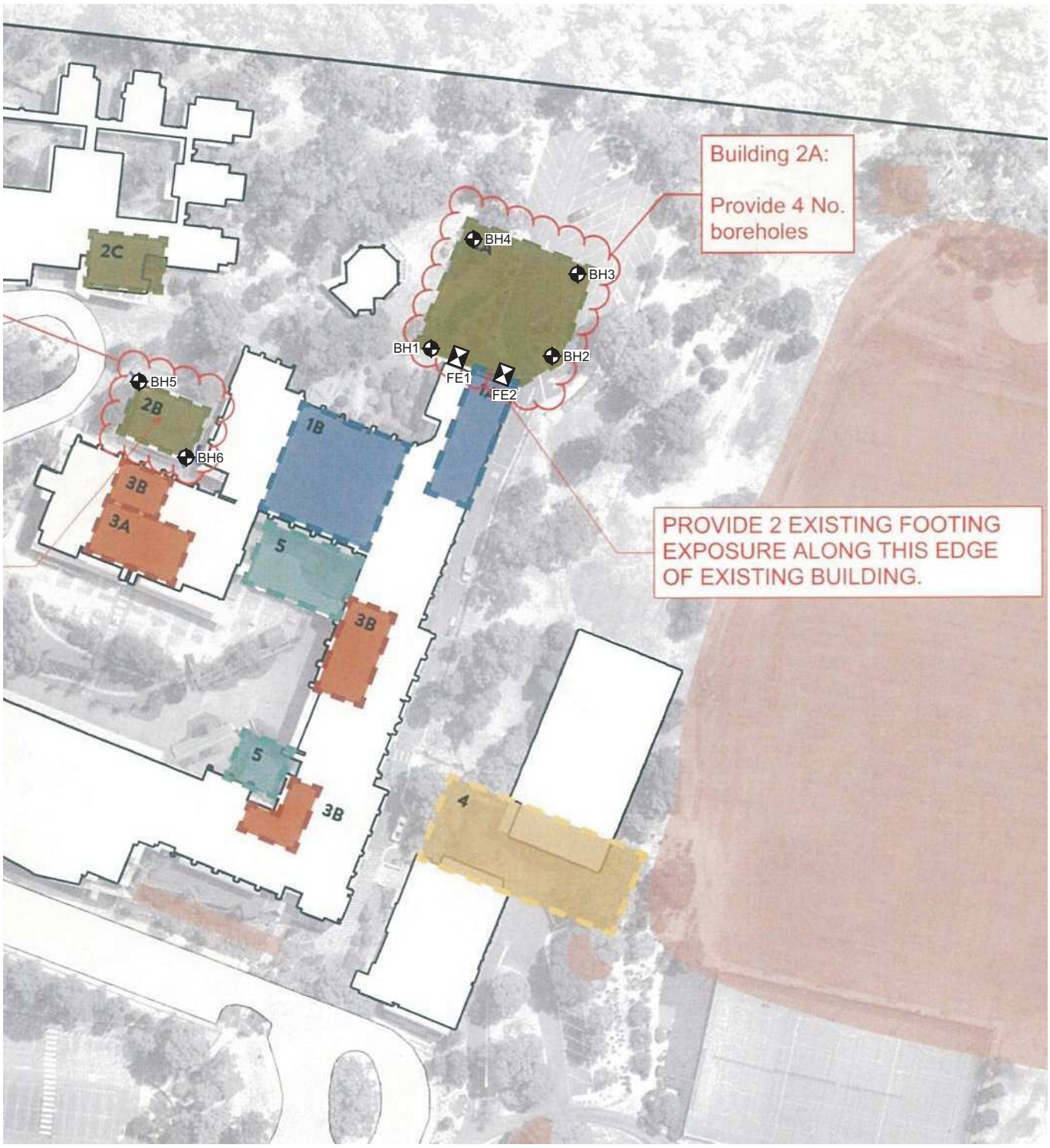
Report integrity

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

Geoenvironmental issues

This report does not cover issues of site contamination unless specifically required to do so by the client. In the absence of such a request, NSP take no responsibility for such issues.

Figures



ADVERTISED PLAN

CLIENT			
CREO CONSULTANTS	CATHOLIC LADIES COLLEGE ELTHAM		
NSP Geotechnics Pty Ltd	JOB NO N1881	SCALE NTS	FIG. 1

Appendix 1

Borehole Logs

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SOIL DESCRIPTIONS

Soil Type, Particle Size and Unified Soil Classification Group Symbols

Major Divisions		Symbols	Subdivision	Particle Size	USC Symbol	Typical Names
Coarse Grained Soils *(More than half of material is larger than 0.075mm)*	**Boulders**			>200mm		
	Cobbles			63mm – 200mm		
	Gravels *(more than half of coarse fraction is larger than 2.36mm)*	**G**	Coarse Medium Fine	20mm – 63mm 6mm – 20mm 2.36mm – 6mm	**GW**	Well graded gravels
					GP	Poorly graded gravels
					GM	Silty gravels
					GC	Clayey gravels
	Sands *(more than half of coarse fraction is smaller than 2.36mm)*	**S**	Coarse Medium Fine	0.6mm – 2.36mm 0.2mm – 0.6mm 0.075mm – 0.2mm	**SW**	Well graded sands
					SP	Poorly graded sands
					SM	Silty sands
					SC	Clayey sands
Fine Grained Soils *(more than half of material is smaller than 0.075mm)*	**Silts**	**M**		< 0.075mm	**ML**	Inorganic silts of low plasticity
					MH	Inorganic silts of high plasticity
	Clays	**C**			**CL**	Inorganic clay of low plasticity
					CI	Inorganic clay of medium plasticity
					CH	Inorganic clay of high plasticity
	Organic	**O**			**OL**	Organic silts of low plasticity
					OH	Organic clay of high plasticity
					Pt	Peat and other highly organic soils

Moisture Condition

Symbol	Term	Field Assessment
D	Dry	Clay and silt are hard, friable, powdery, well dry of plastic limit. Sands and gravels are cohesionless, free running
M	Moist	Feels cool, darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere
W	Wet	Feels cool, darkened in colour. Cohesive soils weakened, free water forms on hands when handling. Granular soils cohere

Soil Plasticity

Symbol	Term	Field Assessment
LP	Low Plasticity	Cannot be rolled into threads when moist
MP	Medium Plasticity	Can be rolled into threads when moist. Shows some shrinkage on drying
HP	High Plasticity	Can be rolled into threads when moist. Considerable shrinkage on drying. Greasy to touch. Cracks in dry material

Cohesive Soils – Consistency Terms

Symbol	Term	Field Assessment	Undrained Shear Strength
VS	Very Soft	Exudes between fingers when squeezed	< 12kPa
S	Soft	Can be moulded by light finger pressure	12kPa – 25kPa
F	Firm	Can be moulded by strong finger pressure	25kPa – 50kPa
St	Stiff	Cannot be moulded by fingers. Can be indented by thumb	50kPa –100kPa
VSt	Very Stiff	Can be indented by thumb nail	100kPa – 200kPa
H	Hard	Difficult to indented by thumb nail	> 200kPa

Granular Soil – Density

Symbol	Term	Field Assessment	SPT N – Value	Density Index (%)
VL	Very Loose	Foot imprints easily	< 4	< 15
L	Loose	Can be excavated with spade. 50mm peg easily driven	4 – 10	15 – 35
MD	Medium Dense	Shovelling difficult	10 – 30	35 – 65
D	Dense	Needs pick for excavation. 50mm peg hard to drive	30 – 50	65 – 85
VD	Very Dense	Picking difficult	> 50	> 85
C	Cemented	Cemented, indurated or large size particles	> 50	N / A

Ground Water		Sampling & Testing	
*	Not observed	**U63**	Undisturbed Sample, 63mm diameter
▽	Observed water level (with date shown)	**D**	Disturbed Sample
▶	Observed water inflow (with date shown)	**SPT N***	Standard Penetration Test + Sample, figure = results
◀	Observed water outflow (with date shown)	**V**	Vane Shear Test, figure = result (kPa)
R	Refer report for details	**PP**	Pocket Penetrometers Test, figure = result (kPa)
		DCP	Dynamic Cone Penetrometers Test, figure = blows/100mm
		E	Environmental Sample

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ROCK DESCRIPTIONS

Rock Strength

Symbol	Term	Point Load Index $Is_{(50)}$ (MPa)	Field Assessment
EL	Extremely Low	$Is_{(50)} < 0.03$	Easily remoulded by hand to a material with soil properties
VL	Very Low	$0.03 \leq Is_{(50)} < 0.1$	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; pieces up to 30mm thick can be broken by finger pressure
L	Low	$0.1 \leq Is_{(50)} < 0.3$	Easily scored with knife; indentations 1mm to 3mm after firm blows with pick point; core 150mm long and 50mm diameter can be broken by hand; sharp edges of core friable
M	Medium	$0.3 \leq Is_{(50)} < 1.0$	Readily scored with knife; core 150mm long and 50mm diameter can be broken by hand with difficulty
H	High	$1.0 \leq Is_{(50)} < 3.0$	Core 150mm long and 50mm diameter cannot be broken by hand but can be broken by single firm blow of pick; rock rings under hammer
VH	Very High	$3.0 \leq Is_{(50)} < 10$	Hand held specimen breaks with pick after more than one blow; rock rings under hammer
EH	Extremely High	$10 \leq Is_{(50)}$	Specimen requires many pick blows to break intact rock, rock rings under hammer

Rock Weathering Classification

Symbol	Term	Description
RS	Residual Soil	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported
EW	Extremely Weathered	Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident
HW	Highly Weathered	Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable
MW	Moderately Weathered	Significant colour change compared with fresh rock, bur not completely through rock fabric; substantial loss of lustre; rock fabric preserved.
SW	Slightly Weathered	Rock substance is slightly discoloured but shows little or no change of strength from fresh rock
Fs	Fresh Stained	Rock substance unaffected by weathering but staining visible along defects
Fr	Fresh	No signs of decomposition or staining

Degree of Fracturing

Term	Description
Fragmented	Fragments of < 20mm
Highly Fractured	Core lengths of 20mm – 40mm with some fragments
Fractured	Core lengths of 40mm – 200mm with some shorter and longer sections
Slightly Fractured	Core lengths of 200mm – 1000mm with some shorter and loner sections
Unbroken	Core lengths mostly > 1000mm

Stratification Spacing

Term	Separation of Stratification Planes
Thinly laminated	< 6mm
Laminated	6mm – 20mm
Very thinly bedded	20mm – 60mm
Thinly bedded	60mm – 0.2m
Medium bedded	0.2m – 0.6m
Thickly bedded	0.6m – 2m
Very thickly bedded	> 2m

Rock Quality Designation (RQD):

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$RQD\ \% = \frac{\text{Cumulative length of 'sound' core sections} \geq 100\text{mm long}}{\text{Total drilled length of section being assessed}}$$

(where 'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.)

Core Recovery:

Core recovery is calculated for each core run. Core recovery is the total length of core, rock or soil, recovered expressed as a percentage of the total length of the core run.

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ENGINEERING BOREHOLE LOG

Borehole no. 1
Sheet no. 1 of 1
Job no. N1881

Client :	CREO CONSULTANTS			Date :	16/09/2020
Project :	CATHOLIC LADIES COLLEGE, ELTHAM			Logged By :	CS/BZ
Location :	19 DIAMOND STREET, ELTHAM				
Drill model :	Ezidrill	Slope	90 deg	RL Surface :	*Not measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
ASPHALT: 30mm FILL: SANDY GRAVEL, fine to medium sands and gravels, brown (100mm) SILTSTONE: Moderately Weathered, high strength, pale brown BH1 - Refusal @ 0.40 metres	0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00		*	M D	MD H	FILL		D	-

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ENGINEERING BOREHOLE LOG

Borehole no. 2
Sheet no. 1 of 1
Job no. N1881

Client :	CREO CONSULTANTS			Date :	16/09/2020
Project :	CATHOLIC LADIES COLLEGE, ELTHAM			Logged By :	CS/BZ
Location :	19 DIAMOND STREET, ELTHAM				
Drill model :	Ezidrill	Slope	90 deg	RL Surface :	*Not measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
MULCH: 100mm			*					D	-
FILL: SILTY SAND, fine to medium sands, dark brown and grey				M	L/ MD	FILL			
FILL: SANDY GRAVEL, fine to coarse sands and gravels, brown and grey	0.50			M	MD	FILL			
FILL: SILTY GRAVEL, fine to coarse gravels, pale brown (Crushed SILTSTONE Materials)	1.00			M	MD	FILL			
FILL: GRAVELLY CLAY, medium to high plasticity, fine to coarse gravels, pale brown	1.50			M	St	FILL			
	2.00								
SILTY CLAY (CH), high plasticity, pale brown	2.50			M	VSt				
				D					
SILTSTONE: High Weathered, medium strength, pale brown	3.00			D	H				
becoming Moderately Weathered, high strength	3.50								
BH2 - Refusal @ 3.80 metres	4.00								

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ENGINEERING BOREHOLE LOG

Borehole no. 3
Sheet no. 1 of 2
Job no. N1881

Client :	CREO CONSULTANTS			Date :	16/09/2020
Project :	CATHOLIC LADIES COLLEGE, ELTHAM			Logged By :	CS/BZ
Location :	19 DIAMOND STREET, ELTHAM				
Drill model :	Ezidrill	Slope	90 deg	RL Surface :	*Not measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
ASPHALT: 30mm			*					D	-
FILL: SANDY GRAVEL, fine to medium sands and gravels, brown and grey				D	MD	FILL			
FILL: SILTY GRAVEL, fine to coarse gravels, pale brown (Crushed SILTSTONE Materials)	0.50			D/M	MD	FILL			
	1.00			D					
	1.50								
	2.00								
	2.50			M					
	3.00								
	3.50								
some clay									
SILTSTONE: Extremely Weathered, low to medium strength, pale brown	4.00			D	H				

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ENGINEERING BOREHOLE LOG

Borehole no. 3
Sheet no. 2 of 2
Job no. N1881

Client :	CREO CONSULTANTS			Date :	16/09/2020
Project :	CATHOLIC LADIES COLLEGE, ELTHAM			Logged By :	CS/BZ
Location :	19 DIAMOND STREET, ELTHAM				
Drill model :	Ezidrill	Slope	90 deg	RL Surface :	*Not measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
SILTSTONE: Extremely Weathered, low to medium strength, pale brown becoming Highly Weathered	4.50			D	H			D	-
becoming Moderately Weathered, high strength	5.50								
BH3 - Refusal @ 5.80 metres	6.00 6.50 7.00 7.50 8.00								

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ENGINEERING BOREHOLE LOG

Borehole no. 4
Sheet no. 1 of 1
Job no. N1881

Client :	CREO CONSULTANTS			Date :	16/09/2020
Project :	CATHOLIC LADIES COLLEGE, ELTHAM			Logged By :	CS/BZ
Location :	19 DIAMOND STREET, ELTHAM				
Drill model :	Handauger	Slope	90 deg	RL Surface :	*Not measured*
Hole diameter :	55mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
TOPSOIL: CLAYEY SILT, low plasticity, brown, roots to 100mm			*	M	St			D	-
GRAVELLY CLAYEY SILT (ML), low plasticity, fine to medium gravels, brown	0.50			M/D	St				
0.55m									
SILTY CLAY (CH), high plasticity, brown and red brown	1.00			M	VSt	V = 140+ kPa			
BH4 - Refusal @ 1.00 metre on SILTSTONE	1.50								
	2.00								
	2.50								
	3.00								
	3.50								
	4.00								

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ENGINEERING BOREHOLE LOG

Borehole no. 5
Sheet no. 1 of 1
Job no. N1881

Client :	CREO CONSULTANTS			Date :	16/09/2020
Project :	CATHOLIC LADIES COLLEGE, ELTHAM			Logged By :	CS/BZ
Location :	19 DIAMOND STREET, ELTHAM				
Drill model :	Handauger	Slope	90 deg	RL Surface :	*Not measured*
Hole diameter :	55mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
FILL: CLAYEY GRAVEL, fine-coarse, brown			*	M D	MD H	FILL		D	-
SILTSTONE: Highly to Moderately Weathered medium to high strength, pale brown									
BH5 - Refusal @ 0.13 metres	0.50								
	1.00								
	1.50								

Photo: N1881 - BH5

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ENGINEERING BOREHOLE LOG

Borehole no. 6
Sheet no. 1 of 1
Job no. N1881

Client :	CREO CONSULTANTS			Date :	16/09/2020
Project :	CATHOLIC LADIES COLLEGE, ELTHAM			Logged By :	CS/BZ
Location :	19 DIAMOND STREET, ELTHAM				
Drill model :	Handauger	Slope	90 deg	RL Surface :	*Not measured*
Hole diameter :	55mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
FILL: SILTY SAND, fine to medium sands, grey	0.15m		*	M	MD	FILL		D	-
SILTSTONE: Highly Weathered, medium to high strength, pale brown				D	H				
BH6 - Refusal @ 0.30 metres	0.50								
	1.00								
	1.50								

Photo: N1881 - BH6

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ENGINEERING BOREHOLE LOG

Borehole no. FE1
Sheet no. 1 of 1
Job no. N1881

Client :	CREO CONSULTANTS			Date :	16/09/2020
Project :	CATHOLIC LADIES COLLEGE, ELTHAM			Logged By :	CS/BZ
Location :	19 DIAMOND STREET, ELTHAM				
Drill model :	Handauger	Slope	90 deg	RL Surface :	*Not measured*
Hole diameter :	55mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations		Method	Support
(EXPOSED)	0.00						Concrete Footing	D	-
FILL: MULCH and SILTY SAND, dark brown				M	L	FILL			
SILTSTONE: Highly to Moderately Weathered, medium to high strength, pale brown				D	H		Underside @ 0.1m		
FE1 - Refusal @ @ 0.40 metres	0.50								
	1.00								

Photo: N1881 - FE1

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ENGINEERING BOREHOLE LOG

Borehole no. FE2
Sheet no. 1 of 1
Job no. N1881

Client :	CREO CONSULTANTS			Date :	16/09/2020
Project :	CATHOLIC LADIES COLLEGE, ELTHAM			Logged By :	CS/BZ
Location :	19 DIAMOND STREET, ELTHAM				
Drill model :	Handauger	Slope	90 deg	RL Surface :	*Not measured*
Hole diameter :	55mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Method	Support
FILL: SILTY SAND, fine to medium sands, dark brown			*	M	L	FILL ←0.45m→	D	-
FILL: SANDY GRAVEL, fine to medium sands and gravels, brown and grey				M	MD	FILL Outstands = 0.35m		
SILTY CLAY (CH), high plasticity, pale brown	0.50			M	VSt	Concrete Footing		
SILTSTONE: Extremely Weathered, brown				D	H			
FE2 - Refusal @ 0.80 metres	1.00 1.50							

Photo: N1881 - FE2