TITLE
Project Olympus WORKING TEST PILE DESIGN REPORT Asite Ref: LCY11-KTB-B1-ZZ-RP-C-00004 Revision: C02

Description of modifications
LCY11-KTB-B1-ZZ-DR-C-00004 P02, LCY11-KTB-B1-ZZ-CT-C-00004 C01 & LCY11-KTB-B1-ZZ-RP-C-00004 C01 Have all now been withdrawn and instead combined into LCY11-KTB-B1-ZZ-RP-C-00004 to form one document This new combined document will include all latest revisions of the design check certificate, drawings and design report, and be uploaded as a C02 revision.

Design & Check Certificate

Project Title:	Project Olympus	**WHP Project No.:**	3463
Design Item:	Working Test Pile Design	**Location on site:**	LCY11
Document Number:	3463-WHP-XX-XX-RP-X-0300		
Client:	Keltbray Built Environment		
DB Reference No.:	DB-003	**Check Category:**	Cat 2
Rev Description:	C02		

Designed by:

I certify that reasonable professional skill and care has been used in the preparation of this design.

Name:	Janavi Patel	**Signature:**	Janavi Patel Digitally signed by Janavi Patel DN: C=GB, E=jan.patel@wentworth-house.co.uk, O=Wentworth House, OU=Team 9, CN=Janavi Patel Location: Esher Reason: I am the author of this document Contact Info: 07774 690128 Date: 2025.04.09 10:48:36+01'00'
Qualifications:	MEng, GMICE	**Date:**	09 April 2025

Description of Design:

Working Test Pile Design Report and the selection of the appropriate Socotec proprietary pile load test frame to carry the design test loads. The purpose of the updated design is adjusted to provide increased coverage across the site to more critical piles.

Design References:

LCY10-CDL-XX-XX-RP-GE-10002 – Geotechnical and Geoenvironmental Summary Report revP01 (Cundall, 2024)

LCY-CDL-XX-XX-RP-GE-20004 – Phase II Geotechnical and Geoenvironmental Assessment revP01 (Cundall, 2024)

13464-HYD-XX-DS-GE-1000 – Report on Desk Study and Ground Investigation (Hydrock, 2020)

DUN-H30219 – Factual Report on Site Investigation for Land at Project Olympus (Dunelm, 2024)

LCY10-CDL-XX-XX-SP-GE-50001 revP02 – Specification for Piling and Embedded Retaining Walls (Cundall, 2024)

BS EN 1536: 2010. Execution of special geotechnical work – Bored Piles

BS EN 1992-1-1:2004. Eurocode 2: Design of concrete structures

BS EN 1997-1:2004. Eurocode 7 Geotechnical Design

BS EN ISO 14688-1: 2002 + A1:2013. Geotechnical investigation and testing – Identification and classification of soil. Part 1: Identification and description

BS EN ISO 14688-2: 2004 + A1:2013. Geotechnical investigation and testing – Identification and classification of soil. Part 2: Principles for a classification

ICE Specification for Piling and Embedded Retaining Wall (SPERW) 3rd edition 2016

NA to BS EN 1991:2004. UK National annex to Eurocode 7: Geotechnical Design

NA to BS EN 1992-1-1:2004. UK National annex to Eurocode 2 Design of concrete structures. 1.1 General rules and rules for building

BS 8004:2015. Code of practice for foundations, BSI Standards Publication

Design Statement:	LCY11-KTB-B1-ZZ-RP-C-00004 C02
Design Risk Assessment:	3463-WHP-XX-XX-HS-X-0301-S4-C01
Design Deliverables:	
LCY11-KTB-B1-ZZ-RP-C-00004 C02	

Checked by:

I certify that reasonable professional skill and care has been used to undertake this design check.

Name:	Vasileios Mantikos	**Signature:**	Digitally signed by: Vasileios Mantikos DN: CN = Vasileios Mantikos email = Vasileios.Mantikos@wentworth-house.co.uk C = GB O = Keltbray OU = WHP Date: 2025.04.14 16:21:16 +01'00'
Qualifications:	PhD DIC, MSc DIC, MEng, CEng MICE	**Date:**	09 April 2025
Comment Doc Ref:	N/A		
Comments:			
If none, then state none			

Approved by:

I certify that this design check has been undertaken by suitably qualified and experienced personnel in accordance with the WHP business operating processes and procedures.

Name:	Kostas Leontaridis	**Signature:**	Kostas Leontaridis Digitally signed by: Kostas Leontaridis DN: CN = Kostas Leontaridis email = kostas.leontaridis@wentworth-house.co.uk C = GB O = WHP Date: 2025.04.14 16:18:04 +01'00'
Qualifications:	MEng, CEng MICE	**Date:**	09 April 2025
Comments:			
If none, then state none			

- This certificate is valid only for the design as show in the documents listed. Change to the design will invalidate this certificate, any changes must be reported to the design/checker for re-assessment.

Project Olympus

Working Test Pile Design Report

Report reference: LCY11-KTB-B1-ZZ-RP-C-00004 C02

keltbray
serious on safety

FEDERATION OF PILING SPECIALISTS

PROJECT DETAILS

Client: McLaren

DOCUMENT

Title: Project Olympus

Reference: LCY10-KTB-XX-ZZ-RP-C-00004

DOCUMENT ISSUE

Rev	Dated	Details	Prepared by	Checked by	Approved by
C01	26/03/2025	First Issue	CM	MS	SS
C02	14/04/2025	Change of test piles	JP	FM	KL

This design is in accordance with the principles set out in current Standards, Codes of Practice and Industry Specifications. Reference to a Standard, Code of Practice or Specification does not imply total compliance within the whole document. Standards, Codes of Practice and Specifications are complied with where, in the experience of Keltbray, they are appropriate. In the event of a conflict between Specifications, Standards and Codes of Practice, Keltbray will generally design in accordance with the ICE Specification for Piling and Embedded Retaining Walls (SPERW) 2016.

Table of Contents

Table of Tables

1 Executive Summary

- The calculations presented herein cover the design for the 7no working test piles (WTP) and associated anchor piles for the proposed development at Project Olympus.
- The WTPs are to be constructed using the continuous flight auger (CFA) method of piling. Test piles are to be integrity tested ahead of commencing the pile load test. A test cap shall be installed, and the load jack shall be centralised on the pile centre as opposed to the pile cap to prevent eccentric loading of the test pile.
- Design of the piles is based on a minimum characteristic concrete cylinder strength of 32N/mm^2 (i.e. C32/40). These are to be confirmed through concrete cube testing taken prior to any pile testing.
- Tests shall be carried out using either S300 or S450 test frames, with 2no or 3no. anchor piles respectively.
- Piles shall be installed from a piling platform at a level of 2.9mOD.
- All working test piles are to be undertaken in accordance with the ICE Specification for Piling and Embedded Retaining Walls (SPERW), 3rd Edition and loaded in accordance with Table B17.1.
- Reinforcement design carried out in accordance with BS EN 1992-1-1:2004 (Eurocode 2). DYWIDAG tension bars shall be installed in anchor piles and shall project approximately 2m above the test pile cap level (or to suit the test frame arrangement).
- A detailed CDM risk assessment has been undertaken for the proposed works and is contained in Appendix A.
- The design for the test piles and anchor piles are summarised in Tables 1 and 2 respectively.

Test Ref	Test Pile	Test Frame	No. of	Pile diameter (mm)	F_{rep}	DVL (kN)	DVL +
WTP1	P623	S300	2	450	1358	1378	2057
WTP2	P113	S450	3	600	2416	2421	3629
WTP3	P431A	S450	3	600	2461	2466	3697
WTP4	P024	S450	3	600	2404	2405	3607
WTP5	P600	S450	3	600	1507	1555	2309
WTP6	P145	S450	3	750	2316	2331	3489
WTP7	P309	S450	3	750	2714	2730	4087

Table 1 Pile design summary

Test Pile	Max Test Load (kN)	No. of	Anchor Pile	Max Anchor Load (kN)	Design Toe	DYWIDAG Bars per pile
WTP1	2057	2	600	1029	-18.4	1D47
WTP2	3629	3	600	1210	-19.8	1D47
WTP3	3697	3	600	1233	-20.1	1D47
WTP4	3607	3	600	1203	-19.8	1D47
WTP5	2309	3	600	770	-16.6	1D36
WTP6	3489	3	750	1163	-17.8	2D36
WTP7	4087	3	750 600	1363	-19.0 -20.8	2D40

Table 2 Anchor Pile Summary

2 Project summary

2.1 General

The proposed scheme for new data centres comprises 3no data centre buildings up to eight storeys in height, a substation and a secant wall. Each data centre building comprises 655no bearing piles ranging from 450mm to 900mm diameter. This report covers the design of the proposed working test piles for LCY11.

It is proposed that 7no WTPs are carried out within LCY11. The proposed tests include 4no 600mm, 2no 750mm and 1no 450mm diameter piles. The proposed locations of the test piles have been based upon several factors:

- F_{rep} within the upper quartile of loads.
- Testing locations spread across LCY11 to ensure a good coverage of results.
- To avoid known obstructions.

All WTPs and associated anchor piles shall be installed as CFA piles. The tests shall be carried out using either a S300 or an S450 test frame with 2no or 3no anchor piles respectively. Anchor piles shall have 1no or 2no central bar(s) anchored into the test frame, the diameter and length of the bars shall vary depending on the maximum load per anchor.

3 Piling Specification – Key Requirements

3.1 Project piling specification

- Specification for the bearing piles can be found in the document titled, Project Olympus – Performance Specification for Piling and Embedded Retaining Walls, report reference LCY10-CDL-XX-XX-SP-GE-50001 revP02.
- B1.2(j) - All piles shall have a minimum factor of safety of 1.2 on shaft friction when ignoring pile base resistance.
- B1.2(o) – Due to the number of piles and expected ground conditions preliminary piles are considered necessary.

3.2 Comments on the project piling specification

- Piles shall be tested to DVL + 50% F_{rep} in accordance with Table B17.1.
- F_{rep} hasn't been provided by the Engineer. Therefore, F_{rep} has been determined by Keltbray.

3.3 Information to be provided / clarified by the Clients Engineer

- Acceptance of the basis for this design by all parties and any qualifications presented herein.
- Acceptance of the proposed working test pile locations.
- Serviceability performance requirements are as proposed:
    - 450mm: 6mm at DVL, 10mm at DVL + 50% F_{rep}
    - 600mm: 6mm at DVL, 10mm at DVL + 50% F_{rep}
    - 750mm: 7mm at DVL, 10mm at DVL + 50% F_{rep}
    - 900mm: 8mm at DVL, 12mm at DVL + 50% F_{rep}
- No debonding will be present above final pile cut off level for the working test piles. Piles are to be broken down to required COL and integrity tested before incorporating into the foundations.

4 Ground Conditions

For a full assessment of the ground conditions, refer to the bearing pile design report ref. LCY11-KTB-B1-ZZ-DN-X-00002.

4.1 Geotechnical Design Parameters

The soil parameters adopted for the pile design are summarised in Table 3 below. For the full soil strength plots, see Appendix B.

Stratum	Level (mOD)	γ (kN/m³)	α / K_s	φ' (°)	Cu (kPa)
Made Ground	2.9 (PPL)	16	0.8	30	N/A
Alluvium	0.0	16	0.5	N/A	15
River Terrace Deposits	-4.0	20	0.8	34	N/A
London Clay	-11.5	20	0.5	24	140+10z
Lambeth Sand/Gravel	-17.5	20	0.9	38	N/A
Lambeth Clay	-24.0	20	0.5	24	300
Thanet Sands	-28.0	20	0.9	38	N/A

Table 3 Summary of design soil parameters

5 Test Pile Design

5.1.1 Basis of Design

For the design of the permanent works piles, see report ref. LCY11-KTB-B1-ZZ-DN-X-00002. Pile reinforcement shall be extended to the pile platform level to enable for load testing to be carried out.

The purpose of the WTPs is to validate the performance of the piles, in accordance with the project specification and BS EN 1997-1:2004 (Eurocode 7). The capacity through Made Ground has been ignored in the permanent works designs and the design of the anchor piles. The WTPs will be tested at DVL and DVL + ½ F_{rep}, in accordance with Table B17.1 of ICE SPERW.

5.1.2 Working Test Pile Loading

In the absence of a specified F_{rep} by the engineer, this has been calculated by Keltbray. In accordance with the approach outlined in the bearing pile design report (ref. LCY11-KTB-B1-ZZ-DN-X-00002), Safe Working Load (SWL), or F_{rep}, has been calculated applying the appropriate Ψ_2 values for quasi-permanent actions to the imposed loadings as per Table NA.A1.1 of the National Annex to BS EN 1990:2002+A1:2005 (Eurocode 0). A factor of 0.6 for Category C and D has been applied to the variable actions and a factor of 0 has been applied to wind and temperature loads. Further to this, as there is a significant risk of Negative Skin Friction (NSF) in the permanent conditions, an additional load equal to the value of calculated NSF has been applied.

Further to this, as piles shall be tested from a platform level above the permanent pile cut off level, as well as some length of pile through strata where capacity is not taken for the permanent works design, additional load has been added to the Design Verification Load (DVL) to account of the build-up of shaft friction along these lengths. See Appendix C for the capacity calculations. A summary of the WTP loads for each test can be seen in Table 4 below.

Test Ref	Test Pile	Test Frame	Pile diameter (mm)	Pile COL (mOD)	F_{rep} (kN)	DVL (kN)	DVL + 50%F_{rep}
WTP1	P623	S300	450	0.965	1358	1378	2057
WTP2	P113	S450	600	2.04	2416	2421	3629
WTP3	P431	S450	600	2.040	2461	2466	3697
WTP4	P024	S450	600	2.515	2404	2405	3607
WTP5	P600	S450	600	0.265	1507	1555	2309
WTP6	P145	S450	750	1.615	2316	2331	3489
WTP7	P309	S450	750	1.540	2714	2730	4087

Table 4 WTP Load summary

6 Anchor Pile Design Summary

6.1 Geotechnical Design

Due to the nature of the ground conditions, no shaft capacity is taken through the Made Ground or the Alluvium in the design of the anchor piles. The anchor piles are designed with a factor of safety on the shaft friction of 2.0. For full capacity calculations, see Appendix C. Full anchor designs are provided in Appendix D.

6.1.1 Calculation of Ultimate Capacity

The geotechnical capacity of the anchor piles has been calculated using the methodology described below:

Shaft Resistance - Cohesive strata

Characteristic Shaft Resistance of Stratum $q_{s;i;k}$ = $\alpha \times C_{u\ av.}$

Characteristic Shaft Resistance of Pile $R_{s;k}$ = $A_{s;i}\ q_{s;i;k}$

Where:

A_s = π x dia x length of shaft in clay

$C_{u\ av.}$ = Av. undrained shear strength over length of shaft

α = 0.5

Note that ultimate shaft friction has been limited to a maximum value of 140kPa in the London Clay with the average value over the pile shaft length not exceeding 110kPa.

Shaft Resistance – Cohesionless strata

Characteristic Shaft Resistance of Stratum $q_{s;i;k}$ = $K_s \tan \delta \times {}_{-}{}'$

Where shaft friction factor K_s = values as per Table 4

Characteristic Shaft Resistance of Pile $R_{s;k}$ = $A_{s;i}\ q_{s;i;k}$

Where:

A_s = π x dia x length of shaft in clay

${}_{-}{}'$ = Average effective vertical stress

6.2 Structural Design

6.2.1 Structural Design Parameters

Anchor Pile diameter = 600mm/750mm

Min. Concrete strength, f_{cu}	=	40 N/mm² (i.e. C32/40 @ 28 days)
Dywidag Steel f_y	=	950 N/mm² (BS 4486)
Material factors	=	1.15 (reinforcement)
	=	1.65 (concrete)

6.2.2 Tension Bars

The capacities of the Dywidag tension bars summarised in Table 5. In accordance with DYWIDAG guidance, 75% of the ultimate capacity is used for geotechnical applications. All Dywidag bars extend to full length of anchor.

Nominal Diameter	Steel Grade	Ultimate Strength *f*pu	0.1% (a) Proof Strength	70% (b) Ultimate Strength	50% Ultimate Strength	Cross Sectional Area	Diameter Over Threads	Thread Pitch	Bar Weight
mm	N/mm²	kN	kN	kN	kN	mm²	mm	mm	kg/m
15	900/1100	195	159	136	98	177	17	10	1.44
20	900/1100	345	283	241	173	314	23	10	2.56
26.5	950/1050	579	523	405	290	551	30	13	4.48
32	950/1050	844	764	591	422	804	36	16	6.53
36	950/1050	1069	967	748	535	1018	40	18	8.27
40	950/1050	1320	1194	924	660	1257	45	20	10.21
47	950/1050	1822	1648	1275	911	1735	52	21	14.10
57	835/1035	2671	2155	1870	1335	2581	64	21	20.95
65	835/1035	3447	2771	2413	1724	3318	71	23	27.10
75	835/1035	4572	3645	3200	2286	4418	82	24	35.90

Table 5 Dywidag Bar capacities

6.3 Anchor Pile Design Summary

For a summary of the design of the anchor piles for each working test, see Table 6 below.

Test Pile	Test Load (kN)	No. of Anchors	Anchor Pile	Max Anchor Load (kN)	Design Toe	DYWIDAG Bars per pile(1)
WTP1	2057	2	600	1029	-18.4	1D47
WTP2	3629	3	600	1210	-19.8	1D47
WTP3	3697	3	600	1233	-20.1	1D47
WTP4	3607	3	600	1203	-19.8	1D47
WTP5	2309	3	600	770	-16.6	1D36
WTP6	3489	3	750	1163	-17.8	2D36
WTP7	4087	3	750 600	1363	-19.0 -20.8	2D40

Table 6 Anchor Pile Summary

7 References

7.1 Document References

1. LCY10-CDL-XX-XX-RP-GE-10002 – Geotechnical and Geoenvironmental Summary Report revP01 (Cundall, 2024)
2. LCY-CDL-XX-XX-RP-GE-20004 – Phase II Geotechnical and Geoenvironmental Assessment revP01 (Cundall, 2024)
3. 13464-HYD-XX-DS-GE-1000 – Report on Desk Study and Ground Investigation (Hydrock, 2020)
4. DUN-H30219 – Factual Report on Site Investigation for Land at Project Olympus (Dunelm, 2024)
5. LCY10-CDL-XX-XX-SP-GE-50001 revP02 – Specification for Piling and Embedded Retaining Walls (Cundall, 2024)
6. BRE Special Digest 1: 2005 3rd Edition
7. BS 8002:2015. Code of practice for retaining structures, BSI Standards Publication
8. BS EN 1536: 2010. Execution of special geotechnical work – Bored Piles
9. BS EN 1992-1-1:2004. Eurocode 2: Design of concrete structures
10. BS EN 1997-1:2004. Eurocode 7 Geotechnical Design
11. BS EN ISO 14688-1: 2002 + A1:2013. Geotechnical investigation and testing – Identification and classification of soil. Part 1: Identification and description
12. BS EN ISO 14688-2: 2004 + A1:2013. Geotechnical investigation and testing – Identification and classification of soil. Part 2: Principles for a classification
13. BS4449: 2005. Steel for reinforced concrete
14. CIRIA C761 (2018). Tower crane foundation and tie design
15. ICE Specification for Piling and Embedded Retaining Wall (SPERW) 3rd edition 2016
16. NA to BS EN 1991:2004. UK National annex to Eurocode 7: Geotechnical Design
17. NA to BS EN 1992-1-1:2004. UK National annex to Eurocode 2 Design of concrete structures. 1.1 General rules and rules for building
18. The Concrete Centre, How to Design Concrete Structures using Eurocode 2 (Bond, A.J., Brooker, O., Harris, A.J., Harrison, T., Moss, R.M., Narayanan, R.S., and Webster, R., 2006)
19. Orr et al (2010) Shear design EC2 truss model
20. BS 8004:2015. Code of practice for foundations, BSI Standards Publication

Appendix A Design Risk Assessment

Design Risk Assessment

Project:	Project Olympus
Contract no:	3646
Prepared by:	JP
Checked by:	FM
Date:	14/04/2025
Revision:	**C02**

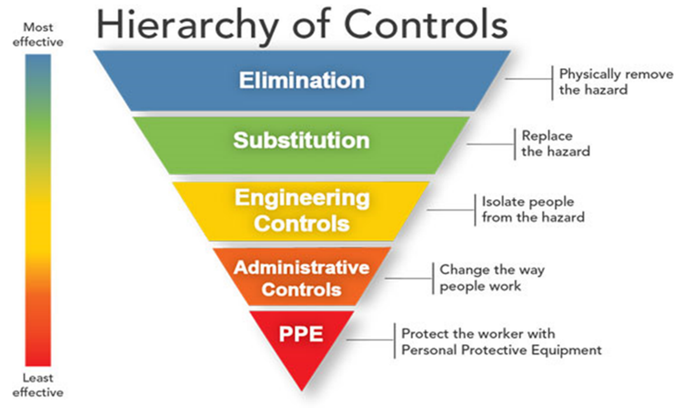
Risk matrix					
Severity score	**Likelihood score**				
	1	**2**	**3**	**4**	**5**
1	Low	Low	Low	Med	Med
2	Low	Low	Med	Med	High
3	Low	Med	Med	High	High
4	Med	Med	High	High	High
5	Med	High	High	High	High

Severity category			
Score	**Health & Safety**	**Environmental**	**Technical**
1	Inconvenience / Minor delay to work	Short term local damage	Design approval required
2	Minor injury	Medium term local damage / Short term regional damage	Onerous performance specification
3	Reportable / Lost time injury	Long term local damage / Regional damage	Complex design solution / Variable soil
4	Major injury or illness. Long term effects	Long term widespread damage	Limited SI data / Highly variable soil
5	Fatalities	Widespread permanent damage	Catastrophic element failure / Novel design

Likelihood category		
Score	**Description**	**Likelihood**
1	Improbable	About 1:1000
2	Remote	About 1:100
3	Occasional	About 1:10
4	Probable	Likely
5	Frequent	Expected

Residual Risk level action	
Risk level	**Action required**
Low	Check that no further risks can be eliminated by design modifications. Proceed with design.
Med	Consider alternative design or construction method. If alternatives are not available, specify precautions to be adopted. List residual hazards in risk register.
High	Seek alternative solutions. If alternatives are not available, specify precautions to be adopted. Inform Ops Manager and list residual hazards in risk register.

Ref	**Hazard**	**Cause**	**Type**	**Activity**	**Pre Control Measure**			**Control Measure**	**Responsibility**	**Post Control Measure**			**Residual risk**
					Severity	**Likelihood**	**Risk**			**Severity**	**Likelihood**	**Risk**	
1	Personal injury or death	Reinforcement falling during lifting activities due to failure at lifitng points	Health & Safety	Piling	5	3	High	Checks to be carried out on the lifting points to ensure sufficient capacity by others. Lift plans to be covered in the RAMS.	Keltbray	5	3	High	
2	Excessive ground movements	Overflighting of pile bore	Technical	Piling	4	2	Med	Control of the auger revolutions per metre.Target of 10 revolutions per metre. Use of "Auto-drill" function on the rig where available.	Keltbray	4	2	Med	
3	Geotechnical failure of pile	Anchor piles being pulled out of ground due to poor ground conditions	Technical	Piling	4	2	Med	Completing the design with conservative ground parameters will provide greater shaft capacity	Keltbray	4	1	Med	
4	Structural failure of pile	Positioning of the tension bars being out of design tolerance	Technical	Piling	4	3	High	Surveying the pile before the commencement of any testing to verify that the tension bars are within tolerance and suitable for use. Ensuring correct bars are placed into the correct test piles.	Keltbray	4	3	High	
5	Structural failure of pile	Tension bar couplers not secured correctly causing failure	Technical	Piling	4	2	Med	Ensuring the couplers are double checked by operatives for sufficient anchorage and tightness of bond	Keltbray	4	2	Med	
6	Structural failure of pile	Insufficient reinforcement anchorage due to tension bar being installed low.	Technical	Piling	4	3	High	Tension bars to be detailed to allow for reinforcement installation tolerances as per ICE SPERW. Tension bars to be tied off at the required level to prevent sinking under self-weight.	Keltbray	4	1	Med	
7	Structural failure of pile	Insufficient concrete strength	Technical	Piling	5	3	High	Concrete trials to be undertaken ahead piling works. Concrete cubes to be taken at 7, 28 and 56 days. Cubes to be taken by trained operatives and in accordance with relevant standards.	Keltbray	5	3	High	
8	Plant overturning	Failure of the working platform	Technical	Piling	5	3	High	Platform to be designed by others to relevant design standards. Verification testing to take place ahead of loading. Platform to be regularly inspected and maintained.	Temporary Works Designer	5	3	High	



Appendix B Bearing Capacity Calculations

Project				
Project Olympus				
Calculations for	Job No			
Bearing capacity - Anchor Piles	Cal'd by	CM	Date	18/03/2025
	Ch'd by	MS	Date	18/03/2025

Pile Details

Analysis:	Single pile	Design factors:	EC7	
Piling method:	CFA	PPL =	2.900	mOD
Compression testing?	Yes	COL =	2.900	mOD
Tension testing?	No	Calculation increment =	0.100	m
Prelim test?	Yes			

Pile Properties

f_{ck} = 32 N/mm^2 i.e. C32/40

α_{cc} = 0.85

K_f = 1.1

γ_c = 1.5

Pile diameters (mm)			
450	600	750	900
Concrete capacity (kN)			
2622	4661	7283	10487

Partial factors for pile resistance

EC7 - Combination 1		EC7 - Combination 2	
+ Shaft	1	+ Shaft	1.2
Base	1	Base	###########
- Shaft	1	- Shaft	2.4
	Model factor	1.0	BS EN 1997

LDSA (2009)	
FoS in compression =	N/A
FoS in tension =	N/A
FoS on shaft resistance =	N/A

Minimum FoS on shaft resistance = 1.00E-06 (Nominal factor - not used in LDSA analysis)

Analysis options Overburden stress σ_v' = 0 Minimum embeddment in founding stratum = 2 x D

Groundwater conditions

Porewater pressure profile: Hydrostatic

Water level = 1.0 mOD

Granular soils

delta/phi: δ/φ = 1.00

N_q: Calculated based on phi

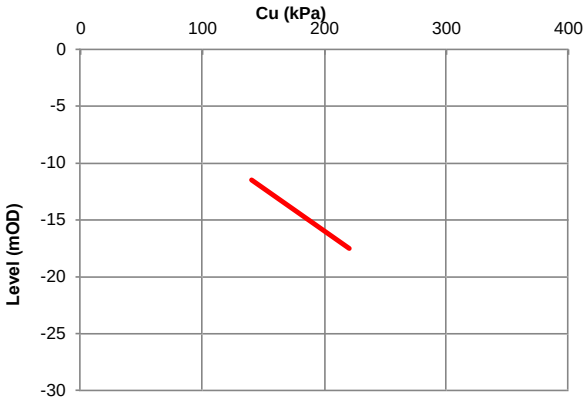
Limiting N_q: $N_{q,max}$ = 200

Chalk PR11 Base resistance factor: q_b/N =

Cohesive soils Bearing capacity factor: N_c = 9.0

Undrained strength

Level (mOD)	Cu (kPa)	
-11.5	140	
-17.5	220	z= 13.333
-24	300	z= 12.5
-28	300	z= 0



Soil Information

Number of strata 6

Soil No	Stratum	Type	γ (kN/m²)	ϕ'	α or K_s	Top	Bottom	$q_{us,max}$ (kPa)	$q_{ub,max}$ (kPa)	Cased?
1	Alluvium	made ground	16	#N/A	#N/A	4.0	-4.0	#N/A	#N/A	No
2	RTD	sand	20	34.0	0.80	-4.0	-11.5	200	10000	No
3	LC	clay	20	#N/A	0.50	-11.5	-17.5	140	4000	No
4	LG Gravel	sand	20	38.0	0.90	-17.5	-24.0	200	4000	No
5	LG Clay	clay	20	#N/A	0.50	-24.0	-28.0	140	4000	No
6	Thanet	sand	20	38.0	0.90	-28.0	-35.0	200	15000	No

Project				
Project Olympus				
Calculations for	Job No:			
Bearing capacity - Anchor Piles	Calculated by	CM	Date 18/03/25	Sheet Nr
	Checked by	MS	Date 18/03/25	of

RESULTS SUMMARY

Top 2.9 mOD Step 0.1 m

Bottom -35 mOD

Level	Bore	Soil	γ	ϕ'	Nq	Cu	$\alpha/K_\sigma/\beta$	N-value	σ_v	u	σ_v'	q_s	q_b	Rcd DA1 - Comb 2 (kN)				Tension - Comb 2 (kN)			
m	m		kN/m³			kPa			kPa	kPa	kPa	kPa	kPa	450mm	600mm	750mm	900mm	450mm	600mm	750mm	900mm
2.90	0.00	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0
2.80	0.10	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	1.6	0.0	1.6	0.0	0.0	0	0	0	0	0	0	0	0
2.70	0.20	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	3.2	0.0	3.2	0.0	0.0	0	0	0	0	0	0	0	0
2.60	0.30	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	4.8	0.0	4.8	0.0	0.0	0	0	0	0	0	0	0	0
2.50	0.40	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	6.4	0.0	6.4	0.0	0.0	0	0	0	0	0	0	0	0
2.40	0.50	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	8.0	0.0	8.0	0.0	0.0	0	0	0	0	0	0	0	0
2.30	0.60	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	9.6	0.0	9.6	0.0	0.0	0	0	0	0	0	0	0	0
2.20	0.70	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	11.2	0.0	11.2	0.0	0.0	0	0	0	0	0	0	0	0
2.10	0.80	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	12.8	0.0	12.8	0.0	0.0	0	0	0	0	0	0	0	0
2.00	0.90	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	14.4	0.0	14.4	0.0	0.0	0	0	0	0	0	0	0	0
1.90	1.00	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	16.0	0.0	16.0	0.0	0.0	0	0	0	0	0	0	0	0
1.80	1.10	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	17.6	0.0	17.6	0.0	0.0	0	0	0	0	0	0	0	0
1.70	1.20	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	19.2	0.0	19.2	0.0	0.0	0	0	0	0	0	0	0	0
1.60	1.30	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	20.8	0.0	20.8	0.0	0.0	0	0	0	0	0	0	0	0
1.50	1.40	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	22.4	0.0	22.4	0.0	0.0	0	0	0	0	0	0	0	0
1.40	1.50	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	24.0	0.0	24.0	0.0	0.0	0	0	0	0	0	0	0	0
1.30	1.60	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	25.6	0.0	25.6	0.0	0.0	0	0	0	0	0	0	0	0
1.20	1.70	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	27.2	0.0	27.2	0.0	0.0	0	0	0	0	0	0	0	0
1.10	1.80	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	28.8	0.0	28.8	0.0	0.0	0	0	0	0	0	0	0	0
1.00	1.90	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	30.4	0.0	30.4	0.0	0.0	0	0	0	0	0	0	0	0
0.90	2.00	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	32.0	1.0	31.0	0.0	0.0	0	0	0	0	0	0	0	0
0.80	2.10	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	33.6	2.0	31.6	0.0	0.0	0	0	0	0	0	0	0	0
0.70	2.20	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	35.2	2.9	32.3	0.0	0.0	0	0	0	0	0	0	0	0
0.60	2.30	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	36.8	3.9	32.9	0.0	0.0	0	0	0	0	0	0	0	0
0.50	2.40	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	38.4	4.9	33.5	0.0	0.0	0	0	0	0	0	0	0	0
0.40	2.50	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	40.0	5.9	34.1	0.0	0.0	0	0	0	0	0	0	0	0
0.30	2.60	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	41.6	6.9	34.7	0.0	0.0	0	0	0	0	0	0	0	0
0.20	2.70	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	43.2	7.8	35.4	0.0	0.0	0	0	0	0	0	0	0	0
0.10	2.80	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	44.8	8.8	36.0	0.0	0.0	0	0	0	0	0	0	0	0
0.00	2.90	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	46.4	9.8	36.6	0.0	0.0	0	0	0	0	0	0	0	0
-0.10	3.00	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	48.0	10.8	37.2	0.0	0.0	0	0	0	0	0	0	0	0
-0.20	3.10	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	49.6	11.8	37.8	0.0	0.0	0	0	0	0	0	0	0	0
-0.30	3.20	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	51.2	12.8	38.4	0.0	0.0	0	0	0	0	0	0	0	0

Project				
Project Olympus				
Calculations for		Job No:		
Bearing capacity - Anchor Piles	Calculated by CM	Date 18/03/25	Sheet Nr	
	Checked by MS	Date 18/03/25	of	

RESULTS SUMMARY

Top 2.9 mOD Step 0.1 m

Bottom -35 mOD

Level	Bore	Soil	γ	ϕ'	Nq	Cu	$\alpha/K_\sigma/\beta$	N-value	σ_v	u	σ_v'	q_s	q_b	Rcd DA1 - Comb 2 (kN)				Tension - Comb 2 (kN)			
m	m		kN/m³			kPa			kPa	kPa	kPa	kPa	kPa	450mm	600mm	750mm	900mm	450mm	600mm	750mm	900mm
-0.40	3.30	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	52.8	13.7	39.1	0.0	0.0	0	0	0	0	0	0	0	0
-0.50	3.40	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	54.4	14.7	39.7	0.0	0.0	0	0	0	0	0	0	0	0
-0.60	3.50	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	56.0	15.7	40.3	0.0	0.0	0	0	0	0	0	0	0	0
-0.70	3.60	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	57.6	16.7	40.9	0.0	0.0	0	0	0	0	0	0	0	0
-0.80	3.70	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	59.2	17.7	41.5	0.0	0.0	0	0	0	0	0	0	0	0
-0.90	3.80	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	60.8	18.6	42.2	0.0	0.0	0	0	0	0	0	0	0	0
-1.00	3.90	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	62.4	19.6	42.8	0.0	0.0	0	0	0	0	0	0	0	0
-1.10	4.00	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	64.0	20.6	43.4	0.0	0.0	0	0	0	0	0	0	0	0
-1.20	4.10	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	65.6	21.6	44.0	0.0	0.0	0	0	0	0	0	0	0	0
-1.30	4.20	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	67.2	22.6	44.6	0.0	0.0	0	0	0	0	0	0	0	0
-1.40	4.30	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	68.8	23.5	45.3	0.0	0.0	0	0	0	0	0	0	0	0
-1.50	4.40	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	70.4	24.5	45.9	0.0	0.0	0	0	0	0	0	0	0	0
-1.60	4.50	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	72.0	25.5	46.5	0.0	0.0	0	0	0	0	0	0	0	0
-1.70	4.60	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	73.6	26.5	47.1	0.0	0.0	0	0	0	0	0	0	0	0
-1.80	4.70	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	75.2	27.5	47.7	0.0	0.0	0	0	0	0	0	0	0	0
-1.90	4.80	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	76.8	28.4	48.4	0.0	0.0	0	0	0	0	0	0	0	0
-2.00	4.90	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	78.4	29.4	49.0	0.0	0.0	0	0	0	0	0	0	0	0
-2.10	5.00	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	80.0	30.4	49.6	0.0	0.0	0	0	0	0	0	0	0	0
-2.20	5.10	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	81.6	31.4	50.2	0.0	0.0	0	0	0	0	0	0	0	0
-2.30	5.20	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	83.2	32.4	50.8	0.0	0.0	0	0	0	0	0	0	0	0
-2.40	5.30	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	84.8	33.4	51.4	0.0	0.0	0	0	0	0	0	0	0	0
-2.50	5.40	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	86.4	34.3	52.1	0.0	0.0	0	0	0	0	0	0	0	0
-2.60	5.50	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	88.0	35.3	52.7	0.0	0.0	0	0	0	0	0	0	0	0
-2.70	5.60	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	89.6	36.3	53.3	0.0	0.0	0	0	0	0	0	0	0	0
-2.80	5.70	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	91.2	37.3	53.9	0.0	0.0	0	0	0	0	0	0	0	0
-2.90	5.80	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	92.8	38.3	54.5	0.0	0.0	0	0	0	0	0	0	0	0
-3.00	5.90	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	94.4	39.2	55.2	0.0	0.0	0	0	0	0	0	0	0	0
-3.10	6.00	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	96.0	40.2	55.8	0.0	0.0	0	0	0	0	0	0	0	0
-3.20	6.10	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	97.6	41.2	56.4	0.0	0.0	0	0	0	0	0	0	0	0
-3.30	6.20	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	99.2	42.2	57.0	0.0	0.0	0	0	0	0	0	0	0	0
-3.40	6.30	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	100.8	43.2	57.6	0.0	0.0	0	0	0	0	0	0	0	0
-3.50	6.40	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	102.4	44.1	58.3	0.0	0.0	0	0	0	0	0	0	0	0
-3.60	6.50	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	104.0	45.1	58.9	0.0	0.0	0	0	0	0	0	0	0	0

Project				
Project Olympus				
Calculations for	Job No:			
Bearing capacity - Anchor Piles	Calculated by	CM	Date	18/03/25
	Checked by	MS	Date	18/03/25

Sheet Nr
of

RESULTS SUMMARY

Top 2.9 mOD Step 0.1 m

Bottom -35 mOD

Level	Bore	Soil	γ	ϕ'	Nq	Cu	$\alpha/K_\sigma/\beta$	N-value	σ_v	u	σ_v'	q_s	q_b	Rcd DA1 - Comb 2 (kN)				Tension - Comb 2 (kN)			
m	m		kN/m³			kPa			kPa	kPa	kPa	kPa	kPa	450mm	600mm	750mm	900mm	450mm	600mm	750mm	900mm
-3.70	6.60	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	105.6	46.1	59.5	0.0	0.0	0	0	0	0	0	0	0	0
-3.80	6.70	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	107.2	47.1	60.1	0.0	0.0	0	0	0	0	0	0	0	0
-3.90	6.80	1	16.0	#N/A	#N/A	#N/A	#N/A	#N/A	108.8	48.1	60.7	0.0	0.0	0	0	0	0	0	0	0	0
-4.00	6.90	2	20.0	34.0	65.5	#N/A	0.80	#N/A	110.8	49.1	61.7	33.0	4043.7	4	5	6	8	2	3	3	4
-4.10	7.00	2	20.0	34.0	65.5	#N/A	0.80	#N/A	112.8	50.0	62.8	33.6	4110.4	8	10	13	16	4	5	7	8
-4.20	7.10	2	20.0	34.0	65.5	#N/A	0.80	#N/A	114.8	51.0	63.8	34.1	4177.2	12	16	20	24	6	8	10	12
-4.30	7.20	2	20.0	34.0	65.5	#N/A	0.80	#N/A	116.8	52.0	64.8	34.7	4243.9	16	21	27	32	8	11	13	16
-4.40	7.30	2	20.0	34.0	65.5	#N/A	0.80	#N/A	118.8	53.0	65.8	35.2	4310.6	20	27	34	40	10	13	17	20
-4.50	7.40	2	20.0	34.0	65.5	#N/A	0.80	#N/A	120.8	54.0	66.8	35.8	4377.4	24	32	41	49	12	16	20	24
-4.60	7.50	2	20.0	34.0	65.5	#N/A	0.80	#N/A	122.8	54.9	67.9	36.3	4444.1	29	38	48	57	14	19	24	29
-4.70	7.60	2	20.0	34.0	65.5	#N/A	0.80	#N/A	124.8	55.9	68.9	36.9	4510.8	33	44	55	66	16	22	27	33
-4.80	7.70	2	20.0	34.0	65.5	#N/A	0.80	#N/A	126.8	56.9	69.9	37.4	4577.6	37	50	62	75	19	25	31	37
-4.90	7.80	2	20.0	34.0	65.5	#N/A	0.80	#N/A	128.8	57.9	70.9	38.0	4644.3	42	56	70	84	21	28	35	42
-5.00	7.90	2	20.0	34.0	65.5	#N/A	0.80	#N/A	130.8	58.9	71.9	38.5	4711.0	46	62	77	93	23	31	39	46
-5.10	8.00	2	20.0	34.0	65.5	#N/A	0.80	#N/A	132.8	59.8	73.0	39.1	4777.7	51	68	85	102	25	34	42	51
-5.20	8.10	2	20.0	34.0	65.5	#N/A	0.80	#N/A	134.8	60.8	74.0	39.6	4844.5	56	74	93	111	28	37	46	56
-5.30	8.20	2	20.0	34.0	65.5	#N/A	0.80	#N/A	136.8	61.8	75.0	40.2	4911.2	60	81	101	121	30	40	50	60
-5.40	8.30	2	20.0	34.0	65.5	#N/A	0.80	#N/A	138.8	62.8	76.0	40.7	4977.9	65	87	109	130	33	43	54	65
-5.50	8.40	2	20.0	34.0	65.5	#N/A	0.80	#N/A	140.8	63.8	77.0	41.3	5044.7	70	93	117	140	35	47	58	70
-5.60	8.50	2	20.0	34.0	65.5	#N/A	0.80	#N/A	142.8	64.7	78.1	41.8	5111.4	75	100	125	150	37	50	62	75
-5.70	8.60	2	20.0	34.0	65.5	#N/A	0.80	#N/A	144.8	65.7	79.1	42.4	5178.1	80	107	133	160	40	53	67	80
-5.80	8.70	2	20.0	34.0	65.5	#N/A	0.80	#N/A	146.8	66.7	80.1	42.9	5244.8	85	113	142	170	43	57	71	85
-5.90	8.80	2	20.0	34.0	65.5	#N/A	0.80	#N/A	148.8	67.7	81.1	43.5	5311.6	90	120	150	180	45	60	75	90
-6.00	8.90	2	20.0	34.0	65.5	#N/A	0.80	#N/A	150.8	68.7	82.1	44.0	5378.3	95	127	159	191	48	64	79	95
-6.10	9.00	2	20.0	34.0	65.5	#N/A	0.80	#N/A	152.8	69.7	83.1	44.6	5445.0	101	134	168	201	50	67	84	101
-6.20	9.10	2	20.0	34.0	65.5	#N/A	0.80	#N/A	154.8	70.6	84.2	45.1	5511.8	106	141	177	212	53	71	88	106
-6.30	9.20	2	20.0	34.0	65.5	#N/A	0.80	#N/A	156.8	71.6	85.2	45.7	5578.5	111	148	186	223	56	74	93	111
-6.40	9.30	2	20.0	34.0	65.5	#N/A	0.80	#N/A	158.8	72.6	86.2	46.2	5645.2	117	156	195	234	58	78	97	117
-6.50	9.40	2	20.0	34.0	65.5	#N/A	0.80	#N/A	160.8	73.6	87.2	46.8	5712.0	122	163	204	245	61	82	102	122
-6.60	9.50	2	20.0	34.0	65.5	#N/A	0.80	#N/A	162.8	74.6	88.2	47.3	5778.7	128	170	213	256	64	85	107	128
-6.70	9.60	2	20.0	34.0	65.5	#N/A	0.80	#N/A	164.8	75.5	89.3	47.9	5845.4	133	178	222	267	67	89	111	133
-6.80	9.70	2	20.0	34.0	65.5	#N/A	0.80	#N/A	166.8	76.5	90.3	48.4	5912.1	139	186	232	278	70	93	116	139
-6.90	9.80	2	20.0	34.0	65.5	#N/A	0.80	#N/A	168.8	77.5	91.3	49.0	5978.9	145	193	242	290	72	97	121	145

Project				
Project Olympus				
Calculations for	Job No:			
Bearing capacity - Anchor Piles	Calculated by	CM	Date	18/03/25
	Checked by	MS	Date	18/03/25

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of

RESULTS SUMMARY

Top 2.9 mOD Step 0.1 m

Bottom -35 mOD

Level	Bore	Soil	γ	ϕ'	Nq	Cu	$\alpha/K_\sigma/\beta$	N-value	σ_v	u	σ_v'	q_s	q_b	Rcd DA1 - Comb 2 (kN)				Tension - Comb 2 (kN)			
m	m		kN/m³			kPa			kPa	kPa	kPa	kPa	kPa	450mm	600mm	750mm	900mm	450mm	600mm	750mm	900mm
-7.00	9.90	2	20.0	34.0	65.5	#N/A	0.80	#N/A	170.8	78.5	92.3	49.5	6045.6	151	201	251	302	75	101	126	151
-7.10	10.00	2	20.0	34.0	65.5	#N/A	0.80	#N/A	172.8	79.5	93.3	50.1	6112.3	157	209	261	313	78	104	131	157
-7.20	10.10	2	20.0	34.0	65.5	#N/A	0.80	#N/A	174.8	80.4	94.4	50.6	6179.1	163	217	271	325	81	108	136	163
-7.30	10.20	2	20.0	34.0	65.5	#N/A	0.80	#N/A	176.8	81.4	95.4	51.2	6245.8	169	225	281	337	84	112	141	169
-7.40	10.30	2	20.0	34.0	65.5	#N/A	0.80	#N/A	178.8	82.4	96.4	51.7	6312.5	175	233	291	350	87	117	146	175
-7.50	10.40	2	20.0	34.0	65.5	#N/A	0.80	#N/A	180.8	83.4	97.4	52.3	6379.2	181	241	302	362	90	121	151	181
-7.60	10.50	2	20.0	34.0	65.5	#N/A	0.80	#N/A	182.8	84.4	98.4	52.8	6446.0	187	250	312	374	94	125	156	187
-7.70	10.60	2	20.0	34.0	65.5	#N/A	0.80	#N/A	184.8	85.3	99.5	53.4	6512.7	193	258	322	387	97	129	161	193
-7.80	10.70	2	20.0	34.0	65.5	#N/A	0.80	#N/A	186.8	86.3	100.5	53.9	6579.4	200	266	333	400	100	133	167	200
-7.90	10.80	2	20.0	34.0	65.5	#N/A	0.80	#N/A	188.8	87.3	101.5	54.5	6646.2	206	275	344	413	103	138	172	206
-8.00	10.90	2	20.0	34.0	65.5	#N/A	0.80	#N/A	190.8	88.3	102.5	55.0	6712.9	213	284	355	425	106	142	177	213
-8.10	11.00	2	20.0	34.0	65.5	#N/A	0.80	#N/A	192.8	89.3	103.5	55.6	6779.6	219	292	365	439	110	146	183	219
-8.20	11.10	2	20.0	34.0	65.5	#N/A	0.80	#N/A	194.8	90.3	104.5	56.1	6846.4	226	301	376	452	113	151	188	226
-8.30	11.20	2	20.0	34.0	65.5	#N/A	0.80	#N/A	196.8	91.2	105.6	56.7	6913.1	233	310	388	465	116	155	194	233
-8.40	11.30	2	20.0	34.0	65.5	#N/A	0.80	#N/A	198.8	92.2	106.6	57.2	6979.8	239	319	399	479	120	160	199	239
-8.50	11.40	2	20.0	34.0	65.5	#N/A	0.80	#N/A	200.8	93.2	107.6	57.8	7046.5	246	328	410	492	123	164	205	246
-8.60	11.50	2	20.0	34.0	65.5	#N/A	0.80	#N/A	202.8	94.2	108.6	58.3	7113.3	253	337	422	506	127	169	211	253
-8.70	11.60	2	20.0	34.0	65.5	#N/A	0.80	#N/A	204.8	95.2	109.6	58.9	7180.0	260	347	433	520	130	173	217	260
-8.80	11.70	2	20.0	34.0	65.5	#N/A	0.80	#N/A	206.8	96.1	110.7	59.4	7246.7	267	356	445	534	133	178	222	267
-8.90	11.80	2	20.0	34.0	65.5	#N/A	0.80	#N/A	208.8	97.1	111.7	60.0	7313.5	274	365	457	548	137	183	228	274
-9.00	11.90	2	20.0	34.0	65.5	#N/A	0.80	#N/A	210.8	98.1	112.7	60.5	7380.2	281	375	469	562	141	187	234	281
-9.10	12.00	2	20.0	34.0	65.5	#N/A	0.80	#N/A	212.8	99.1	113.7	61.1	7446.9	288	384	481	577	144	192	240	288
-9.20	12.10	2	20.0	34.0	65.5	#N/A	0.80	#N/A	214.8	100.1	114.7	61.6	7513.6	296	394	493	591	148	197	246	296
-9.30	12.20	2	20.0	34.0	65.5	#N/A	0.80	#N/A	216.8	101.0	115.8	62.2	7580.4	303	404	505	606	151	202	252	303
-9.40	12.30	2	20.0	34.0	65.5	#N/A	0.80	#N/A	218.8	102.0	116.8	62.7	7647.1	310	414	517	621	155	207	259	310
-9.50	12.40	2	20.0	34.0	65.5	#N/A	0.80	#N/A	220.8	103.0	117.8	63.3	7713.8	318	424	530	636	159	212	265	318
-9.60	12.50	2	20.0	34.0	65.5	#N/A	0.80	#N/A	222.8	104.0	118.8	63.8	7780.6	325	434	542	651	163	217	271	325
-9.70	12.60	2	20.0	34.0	65.5	#N/A	0.80	#N/A	224.8	105.0	119.8	64.4	7847.3	333	444	555	666	166	222	277	333
-9.80	12.70	2	20.0	34.0	65.5	#N/A	0.80	#N/A	226.8	105.9	120.9	64.9	7914.0	341	454	568	681	170	227	284	341
-9.90	12.80	2	20.0	34.0	65.5	#N/A	0.80	#N/A	228.8	106.9	121.9	65.5	7980.8	348	464	580	696	174	232	290	348
-10.00	12.90	2	20.0	34.0	65.5	#N/A	0.80	#N/A	230.8	107.9	122.9	66.0	8047.5	356	475	593	712	178	237	297	356
-10.10	13.00	2	20.0	34.0	65.5	#N/A	0.80	#N/A	232.8	108.9	123.9	66.6	8114.2	364	485	606	728	182	243	303	364
-10.20	13.10	2	20.0	34.0	65.5	#N/A	0.80	#N/A	234.8	109.9	124.9	67.1	8180.9	372	496	620	744	186	248	310	372

Project				
Project Olympus				
Calculations for	Job No:			
Bearing capacity - Anchor Piles	Calculated by	CM	Date 18/03/25	Sheet Nr
	Checked by	MS	Date 18/03/25	of

RESULTS SUMMARY

Top 2.9 mOD Step 0.1 m

Bottom -35 mOD

Level	Bore	Soil	γ	ϕ'	Nq	Cu	$\alpha/K_\sigma/\beta$	N-value	σ_v	u	σ_v'	q_s	q_b	Rcd DA1 - Comb 2 (kN)				Tension - Comb 2 (kN)			
m	m		kN/m³			kPa			kPa	kPa	kPa	kPa	kPa	450mm	600mm	750mm	900mm	450mm	600mm	750mm	900mm
-10.30	13.20	2	20.0	34.0	65.5	#N/A	0.80	#N/A	236.8	110.9	125.9	67.7	8247.7	380	506	633	760	190	253	316	380
-10.40	13.30	2	20.0	34.0	65.5	#N/A	0.80	#N/A	238.8	111.8	127.0	68.2	8314.4	388	517	646	776	194	259	323	388
-10.50	13.40	2	20.0	34.0	65.5	#N/A	0.80	#N/A	240.8	112.8	128.0	68.8	8381.1	396	528	660	792	198	264	330	396
-10.60	13.50	2	20.0	34.0	65.5	#N/A	0.80	#N/A	242.8	113.8	129.0	69.3	8447.9	404	539	673	808	202	269	337	404
-10.70	13.60	2	20.0	34.0	65.5	#N/A	0.80	#N/A	244.8	114.8	130.0	69.9	8514.6	412	550	687	825	206	275	344	412
-10.80	13.70	2	20.0	34.0	65.5	#N/A	0.80	#N/A	246.8	115.8	131.0	70.4	8581.3	421	561	701	841	210	280	350	421
-10.90	13.80	2	20.0	34.0	65.5	#N/A	0.80	#N/A	248.8	116.7	132.1	71.0	8648.0	429	572	715	858	214	286	357	429
-11.00	13.90	2	20.0	34.0	65.5	#N/A	0.80	#N/A	250.8	117.7	133.1	71.5	8714.8	437	583	729	875	219	292	364	437
-11.10	14.00	2	20.0	34.0	65.5	#N/A	0.80	#N/A	252.8	118.7	134.1	72.1	8781.5	446	595	743	892	223	297	372	446
-11.20	14.10	2	20.0	34.0	65.5	#N/A	0.80	#N/A	254.8	119.7	135.1	72.6	8848.2	454	606	757	909	227	303	379	454
-11.30	14.20	2	20.0	34.0	65.5	#N/A	0.80	#N/A	256.8	120.7	136.1	73.2	8915.0	463	617	772	926	232	309	386	463
-11.40	14.30	2	20.0	34.0	65.5	#N/A	0.80	#N/A	258.8	121.6	137.2	73.7	8981.7	472	629	786	943	236	314	393	472
-11.50	14.40	2	20.0	34.0	65.5	#N/A	0.80	#N/A	260.8	122.6	138.2	74.3	9048.4	480	641	801	961	240	320	400	480
-11.60	14.50	3	20.0	#N/A	#N/A	141.3	0.50	#N/A	262.8	123.6	139.2	70.3	1272.0	489	652	815	978	244	326	407	489
-11.70	14.60	3	20.0	#N/A	#N/A	142.7	0.50	#N/A	264.8	124.6	140.2	71.0	1284.0	497	663	829	994	249	331	414	497
-11.80	14.70	3	20.0	#N/A	#N/A	144.0	0.50	#N/A	266.8	125.6	141.2	71.7	1296.0	506	674	843	1011	253	337	421	506
-11.90	14.80	3	20.0	#N/A	#N/A	145.3	0.50	#N/A	268.8	126.5	142.3	72.3	1308.0	514	685	857	1028	257	343	428	514
-12.00	14.90	3	20.0	#N/A	#N/A	146.7	0.50	#N/A	270.8	127.5	143.3	73.0	1320.0	523	697	871	1045	261	348	436	523
-12.10	15.00	3	20.0	#N/A	#N/A	148.0	0.50	#N/A	272.8	128.5	144.3	73.7	1332.0	531	709	886	1063	266	354	443	531
-12.20	15.10	3	20.0	#N/A	#N/A	149.3	0.50	#N/A	274.8	129.5	145.3	74.3	1344.0	540	720	900	1080	270	360	450	540
-12.30	15.20	3	20.0	#N/A	#N/A	150.7	0.50	#N/A	276.8	130.5	146.3	75.0	1356.0	549	732	915	1098	274	366	457	549
-12.40	15.30	3	20.0	#N/A	#N/A	152.0	0.50	#N/A	278.8	131.5	147.3	75.7	1368.0	558	744	930	1116	279	372	465	558
-12.50	15.40	3	20.0	#N/A	#N/A	153.3	0.50	#N/A	280.8	132.4	148.4	76.3	1380.0	567	756	945	1134	283	378	472	567
-12.60	15.50	3	20.0	#N/A	#N/A	154.7	0.50	#N/A	282.8	133.4	149.4	77.0	1392.0	576	768	960	1152	288	384	480	576
-12.70	15.60	3	20.0	#N/A	#N/A	156.0	0.50	#N/A	284.8	134.4	150.4	77.7	1404.0	585	780	975	1170	293	390	488	585
-12.80	15.70	3	20.0	#N/A	#N/A	157.3	0.50	#N/A	286.8	135.4	151.4	78.3	1416.0	594	792	991	1189	297	396	495	594
-12.90	15.80	3	20.0	#N/A	#N/A	158.7	0.50	#N/A	288.8	136.4	152.4	79.0	1428.0	604	805	1006	1207	302	402	503	604
-13.00	15.90	3	20.0	#N/A	#N/A	160.0	0.50	#N/A	290.8	137.3	153.5	79.7	1440.0	613	817	1022	1226	307	409	511	613
-13.10	16.00	3	20.0	#N/A	#N/A	161.3	0.50	#N/A	292.8	138.3	154.5	80.3	1452.0	622	830	1037	1245	311	415	519	622
-13.20	16.10	3	20.0	#N/A	#N/A	162.7	0.50	#N/A	294.8	139.3	155.5	81.0	1464.0	632	843	1053	1264	316	421	527	632
-13.30	16.20	3	20.0	#N/A	#N/A	164.0	0.50	#N/A	296.8	140.3	156.5	81.7	1476.0	642	856	1069	1283	321	428	535	642
-13.40	16.30	3	20.0	#N/A	#N/A	165.3	0.50	#N/A	298.8	141.3	157.5	82.3	1488.0	651	868	1086	1303	326	434	543	651
-13.50	16.40	3	20.0	#N/A	#N/A	166.7	0.50	#N/A	300.8	142.2	158.6	83.0	1500.0	661	882	1102	1322	331	441	551	661

Project				
Project Olympus				
Calculations for	Job No:			
Bearing capacity - Anchor Piles	Calculated by	CM	Date	18/03/25
	Checked by	MS	Date	18/03/25

Sheet Nr
of

RESULTS SUMMARY

Top 2.9 mOD Step 0.1 m

Bottom -35 mOD

Level	Bore	Soil	γ	ϕ'	Nq	Cu	$\alpha/K_\sigma/\beta$	N-value	σ_v	u	σ_v'	q_s	q_b	Rcd DA1 - Comb 2 (kN)				Tension - Comb 2 (kN)			
m	m		kN/m³			kPa			kPa	kPa	kPa	kPa	kPa	450mm	600mm	750mm	900mm	450mm	600mm	750mm	900mm
-13.60	16.50	3	20.0	#N/A	#N/A	168.0	0.50	#N/A	302.8	143.2	159.6	83.7	1512.0	671	895	1118	1342	335	447	559	671
-13.70	16.60	3	20.0	#N/A	#N/A	169.3	0.50	#N/A	304.8	144.2	160.6	84.3	1524.0	681	908	1135	1362	340	454	567	681
-13.80	16.70	3	20.0	#N/A	#N/A	170.7	0.50	#N/A	306.8	145.2	161.6	85.0	1536.0	691	921	1152	1382	345	461	576	691
-13.90	16.80	3	20.0	#N/A	#N/A	172.0	0.50	#N/A	308.8	146.2	162.6	85.7	1548.0	701	935	1168	1402	351	467	584	701
-14.00	16.90	3	20.0	#N/A	#N/A	173.3	0.50	#N/A	310.8	147.2	163.7	86.3	1560.0	711	948	1185	1422	356	474	593	711
-14.10	17.00	3	20.0	#N/A	#N/A	174.7	0.50	#N/A	312.8	148.1	164.7	87.0	1572.0	721	962	1202	1443	361	481	601	721
-14.20	17.10	3	20.0	#N/A	#N/A	176.0	0.50	#N/A	314.8	149.1	165.7	87.7	1584.0	732	976	1220	1464	366	488	610	732
-14.30	17.20	3	20.0	#N/A	#N/A	177.3	0.50	#N/A	316.8	150.1	166.7	88.3	1596.0	742	990	1237	1484	371	495	618	742
-14.40	17.30	3	20.0	#N/A	#N/A	178.7	0.50	#N/A	318.8	151.1	167.7	89.0	1608.0	753	1004	1254	1505	376	502	627	753
-14.50	17.40	3	20.0	#N/A	#N/A	180.0	0.50	#N/A	320.8	152.1	168.7	89.7	1620.0	763	1018	1272	1526	382	509	636	763
-14.60	17.50	3	20.0	#N/A	#N/A	181.3	0.50	#N/A	322.8	153.0	169.8	90.3	1632.0	774	1032	1290	1548	387	516	645	774
-14.70	17.60	3	20.0	#N/A	#N/A	182.7	0.50	#N/A	324.8	154.0	170.8	91.0	1644.0	785	1046	1308	1569	392	523	654	785
-14.80	17.70	3	20.0	#N/A	#N/A	184.0	0.50	#N/A	326.8	155.0	171.8	91.7	1656.0	795	1061	1326	1591	398	530	663	795
-14.90	17.80	3	20.0	#N/A	#N/A	185.3	0.50	#N/A	328.8	156.0	172.8	92.3	1668.0	806	1075	1344	1613	403	538	672	806
-15.00	17.90	3	20.0	#N/A	#N/A	186.7	0.50	#N/A	330.8	157.0	173.8	93.0	1680.0	817	1090	1362	1634	409	545	681	817
-15.10	18.00	3	20.0	#N/A	#N/A	188.0	0.50	#N/A	332.8	157.9	174.9	93.7	1692.0	828	1104	1380	1657	414	552	690	828
-15.20	18.10	3	20.0	#N/A	#N/A	189.3	0.50	#N/A	334.8	158.9	175.9	94.3	1704.0	839	1119	1399	1679	420	560	699	839
-15.30	18.20	3	20.0	#N/A	#N/A	190.7	0.50	#N/A	336.8	159.9	176.9	95.0	1716.0	851	1134	1418	1701	425	567	709	851
-15.40	18.30	3	20.0	#N/A	#N/A	192.0	0.50	#N/A	338.8	160.9	177.9	95.7	1728.0	862	1149	1436	1724	431	575	718	862
-15.50	18.40	3	20.0	#N/A	#N/A	193.3	0.50	#N/A	340.8	161.9	178.9	96.3	1740.0	873	1164	1455	1746	437	582	728	873
-15.60	18.50	3	20.0	#N/A	#N/A	194.7	0.50	#N/A	342.8	162.8	180.0	97.0	1752.0	885	1179	1474	1769	442	590	737	885
-15.70	18.60	3	20.0	#N/A	#N/A	196.0	0.50	#N/A	344.8	163.8	181.0	97.7	1764.0	896	1195	1494	1792	448	597	747	896
-15.80	18.70	3	20.0	#N/A	#N/A	197.3	0.50	#N/A	346.8	164.8	182.0	98.3	1776.0	908	1210	1513	1815	454	605	756	908
-15.90	18.80	3	20.0	#N/A	#N/A	198.7	0.50	#N/A	348.8	165.8	183.0	99.0	1788.0	919	1226	1532	1839	460	613	766	919
-16.00	18.90	3	20.0	#N/A	#N/A	200.0	0.50	#N/A	350.8	166.8	184.0	99.7	1800.0	931	1241	1552	1862	466	621	776	931
-16.10	19.00	3	20.0	#N/A	#N/A	201.3	0.50	#N/A	352.8	167.8	185.0	100.3	1812.0	943	1257	1572	1886	471	629	786	943
-16.20	19.10	3	20.0	#N/A	#N/A	202.7	0.50	#N/A	354.8	168.7	186.1	101.0	1824.0	955	1273	1591	1910	477	637	796	955
-16.30	19.20	3	20.0	#N/A	#N/A	204.0	0.50	#N/A	356.8	169.7	187.1	101.7	1836.0	967	1289	1611	1934	483	645	806	967
-16.40	19.30	3	20.0	#N/A	#N/A	205.3	0.50	#N/A	358.8	170.7	188.1	102.3	1848.0	979	1305	1631	1958	489	653	816	979
-16.50	19.40	3	20.0	#N/A	#N/A	206.7	0.50	#N/A	360.8	171.7	189.1	103.0	1860.0	991	1321	1652	1982	496	661	826	991
-16.60	19.50	3	20.0	#N/A	#N/A	208.0	0.50	#N/A	362.8	172.7	190.1	103.7	1872.0	1003	1338	1672	2006	502	669	836	1003
-16.70	19.60	3	20.0	#N/A	#N/A	209.3	0.50	#N/A	364.8	173.6	191.2	104.3	1884.0	1016	1354	1693	2031	508	677	846	1016
-16.80	19.70	3	20.0	#N/A	#N/A	210.7	0.50	#N/A	366.8	174.6	192.2	105.0	1896.0	1028	1371	1713	2056	514	685	857	1028

Project				
Project Olympus				
Calculations for		Job No:		
Bearing capacity - Anchor Piles	Calculated by	CM	Date	18/03/25
	Checked by	MS	Date	18/03/25

Sheet Nr
of

RESULTS SUMMARY

Top 2.9 mOD Step 0.1 m

Bottom -35 mOD

Level	Bore	Soil	γ	ϕ'	Nq	Cu	$\alpha/K_\sigma/\beta$	N-value	σ_v	u	σ_v'	q_s	q_b	Rcd DA1 - Comb 2 (kN)				Tension - Comb 2 (kN)			
m	m		kN/m³			kPa			kPa	kPa	kPa	kPa	kPa	450mm	600mm	750mm	900mm	450mm	600mm	750mm	900mm
-16.90	19.80	3	20.0	#N/A	#N/A	212.0	0.50	#N/A	368.8	175.6	193.2	105.7	1908.0	1040	1387	1734	2081	520	694	867	1040
-17.00	19.90	3	20.0	#N/A	#N/A	213.3	0.50	#N/A	370.8	176.6	194.2	106.3	1920.0	1053	1404	1755	2106	526	702	877	1053
-17.10	20.00	3	20.0	#N/A	#N/A	214.7	0.50	#N/A	372.8	177.6	195.2	107.0	1932.0	1065	1421	1776	2131	533	710	888	1065
-17.20	20.10	3	20.0	#N/A	#N/A	216.0	0.50	#N/A	374.8	178.5	196.3	107.7	1944.0	1078	1438	1797	2156	539	719	898	1078
-17.30	20.20	3	20.0	#N/A	#N/A	217.3	0.50	#N/A	376.8	179.5	197.3	108.3	1956.0	1091	1455	1818	2182	545	727	909	1091
-17.40	20.30	3	20.0	#N/A	#N/A	218.7	0.50	#N/A	378.8	180.5	198.3	109.0	1968.0	1104	1472	1840	2207	552	736	920	1104
-17.50	20.40	3	20.0	#N/A	#N/A	220.0	0.50	#N/A	380.8	181.5	199.3	109.7	1980.0	1117	1489	1861	2233	558	744	931	1117
-17.60	20.50	4	20.0	38.0	130.3	#N/A	0.90	#N/A	382.8	182.5	200.3	140.5	4000.0	1133	1511	1889	2266	567	755	944	1133
-17.70	20.60	4	20.0	38.0	130.3	#N/A	0.90	#N/A	384.8	183.4	201.4	141.2	4000.0	1150	1533	1916	2300	575	767	958	1150
-17.80	20.70	4	20.0	38.0	130.3	#N/A	0.90	#N/A	386.8	184.4	202.4	141.9	4000.0	1167	1555	1944	2333	583	778	972	1167
-17.90	20.80	4	20.0	38.0	130.3	#N/A	0.90	#N/A	388.8	185.4	203.4	142.7	4000.0	1183	1578	1972	2367	592	789	986	1183
-18.00	20.90	4	20.0	38.0	130.3	#N/A	0.90	#N/A	390.8	186.4	204.4	143.4	4000.0	1200	1600	2000	2401	600	800	1000	1200
-18.10	21.00	4	20.0	38.0	130.3	#N/A	0.90	#N/A	392.8	187.4	205.4	144.1	4000.0	1217	1623	2029	2435	609	812	1014	1217
-18.20	21.10	4	20.0	38.0	130.3	#N/A	0.90	#N/A	394.8	188.4	206.4	144.8	4000.0	1234	1646	2057	2469	617	823	1029	1234
-18.30	21.20	4	20.0	38.0	130.3	#N/A	0.90	#N/A	396.8	189.3	207.5	145.5	4000.0	1251	1669	2086	2503	626	834	1043	1251
-18.40	21.30	4	20.0	38.0	130.3	#N/A	0.90	#N/A	398.8	190.3	208.5	146.2	4000.0	1269	1692	2114	2537	634	846	1057	1269
-18.50	21.40	4	20.0	38.0	130.3	#N/A	0.90	#N/A	400.8	191.3	209.5	147.0	4000.0	1286	1715	2143	2572	643	857	1072	1286
-18.60	21.50	4	20.0	38.0	130.3	#N/A	0.90	#N/A	402.8	192.3	210.5	147.7	4000.0	1303	1738	2172	2607	652	869	1086	1303
-18.70	21.60	4	20.0	38.0	130.3	#N/A	0.90	#N/A	404.8	193.3	211.5	148.4	4000.0	1321	1761	2201	2642	660	881	1101	1321
-18.80	21.70	4	20.0	38.0	130.3	#N/A	0.90	#N/A	406.8	194.2	212.6	149.1	4000.0	1338	1785	2231	2677	669	892	1115	1338
-18.90	21.80	4	20.0	38.0	130.3	#N/A	0.90	#N/A	408.8	195.2	213.6	149.8	4000.0	1356	1808	2260	2712	678	904	1130	1356
-19.00	21.90	4	20.0	38.0	130.3	#N/A	0.90	#N/A	410.8	196.2	214.6	150.5	4000.0	1374	1832	2290	2748	687	916	1145	1374
-19.10	22.00	4	20.0	38.0	130.3	#N/A	0.90	#N/A	412.8	197.2	215.6	151.3	4000.0	1392	1856	2319	2783	696	928	1160	1392
-19.20	22.10	4	20.0	38.0	130.3	#N/A	0.90	#N/A	414.8	198.2	216.6	152.0	4000.0	1410	1879	2349	2819	705	940	1175	1410
-19.30	22.20	4	20.0	38.0	130.3	#N/A	0.90	#N/A	416.8	199.1	217.7	152.7	4000.0	1428	1903	2379	2855	714	952	1190	1428
-19.40	22.30	4	20.0	38.0	130.3	#N/A	0.90	#N/A	418.8	200.1	218.7	153.4	4000.0	1446	1927	2409	2891	723	964	1205	1446
-19.50	22.40	4	20.0	38.0	130.3	#N/A	0.90	#N/A	420.8	201.1	219.7	154.1	4000.0	1464	1952	2440	2928	732	976	1220	1464
-19.60	22.50	4	20.0	38.0	130.3	#N/A	0.90	#N/A	422.8	202.1	220.7	154.8	4000.0	1482	1976	2470	2964	741	988	1235	1482
-19.70	22.60	4	20.0	38.0	130.3	#N/A	0.90	#N/A	424.8	203.1	221.7	155.6	4000.0	1500	2000	2501	3001	750	1000	1250	1500
-19.80	22.70	4	20.0	38.0	130.3	#N/A	0.90	#N/A	426.8	204.0	222.8	156.3	4000.0	1519	2025	2531	3037	759	1012	1266	1519
-19.90	22.80	4	20.0	38.0	130.3	#N/A	0.90	#N/A	428.8	205.0	223.8	157.0	4000.0	1537	2050	2562	3074	769	1025	1281	1537
-20.00	22.90	4	20.0	38.0	130.3	#N/A	0.90	#N/A	430.8	206.0	224.8	157.7	4000.0	1556	2074	2593	3112	778	1037	1297	1556
-20.10	23.00	4	20.0	38.0	130.3	#N/A	0.90	#N/A	432.8	207.0	225.8	158.4	4000.0	1574	2099	2624	3149	787	1050	1312	1574

Project				
Project Olympus				
Calculations for		Job No:		
Bearing capacity - Anchor Piles	Calculated by CM	Date 18/03/25	Sheet Nr	
	Checked by MS	Date 18/03/25	of	

RESULTS SUMMARY

Top 2.9 mOD Step 0.1 m

Bottom -35 mOD

Level	Bore	Soil	γ	ϕ'	Nq	Cu	$\alpha/K_\sigma/\beta$	N-value	σ_v	u	σ_v'	q_s	q_b	Rcd DA1 - Comb 2 (kN)				Tension - Comb 2 (kN)			
m	m		kN/m³			kPa			kPa	kPa	kPa	kPa	kPa	450mm	600mm	750mm	900mm	450mm	600mm	750mm	900mm
-20.20	23.10	4	20.0	38.0	130.3	#N/A	0.90	#N/A	434.8	208.0	226.8	159.1	4000.0	1593	2124	2655	3186	797	1062	1328	1593
-20.30	23.20	4	20.0	38.0	130.3	#N/A	0.90	#N/A	436.8	209.0	227.8	159.9	4000.0	1612	2149	2687	3224	806	1075	1343	1612
-20.40	23.30	4	20.0	38.0	130.3	#N/A	0.90	#N/A	438.8	209.9	228.9	160.6	4000.0	1631	2175	2718	3262	815	1087	1359	1631
-20.50	23.40	4	20.0	38.0	130.3	#N/A	0.90	#N/A	440.8	210.9	229.9	161.3	4000.0	1650	2200	2750	3300	825	1100	1375	1650
-20.60	23.50	4	20.0	38.0	130.3	#N/A	0.90	#N/A	442.8	211.9	230.9	162.0	4000.0	1669	2225	2782	3338	835	1113	1391	1669
-20.70	23.60	4	20.0	38.0	130.3	#N/A	0.90	#N/A	444.8	212.9	231.9	162.7	4000.0	1688	2251	2814	3376	844	1125	1407	1688
-20.80	23.70	4	20.0	38.0	130.3	#N/A	0.90	#N/A	446.8	213.9	232.9	163.4	4000.0	1707	2277	2846	3415	854	1138	1423	1707
-20.90	23.80	4	20.0	38.0	130.3	#N/A	0.90	#N/A	448.8	214.8	234.0	164.2	4000.0	1727	2302	2878	3454	863	1151	1439	1727
-21.00	23.90	4	20.0	38.0	130.3	#N/A	0.90	#N/A	450.8	215.8	235.0	164.9	4000.0	1746	2328	2910	3493	873	1164	1455	1746
-21.10	24.00	4	20.0	38.0	130.3	#N/A	0.90	#N/A	452.8	216.8	236.0	165.6	4000.0	1766	2354	2943	3532	883	1177	1471	1766
-21.20	24.10	4	20.0	38.0	130.3	#N/A	0.90	#N/A	454.8	217.8	237.0	166.3	4000.0	1785	2380	2976	3571	893	1190	1488	1785
-21.30	24.20	4	20.0	38.0	130.3	#N/A	0.90	#N/A	456.8	218.8	238.0	167.0	4000.0	1805	2407	3008	3610	903	1203	1504	1805
-21.40	24.30	4	20.0	38.0	130.3	#N/A	0.90	#N/A	458.8	219.7	239.1	167.7	4000.0	1825	2433	3041	3650	912	1217	1521	1825
-21.50	24.40	4	20.0	38.0	130.3	#N/A	0.90	#N/A	460.8	220.7	240.1	168.5	4000.0	1845	2460	3074	3689	922	1230	1537	1845
-21.60	24.50	4	20.0	38.0	130.3	#N/A	0.90	#N/A	462.8	221.7	241.1	169.2	4000.0	1865	2486	3108	3729	932	1243	1554	1865
-21.70	24.60	4	20.0	38.0	130.3	#N/A	0.90	#N/A	464.8	222.7	242.1	169.9	4000.0	1885	2513	3141	3769	942	1256	1570	1885
-21.80	24.70	4	20.0	38.0	130.3	#N/A	0.90	#N/A	466.8	223.7	243.1	170.6	4000.0	1905	2540	3174	3809	952	1270	1587	1905
-21.90	24.80	4	20.0	38.0	130.3	#N/A	0.90	#N/A	468.8	224.6	244.2	171.3	4000.0	1925	2566	3208	3850	962	1283	1604	1925
-22.00	24.90	4	20.0	38.0	130.3	#N/A	0.90	#N/A	470.8	225.6	245.2	172.0	4000.0	1945	2594	3242	3890	973	1297	1621	1945
-22.10	25.00	4	20.0	38.0	130.3	#N/A	0.90	#N/A	472.8	226.6	246.2	172.8	4000.0	1965	2621	3276	3931	983	1310	1638	1965
-22.20	25.10	4	20.0	38.0	130.3	#N/A	0.90	#N/A	474.8	227.6	247.2	173.5	4000.0	1986	2648	3310	3972	993	1324	1655	1986
-22.30	25.20	4	20.0	38.0	130.3	#N/A	0.90	#N/A	476.8	228.6	248.2	174.2	4000.0	2006	2675	3344	4013	1003	1338	1672	2006
-22.40	25.30	4	20.0	38.0	130.3	#N/A	0.90	#N/A	478.8	229.6	249.2	174.9	4000.0	2027	2703	3378	4054	1014	1351	1689	2027
-22.50	25.40	4	20.0	38.0	130.3	#N/A	0.90	#N/A	480.8	230.5	250.3	175.6	4000.0	2048	2730	3413	4095	1024	1365	1706	2048
-22.60	25.50	4	20.0	38.0	130.3	#N/A	0.90	#N/A	482.8	231.5	251.3	176.3	4000.0	2069	2758	3448	4137	1034	1379	1724	2069
-22.70	25.60	4	20.0	38.0	130.3	#N/A	0.90	#N/A	484.8	232.5	252.3	177.1	4000.0	2089	2786	3482	4179	1045	1393	1741	2089
-22.80	25.70	4	20.0	38.0	130.3	#N/A	0.90	#N/A	486.8	233.5	253.3	177.8	4000.0	2110	2814	3517	4221	1055	1407	1759	2110
-22.90	25.80	4	20.0	38.0	130.3	#N/A	0.90	#N/A	488.8	234.5	254.3	178.5	4000.0	2131	2842	3552	4263	1066	1421	1776	2131
-23.00	25.90	4	20.0	38.0	130.3	#N/A	0.90	#N/A	490.8	235.4	255.4	179.2	4000.0	2152	2870	3587	4305	1076	1435	1794	2152
-23.10	26.00	4	20.0	38.0	130.3	#N/A	0.90	#N/A	492.8	236.4	256.4	179.9	4000.0	2174	2898	3623	4347	1087	1449	1811	2174
-23.20	26.10	4	20.0	38.0	130.3	#N/A	0.90	#N/A	494.8	237.4	257.4	180.6	4000.0	2195	2927	3658	4390	1097	1463	1829	2195
-23.30	26.20	4	20.0	38.0	130.3	#N/A	0.90	#N/A	496.8	238.4	258.4	181.3	4000.0	2216	2955	3694	4433	1108	1478	1847	2216
-23.40	26.30	4	20.0	38.0	130.3	#N/A	0.90	#N/A	498.8	239.4	259.4	182.1	4000.0	2238	2984	3730	4475	1119	1492	1865	2238

Project				
Project Olympus				
Calculations for	Job No:			
Bearing capacity - Anchor Piles	Calculated by	CM	Date	18/03/25
	Checked by	MS	Date	18/03/25

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of

RESULTS SUMMARY

Top 2.9 mOD Step 0.1 m

Bottom -35 mOD

Level	Bore	Soil	γ	ϕ'	Nq	Cu	$\alpha/K_\sigma/\beta$	N-value	σ_v	u	σ_v'	q_s	q_b	Rcd DA1 - Comb 2 (kN)				Tension - Comb 2 (kN)			
m	m		kN/m³			kPa			kPa	kPa	kPa	kPa	kPa	450mm	600mm	750mm	900mm	450mm	600mm	750mm	900mm
-23.50	26.40	4	20.0	38.0	130.3	#N/A	0.90	#N/A	500.8	240.3	260.5	182.8	4000.0	2259	3012	3765	4519	1130	1506	1883	2259
-23.60	26.50	4	20.0	38.0	130.3	#N/A	0.90	#N/A	502.8	241.3	261.5	183.5	4000.0	2281	3041	3801	4562	1140	1521	1901	2281
-23.70	26.60	4	20.0	38.0	130.3	#N/A	0.90	#N/A	504.8	242.3	262.5	184.2	4000.0	2303	3070	3838	4605	1151	1535	1919	2303
-23.80	26.70	4	20.0	38.0	130.3	#N/A	0.90	#N/A	506.8	243.3	263.5	184.9	4000.0	2324	3099	3874	4649	1162	1550	1937	2324
-23.90	26.80	4	20.0	38.0	130.3	#N/A	0.90	#N/A	508.8	244.3	264.5	185.6	4000.0	2346	3128	3910	4693	1173	1564	1955	2346
-24.00	26.90	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	510.8	245.3	265.5	140.0	2700.0	2363	3150	3938	4725	1181	1575	1969	2363
-24.10	27.00	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	512.8	246.2	266.6	140.0	2700.0	2379	3172	3965	4758	1190	1586	1983	2379
-24.20	27.10	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	514.8	247.2	267.6	140.0	2700.0	2396	3194	3993	4791	1198	1597	1996	2396
-24.30	27.20	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	516.8	248.2	268.6	140.0	2700.0	2412	3216	4020	4824	1206	1608	2010	2412
-24.40	27.30	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	518.8	249.2	269.6	140.0	2700.0	2429	3238	4048	4857	1214	1619	2024	2429
-24.50	27.40	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	520.8	250.2	270.6	140.0	2700.0	2445	3260	4075	4890	1223	1630	2038	2445
-24.60	27.50	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	522.8	251.1	271.7	140.0	2700.0	2462	3282	4103	4923	1231	1641	2051	2462
-24.70	27.60	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	524.8	252.1	272.7	140.0	2700.0	2478	3304	4130	4956	1239	1652	2065	2478
-24.80	27.70	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	526.8	253.1	273.7	140.0	2700.0	2495	3326	4158	4989	1247	1663	2079	2495
-24.90	27.80	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	528.8	254.1	274.7	140.0	2700.0	2511	3348	4185	5022	1256	1674	2093	2511
-25.00	27.90	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	530.8	255.1	275.7	140.0	2700.0	2528	3370	4213	5055	1264	1685	2106	2528
-25.10	28.00	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	532.8	256.0	276.8	140.0	2700.0	2544	3392	4240	5088	1272	1696	2120	2544
-25.20	28.10	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	534.8	257.0	277.8	140.0	2700.0	2561	3414	4268	5121	1280	1707	2134	2561
-25.30	28.20	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	536.8	258.0	278.8	140.0	2700.0	2577	3436	4295	5154	1289	1718	2148	2577
-25.40	28.30	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	538.8	259.0	279.8	140.0	2700.0	2594	3458	4323	5187	1297	1729	2161	2594
-25.50	28.40	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	540.8	260.0	280.8	140.0	2700.0	2610	3480	4350	5220	1305	1740	2175	2610
-25.60	28.50	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	542.8	260.9	281.9	140.0	2700.0	2627	3502	4378	5253	1313	1751	2189	2627
-25.70	28.60	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	544.8	261.9	282.9	140.0	2700.0	2643	3524	4405	5286	1322	1762	2203	2643
-25.80	28.70	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	546.8	262.9	283.9	140.0	2700.0	2660	3546	4433	5319	1330	1773	2216	2660
-25.90	28.80	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	548.8	263.9	284.9	140.0	2700.0	2676	3568	4460	5352	1338	1784	2230	2676
-26.00	28.90	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	550.8	264.9	285.9	140.0	2700.0	2693	3590	4488	5385	1346	1795	2244	2693
-26.10	29.00	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	552.8	265.9	286.9	140.0	2700.0	2709	3612	4515	5418	1355	1806	2258	2709
-26.20	29.10	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	554.8	266.8	288.0	140.0	2700.0	2726	3634	4543	5451	1363	1817	2271	2726
-26.30	29.20	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	556.8	267.8	289.0	140.0	2700.0	2742	3656	4570	5484	1371	1828	2285	2742
-26.40	29.30	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	558.8	268.8	290.0	140.0	2700.0	2759	3678	4598	5517	1379	1839	2299	2759
-26.50	29.40	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	560.8	269.8	291.0	140.0	2700.0	2775	3700	4625	5550	1388	1850	2313	2775
-26.60	29.50	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	562.8	270.8	292.0	140.0	2700.0	2792	3722	4653	5583	1396	1861	2326	2792
-26.70	29.60	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	564.8	271.7	293.1	140.0	2700.0	2808	3744	4680	5616	1404	1872	2340	2808

Project					
Project Olympus					
Calculations for		Job No:			
Bearing capacity - Anchor Piles		Calculated by	CM	Date	18/03/25
		Checked by	MS	Date	18/03/25

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RESULTS SUMMARY

Top 2.9 mOD Step 0.1 m

Bottom -35 mOD

Level	Bore	Soil	γ	ϕ'	Nq	Cu	$\alpha/K_\sigma/\beta$	N-value	σ_v	u	σ_v'	q_s	q_b	Rcd DA1 - Comb 2 (kN)				Tension - Comb 2 (kN)			
m	m		kN/m³			kPa			kPa	kPa	kPa	kPa	kPa	450mm	600mm	750mm	900mm	450mm	600mm	750mm	900mm
-26.80	29.70	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	566.8	272.7	294.1	140.0	2700.0	2825	3766	4708	5649	1412	1883	2354	2825
-26.90	29.80	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	568.8	273.7	295.1	140.0	2700.0	2841	3788	4735	5682	1421	1894	2368	2841
-27.00	29.90	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	570.8	274.7	296.1	140.0	2700.0	2858	3810	4763	5715	1429	1905	2381	2858
-27.10	30.00	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	572.8	275.7	297.1	140.0	2700.0	2874	3832	4790	5748	1437	1916	2395	2874
-27.20	30.10	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	574.8	276.6	298.2	140.0	2700.0	2891	3854	4818	5781	1445	1927	2409	2891
-27.30	30.20	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	576.8	277.6	299.2	140.0	2700.0	2907	3876	4845	5814	1454	1938	2423	2907
-27.40	30.30	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	578.8	278.6	300.2	140.0	2700.0	2924	3898	4873	5847	1462	1949	2436	2924
-27.50	30.40	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	580.8	279.6	301.2	140.0	2700.0	2940	3920	4900	5880	1470	1960	2450	2940
-27.60	30.50	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	582.8	280.6	302.2	140.0	2700.0	2957	3942	4928	5913	1478	1971	2464	2957
-27.70	30.60	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	584.8	281.5	303.3	140.0	2700.0	2973	3964	4955	5946	1486	1982	2477	2973
-27.80	30.70	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	586.8	282.5	304.3	140.0	2700.0	2989	3986	4982	5979	1495	1993	2491	2989
-27.90	30.80	5	20.0	#N/A	#N/A	300.0	0.50	#N/A	588.8	283.5	305.3	140.0	2700.0	3006	4008	5010	6012	1503	2004	2505	3006
-28.00	30.90	6	20.0	38.0	130.3	#N/A	0.90	#N/A	590.8	284.5	306.3	200.0	15000.0	3030	4039	5049	6059	1515	2020	2525	3030
-28.10	31.00	6	20.0	38.0	130.3	#N/A	0.90	#N/A	592.8	285.5	307.3	200.0	15000.0	3053	4071	5089	6106	1527	2035	2544	3053
-28.20	31.10	6	20.0	38.0	130.3	#N/A	0.90	#N/A	594.8	286.5	308.3	200.0	15000.0	3077	4102	5128	6153	1538	2051	2564	3077
-28.30	31.20	6	20.0	38.0	130.3	#N/A	0.90	#N/A	596.8	287.4	309.4	200.0	15000.0	3100	4134	5167	6200	1550	2067	2584	3100
-28.40	31.30	6	20.0	38.0	130.3	#N/A	0.90	#N/A	598.8	288.4	310.4	200.0	15000.0	3124	4165	5206	6248	1562	2083	2603	3124
-28.50	31.40	6	20.0	38.0	130.3	#N/A	0.90	#N/A	600.8	289.4	311.4	200.0	15000.0	3147	4196	5246	6295	1574	2098	2623	3147
-28.60	31.50	6	20.0	38.0	130.3	#N/A	0.90	#N/A	602.8	290.4	312.4	200.0	15000.0	3171	4228	5285	6342	1585	2114	2642	3171
-28.70	31.60	6	20.0	38.0	130.3	#N/A	0.90	#N/A	604.8	291.4	313.4	200.0	15000.0	3194	4259	5324	6389	1597	2130	2662	3194
-28.80	31.70	6	20.0	38.0	130.3	#N/A	0.90	#N/A	606.8	292.3	314.5	200.0	15000.0	3218	4291	5363	6436	1609	2145	2682	3218
-28.90	31.80	6	20.0	38.0	130.3	#N/A	0.90	#N/A	608.8	293.3	315.5	200.0	15000.0	3242	4322	5403	6483	1621	2161	2701	3242
-29.00	31.90	6	20.0	38.0	130.3	#N/A	0.90	#N/A	610.8	294.3	316.5	200.0	15000.0	3265	4354	5442	6530	1633	2177	2721	3265
-29.10	32.00	6	20.0	38.0	130.3	#N/A	0.90	#N/A	612.8	295.3	317.5	200.0	15000.0	3289	4385	5481	6577	1644	2192	2741	3289
-29.20	32.10	6	20.0	38.0	130.3	#N/A	0.90	#N/A	614.8	296.3	318.5	200.0	15000.0	3312	4416	5520	6625	1656	2208	2760	3312
-29.30	32.20	6	20.0	38.0	130.3	#N/A	0.90	#N/A	616.8	297.2	319.6	200.0	15000.0	3336	4448	5560	6672	1668	2224	2780	3336
-29.40	32.30	6	20.0	38.0	130.3	#N/A	0.90	#N/A	618.8	298.2	320.6	200.0	15000.0	3359	4479	5599	6719	1680	2240	2800	3359
-29.50	32.40	6	20.0	38.0	130.3	#N/A	0.90	#N/A	620.8	299.2	321.6	200.0	15000.0	3383	4511	5638	6766	1691	2255	2819	3383
-29.60	32.50	6	20.0	38.0	130.3	#N/A	0.90	#N/A	622.8	300.2	322.6	200.0	15000.0	3407	4542	5678	6813	1703	2271	2839	3407
-29.70	32.60	6	20.0	38.0	130.3	#N/A	0.90	#N/A	624.8	301.2	323.6	200.0	15000.0	3430	4573	5717	6860	1715	2287	2858	3430
-29.80	32.70	6	20.0	38.0	130.3	#N/A	0.90	#N/A	626.8	302.1	324.7	200.0	15000.0	3454	4605	5756	6907	1727	2302	2878	3454
-29.90	32.80	6	20.0	38.0	130.3	#N/A	0.90	#N/A	628.8	303.1	325.7	200.0	15000.0	3477	4636	5795	6954	1739	2318	2898	3477
-30.00	32.90	6	20.0	38.0	130.3	#N/A	0.90	#N/A	630.8	304.1	326.7	200.0	15000.0	3501	4668	5835	7002	1750	2334	2917	3501

Project				
Project Olympus				
Calculations for	Job No:			
Bearing capacity - Anchor Piles	Calculated by	CM	Date	18/03/25
	Checked by	MS	Date	18/03/25

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of

RESULTS SUMMARY

Top 2.9 mOD Step 0.1 m

Bottom -35 mOD

Level	Bore	Soil	γ	ϕ'	Nq	Cu	$\alpha/K_\sigma/\beta$	N-value	σ_v	u	σ_v'	q_s	q_b	Rcd DA1 - Comb 2 (kN)				Tension - Comb 2 (kN)			
m	m		kN/m³			kPa			kPa	kPa	kPa	kPa	kPa	450mm	600mm	750mm	900mm	450mm	600mm	750mm	900mm
-30.10	33.00	6	20.0	38.0	130.3	#N/A	0.90	#N/A	632.8	305.1	327.7	200.0	15000.0	3524	4699	5874	7049	1762	2350	2937	3524
-30.20	33.10	6	20.0	38.0	130.3	#N/A	0.90	#N/A	634.8	306.1	328.7	200.0	15000.0	3548	4731	5913	7096	1774	2365	2957	3548
-30.30	33.20	6	20.0	38.0	130.3	#N/A	0.90	#N/A	636.8	307.1	329.7	200.0	15000.0	3571	4762	5952	7143	1786	2381	2976	3571
-30.40	33.30	6	20.0	38.0	130.3	#N/A	0.90	#N/A	638.8	308.0	330.8	200.0	15000.0	3595	4793	5992	7190	1798	2397	2996	3595
-30.50	33.40	6	20.0	38.0	130.3	#N/A	0.90	#N/A	640.8	309.0	331.8	200.0	15000.0	3619	4825	6031	7237	1809	2412	3015	3619
-30.60	33.50	6	20.0	38.0	130.3	#N/A	0.90	#N/A	642.8	310.0	332.8	200.0	15000.0	3642	4856	6070	7284	1821	2428	3035	3642
-30.70	33.60	6	20.0	38.0	130.3	#N/A	0.90	#N/A	644.8	311.0	333.8	200.0	15000.0	3666	4888	6110	7331	1833	2444	3055	3666
-30.80	33.70	6	20.0	38.0	130.3	#N/A	0.90	#N/A	646.8	312.0	334.8	200.0	15000.0	3689	4919	6149	7379	1845	2460	3074	3689
-30.90	33.80	6	20.0	38.0	130.3	#N/A	0.90	#N/A	648.8	312.9	335.9	200.0	15000.0	3713	4950	6188	7426	1856	2475	3094	3713
-31.00	33.90	6	20.0	38.0	130.3	#N/A	0.90	#N/A	650.8	313.9	336.9	200.0	15000.0	3736	4982	6227	7473	1868	2491	3114	3736
-31.10	34.00	6	20.0	38.0	130.3	#N/A	0.90	#N/A	652.8	314.9	337.9	200.0	15000.0	3760	5013	6267	7520	1880	2507	3133	3760
-31.20	34.10	6	20.0	38.0	130.3	#N/A	0.90	#N/A	654.8	315.9	338.9	200.0	15000.0	3784	5045	6306	7567	1892	2522	3153	3784
-31.30	34.20	6	20.0	38.0	130.3	#N/A	0.90	#N/A	656.8	316.9	339.9	200.0	15000.0	3807	5076	6345	7614	1904	2538	3173	3807
-31.40	34.30	6	20.0	38.0	130.3	#N/A	0.90	#N/A	658.8	317.8	341.0	200.0	15000.0	3831	5108	6384	7661	1915	2554	3192	3831
-31.50	34.40	6	20.0	38.0	130.3	#N/A	0.90	#N/A	660.8	318.8	342.0	200.0	15000.0	3854	5139	6424	7708	1927	2569	3212	3854
-31.60	34.50	6	20.0	38.0	130.3	#N/A	0.90	#N/A	662.8	319.8	343.0	200.0	15000.0	3878	5170	6463	7756	1939	2585	3231	3878
-31.70	34.60	6	20.0	38.0	130.3	#N/A	0.90	#N/A	664.8	320.8	344.0	200.0	15000.0	3901	5202	6502	7803	1951	2601	3251	3901
-31.80	34.70	6	20.0	38.0	130.3	#N/A	0.90	#N/A	666.8	321.8	345.0	200.0	15000.0	3925	5233	6542	7850	1962	2617	3271	3925
-31.90	34.80	6	20.0	38.0	130.3	#N/A	0.90	#N/A	668.8	322.7	346.1	200.0	15000.0	3948	5265	6581	7897	1974	2632	3290	3948
-32.00	34.90	6	20.0	38.0	130.3	#N/A	0.90	#N/A	670.8	323.7	347.1	200.0	15000.0	3972	5296	6620	7944	1986	2648	3310	3972
-32.10	35.00	6	20.0	38.0	130.3	#N/A	0.90	#N/A	672.8	324.7	348.1	200.0	15000.0	3996	5327	6659	7991	1998	2664	3330	3996
-32.20	35.10	6	20.0	38.0	130.3	#N/A	0.90	#N/A	674.8	325.7	349.1	200.0	15000.0	4019	5359	6699	8038	2010	2679	3349	4019
-32.30	35.20	6	20.0	38.0	130.3	#N/A	0.90	#N/A	676.8	326.7	350.1	200.0	15000.0	4043	5390	6738	8085	2021	2695	3369	4043
-32.40	35.30	6	20.0	38.0	130.3	#N/A	0.90	#N/A	678.8	327.7	351.1	200.0	15000.0	4066	5422	6777	8133	2033	2711	3389	4066
-32.50	35.40	6	20.0	38.0	130.3	#N/A	0.90	#N/A	680.8	328.6	352.2	200.0	15000.0	4090	5453	6816	8180	2045	2727	3408	4090
-32.60	35.50	6	20.0	38.0	130.3	#N/A	0.90	#N/A	682.8	329.6	353.2	200.0	15000.0	4113	5485	6856	8227	2057	2742	3428	4113
-32.70	35.60	6	20.0	38.0	130.3	#N/A	0.90	#N/A	684.8	330.6	354.2	200.0	15000.0	4137	5516	6895	8274	2068	2758	3447	4137
-32.80	35.70	6	20.0	38.0	130.3	#N/A	0.90	#N/A	686.8	331.6	355.2	200.0	15000.0	4161	5547	6934	8321	2080	2774	3467	4161
-32.90	35.80	6	20.0	38.0	130.3	#N/A	0.90	#N/A	688.8	332.6	356.2	200.0	15000.0	4184	5579	6973	8368	2092	2789	3487	4184
-33.00	35.90	6	20.0	38.0	130.3	#N/A	0.90	#N/A	690.8	333.5	357.3	200.0	15000.0	4208	5610	7013	8415	2104	2805	3506	4208
-33.10	36.00	6	20.0	38.0	130.3	#N/A	0.90	#N/A	692.8	334.5	358.3	200.0	15000.0	4231	5642	7052	8462	2116	2821	3526	4231
-33.20	36.10	6	20.0	38.0	130.3	#N/A	0.90	#N/A	694.8	335.5	359.3	200.0	15000.0	4255	5673	7091	8510	2127	2837	3546	4255
-33.30	36.20	6	20.0	38.0	130.3	#N/A	0.90	#N/A	696.8	336.5	360.3	200.0	15000.0	4278	5704	7131	8557	2139	2852	3565	4278

Project					
Project Olympus					
Calculations for		Job No:			
Bearing capacity - Anchor Piles	Calculated by	CM	Date	18/03/25	Sheet Nr
	Checked by	MS	Date	18/03/25	of

RESULTS SUMMARY

Top 2.9 mOD Step 0.1 m

Bottom -35 mOD

Level	Bore	Soil	γ	ϕ'	Nq	Cu	$\alpha/K_\sigma/\beta$	N-value	σ_v	u	σ_v'	q_s	q_b	Rcd DA1 - Comb 2 (kN)				Tension - Comb 2 (kN)			
m	m		kN/m³			kPa			kPa	kPa	kPa	kPa	kPa	450mm	600mm	750mm	900mm	450mm	600mm	750mm	900mm
-33.40	36.30	6	20.0	38.0	130.3	#N/A	0.90	#N/A	698.8	337.5	361.3	200.0	15000.0	4302	5736	7170	8604	2151	2868	3585	4302
-33.50	36.40	6	20.0	38.0	130.3	#N/A	0.90	#N/A	700.8	338.4	362.4	200.0	15000.0	4325	5767	7209	8651	2163	2884	3605	4325
-33.60	36.50	6	20.0	38.0	130.3	#N/A	0.90	#N/A	702.8	339.4	363.4	200.0	15000.0	4349	5799	7248	8698	2175	2899	3624	4349
-33.70	36.60	6	20.0	38.0	130.3	#N/A	0.90	#N/A	704.8	340.4	364.4	200.0	15000.0	4373	5830	7288	8745	2186	2915	3644	4373
-33.80	36.70	6	20.0	38.0	130.3	#N/A	0.90	#N/A	706.8	341.4	365.4	200.0	15000.0	4396	5862	7327	8792	2198	2931	3663	4396
-33.90	36.80	6	20.0	38.0	130.3	#N/A	0.90	#N/A	708.8	342.4	366.4	200.0	15000.0	4420	5893	7366	8839	2210	2946	3683	4420
-34.00	36.90	6	20.0	38.0	130.3	#N/A	0.90	#N/A	710.8	343.4	367.4	200.0	15000.0	4443	5924	7405	8887	2222	2962	3703	4443
-34.10	37.00	6	20.0	38.0	130.3	#N/A	0.90	#N/A	712.8	344.3	368.5	200.0	15000.0	4467	5956	7445	8934	2233	2978	3722	4467
-34.20	37.10	6	20.0	38.0	130.3	#N/A	0.90	#N/A	714.8	345.3	369.5	200.0	15000.0	4490	5987	7484	8981	2245	2994	3742	4490
-34.30	37.20	6	20.0	38.0	130.3	#N/A	0.90	#N/A	716.8	346.3	370.5	200.0	15000.0	4514	6019	7523	9028	2257	3009	3762	4514
-34.40	37.30	6	20.0	38.0	130.3	#N/A	0.90	#N/A	718.8	347.3	371.5	200.0	15000.0	4538	6050	7563	9075	2269	3025	3781	4538
-34.50	37.40	6	20.0	38.0	130.3	#N/A	0.90	#N/A	720.8	348.3	372.5	200.0	15000.0	4561	6081	7602	9122	2281	3041	3801	4561
-34.60	37.50	6	20.0	38.0	130.3	#N/A	0.90	#N/A	722.8	349.2	373.6	200.0	15000.0	4585	6113	7641	9169	2292	3056	3821	4585
-34.70	37.60	6	20.0	38.0	130.3	#N/A	0.90	#N/A	724.8	350.2	374.6	200.0	15000.0	4608	6144	7680	9216	2304	3072	3840	4608
-34.80	37.70	6	20.0	38.0	130.3	#N/A	0.90	#N/A	726.8	351.2	375.6	200.0	15000.0	4632	6176	7720	9264	2316	3088	3860	4632
-34.90	37.80	6	20.0	38.0	130.3	#N/A	0.90	#N/A	728.8	352.2	376.6	200.0	15000.0	4655	6207	7759	9311	2328	3104	3879	4655

Appendix C Anchor Pile Design

Anchor Pile Design

Project:	Project Olympys	**Design ref:**	BE0046		
Test Pile Ref:	WTP1	**Revision:**	1	**Date:**	18/03/2025

Summary scope

Design to cover anchor piles required for WTP1 to be completed at Project Olympus.
Anchor piles to be 600mm diameter
Piles to be constructed using CFA bored technique

Load test details

F_{rep}	1358	kN
DVL	1378	kN
DVL + 0.5xF_{rep}	**2057**	**kN**
Max test load	**2057**	**kN**
Anchor pile load	**-1028.5**	**kN**

Test frame capacity	**3000**	**kN**
Socotec test system	**S300**	
Number anchors	**2**	

For test loads above 10MN contact operations manager or Socotec

Anchor Pile details

Pile diameter	600	mm			
Pile toe level	-18.40	mOD	QuS at pile toe	2058	kN
FoS on tension	2.0	(note minimum=2.0)	Concrete strength	32	

Anchor Pile reinforcement

Anchor pile load	-1028.5	kN
Load factor	1	
Factored load	**-1028.5**	**kN**

Acceptable combinations

Dywidag/pile	**1nr**	**2nr**	**4nr**
Bar dia (mm)	47	32	20
Bar capacity (kN)	1366.5	633	258.75

Capacity is ULS combination 1

Anchor Pile summary

Reference	PPL (mOD)	Toe level (mOD)	Bored length (m)	Conc. Length (m)	Reinforcement	Input nr central bars
AP1-1	2.9	-18.40	21.30	21.30	1nr D47 DYWIDAG	1
AP1-2	2.9	-18.40	21.30	21.30	1nr D47 DYWIDAG	1

Note: Dywidag projection above PPL to be added on to the above lengths. Minimum is generally 2.0m.

Anchor Pile Design

Project: Project Olympys | **Design ref:** BE0046
Test Pile Ref: WTP2 | **Revision:** 1 | **Date:** 18/03/2025

Summary scope

Design to cover anchor piles required for WTP2 to be completed at Project Olympus.
Anchor piles to be 600mm diameter
Piles to be constructed using CFA bored technique

Load test details

F_{rep}	2416	kN
DVL	2421	kN
DVL + 0.5xF_{rep}	**3629**	**kN**
Max test load	**3629**	**kN**
Anchor pile load	**-1209.667**	**kN**

Test frame capacity	**4500**	**kN**
Socotec test system	**S450**	
Number anchors	**3**	

For test loads above 10MN contact operations manager or Socotec

Anchor Pile details

Pile diameter 600 mm
Pile toe level -19.80 mOD
QuS at pile toe 2430 kN

FoS on tension 2.0 (note minimum=2.0)
Concrete strength 32

Anchor Pile reinforcement

Anchor pile load -1209.667 kN
Load factor 1
Factored load -1209.667 kN

Acceptable combinations

Dywidag/pile	**1nr**	**2nr**	**4nr**
Bar dia (mm)	47	32	26.5
Bar capacity (kN)	1366.5	633	434.25

Capacity is ULS combination 1

Anchor Pile summary

Reference	PPL (mOD)	Toe level (mOD)	Bored length (m)	Conc. Length (m)	Reinforcement	Input nr central bars
AP1-1	2.9	-19.80	22.70	22.70	1nr D47 DYWIDAG	1
AP1-2	2.9	-19.80	22.70	22.70	1nr D47 DYWIDAG	1
AP1-3	2.9	-19.80	22.70	22.70	1nr D47 DYWIDAG	1

Note: Dywidag projection above PPL to be added on to the above lengths. Minimum is generally 2.0m.

Anchor Pile Design

Project:	Project Olympus	**Design ref:**	BE0046		
Test Pile Ref:	WTP3	**Revision:**	2	**Date:**	09/04/2025

Summary scope

Design to cover anchor piles required for WTP3 to be completed at Project Olympus.
Anchor piles to be 600mm diameter
Piles to be constructed using CFA bored technique

Load test details

F_{rep}	2461	kN
DVL	2466	kN
DVL + 0.5xF_{rep}	**3696.5**	**kN**
Max test load	**3696.5**	**kN**
Anchor pile load	**-1232.167**	**kN**

Test frame capacity	**4500**	**kN**
Socotec test system	**S450**	
Number anchors	**3**	

For test loads above 10MN contact operations manager or Socotec

Anchor Pile details

Pile diameter	600	mm			
Pile toe level	-20.10	mOD	QuS at pile toe	2519.17822	kN
FoS on tension	2.0	(note minimum=2.0)	Concrete strength	32	

Anchor Pile reinforcement

Anchor pile load -1232.167 kN

Load factor 1

Factored load -1232.167 kN

Acceptable combinations

Dywidag/pile	**1nr**	**2nr**	**4nr**
Bar dia (mm)	47	32	26.5
Bar capacity (kN)	1366.5	633	434.25

Capacity is ULS combination 1

Anchor Pile summary

Reference	PPL (mOD)	Toe level (mOD)	Bored length (m)	Conc. Length (m)	Reinforcement	Input nr central bars
AP1-1	2.9	-20.10	23.00	23.00	1nr D47 DYWIDAG	1
AP1-2	2.9	-20.10	23.00	23.00	1nr D47 DYWIDAG	1
AP1-3	2.9	-20.10	23.00	23.00	1nr D47 DYWIDAG	1

Note: Dywidag projection above PPL to be added on to the above lengths. Minimum is generally 2.0m.

Anchor Pile Design

Project: Project Olympys | **Design ref:** BE0046
Test Pile Ref: WTP4 | **Revision:** 1 | **Date:** 18/03/2025

Summary scope

Design to cover anchor piles required for WTP4 to be completed at Project Olympus.
Anchor piles to be 600mm diameter
Piles to be constructed using CFA bored technique

Load test details

F_{rep}	2404	kN
DVL	2405	kN
DVL + 0.5xF_{rep}	**3607**	**kN**
Max test load	**3607**	**kN**
Anchor pile load	**-1202.333**	**kN**

Test frame capacity	**4500**	**kN**
Socotec test system	**S450**	
Number anchors	**3**	

For test loads above 10MN contact operations manager or Socotec

Anchor Pile details

Pile diameter 600 mm
Pile toe level -19.80 mOD
QuS at pile toe 2430 kN

FoS on tension 2.0 (note minimum=2.0)
Concrete strength 32

Anchor Pile reinforcement

Anchor pile load -1202.333 kN
Load factor 1
Factored load -1202.333 kN

Acceptable combinations

Dywidag/pile	**1nr**	**2nr**	**4nr**
Bar dia (mm)	47	32	26.5
Bar capacity (kN)	1366.5	633	434.25

Capacity is ULS combination 1

Anchor Pile summary

Reference	PPL (mOD)	Toe level (mOD)	Bored length (m)	Conc. Length (m)	Reinforcement	Input nr central bars
AP1-1	2.9	-19.80	22.70	22.70	1nr D47 DYWIDAG	1
AP1-2	2.9	-19.80	22.70	22.70	1nr D47 DYWIDAG	1
AP1-3	2.9	-19.80	22.70	22.70	1nr D47 DYWIDAG	1

Note: Dywidag projection above PPL to be added on to the above lengths. Minimum is generally 2.0m.

Anchor Pile Design

Project: Project Olympus
Test Pile Ref: WTP5
Design ref: BE0046
Revision: 2
Date: 09/04/2025

Summary scope

Design to cover anchor piles required for WTP5 to be completed at Project Olympus.
Anchor piles to be 600mm diameter
Piles to be constructed using CFA bored technique

Load test details

F_{rep}	1507	kN
DVL	1555	kN
DVL + 0.5xF_{rep}	**2308.5**	**kN**
Max test load	**2308.5**	**kN**
Anchor pile load	**-769.5**	**kN**

Test frame capacity	**4500**	**kN**
Socotec test system	**S450**	
Number anchors	**3**	

For test loads above 10MN contact operations manager or Socotec

Anchor Pile details

Pile diameter 600 mm
Pile toe level -16.60 mOD
QuS at pile toe 1605.1 kN

FoS on tension 2.1 (note minimum=2.0)
Concrete strength 32

Anchor Pile reinforcement

Anchor pile load -769.5 kN
Load factor 1
Factored load -769.5 kN

Acceptable combinations

Dywidag/pile	**1nr**	**2nr**	**4nr**
Bar dia (mm)	36	26.5	20
Bar capacity (kN)	801.75	434.25	258.75

Capacity is ULS combination 1

Anchor Pile summary

Reference	PPL (mOD)	Toe level (mOD)	Bored length (m)	Conc. Length (m)	Reinforcement	Input nr central bars
AP1-1	2.9	-16.60	19.50	19.50	1nr D36 DYWIDAG	1
AP1-2	2.9	-16.60	19.50	19.50	1nr D36 DYWIDAG	1
AP1-3	2.9	-16.60	19.50	19.50	1nr D36 DYWIDAG	1

Note: Dywidag projection above PPL to be added on to the above lengths. Minimum is generally 2.0m.

Anchor Pile Design

Project:	Project Olympus	**Design ref:**	BE0046		
Test Pile Ref:	WTP6	**Revision:**	2	**Date:**	14/04/2025

Summary scope

Design to cover anchor piles required for WTP6 to be completed at Project Olympus.
Anchor piles to be 750mm diameter
Piles to be constructed using CFA bored technique

Load test details

F_{rep}	2316	kN
DVL	2331	kN
DVL + 0.5xF_{rep}	**3489**	**kN**
Max test load	**3489**	**kN**
Anchor pile load	**-1163**	**kN**

Test frame capacity	**4500**	**kN**
Socotec test system	**S450**	
Number anchors	**3**	

For test loads above 10MN contact operations manager or Socotec

Anchor Pile details

Pile diameter	750	mm			
Pile toe level	-17.80	mOD	QuS at pile toe	2333.16335	kN
FoS on tension	2.0	(note minimum=2.0)	Concrete strength	32	

Anchor Pile reinforcement

Anchor pile load	-1163	kN
Load factor	1.35	
Factored load	**-1570.05**	**kN**

Acceptable combinations

Dywidag/pile	**1nr**	**2nr**	**4nr**
Bar dia (mm)	57	36	26.5
Bar capacity (kN)	2003.25	801.75	434.25

Capacity is ULS combination 1

Anchor Pile summary

Reference	PPL (mOD)	Toe level (mOD)	Bored length (m)	Conc. Length (m)	Reinforcement	Input nr central bars
AP1-1	2.9	-17.80	20.70	20.70	2nr D36 DYWIDAG	2
AP1-2	2.9	-17.80	20.70	20.70	2nr D36 DYWIDAG	2
AP1-3	2.9	-17.80	20.70	20.70	2nr D36 DYWIDAG	2

Note: Dywidag projection above PPL to be added on to the above lengths. Minimum is generally 2.0m.

Anchor Pile Design

Project:	Project Olympus	**Design ref:**	BE0046		
Test Pile Ref:	WTP7 - 750mm Anchors	**Revision:**	2	**Date:**	14/04/2025

Summary scope

Design to cover anchor piles required for WTP7 - 750mm Anchors to be completed at Project Olympus.
Anchor piles to be 750mm diameter
Piles to be constructed using CFA bored technique

Load test details

F_{rep}	2714	kN
DVL	2729.9	kN
DVL + 0.5xF_{rep}	**4086.9**	**kN**
Max test load	**4086.9**	**kN**
Anchor pile load	**-1362.3**	**kN**

Test frame capacity	**4500**	**kN**
Socotec test system	**S450**	
Number anchors	**3**	

For test loads above 10MN contact operations manager or Socotec

Anchor Pile details

Pile diameter	750	mm			
Pile toe level	-19.00	mOD	QuS at pile toe	2732	kN
FoS on tension	2.0	(note minimum=2.0)	Concrete strength	32	

Anchor Pile reinforcement

Anchor pile load -1362.3 kN

Load factor 1.35

Factored load -1839.105 kN

Acceptable combinations

Dywidag/pile	**1nr**	**2nr**	**4nr**
Bar dia (mm)	57	40	32
Bar capacity (kN)	2003.25	990	633

Capacity is ULS combination 1

Anchor Pile summary

Reference	PPL (mOD)	Toe level (mOD)	Bored length (m)	Conc. Length (m)	Reinforcement	Input nr central bars
AP1-1	2.9	-19.00	21.90	21.90	2nr D40 DYWIDAG	2
AP1-2	2.9	-19.00	21.90	21.90	2nr D40 DYWIDAG	2
AP1-3	2.90	-19.00	21.90	21.90	2nr D40 DYWIDAG	2

Note: Dywidag projection above PPL to be added on to the above lengths. Minimum is generally 2.0m.

Anchor Pile Design

Project:	Project Olympus	**Design ref:**	BE0046		
Test Pile Ref:	WTP7 - 600mm Anchors	**Revision:**	2	**Date:**	14/04/2025

Summary scope

Design to cover anchor piles required for WTP7 - 600mm Anchors to be completed at Project Olympus.
Anchor piles to be 600mm diameter
Piles to be constructed using CFA bored technique

Load test details

F_{rep}	2714	kN
DVL	2729.9	kN
DVL + 0.5xF_{rep}	**4086.9**	**kN**
Max test load	**4086.9**	**kN**
Anchor pile load	**-1362.3**	**kN**

Test frame capacity	**4500**	**kN**
Socotec test system	**S450**	
Number anchors	**3**	

For test loads above 10MN contact operations manager or Socotec

Anchor Pile details

Pile diameter	600	mm			
Pile toe level	-20.80	mOD	QuS at pile toe	2732	kN
FoS on tension	2.0	(note minimum=2.0)	Concrete strength	32	

Anchor Pile reinforcement

Anchor pile load -1362.3 kN

Load factor 1.35

Factored load -1839.105 kN

Acceptable combinations

Dywidag/pile	**1nr**	**2nr**	**4nr**
Bar dia (mm)	57	40	32
Bar capacity (kN)	2003.25	990	633

Capacity is ULS combination 1

Anchor Pile summary

Reference	PPL (mOD)	Toe level (mOD)	Bored length (m)	Conc. Length (m)	Reinforcement	Input nr central bars
AP1-1	2.9	-20.80	23.70	23.70	2nr D40 DYWIDAG	2
AP1-2	2.9	-20.80	23.70	23.70	2nr D40 DYWIDAG	2
AP1-3	2.90	-20.80	23.70	23.70	2nr D40 DYWIDAG	2

Note: Dywidag projection above PPL to be added on to the above lengths. Minimum is generally 2.0m.

Appendix D Load Schedule

keltbray Piling

Maintained Load Test Schedule

Site	Project Olympys	**Test Reference**	WTP1
Reference	BE0046	**Designer**	CM

Test to be completed in accordance with Part B17 - ICE SPERW 2017

Loading Details		Test Pile Details		Structural Capacity	
F_{rep} (kN)	1358	**Pile dia (mm)**	450	**Conc. Ult (kN)**	4771.9125
NSF (kN)	0	**PPL (mOD)**	2.900	**Min. cube strength (N/mm2)**	30
DVL (kN)	1378	**Pile Toe (mOD)**	-22.600		
Max test load (kN)	2057	**Pile length (m)**	25.5	**Pile area (mm2)**	159063.75

Load	Load (kN)	Minimum Hold Period	Instruction	Conc. Stress (N/mm2)	Conc. Stress (% ult)
25% DVL	345	30 Minutes		2.166	7.22
50% DVL	689	30 Minutes		4.332	14.44
75% DVL	1034	30 Minutes		6.497	21.66
100% DVL	1378	6 Hours		8.663	28.88
75% DVL	1034	10 Minutes		6.497	21.66
50% DVL	689	10 Minutes		4.332	14.44
25% DVL	345	10 Minutes		2.166	7.22
0% DVL	0	1 Hour	Hold for 1 hour and commence 2nd cycle	0.000	0.00
100% DVL	1378	1 Hour		8.663	28.88
100% DVL + 25% F_{rep}	1718	1 Hour		10.798	35.99
100% DVL + 50% F_{rep}	2057	6 Hours		12.932	43.11
100% DVL + 25% F_{rep}	1718	10 Minutes		10.798	35.99
100% DVL	1378	10 Minutes		8.663	28.88
75% DVL	1034	10 Minutes		6.497	21.66
50% DVL	689	10 Minutes		4.332	14.44
25% DVL	345	10 Minutes		2.166	7.22
0% DVL	0	1 Hour		0.000	0.00

Reduce load from maximum held capacity in 5 equal stages to zero

IMPORTANT - In the event that the test load cannot be maintained, or the pile head velocity has not reduced to be within the settlement criteria stated in ICE SPERW B17.13.1 after a two hour period, then the load shall be decreased to the previous load increment and:
- if the load can be stabilised the load shall be held for 30 minutes and then increased in increments of 10% F_{rep}, each held for a further 30 minutes, until a load is reached where the load increment cannot be stabilised.
-if the load fails to stabilise, the load shall again be reduced to the highest previous load increment at which the load can be stabilised and the load held at that level for 30 minutes, and then increased in increments of 10% F_{rep} until a load is reached where the load cannot be stabilised. For each of these increments, the load shall be held for 30 minutes.

Test Pile Notes

Test procedure for maintained load compression test in ICE SPERW 3rd ed. (2017) is to be followed
Position of load jack to be centralized with respect to as built pile centroid by surveying. This is not necessarily the centre of the test cap
The rate of settlement shall be measured over a minimum rolling period of 30 minutes
Ensure design cube strength is achieved prior to loading
F_{rep} denotes representative action
NSF denotes Negative Skin Friction
DVL denotes Design Verification Load

keltbray Piling

Maintained Load Test Schedule

Site	Project Olympys	**Test Reference**	WTP2
Reference	BE0046	**Designer**	CM

Test to be completed in accordance with Part B17 - ICE SPERW 2017

Loading Details		Test Pile Details		Structural Capacity	
F_{rep} (kN)	2416	**Pile dia (mm)**	750	**Conc. Ult (kN)**	11046.09375
NSF (kN)	0	**PPL (mOD)**	2.900	**Min. cube strength (N/mm2)**	25
DVL (kN)	2421	**Pile Toe (mOD)**	-27.600		
Max test load (kN)	3629	**Pile length (m)**	30.5	**Pile area (mm2)**	441843.75

Load	Load (kN)	Minimum Hold Period	Instruction	Conc. Stress (N/mm2)	Conc. Stress (% ult)
25% DVL	605	30 Minutes		1.370	5.48
50% DVL	1211	30 Minutes		2.740	10.96
75% DVL	1816	30 Minutes		4.109	16.44
100% DVL	2421	6 Hours		5.479	21.92
75% DVL	1816	10 Minutes		4.109	16.44
50% DVL	1211	10 Minutes		2.740	10.96
25% DVL	605	10 Minutes		1.370	5.48
0% DVL	0	1 Hour	Hold for 1 hour and commence 2nd cycle	0.000	0.00
100% DVL	2421	1 Hour		5.479	21.92
100% DVL + 25% F_{rep}	3025	1 Hour		6.846	27.39
100% DVL + 50% F_{rep}	3629	6 Hours		8.213	32.85
100% DVL + 25% F_{rep}	3025	10 Minutes		6.846	27.39
100% DVL	2421	10 Minutes		5.479	21.92
75% DVL	1816	10 Minutes		4.109	16.44
50% DVL	1211	10 Minutes		2.740	10.96
25% DVL	605	10 Minutes		1.370	5.48
0% DVL	0	1 Hour		0.000	0.00

Reduce load from maximum held capacity in 5 equal stages to zero

IMPORTANT - In the event that the test load cannot be maintained, or the pile head velocity has not reduced to be within the settlement criteria stated in ICE SPERW B17.13.1 after a two hour period, then the load shall be decreased to the previous load increment and:
- if the load can be stabilised the load shall be held for 30 minutes and then increased in increments of 10% F_{rep}, each held for a further 30 minutes, until a load is reached where the load increment cannot be stabilised.
-if the load fails to stabilise, the load shall again be reduced to the highest previous load increment at which the load can be stabilised and the load held at that level for 30 minutes, and then increased in increments of 10% F_{rep} until a load is reached where the load cannot be stabilised. For each of these increments, the load shall be held for 30 minutes.

Test Pile Notes

Test procedure for maintained load compression test in ICE SPERW 3rd ed. (2017) is to be followed
Position of load jack to be centralized with respect to as built pile centroid by surveying. This is not necessarily the centre of the test cap
The rate of settlement shall be measured over a minimum rolling period of 30 minutes
Ensure design cube strength is achieved prior to loading
F_{rep} denotes representative action
NSF denotes Negative Skin Friction
DVL denotes Design Verification Load

Maintained Load Test Schedule

Site	Project Olympus	**Test Reference**	WTP3
Reference	BE0046	**Designer**	JP

Test to be completed in accordance with Part B17 - ICE SPERW 2017

Loading Details		Test Pile Details		Structural Capacity	
F_{rep} (kN)	2461	**Pile dia (mm)**	600	**Conc. Ult (kN)**	11311.2
NSF (kN)	0	**PPL (mOD)**	2.900	**Min. cube strength (N/mm2)**	40
DVL (kN)	2466	**Pile Toe (mOD)**	-29.300		
Max test load (kN)	3697	**Pile length (m)**	32.2	**Pile area (mm2)**	282780

Load	Load (kN)	Minimum Hold Period	Instruction	Conc. Stress (N/mm2)	Conc. Stress (% ult)
25% DVL	617	30 Minutes		2.180	5.45
50% DVL	1233	30 Minutes		4.360	10.90
75% DVL	1850	30 Minutes		6.540	16.35
100% DVL	2466	6 Hours		8.721	21.80
75% DVL	1850	10 Minutes		6.540	16.35
50% DVL	1233	10 Minutes		4.360	10.90
25% DVL	617	10 Minutes		2.180	5.45
0% DVL	0	1 Hour	Hold for 1 hour and commence 2nd cycle	0.000	0.00
100% DVL	2466	1 Hour		8.721	21.80
100% DVL + 25% F_{rep}	3081	1 Hour		10.896	27.24
100% DVL + 50% F_{rep}	3697	6 Hours		13.072	32.68
100% DVL + 25% F_{rep}	3081	10 Minutes		10.896	27.24
100% DVL	2466	10 Minutes		8.721	21.80
75% DVL	1850	10 Minutes		6.540	16.35
50% DVL	1233	10 Minutes		4.360	10.90
25% DVL	617	10 Minutes		2.180	5.45
0% DVL	0	1 Hour		0.000	0.00

Reduce load from maximum held capacity in 5 equal stages to zero

IMPORTANT - In the event that the test load cannot be maintained, or the pile head velocity has not reduced to be within the settlement criteria stated in ICE SPERW B17.13.1 after a two hour period, then the load shall be decreased to the previous load increment and:
- if the load can be stabilised the load shall be held for 30 minutes and then increased in increments of 10% F_{rep}, each held for a further 30 minutes, until a load is reached where the load increment cannot be stabilised.
-if the load fails to stabilise, the load shall again be reduced to the highest previous load increment at which the load can be stabilised and the load held at that level for 30 minutes, and then increased in increments of 10% F_{rep} until a load is reached where the load cannot be stabilised. For each of these increments, the load shall be held for 30 minutes.

Test Pile Notes

Test procedure for maintained load compression test in ICE SPERW 3rd ed. (2017) is to be followed
Position of load jack to be centralized with respect to as built pile centroid by surveying. This is not necessarily the centre of the test cap
The rate of settlement shall be measured over a minimum rolling period of 30 minutes
Ensure design cube strength is achieved prior to loading
F_{rep} denotes representative action
NSF denotes Negative Skin Friction
DVL denotes Design Verification Load

keltbray Piling — Maintained Load Test Schedule

Site	Project Olympys	**Test Reference**	WTP4
Reference	BE0046	**Designer**	CM

Test to be completed in accordance with Part B17 - ICE SPERW 2017

Loading Details		Test Pile Details		Structural Capacity	
F_{rep} (kN)	2404	**Pile dia (mm)**	600	**Conc. Ult (kN)**	9897.3
NSF (kN)	0	**PPL (mOD)**	2.900	**Min. cube strength (N/mm2)**	35
DVL (kN)	2405	**Pile Toe (mOD)**	-26.200		
Max test load (kN)	3607	**Pile length (m)**	29.1	**Pile area (mm2)**	282780

Load	Load (kN)	Minimum Hold Period	Instruction	Conc. Stress (N/mm2)	Conc. Stress (% ult)
25% DVL	601	30 Minutes		2.126	6.07
50% DVL	1203	30 Minutes		4.252	12.15
75% DVL	1804	30 Minutes		6.379	18.22
100% DVL	2405	6 Hours		8.505	24.30
75% DVL	1804	10 Minutes		6.379	18.22
50% DVL	1203	10 Minutes		4.252	12.15
25% DVL	601	10 Minutes		2.126	6.07
0% DVL	0	1 Hour	Hold for 1 hour and commence 2nd cycle	0.000	0.00
100% DVL	2405	1 Hour		8.505	24.30
100% DVL + 25% F_{rep}	3006	1 Hour		10.630	30.37
100% DVL + 50% F_{rep}	3607	6 Hours		12.755	36.44
100% DVL + 25% F_{rep}	3006	10 Minutes		10.630	30.37
100% DVL	2405	10 Minutes		8.505	24.30
75% DVL	1804	10 Minutes		6.379	18.22
50% DVL	1203	10 Minutes		4.252	12.15
25% DVL	601	10 Minutes		2.126	6.07
0% DVL	0	1 Hour		0.000	0.00

Reduce load from maximum held capacity in 5 equal stages to zero

IMPORTANT - In the event that the test load cannot be maintained, or the pile head velocity has not reduced to be within the settlement criteria stated in ICE SPERW B17.13.1 after a two hour period, then the load shall be decreased to the previous load increment and:
- if the load can be stabilised the load shall be held for 30 minutes and then increased in increments of 10% F_{rep}, each held for a further 30 minutes, until a load is reached where the load increment cannot be stabilised.
-if the load fails to stabilise, the load shall again be reduced to the highest previous load increment at which the load can be stabilised and the load held at that level for 30 minutes, and then increased in increments of 10% F_{rep} until a load is reached where the load cannot be stabilised. For each of these increments, the load shall be held for 30 minutes.

Test Pile Notes

Test procedure for maintained load compression test in ICE SPERW 3rd ed. (2017) is to be followed
Position of load jack to be centralized with respect to as built pile centroid by surveying. This is not necessarily the centre of the test cap
The rate of settlement shall be measured over a minimum rolling period of 30 minutes
Ensure design cube strength is achieved prior to loading
F_{rep} denotes representative action
NSF denotes Negative Skin Friction
DVL denotes Design Verification Load

Keltbray Piling — Maintained Load Test Schedule

Site	Project Olympus	**Test Reference**	WTP5
Reference	BE0046	**Designer**	JP

Test to be completed in accordance with Part B17 - ICE SPERW 2017

Loading Details		Test Pile Details		Structural Capacity	
F_{rep} (kN)	1507	**Pile dia (mm)**	600	**Conc. Ult (kN)**	11311.2
NSF (kN)	0	**PPL (mOD)**	2.900	**Min. cube strength (N/mm2)**	40
DVL (kN)	1555	**Pile Toe (mOD)**	-22.400		
Max test load (kN)	2309	**Pile length (m)**	25.3	**Pile area (mm2)**	282780

Load	Load (kN)	Minimum Hold Period	Instruction	Conc. Stress (N/mm2)	Conc. Stress (% ult)
25% DVL	389	30 Minutes		1.375	3.44
50% DVL	778	30 Minutes		2.749	6.87
75% DVL	1166	30 Minutes		4.124	10.31
100% DVL	1555	6 Hours		5.499	13.75
75% DVL	1166	10 Minutes		4.124	10.31
50% DVL	778	10 Minutes		2.749	6.87
25% DVL	389	10 Minutes		1.375	3.44
0% DVL	0	1 Hour	Hold for 1 hour and commence 2nd cycle	0.000	0.00
100% DVL	1555	1 Hour		5.499	13.75
100% DVL + 25% F_{rep}	1932	1 Hour		6.831	17.08
100% DVL + 50% F_{rep}	2309	6 Hours		8.164	20.41
100% DVL + 25% F_{rep}	1932	10 Minutes		6.831	17.08
100% DVL	1555	10 Minutes		5.499	13.75
75% DVL	1166	10 Minutes		4.124	10.31
50% DVL	778	10 Minutes		2.749	6.87
25% DVL	389	10 Minutes		1.375	3.44
0% DVL	0	1 Hour		0.000	0.00

Reduce load from maximum held capacity in 5 equal stages to zero

IMPORTANT - In the event that the test load cannot be maintained, or the pile head velocity has not reduced to be within the settlement criteria stated in ICE SPERW B17.13.1 after a two hour period, then the load shall be decreased to the previous load increment and:
- if the load can be stabilised the load shall be held for 30 minutes and then increased in increments of 10% F_{rep}, each held for a further 30 minutes, until a load is reached where the load increment cannot be stabilised.
-if the load fails to stabilise, the load shall again be reduced to the highest previous load increment at which the load can be stabilised and the load held at that level for 30 minutes, and then increased in increments of 10% F_{rep} until a load is reached where the load cannot be stabilised. For each of these increments, the load shall be held for 30 minutes.

Test Pile Notes

Test procedure for maintained load compression test in ICE SPERW 3rd ed. (2017) is to be followed
Position of load jack to be centralized with respect to as built pile centroid by surveying. This is not necessarily the centre of the test cap
The rate of settlement shall be measured over a minimum rolling period of 30 minutes
Ensure design cube strength is achieved prior to loading
F_{rep} denotes representative action
NSF denotes Negative Skin Friction
DVL denotes Design Verification Load

Maintained Load Test Schedule

Site	Project Olympus	**Test Reference**	WTP6
Reference	BE0046	**Designer**	JP

Test to be completed in accordance with Part B17 - ICE SPERW 2017

Loading Details		Test Pile Details		Structural Capacity	
F_{rep} (kN)	2316	**Pile dia (mm)**	600	**Conc. Ult (kN)**	11311.2
NSF (kN)	0	**PPL (mOD)**	2.900	**Min. cube strength (N/mm2)**	40
DVL (kN)	2331	**Pile Toe (mOD)**	-22.200		
Max test load (kN)	3489	**Pile length (m)**	25.1	**Pile area (mm2)**	282780

Load	Load (kN)	Minimum Hold Period	Instruction	Conc. Stress (N/mm2)	Conc. Stress (% ult)
25% DVL	583	30 Minutes		2.061	5.15
50% DVL	1166	30 Minutes		4.122	10.30
75% DVL	1748	30 Minutes		6.182	15.46
100% DVL	2331	6 Hours		8.243	20.61
75% DVL	1748	10 Minutes		6.182	15.46
50% DVL	1166	10 Minutes		4.122	10.30
25% DVL	583	10 Minutes		2.061	5.15
0% DVL	0	1 Hour	Hold for 1 hour and commence 2nd cycle	0.000	0.00
100% DVL	2331	1 Hour		8.243	20.61
100% DVL + 25% F_{rep}	2910	1 Hour		10.291	25.73
100% DVL + 50% F_{rep}	3489	6 Hours		12.338	30.85
100% DVL + 25% F_{rep}	2910	10 Minutes		10.291	25.73
100% DVL	2331	10 Minutes		8.243	20.61
75% DVL	1748	10 Minutes		6.182	15.46
50% DVL	1166	10 Minutes		4.122	10.30
25% DVL	583	10 Minutes		2.061	5.15
0% DVL	0	1 Hour		0.000	0.00

Reduce load from maximum held capacity in 5 equal stages to zero

IMPORTANT - In the event that the test load cannot be maintained, or the pile head velocity has not reduced to be within the settlement criteria stated in ICE SPERW B17.13.1 after a two hour period, then the load shall be decreased to the previous load increment and:
- if the load can be stabilised the load shall be held for 30 minutes and then increased in increments of 10% F_{rep}, each held for a further 30 minutes, until a load is reached where the load increment cannot be stabilised.
-if the load fails to stabilise, the load shall again be reduced to the highest previous load increment at which the load can be stabilised and the load held at that level for 30 minutes, and then increased in increments of 10% F_{rep} until a load is reached where the load cannot be stabilised. For each of these increments, the load shall be held for 30 minutes.

Test Pile Notes

Test procedure for maintained load compression test in ICE SPERW 3rd ed. (2017) is to be followed
Position of load jack to be centralized with respect to as built pile centroid by surveying. This is not necessarily the centre of the test cap
The rate of settlement shall be measured over a minimum rolling period of 30 minutes
Ensure design cube strength is achieved prior to loading
F_{rep} denotes representative action
NSF denotes Negative Skin Friction
DVL denotes Design Verification Load

Maintained Load Test Schedule

Site	Project Olympus	**Test Reference**	WTP7 - 750mm Anchors
Reference	BE0046	**Designer**	JP

Test to be completed in accordance with Part B17 - ICE SPERW 2017

Loading Details		Test Pile Details		Structural Capacity	
F_{rep} (kN)	2714	**Pile dia (mm)**	750	**Conc. Ult (kN)**	17673.75
NSF (kN)	0	**PPL (mOD)**	2.900	**Min. cube strength (N/mm2)**	40
DVL (kN)	2729.9	**Pile Toe (mOD)**	-29.600		
Max test load (kN)	4087	**Pile length (m)**	32.5	**Pile area (mm2)**	441843.75

Load	Load (kN)	Minimum Hold Period	Instruction	Conc. Stress (N/mm2)	Conc. Stress (% ult)
25% DVL	682	30 Minutes		1.545	3.86
50% DVL	1365	30 Minutes		3.089	7.72
75% DVL	2047	30 Minutes		4.634	11.58
100% DVL	2730	6 Hours		6.178	15.45
75% DVL	2047	10 Minutes		4.634	11.58
50% DVL	1365	10 Minutes		3.089	7.72
25% DVL	682	10 Minutes		1.545	3.86
0% DVL	0	1 Hour	Hold for 1 hour and commence 2nd cycle	0.000	0.00
100% DVL	2730	1 Hour		6.178	15.45
100% DVL + 25% F_{rep}	3408	1 Hour		7.714	19.29
100% DVL + 50% F_{rep}	4087	6 Hours		9.250	23.12
100% DVL + 25% F_{rep}	3408	10 Minutes		7.714	19.29
100% DVL	2730	10 Minutes		6.178	15.45
75% DVL	2047	10 Minutes		4.634	11.58
50% DVL	1365	10 Minutes		3.089	7.72
25% DVL	682	10 Minutes		1.545	3.86
0% DVL	0	1 Hour		0.000	0.00

Reduce load from maximum held capacity in 5 equal stages to zero

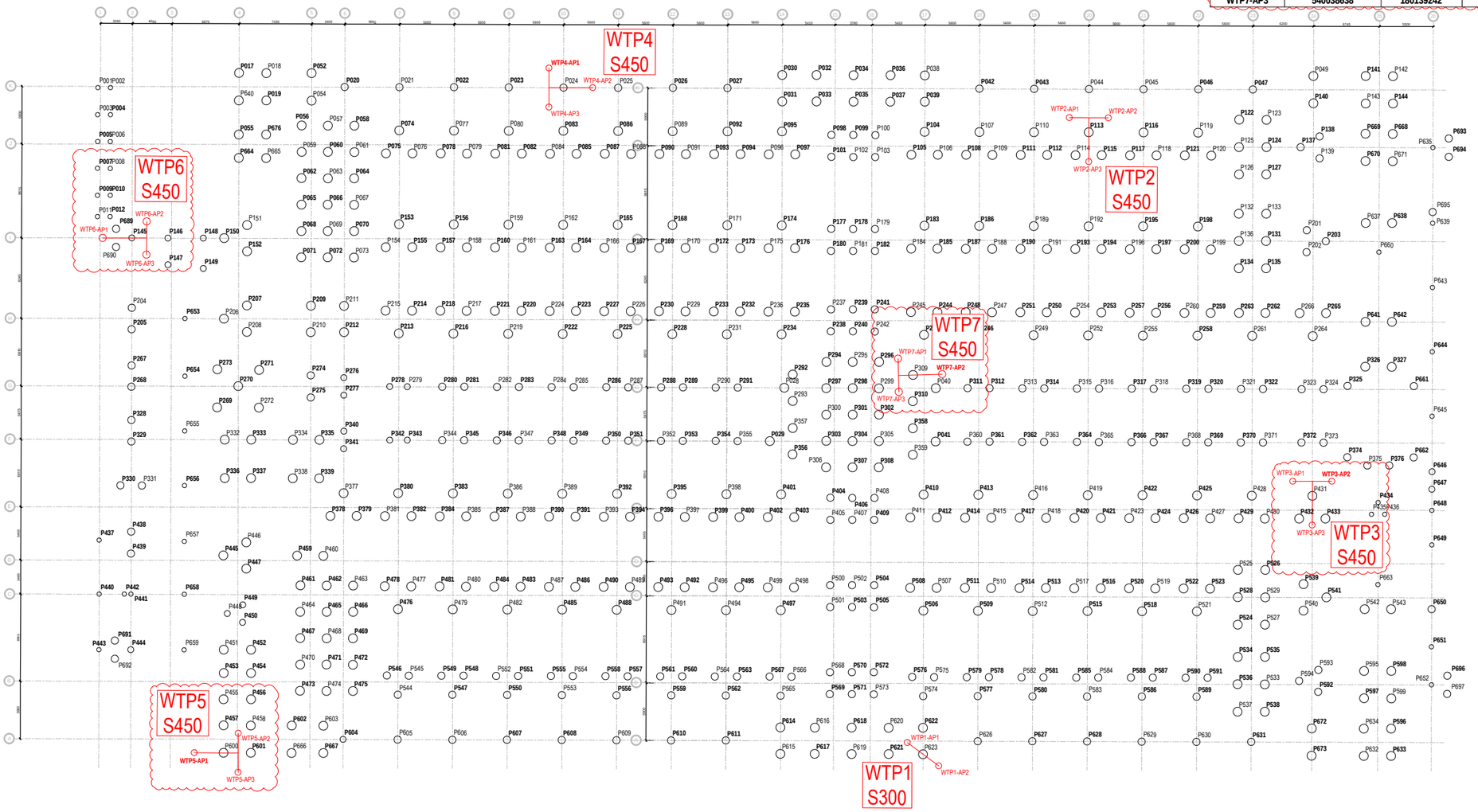
IMPORTANT - In the event that the test load cannot be maintained, or the pile head velocity has not reduced to be within the settlement criteria stated in ICE SPERW B17.13.1 after a two hour period, then the load shall be decreased to the previous load increment and:
- if the load can be stabilised the load shall be held for 30 minutes and then increased in increments of 10% F_{rep}, each held for a further 30 minutes, until a load is reached where the load increment cannot be stabilised.
-if the load fails to stabilise, the load shall again be reduced to the highest previous load increment at which the load can be stabilised and the load held at that level for 30 minutes, and then increased in increments of 10% F_{rep} until a load is reached where the load cannot be stabilised. For each of these increments, the load shall be held for 30 minutes.

Test Pile Notes

Test procedure for maintained load compression test in ICE SPERW 3rd ed. (2017) is to be followed
Position of load jack to be centralized with respect to as built pile centroid by surveying. This is not necessarily the centre of the test cap
The rate of settlement shall be measured over a minimum rolling period of 30 minutes
Ensure design cube strength is achieved prior to loading
F_{rep} denotes representative action
NSF denotes Negative Skin Friction
DVL denotes Design Verification Load

Appendix E Working Test Pile Layout

PILE NO.	EASTING (mm)	NORTHING (mm)	PILE DIA. (mm)	TEST FRAME
WTP1-AP1	540009478	180118269	600	S300
WTP1-AP2	540009308	180114272	600	S300
WTP2-AP1	540071669	180140666	600	S450
WTP2-AP2	540073915	180137357	600	S450
WTP2-AP3	540069069	180136484	600	S450
WTP3-AP1	540053851	180100766	600	S450
WTP3-AP2	540056097	180097457	600	S450
WTP3-AP3	540051251	180096584	600	S450
WTP4-AP1	540045809	180187535	600	S450
WTP4-AP2	540046684	180182689	600	S450
WTP4-AP3	540042500	180185287	600	S450
WTP5-AP1	539967429	180177986	600	S450
WTP5-AP2	539971611	180175385	600	S450
WTP5-AP3	539968301	180173139	600	S450
WTP6-AP1	540005674	180215466	750	S450
WTP6-AP2	540009608	180212698	750	S450
WTP6-AP3	540006795	180210788	750	S450
WTP7-AP1	540041395	180141231	750	S450
WTP7-AP2	540042649	180136587	750	S450
WTP7-AP3	540038638	180139242	750	S450



NOTES:

1. DIMENSIONS NOT TO BE SCALED FROM THIS DRAWING.
2. DIMENSIONS GIVEN IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. ALL LEVELS ARE IN METRES ABOVE ORDINANCE DATUM UNLESS NOTED OTHERWISE.
4. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL ASSOCIATED DRAWINGS, REPORTS AND SPECIFICATIONS.
5. THIS DRAWING IS BASED UPON THE FOLLOWING CUNDALL DRAWINGS:
   LCY11-CDL-XX-XX-DR-GE-10001 - Site Constraints Plan
   LCY11-CDL-81-XX-DR-S-01005_P04
   LCY11-CDL-81-XX-DR-S-01006_P04
   LCY11-CDL-81-XX-DR-S-01007_P04
   LCY11-CDL-82-XX-DR-S-01005_P02
   LCY11-CDL-82-XX-DR-S-01006_P02
   LCY11-CDL-82-XX-DR-S-01007_P02
   LCY11-CDL-83-XX-DR-S-01005_P02
   LCY11-CDL-83-XX-DR-S-01006_P02
   LCY11-CDL-83-XX-DR-S-01007_P02
6. PILE SETTING OUT POINTS ARE BASED UPON THE INFORMATION REFERENCED ABOVE AND MUST BE CHECKED AND APPROVED BY ALL RELEVANT PARTIES.
7. FOR WORKING TEST PILE DESIGN REPORT REFER TO DOCUMENT NO. LCY11-KTB-81-ZZ-RP-C-00004.
8. FOR WORKING TEST PILE DESIGN RISK ASSESSMENT REFER TO DOCUMENT NO. 3463-WHP-XX-XX-HS-X-0301.

LEGEND

- BEARING PILES
- ANCHOR PILES

Revision History

Rev.	Date	Description (Purpose of Issue):	Dm	Chk	App
P02	24.03.25	UPDATES TO TEST LOCATIONS	TL	CM	KL
P01	05.12.24	FIRST ISSUE	TL	CM	SS

Current Revision

Rev.	Date	Description (Purpose of Issue):	Dm	Chk	App
C01	14.04.25	UPDATES TO TEST LOCATIONS	TL	CM	KL

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Project: PROJECT OLYMPUS

Drawing Title: WORKING TEST PILE LAYOUT

Date of First Issue:	Scale @ A3:	Job No:
05.12.2024	1:500	BE0046

Drawing Status: FOR REVIEW

Project:	Originator:	Zone:	Level:	Type:	Role:	Number:
LCY11	KTB	XX	B1	DR	C	0004

Drawing No:	Suitability:	Revision:
LCY11-KTB-B1-XX-XX-DR-C-0004	S4	C01