

4. PREVIOUS GROUND INVESTIGATION

4.1 Atkins Investigation, dated October and November 2022

A site investigation was carried out by Geotechnics Limited in October and November 2022, on behalf of Atkins which included the following:

- Four (4 No.) Dynamically Sampled Windowless / Cable Percussion boreholes (BH01 to BH04) with rotary follow on (up to 25m bgl);
- Twenty four (24 No.) trial pits, completed using a mixture of machine, hand, and vacuum excavation methods (TP01 to TP05, IP01 to IP14);
- Nine (9 No.) In-situ California Bearing Ratio (CBR) tests;
- Three (3 No.) In-situ Plate Load tests;
- Two (2 No.) asphalt road pavement core samples;
- Two (2 No.) soil electrical resistivity tests;
- Installation of four groundwater standpipes within boreholes BH01 to BH04 during the site works period;
- Post-fieldwork monitoring of groundwater levels (for a period of six return visits); and
- Geotechnical and geo-environmental laboratory testing of soil, leachate, and groundwater samples obtained during the ground investigation.

Based on the above information, CGL produced a Geotechnical and Geoenvironmental Factual and Interpretive Report⁴ for MACE, dated September 2023.

5. SUPPLEMENTARY CGL GROUND INVESTIGATION

5.1 Site Investigation

The CGL supplementary site investigation was carried out between 19th and 22nd February 2024 and comprised the following:

-  Specialist service clearance of all exploratory hole locations for buried services using Ground Penetrating Radar (GPR) and CAT & Genny tools prior the intrusive investigation. Additionally elevation and GPS Coordinates were produced for each infiltration and CBR location;
-  Six (6 No.) infiltration test pits (SW01 to SW06) with tests undertaken from depths of between 0.62m below ground level (mbgl) (66.10mOD) and 1.10mbgl (65.17mOD) in accordance with BRE 365¹⁰; and
-  Thirteen (13 No.) in-situ California Bearing Ratio (CBR) tests by a CBR apparatus to depths of between 0.85m (65.75mOD) and 1.16m (65.35mOD).

In addition to the above, CGL provided a twin drum vibration roller for the Client's team (Create Consulting Engineers Limited) to undertake a monitoring exercise to record and monitor the vibrations emitted from tracking of the roller.

A traffic marshal was present during the site works in order to secure safe movement of the equipment/plant across the site.

Results of the vibration monitoring are anticipated to be presented under separate cover by Create Consulting Engineers Limited.

5.2 Testing Rationale

The testing rationale was based on the BDP SI specification report¹¹ provided to CGL by MACE and is presented overleaf. The testing depths were followed as closely as possible, allowing for on - site constraints.

¹⁰ BRE. (2016). *Soakaway design. BRE DG 365*

¹¹ BDP (2023) ECMWF Stage 4 Site Investigation: Scope of Works. Doc Ref: P3002898-BDP-C-SI-01 Rev R01

Table 1. Summary of proposed infiltration testing depths

<i>Location ID</i>	<i>Ground Level (mOD)</i>	<i>Test level (mOD)</i>	<i>Test depth (mbgl)</i>
SW101	66.69	66.10	0.59
SW102	66.60	65.80	0.80
SW103	66.62	66.10	0.80
SW104	66.20	65.20	1.00
SW105	66.50	65.60	0.90
SW106	66.71	65.80	0.91

Notes

*mbgl=meters below ground level

*mOD= meters Ordnance Datum

Table 2. Summary of proposed CBR testing depths

<i>Location ID</i>	<i>Surface</i>	<i>Ground Level (mOD)</i>	<i>Test level (mOD)</i>	<i>Test depth (mbgl)</i>
CBR101	Grass	66.71	65.71	1.00
CBR102	Tarmac	66.61	65.54	1.07
CBR103	Tarmac	66.69	65.54	1.15
CBR104	Tarmac	66.56	65.70	0.86
CBR105	Tarmac	66.50	65.35	1.15
CBR106	Grass	66.57	65.68	0.89
CBR107	Tarmac	66.45	65.49	0.96
CBR108	Un-surfaced	66.03	65.13	0.90
CBR109	Grass	66.18	65.06	1.12
CBR110	Grass	66.25	65.22	1.03
CBR111	Tarmac	66.57	65.42	1.15
CBR112	Grass	66.68	65.67	1.01
CBR113	Grass	66.48	65.63	0.85

5.3 Ground Conditions

The ground conditions encountered during the CGL supplementary investigation are summarised in Table 3 overleaf.

An exploratory hole location plan is included as Appendix A.

The infiltration testing logs can be found in Appendix B.

Table 3. Summary of ground conditions encountered during CGL supplementary investigation

Strata	Depth to top of stratum mbgl (mOD)	Thickness (m)	Locations encountered
Tarmacadam / Paving slab	0.00 (66.60 to 66.62)	0.05	SW102 and SW103
Made Ground Dark grey gravelly slightly sandy clay / silt with gravel of charcoal and red brick fragments over dark grey silty gravel with flint gravel and red brick fragments.	0.00 (66.20 to 66.71)	0.35 to 0.60	All
Boyn Hill Member Greyish yellow slightly gravelly silty SAND.	0.40 (66.20 to 66.22)	0.40 to 0.44	SW102, SW103, SW104 and SW105
Dark grey silty GRAVEL of flint.	0.40 to 0.50 (66.21 to 66.29)	Base not proven	SW101 and SW106

5.4 Made Ground

Made ground was encountered in all locations and generally comprised dark grey gravelly sandy clay / silt with gravel of flint, rare gravel of charcoal and red brick fragments. Below this, a layer of dark grey silty gravel was encountered within locations SW104 and SW106. Tarmacadam or paving materials were encountered above the made ground within SW102 and SW103.

5.5 Boyn Hill Member

The Boyn Hill Member was encountered in all locations and was proved to the maximum depth investigated of 1.00mbgl (65.20mOD). This material typically comprised greyish yellow to yellow slightly gravelly silty fine and medium sand with fine to coarse subangular to subrounded flint gravel. Within SW101 and SW106, the formation comprised dark grey silty fine to coarse subangular to subrounded gravel of flint.

5.6 Groundwater

Groundwater strikes were recorded in the base of soakaway trial pits SW102, SW103, SW104 and SW105, as summarised in Table 4 overleaf. It should be noted that within the locations SW101 and SW106 no groundwater was encountered.

Table 4. Summary of groundwater strikes

Location	Depth m (mOD)
SW102	0.80 (65.80)
SW103	0.80 (65.82)
SW104	1.00 (65.20)
SW105	0.90 (65.60)

6. GEOTECHNICAL INTERPRETATION & RECOMMENDATIONS

6.1 General

The following section provides recommendations for the proposed development regarding geotechnical aspects, based on the information obtained during the ground investigations at the site and the laboratory results.

6.2 Soakaway Testing

A total of six (6 No.) infiltration test pits were completed to enable soakaway testing in accordance with BRE 365¹⁰. The trial pits were excavated with a mini excavator with a 0.5m wide toothless bucket and the water for each test was supplied using a tractor towed water bowser.

Generally, the ground conditions encountered during the soakaway testing were found to be consistent with the previous investigation undertaken by Atkins³, comprising Made Ground over the Boyn Hill Member formation.

A summary of the infiltration tests is provided in Table 5 below. The trial pit logs and soakaway calculation sheets are included in Appendix B and Appendix C respectively.

Table 5. Soakaway testing results

Location	Target Stratum	Depth of test (m bgl)	Depth of test (mOD)	Infiltration Rate (m/s)	Notes
SW101	Boyn Hill Member (Gravel)	0.59	66.10	1.84 x 10 ⁻⁵	Pit stable
				1.22 x 10 ⁻⁵	
				1.30 x 10 ⁻⁵	
SW102	Boyn Hill Member (Sand)	0.80	65.80	2.96 x 10 ⁻⁶	Test Incomplete ¹
SW103	Boyn Hill Member (Sand)	0.80	65.82	-	Test Incomplete ²
SW104	Boyn Hill Member (Sand)	1.00	65.20	-	Test Incomplete ²
SW105	Boyn Hill Member (Sand)	0.90	65.60	-	Test Incomplete ²
SW106	Boyn Hill Member (Gravel)	0.91	65.80	-	Test Incomplete ³
				7.62 x 10 ⁻⁶	

Table notes

¹ Test incomplete, only one 'run' was completed.

² Test incomplete, due to slow infiltration rate and time constraints

³ Test incomplete, only two 'runs' were completed.