APPENDIX E – GROUND INVESTIGATION & WASTE CLASSIFICATION REPORTS

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Ground Investigations Ireland

Cartron Oranmore SI

AKM Design

Ground Investigation Report

June 2023

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APPENDICES

1.0 Preamble

On the instructions of AKM Design, a site investigation was carried out by Ground Investigations Ireland Ltd., during May 2023 at the site of the proposed residential development in Oranmore, Co. Galway.

2.0 Overview

2.1. Background

It is proposed to construct a new residential development with associated services, access roads and car parking at the proposed site. The site is currently greenfield. The proposed construction is envisaged to consist of conventional foundations and pavement make up with some local excavations for services and plant.

2.2. Purpose and Scope

The purpose of the site investigation was to investigate subsurface conditions utilising a variety of investigative methods in accordance with the project specification. The scope of the work undertaken for this project included the following:

- Visit project site to observe existing conditions
- Carry out 8 No. Trial Pits to a maximum depth of 2.55m BGL
- Carry out 13 No. Soakaways to determine a soil infiltration value to BRE digest 365
- Carry out 3 No. Cable Percussion boreholes to a maximum depth of 5.00m BGL
- Geotechnical & Environmental Laboratory testing
- Report with recommendations

3.0 Subsurface Exploration

3.1. General

During the ground investigation a programme of intrusive investigation specified by the Consulting Engineer was undertaken to determine the sub surface conditions at the proposed site. Regular sampling and in-situ testing was undertaken in the exploratory holes to facilitate the geotechnical descriptions and to enable laboratory testing to be carried out on the soil samples recovered during excavation and drilling.
The procedures used in this site investigation are in accordance with Eurocode 7 Part 2: Ground Investigation and testing (ISEN 1997 – 2:2007) and B.S. 5930:2015.

3.2. Trial Pits

The trial pits were excavated using a 2T tracked excavator at the locations shown in the exploratory hole location plan in Appendix 1. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The trial pits were sampled, logged and photographed by an

Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered and the characteristics of the strata encountered and are presented on the trial pit logs which are provided in Appendix 2 of this Report.

3.3. Soakaway Testing

The soakaway testing was carried out in selected trial pits at the locations shown in the exploratory hole location plan in Appendix 1. These pits were carefully excavated and filled with water to assess the infiltration characteristics of the proposed site. The pits were allowed to drain and the drop in water level was recorded over time as required by BRE Digest 365. The pits were logged prior to completing the soakaway test and were backfilled with arising's upon completion. The soakaway test results are provided in Appendix 4 of this Report.

3.4. Cable Percussion Boreholes

The Cable Percussion Boreholes were drilled using a Dando 2000 drilling rig with regular in-situ testing and sampling undertaken to facilitate the production of geotechnical logs and laboratory testing.
The standard method of boring in soil for site investigation is known as the Cable Percussion method. It consists of using a Shell in non cohesive soils and a clay cutter in cohesive soils, both operated on a wire cable. Very hard soils, boulders and other hard obstructions are broken up by chiselling and the fragments removed with the Shell. Where ground conditions made it necessary, the borehole was lined with 200mm diameter steel casing. While the use of the Cable Percussion method of boring gives the maximum data on soil conditions, some mixing of laminated soil is inevitable. For this reason, thin lenses of granular material may not be noticed. Disturbed samples were taken from the boring tools at suitable depths, so that there is a representative sample at the top of each change in stratum and thereafter at regular intervals down the borehole until the next stratum was encountered. The disturbed samples were then sealed and sent to the laboratory where they were visually examined to confirm the description of the relevant strata.
Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records. The test consists of a thick wall sampler tube, 50mm external diameter, being driven into the soil by a monkey weighing 63.5kg and with a free drop of 760mm. For gravels and glacial till the driving shoe was replaced by a solid 60º cone. The Standard Penetration Test number referred to as the 'N' value is the number of blows required to drive the tube 300mm, after an initial penetration of 150mm. The number gives a guide to the consistency of the soil and can also be used to estimate the relative strength/density at the depth of the test and also to estimate the bearing capacity and compressibility of the soil. The cable percussion borehole logs are provided in Appendix 3 of this Report.

3.5. Surveying

The exploratory hole locations have been recorded using a KQ GEO Technologies KQ-M8 System which records the coordinates and elevation of the locations to ITM as required by the project specification. The coordinates and elevations are provided on the exploratory hole logs in the appendices of this Report.

3.6. Insitu Plate Bearing Test

The plate bearing tests were carried out using a 450mm diameter plate at the locations shown on the site plan in Appendix 1. The plate was loaded in increments using a hydraulic jack and an excavator to provide a reaction and the displacement was monitored in accordance with BS1377 Part 9 using independently mounted digital strain gauges. The constrained modulus and equivalent CBR are calculated in accordance with HD29/75 and are provided on the test reports in Appendix 5 of this Report.

3.7. Laboratory Testing

Samples were selected from the exploratory holes for a range of geotechnical and environmental testing to assist in the classification of soils and to provide information for the proposed design.
Environmental & Chemical testing as required by the specification, including the Rilta Suite and pH and sulphate testing was carried out by Element Materials Technology Laboratory in the UK. The Rilta suite testing includes both Solid Waste and Leachate Waste Acceptance Criteria.
Geotechnical testing consisting of moisture content, Atterberg limits, Particle Size Distribution (PSD) and hydrometer tests were carried out in NMTL's Geotechnical Laboratory in Carlow.
The results of the laboratory testing are included in Appendix 6 of this Report.

4.0 Ground Conditions

4.1. General

The ground conditions encountered during the investigation are summarised below with reference to insitu and laboratory test results. The full details of the strata encountered during the ground investigation are provided in the exploratory hole logs included in the appendices of this report.

The sequence of strata encountered were consistent across the site and generally comprised;

- Topsoil
- Made Ground
- Granular Deposits
- Cohesive Deposits
- Bedrock

TOPSOIL: Topsoil was encountered in all the exploratory holes and was present to a maximum depth of 0.30m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the Topsoil and were present to a relatively consistent depth of between 0.50m and 0.70m BGL. These deposits were described generally as *brown sandy slightly gravelly Clay with occasional fragments of ceramic.*

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground/Topsoil and were described typically as *grey/brown sandy gravelly CLAY with occasional cobbles and boulders* overlying a *stiff grey sandy gravelly CLAY with occasional cobbles and boulders*. The strength of the cohesive deposits typically increased with depth and was firm to stiff or stiff below 1.70m BGL in the majority of the exploratory holes where encountered. These deposits had some, occasional or frequent cobble and boulder content, where noted on the exploratory hole logs.

GRANULAR DEPOSITS: Granular deposits were encountered within and below the base of the cohesive deposits and were typically described as *grey clayey very sandy sub rounded to sub angular fine to coarse GRAVEL with many cobbles and rare boulders.*

BEDROCK: The rock encountered at the base of the Trial Pits was Limestone although rock mass quality can not be assessed without rotary coring.

4.2. Groundwater

No groundwater was noted during the investigation however we would point out that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the time of year, rainfall, nearby construction and other factors.

4.3. Laboratory Testing

4.3.1. Geotechnical Laboratory Testing

The results from the completed laboratory testing will be included in Appendix 6 of the final report.

4.3.1. Chemical Laboratory Testing

The pH and sulphate testing carried out indicate that pH results are near neutral and that the water soluble sulphate results is low when compared to the guideline values from BRE Special Digest 1:2005. The samples tested classify the soil as a Design Sulphate Level DS-1.

4.3.2. Environmental Laboratory Testing

A number of samples were analysed for a suite of parameters which allows for the assessment of the sampled material in terms of total pollutant content for classification of materials as *hazardous* or *non-hazardous*. The suite also allows for the assessment of the sampled material in terms of suitability for placement at licenced landfills (inert, stable non-reactive, hazardous etc.). The parameter list for the suite includes analysis of the solid samples for arsenic, barium, cadmium, chromium, copper, cyanide, lead, nickel, mercury, zinc, speciated aliphatic and aromatic petroleum hydrocarbons, pH, sulphate, sulphide, moisture content, soil organic matter and an asbestos screen.

The suite also includes those parameters specified in the EU Council Decision establishing criteria for the acceptance of waste at Landfills (Council Decision 2003/33/EC), which for the solid samples are total organic carbon (TOC), speciated aliphatic and aromatic petroleum hydrocarbons, BTEX, phenol, polychlorinated biphenyls (PCB) and PAH.
As part of the suite a leachate is generated from the solid sample which is analysed for antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, chloride, fluoride, soluble sulphate, sulphide, phenols, dissolved organic carbon (DOC) and total dissolved solids (TDS).
While the laboratory report provides a comparison with the waste acceptance criteria limits it does not provide a waste classification of the material sampled nor does it comment on any potentially hazardous properties of the materials tested. The possibility for contamination, not revealed by the testing undertaken should be borne in mind particularly where Made Ground deposits are present or the previous site use or location indicate a risk of environmental variation. The waste classification report will be included under the cover of a separate report by Ground Investigations Ireland.

The results from the completed laboratory testing are included in Appendix 6 of this report.

5.0 Recommendations & Conclusions

5.1. General

The recommendations given and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between exploratory hole locations, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for conditions which have not been revealed by the exploratory holes. Limited information has been provided at the ground investigation stage and any designs based on the recommendations or conclusions should be completed in accordance with the current design codes, taking into account the variation and the specific details contained within the exploratory hole logs.

5.2. Foundations

An allowable bearing capacity of 200 kN/m^2 is recommended for conventional strip or pad foundations on the very stiff cohesive deposits at a depth of 3.45m BGL at the location of BH02. At the locations of BH01 and BH03 where shallow rock was encountered, an allowable bearing capacity of 500 kN/m^2 is recommended on the competent Limestone encountered. Further site investigation would be required to determine the rock mass quality or for founding at other locations.

In any part of the site, should part of the foundation be on rock we would recommend that all the foundations of the unit in question be lowered to the competent rock stratum to avoid differential settlement.

The pH and sulphate testing completed on samples recovered from the exploratory holes indicates the pH results are near neutral and the sulphate results are low, when compared to the guideline values from BRE Special Digest 1:2005. No special precautions are required for concrete foundations to prevent sulphate attack. The samples tested were below the limits of DS1 in the BRE Special Digest 1:2005.

5.3. External Pavements

The proposed pavements are recommended to be designed in accordance with the CBR test results included in the Appendices of this Report. The low CBR test results in some locations indicate that a capping layer or a sufficient depth of crushed stone fill may be required. Plate bearing tests are recommended at the time of construction to verify the design assumptions for the proposed pavement make up and to verify adequate compaction has been achieved.
The use of a geogrid and separation membrane may improve the performance of the proposed pavement and enable a more economical pavement design to be achieved, a specialist supplier is recommended to advise of the required strength, depth and type of geotextile for the proposed design.

5.4. Excavations

Short term temporary excavations in the cohesive deposits will remain stable for a limited time only and will require to be appropriately battered or the sides supported if the excavation is below 1.25m BGL or is required to permit man entry.

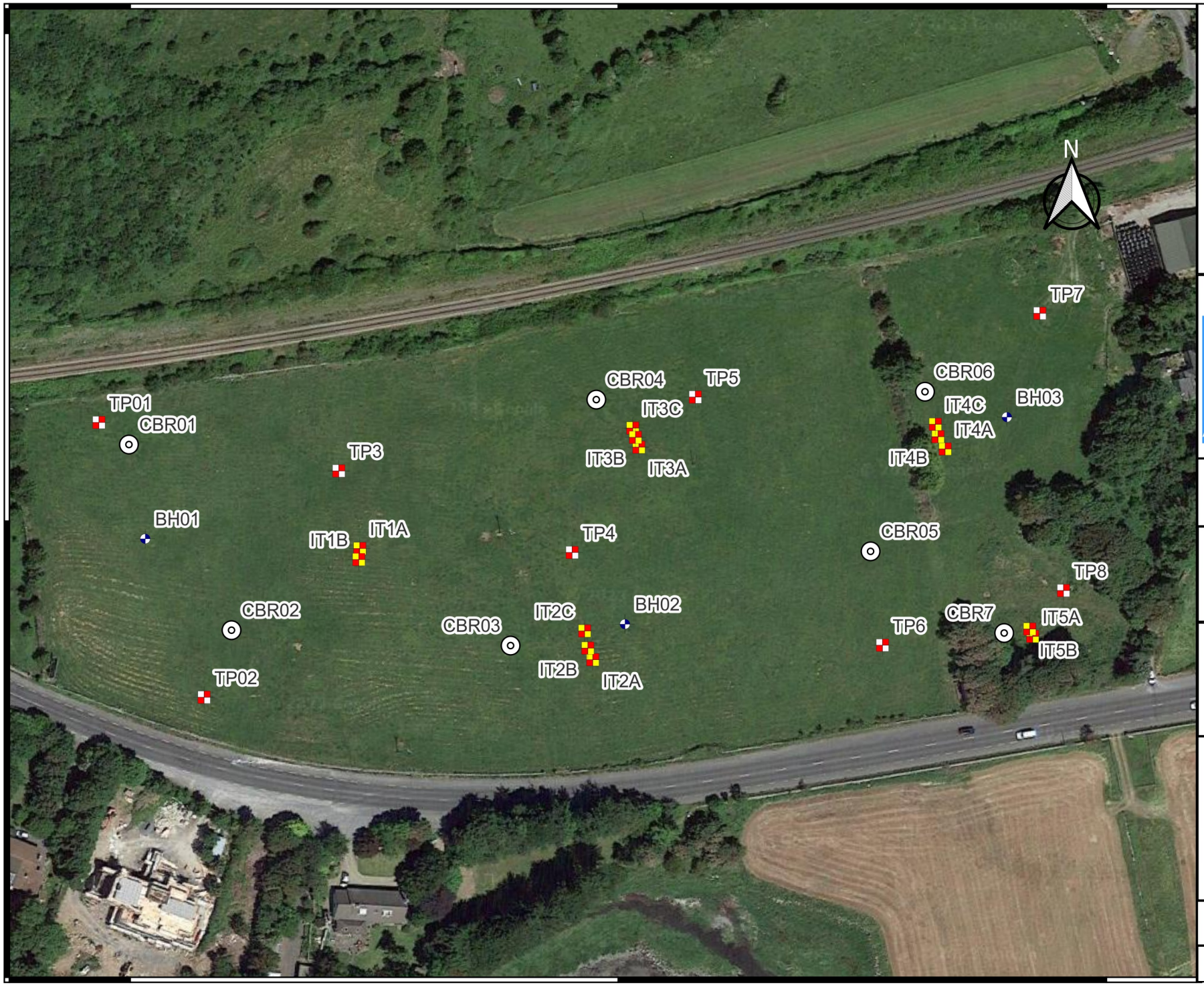
Excavations in the weathered rock deposits are expected to be excavatable with conventional excavation equipment, with zones of more intact bedrock below this depth requiring rock breaking techniques.
Any waste material to be removed off site should be disposed of to a suitably licenced landfill.
The environmental testing completed during the ground investigation is reported under the cover of a separate GII Waste Classification/Subsoil Assessment Report.

5.5. Soakaway Design

Infiltration rates of between f=1.577 x 10^{-4} m/s and 1.667 x 10^{-5} m/s were calculated for the soakaway locations across the site. At the locations of IT02A, IT02B, IT03A, IT03B, IT03C, IT04C, IT05A and IT05B the water level dropped too slowly to allow calculation of 'f' the soil infiltration rate. These locations are therefore not recommended as suitable for soakaway design and construction.

The recommendations provided in this report should be verified in the design of the proposed buildings, using the full details of the loading conditions and taking into consideration the allowable tolerable settlements/movements that the building can accommodate. The founding strata should be inspected and verified by a suitably qualified engineer prior to construction of the building foundations.

APPENDIX 1 - Site Location Plan



Legend

- Borehole
- CBR
- Soakaway
- Trial Pit

Client:

AKM

Project Code:

12674-03-23

Project Title:

Cartron Oranmore

Drawing Title:

Figure 1 Site Location

GROUND INVESTIGATIONS IRELAND
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0 15 30 45 60 m

Drawn By:	Date:
EB	14/06/2023

APPENDIX 2 – Trial Pit Records

Ground Investigations Ireland Ltd
www.gii.ie

Site Cartron Oranmore			**Trial Pit Number** IT01A
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 3.30*0.50*0.90	**Ground Level (mOD)** 11.21	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536320.4 E 725241.3 N	**Dates** 25/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Brown slightly sandy gravelly TOPSOIL with ceramic fragments		
				10.91	0.30			
					(0.30)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with ceramic fragments		
				10.61	0.60			
					(0.30)	Brown slightly sandy clayey fine to coarse angular GRAVEL with some cobbles and boulders		
				10.31	0.90	Complete at 0.90m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion of soakaway test
Trial pit terminated on bedrock

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.IT01A

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Site Cartron Oranmore			**Trial Pit Number** IT01B
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 3.30*0.50*0.90	**Ground Level (mOD)** 11.10	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536320.1 E 725237.9 N	**Dates** 25/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				10.90	0.20	Soft brown sandy CLAY with some subangular to subrounded cobbles		
					(0.30)			
				10.60	0.50	Brown clayey sandy GRAVEL with some angular to subrounded boulders		
					(0.40)			
				10.20	0.90	Complete at 0.90m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion of soakaway test
Trial pit terminated on bedrock

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.IT01B

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Site Cartron Oranmore			**Trial Pit Number** IT02A
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 3.00*0.50*1.50	**Ground Level (mOD)** 7.22	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536392 E 725207.1 N	**Dates** 25/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				7.02	0.20			
					(0.30)	Soft brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
				6.72	0.50			
					(1.00)	Soft to firm grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
				5.72	1.50			
						Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion of soakaway test

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.IT02A

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Site Cartron Oranmore			**Trial Pit Number** IT02B
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 3.00*0.50*2.00	**Ground Level (mOD)** 7.37	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536390.5 E 725210.6 N	**Dates** 25/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				7.17	0.20	Soft to firm brown slightly sandy slightly gravelly CLAY		
					(0.25)			
				6.92	0.45	Soft to firm grey slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles and occasional boulders		
1.00	B				(1.25)			
				5.67	1.70	Stiff grey slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles and occasional boulders		
					(0.30)			
2.00	B			5.37	2.00	Complete at 2.00m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion of soakaway test

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.IT02B

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Site Cartron Oranmore			**Trial Pit Number** IT02C
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 2.00*0.50*1.10	**Ground Level (mOD)** 7.60	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536389.5 E 725215.9 N	**Dates** 25/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				7.40	0.20			
					(0.10)	Soft brown slightly sandy slightly gravelly CLAY		
				7.30	0.30			
						Soft to firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
					(0.80)			
				6.50	1.10			
						Complete at 1.10m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion of soakaway test

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.IT02C

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Site Cartron Oranmore			**Trial Pit Number** IT03A
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 2.10*0.50*2.00	**Ground Level (mOD)** 9.18	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536406.2 E 725272.4 N	**Dates** 25/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				8.98	0.20	Soft brown slightly sandy slightly gravelly CLAY		
					(0.20)			
				8.78	0.40	Soft to firm grey slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
					(1.20)			
1.50	B			7.58	1.60	Grey slightly sandy very clayey subangular to subrounded fine to coarse GRAVEL with occasional cobbles and boulders		
					(0.40)			
2.00	B			7.18	2.00	Complete at 2.00m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion of soakaway test

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.IT03A

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Site Cartron Oranmore			**Trial Pit Number** IT03B
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 2.30*0.50*1.50	**Ground Level (mOD)** 9.40	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536405.1 E 725275.4 N	**Dates** 25/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				9.20	0.20			
					(0.20)	Soft brown slightly sandy slightly gravelly CLAY		
				9.00	0.40			
					(1.10)	Soft to firm grey slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
				7.90	1.50			
						Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion of soakaway test

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.IT03B

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Site Cartron Oranmore			**Trial Pit Number** IT03C
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 2.00*0.50*1.20	**Ground Level (mOD)** 9.53	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536404.3 E 725278.3 N	**Dates** 25/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				9.33	0.20	Soft brown slightly sandy slightly gravelly CLAY		
					(0.20)			
				9.13	0.40	Soft to firm grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
					(0.80)			
1.00	B							
				8.33	1.20	Complete at 1.20m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion of soakaway test

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.IT03C

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Site Cartron Oranmore			**Trial Pit Number** IT04A
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 2.30*0.50*1.90	**Ground Level (mOD)** 6.19	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536500.3 E 725271.9 N	**Dates** 25/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				5.99	0.20			
					(0.30)	Soft light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
				5.69	0.50			
					(0.60)	Soft grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
				5.09	1.10			
1.50	B				(0.80)	Grey slightly sandy very clayey GRAVEL with some subangular to subrounded cobbles and boulders		
				4.29	1.90			
						Complete at 1.90m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion of soakaway test

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.IT04A

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Site Cartron Oranmore			**Trial Pit Number** IT04B
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 2.30*0.50*1.50	**Ground Level (mOD)** 6.40	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536498.1 E 725275.6 N	**Dates** 25/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				6.20	0.20	Soft brown slightly sandy slightly gravelly CLAY		
					(0.30)			
0.50	B			5.90	0.50	Soft to firm grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
					(1.00)			
				4.90	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion of soakaway test

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.IT04B

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Site Cartron Oranmore			**Trial Pit Number** IT04C
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 2.00*0.50*1.00	**Ground Level (mOD)** 6.56	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536497.3 E 725279.4 N	**Dates** 25/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				6.36	0.20	Soft brown slightly sandy slightly gravelly CLAY		
					(0.20)			
				6.16	0.40	Soft to firm grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
					(0.60)			
1.00	B			5.56	1.00	Complete at 1.00m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion of soakaway test

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.IT04C

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Site Cartron Oranmore			**Trial Pit Number** IT05A
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 2.80*0.50*0.90	**Ground Level (mOD)** 4.56	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536527.2 E 725214.3 N	**Dates** 25/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				4.36	0.20	Grey slightly sandy very clayey fine to coarse subangular to subrounded crushed rock FILL		
					(0.30)			
				4.06	0.50	Soft brown slightly sandy slightly gravelly CLAY		
					(0.40)			
				3.66	0.90	Complete at 0.90m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion of soakaway test
Terminated at 0.90m BGL on bedrock

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.IT05A

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Site Cartron Oranmore			**Trial Pit Number** IT05B
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 2.20*0.50*0.90	**Ground Level (mOD)** 4.59	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536526.3 E 725216.5 N	**Dates** 25/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Brown slightly sandy slightly gravelly TOPSOIL		
				4.44	0.15	Grey slightly sandy very clayey fine to coarse subangular to subrounded crushed rock FILL		
					(0.55)			
				3.89	0.70	Soft brown slightly sandy slightly gravelly CLAY		
					(0.20)			
				3.69	0.90	Complete at 0.90m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion of soakaway test
Terminated at 0.90m BGL on bedrock

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.IT05B

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Site Cartron Oranmore			**Trial Pit Number** TP01
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 1.70*0.50*1.00	**Ground Level (mOD)** 13.01	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536240.3 E 725280 N	**Dates** 27/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				12.81	0.20	Soft brown slightly sandy slightly gravelly CLAY with many cobbles and boulders		
					(0.60)			
				12.21	0.80	Grey slightly sandy very clayey angular to subrounded fine to coarse GRAVEL with some cobbles and boulders		
					(0.20)			
				12.01	1.00	Complete at 1.00m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Terminated at 1.00m BGL on bedrock
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.TP01

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Site Cartron Oranmore			**Trial Pit Number** TP02
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 1.50*0.50*1.20	**Ground Level (mOD)** 10.72	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536272.7 E 725195.5 N	**Dates** 27/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				10.52	0.20	MADE GROUND: Brown slightly sandy slightly gravelly Clay with ceramic fragments		
					(0.40)			
				10.12	0.60	Grey sandy clayey angular to subrounded fine to coarse GRAVEL with some cobbles and boulders		
					(0.40)			
1.00	B			9.72	1.00	Grey very sandy slightly clayey angular to subrounded fine to coarse GRAVEL with some cobbles and boulders		
					(0.20)			
				9.52	1.20	Complete at 1.20m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Terminated at 1.20m BGL on bedrock
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.TP02

Ground Investigations Ireland Ltd
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Site Cartron Oranmore			**Trial Pit Number** TP03
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 1.70*0.50*1.25	**Ground Level (mOD)** 11.84	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536314.1 E 725265.1 N	**Dates** 26/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				11.64	0.20			
					(0.30)	Soft brown slightly sandy slightly gravelly CLAY with many cobbles and boulders		
				11.34	0.50			
					(0.75)	Grey sandy slightly clayey angular to subrounded fine to coarse GRAVEL with some cobbles and boulders		
				10.59	1.25			
						Complete at 1.25m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Terminated at 1.25m BGL on bedrock
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.TP04

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Site Cartron Oranmore			**Trial Pit Number** TP04
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 2.30*0.50*2.30	**Ground Level (mOD)** 8.63	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536385.8 E 725240.1 N	**Dates** 26/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				8.43	0.20			
					(0.30)	Soft brown slightly sandy slightly gravelly CLAY with some cobbles		
				8.13	0.50			
					(0.50)	Grey slightly sandy clayey subangular to subrounded fine to coarse GRAVEL with some cobbles and occasional boulders		
				7.63	1.00			
1.20	B					Grey slightly sandy very clayey subangular to subrounded fine to coarse GRAVEL with some cobbles and boulders		
1.50	B							
					(1.30)			
				6.33	2.30			
						Terminated at 2.30m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Terminated at 2.30m BGL due to boulders
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.TP04

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Site Cartron Oranmore			**Trial Pit Number** TP05
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 2.30*0.50*2.50	**Ground Level (mOD)** 9.10	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536423.6 E 725287.8 N	**Dates** 26/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				8.90	0.20	Soft brown slightly sandy slightly gravelly CLAY		
					(0.30)			
				8.60	0.50	Grey slightly sandy very clayey subangular to subrounded fine to coarse GRAVEL with some cobbles		
					(0.50)			
1.00	B			8.10	1.00	Grey sandy clayey subangular to subrounded fine to coarse GRAVEL with many cobbles and boulders		
					(0.70)			
1.50	B							
				7.40	1.70	Grey slightly sandy clayey subangular to subrounded fine to coarse GRAVEL with many cobbles and boulders		
2.00	B				(0.80)			
				6.60	2.50	Terminated at 2.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Terminated at 2.50m BGL due to boulders
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.TP05

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Site Cartron Oranmore			**Trial Pit Number** TP06
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 2.10*0.50*1.90	**Ground Level (mOD)** 4.96	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536481.1 E 725211.5 N	**Dates** 26/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				4.76	0.20			
					(0.20)	Soft brown slightly sandy slightly gravelly CLAY		
				4.56	0.40			
					(0.20)	Grey slightly sandy very clayey subangular to subrounded fine to coarse GRAVEL		
0.50	B			4.36	0.60			
						Grey slightly sandy very clayey subangular to subrounded fine to coarse GRAVEL with many cobbles and boulders		
1.00	B							
					(1.30)			
1.50	B							
				3.06	1.90			
						Complete at 1.90m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Terminated at 1.90m BGL on bedrock
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.TP06

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Site Cartron Oranmore			**Trial Pit Number** TP07
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 3.00*0.50*2.55	**Ground Level (mOD)** 6.14	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536529.5 E 725313.6 N	**Dates** 26/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL		
				5.94	0.20	MADE GROUND: Brown slightly sandy slightly gravelly Clay with ceramic fragments		
					(0.30)			
0.50	B			5.64	0.50	Grey slightly sandy very clayey subangular to subrounded fine to coarse GRAVEL with occasional cobbles and boulders		
1.00	B				(1.00)			
1.50	B			4.64	1.50	Grey slightly sandy very clayey subangular to subrounded fine to coarse GRAVEL with many cobbles and boulders		
2.00	B				(1.05)			
				3.59	2.55	Terminated at 2.55m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Terminated at 2.55m BGL due to boulders
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.TP07

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Site Cartron Oranmore			**Trial Pit Number** TP08
Machine : 5T tracked excavator **Method :** Trial Pit	**Dimensions** 2.20*0.50*1.50	**Ground Level (mOD)** 4.67	**Client** AKM Design	**Job Number** 12674-03-23
	Location 536536.8 E 725228.3 N	**Dates** 25/04/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				4.57	(0.10) 0.10	Brown slightly sandy slightly gravelly TOPSOIL		
					(0.40)	Grey slightly sandy very clayey fine to coarse subangular to subrounded crushed rock FILL		
0.50	B			4.17	0.50	Soft to firm light brown slightly sandy slightly gravelly CLAY with subangular to subrounded cobbles and boulders		
1.00	B				(1.00)			
				3.17	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Terminated at 1.50m BGL on bedrock
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PD	12674-03-23.TP08

Cartron Oranmore Trial Pit
Photographs

IT01A

IT01A

IT01A

IT01B

IT01B

IT01B

IT02A

IT02A

IT02A

IT02B

IT02B

IT02B

IT02B

IT02C

IT02C

IT02C

IT03A

IT03A

IT03A

IT03C

IT03C

IT03C

IT04A

IT04A

IT04A

IT04B

IT04B

IT04B

IT04C

IT04C

IT04C

IT04C

IT05A

IT05A

IT05A

IT05B

IT05B

IT05B

TP01

TP01

TP01

TP02

TP02

TP02

TP03

TP03

TP03

TP04