McGarrell Reilly Homes

Proposed development of lands in
Newtownmoyaghy,
Kilcock, Co. Meath.

VOLUME III

APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DECEMBER 2019

Volume III - Table of Contents

APPENDIX 7.1 - 7.8
EXISTING INFRASTRUCTURE

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

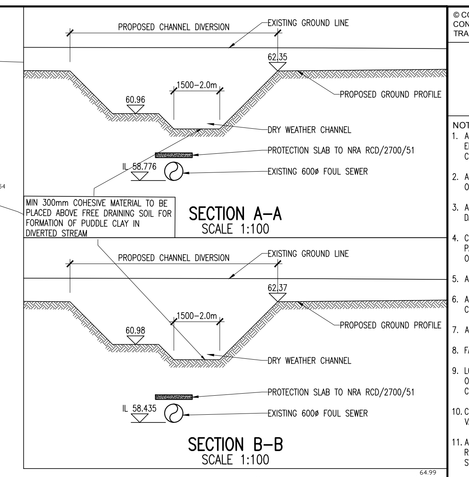
DECEMBER 2019

INTERNAL SW SETTING OUT

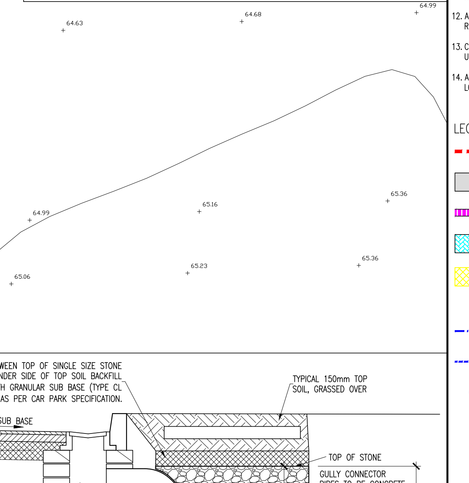
TAG	EASTING	NORTHING	IL	MH TYPE
S1	689224.557	739351.489	IL 61.30	TYPE J
S10	689325.580	739499.136	IL 62.99	TYPE J
S11	689339.922	739493.885	IL 63.07	TYPE J
S12	689381.633	739511.516	IL 63.30	TYPE J
S13	689417.613	739529.235	IL 63.59	TYPE J
S13-1	689415.299	739566.136	IL 63.80	TYPE E
S14	689443.528	739503.343	IL 64.04	TYPE E
S1A	689225.620	739353.752	IL 61.31	TYPE J
S2	689238.173	739380.470	IL 61.41	TYPE J
S2-1	689310.683	739346.670	IL 62.2	TYPE J
S2-2	689346.250	739338.828	IL 62.90	TYPE E
S2A	689199.432	739398.529	IL 62.45	TYPE J
S2B	689147.537	739422.719	IL 62.70	TYPE J
S3	689265.414	739438.910	IL 61.82	TYPE J
S3-1	689220.098	739460.038	IL 62.34	TYPE J
S3-2	689183.237	739477.223	IL 62.77	TYPE J
S4	689295.353	739424.952	IL 61.98	TYPE J
S4-1	689308.374	739418.881	IL 63.0	TYPE J
S4-2	689361.806	739419.590	IL 63.27	TYPE J
S4-3	689366.265	739429.047	IL 63.32	TYPE J
S4-3-1	689351.678	739435.926	IL 63.56	TYPE E
S4-3-1	689392.804	739392.005	IL 63.55	TYPE E
S4-3-2	689343.584	739454.015	IL 63.67	TYPE J
S4-4	689402.442	739455.545	IL 63.51	TYPE E
S4-4-1	689398.046	739470.630	IL 63.8	TYPE E
S4-5	689429.367	739429.005	IL 63.8	TYPE E
S5	689300.029	739434.982	IL 62.04	TYPE J
S6	689321.785	739481.653	IL 62.18	TYPE K
S7	689271.293	739505.197	IL 62.38	TYPE J
S7-1	689211.906	739532.880	IL 64.02	TYPE E
S7-2	689228.383	739568.228	IL 64.25	TYPE E
S8	689287.417	739539.789	IL 62.59	TYPE J
S9	689298.450	739547.795	IL 62.64	TYPE J
S9-1	689312.342	739562.018	IL 63.10	TYPE J
S9-1-1	689300.000	739575.263	IL 64.1	TYPE J
S9-1-2	689256.799	739598.483	IL 64.38	TYPE E
S9-2	689334.464	739563.693	IL 63.18	TYPE J
S9-3	689353.377	739572.084	IL 63.24	TYPE J
S9-3-1	689361.961	739551.853	IL 64.0	TYPE E
S9-4	689354.652	739593.063	IL 63.31	TYPE J
S9-5	689343.848	739613.980	IL 63.59	TYPE J
S9-6	689296.964	739639.179	IL 63.90	TYPE E
S97-1	689448.521	739547.336	IL 63.5	TYPE E

STRATEGIC FOUL SETTING OUT

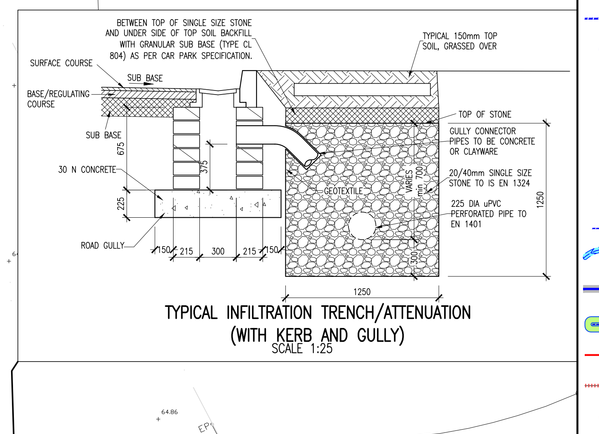
TAG	EASTING	NORTHING	IL	MH TYPE
F50	689345.218	739342.647	IL 60.04	TYPE K
F51	689318.276	739346.716	IL 60.21	TYPE K
F52	689238.065	739384.110	IL 60.73	TYPE J
F52-1	689157.143	739421.835	IL 62.56	TYPE J
F53	689265.410	739442.774	IL 61.11	TYPE K
F53-1	689186.518	739479.555	IL 62.95	TYPE J
F54	689293.660	739429.602	IL 61.32	TYPE K
F54-1	689317.000	739480.432	IL 61.8	TYPE K
F54-2	689338.476	739495.814	IL 62.37	TYPE J
F54-3	689378.624	739513.780	IL 62.76	TYPE J
F54-4	689418.168	739531.475	IL 63.19	TYPE J
F54-5	689443.942	739506.341	IL 63.83	TYPE J
F54-6	689416.644	739564.440	IL 63.59	TYPE E
F55	689319.556	739417.529	IL 61.70	TYPE J
F56	689365.318	739418.137	IL 62.33	TYPE J
F56-1	689398.935	739388.222	IL 63.2	TYPE J
F57	689370.766	739429.689	IL 62.45	TYPE J
F57-1	689353.582	739437.792	IL 62.95	TYPE J
F57-2	689346.551	739453.506	IL 63.4	TYPE J
F58	689402.148	739452.675	IL 62.86	TYPE J
F58-1	689393.163	739472.756	IL 63.4	TYPE J
F59	689424.711	739430.435	IL 63.22	TYPE J
F60	689434.360	739440.225	IL 63.50	TYPE J
F61	689440.010	739457.117	IL 63.7	TYPE J
F70	689368.927	739602.075	IL 61.84	TYPE J
F70-1	689387.389	739590.365	IL 63.62	TYPE J
F71	689352.999	739593.246	IL 61.95	TYPE J
F71-1	689342.304	739612.539	IL 62.37	TYPE J
F71-2	689289.455	739640.945	IL 63.52	TYPE J
F72	689352.292	739566.905	IL 62.12	TYPE J
F72-1	689360.461	739548.649	IL 63.73	TYPE J
F73	689312.442	739564.844	IL 62.39	TYPE J
F73-1	689301.238	739576.868	IL 63.32	TYPE J
F73-2	689260.477	739598.776	IL 63.83	TYPE J
F74	689300.251	739553.031	IL 62.50	TYPE J
F74-1	689314.761	739524.528	IL 63.95	TYPE J
F75	689284.204	739541.772	IL 62.64	TYPE J
F76	689268.516	739507.971	IL 63.0	TYPE J
F76-1	689283.157	739501.123	IL 64.05	TYPE J
F77	689216.860	739531.674	IL 63.56	TYPE J
F78	689232.915	739566.116	IL 64.03	TYPE J



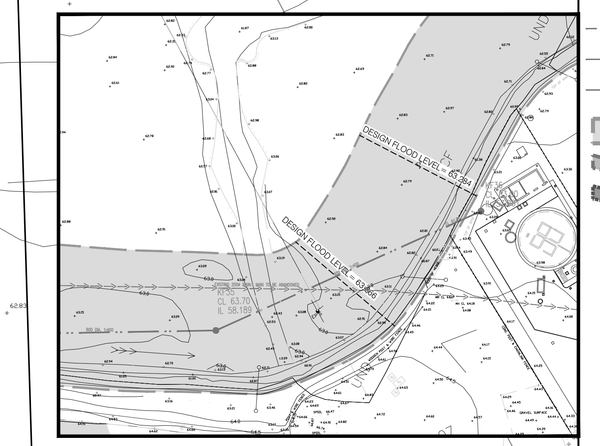
SECTION A–A
SCALE 1:100



SECTION B–B
SCALE 1:100



TYPICAL INFILTRATION TRENCH/ATTENUATION (WITH KERB AND GULLY)
SCALE 1:25



ON ORIGINAL
0 5 10 20 30 40 50mm

NOTES:
1. ALL DRAWINGS TO BE CHECKED BY CONTRACTOR ON SITE AND ENGINEER INFORMED OF DISCREPENCIES BEFORE WORK COMMENCES.
2. ALL DIMENSIONS AND LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
3. ALL LEVELS ARE IN METERS AND ARE RELATED TO ORDINANCE DATUM. CO-ORDINATES RELATE TO NATIONAL GRID.
4. CONTRACTOR SHALL SATISFY HIMSELF AS TO THE ACCURACY OF PAVEMENT LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORKS ON SITE.
5. ALL FOUL SEWERS TO BE CONCRETE.
6. ALL SURFACE WATER SEWERS TO BE 225 DIA. MINIMUM CLASS H CONCRETE.
7. ALL EXTERNAL HOUSE DRAINS TO BE 100mm DIAMETER.
8. FALLS IN FOUL HOUSE DRAINS TO BE 1:60 UNO.
9. LOCATION AND INVERT LEVELS OF EXISTING MANHOLES OR OUTFALL POINTS, WHERE APPLICABLE TO BE VERIFIED BY CONTRACTOR PRIOR TO COMMENCEMENT OF DRAINAGE WORKS.
10. CONTRACTOR TO INCLUDE FOR ADJUSTING ALL EXISTING MANHOLE, VALVE COVERS, ETC WITHIN LIMITS OF WORKS TO NEW LEVELS.
11. ALL COVER LEVELS TO MATCH FINISHED ROAD/VERGE/FOOTPATH/CYCLETRACK LEVELS UNLESS OTHERWISE STATED.
12. ALL DRAINAGE WORKS/CONNECTIONS TO COMPLY WITH THE REQUIREMENTS OF THE LOCAL AUTHORITY.
13. CONTRACTOR TO INCLUDE FOR CCTV SURVEY OF ALL SEWERS UPON COMPLETION OF SAME.
14. ALL CONNECTIONS TO COMPLY WITH THE REQUIREMENTS OF THE LOCAL AUTHORITY.

LEGEND

- PROPOSED EXTENT OF WORKS BOUNDARY
- PROPOSED ROADWAY
- PROPOSED RAMP UP TO "SHARED SURFACE"
- PERMEABLE PAVING (PRIVATE) AS PER DETAIL 072116 – PD 1C
- CONSTRUCT 3.0m WIDE RELIEVING SLAB AS PER NRA RCD/2700/S1 OVER EXISTING 600ø FOUL SEWER
- 57.15 PROPOSED ROAD LEVEL
- S1 PROPOSED SURFACE WATER SEWER
- S1 PROPOSED SURFACE WATER FILTER DRAIN
- 63.90 PROPOSED SURFACE WATER COLLECTOR DRAIN 150ø uPVC
- PROPOSED SURFACE WATER AJ AND 100ø uPVC HOUSE DRAIN AS PER DETAIL 072116 – 3502
- PROPOSED SURFACE WATER 100ø OUTLET TO DIFFUSER BOX AS PER DRG 072116–3506
- PROPOSED SURFACE WATER GULLY AND 150ø COLLECTOR PIPE AS PER DRG 072116–3504
- PROPOSED SURFACE WATER HEADWALL INLET AS PER NRA RCD 500/19 AND DWG 072116–2501
- PROPOSED SURFACE WATER BRO MANHOLE AS PER DRG 072116–3501
- SURFACE WATER SWALE
- SURFACE WATER INFILTRATION TRENCH
- PROPOSED SURFACE WATER SWALE WITH LATERAL INLET KERB AS PER DRG 072116–2501
- F1 PROPOSED FOUL WATER SEWER
- EXISTING FOUL SEWER TO BE GRUBBED UP, DECOMISSIONED VOID BACKFILLED WITH GRADE ST2 CONCRETE
- 63.90 PROPOSED FOUL COLLECTOR DRAIN 100ø uPVC
- PROPOSED FOUL AJ AND 100ø uPVC HOUSE DRAIN AS PER DRG 72116–3502
- PROPOSED FOUL INSPECTION CHAMBER AND 100ø uPVC HOUSE DRAIN AS PER DRG 072116–3502
- EXISTING WATERMAIN
- V EX VALVE
- PRV EX PRESSURE REDUCING VALVE
- EX MH CL 78.84 IL 77.37 EX SW SEWER
- EX MH CL 78.9 IL 76.66 EX FOUL SEWER
- FLOOD MITIGATION WORKS
- EXISTING RIVER/DITCH
- PROPOSED RIVER DIVERSION

L	20.02.19	LAYOUT UPDATED	PGC	BCM
K	18.10.18	LAYOUT UPDATED	PGC	BCM
J	30.08.18	LAYOUT/SHARED SURFACES UPDATED	PGC	BCM
I	19.07.18	DRAINAGE/LEVELS UPDATED	PGC	BCM
H	03.10.17	DRAINAGE UPDATED FOR PHASE 2	PGC	BCM
G	13.07.17	ROAD LEVELS/DRAINAGE UPDATED	PGC	DJR
F	29.06.17	WATERMAIN/DRAINAGE UPDATED	PGC	DJR
E	17.05.17	ROAD LAYOUT/DRAINAGE UPDATED	PGC	DJR
D	30.03.17	DRAINAGE/SCHEDULE UPDATED	PGC	BCM
C	02.03.17	SURFACE WATER S2-1-2-S2 UPDATED	PGC	BCM
B	22.02.17	ARCHITECTS LAYOUT/SERVICES UPDATED	PGC	BCM
A	23.01.17	CONSTRUCTION ISSUE	PGC	BCM
REV.	DATE	DESCRIPTION	BY	CHKD

CONSTRUCTION

DESIGNED	DJR	PREPARED	PGC
DATE	NOV 2016	CHECKED	DJR

DBFL
DUBLIN OFFICE Ormond House, Upper Ormond Quay, Dublin 7, Ireland. mobile: +353 1 400 4000 fax: +353 1 400 4050
WATERFORD OFFICE Unit 2, The Chandlery, 1-2 D Cornell Street, Waterford, Ireland. mobile: +353 51 309 900 fax: +353 51 844 913
DBFL Consulting Engineers email: info@dbfl.ie WEB: www.dbfl.ie

PROJECT
SITE AT BRANGANSTOWN, KILCOCK

DRG. TITLE
PROPOSED DRAINAGE LAYOUT

CLIENT
McGARRELL REILLY

SCALE	1:500 @A0	FILE REF.	072116-3500

DRG. NO. 072116-3500 L

Uisce Éireann
Bosca OP 6000
Baile Átha Cliath 1
Éire

Irish Water
PO Box 6000
Dublin 1
Ireland

T: +353 1 89 25000
F: +353 1 89 25001
www.water.ie

Brendan Manning
Ormond House
Upper Ormond Quay
Dublin 7

18 April 2019

Dear Brendan Manning,

Re: Connection Reference No CDS19000027 pre-connection enquiry - Subject to contract | Contract denied

Connection for Housing Development of 600 unit(s) at Millerstown, Kilcock, Meath.

Irish Water has reviewed your pre-connection enquiry in relation to a water and wastewater connection at Millerstown, Kilcock, Meath. Based upon the details you have provided with your pre-connection enquiry and on the capacity currently available as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, your proposed connection to the Irish Water network can be facilitated.

You are advised that this correspondence does not constitute an offer in whole or in part to provide a connection to any Irish Water infrastructure and is provided subject to a connection agreement being signed at a later date.

A connection agreement can be applied for by completing the connection application form available at **www.water.ie/connections**. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities.

If you have any further questions, please contact us on **1850 278 278** or **+353 1 707 2828, 8.00am-4.30pm, Mon-Fri** or email **newconnections@water.ie**. For further information, visit **www.water.ie/connections.**

Yours sincerely,

Maria O'Dwyer

Connections and Developer Services

Brendan Manning
Ormond House
Upper Ormond Quay
Dublin 7

5 November 2019

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

Re: Design Submission for Millerstown, Kilcock, Meath (the "Development") (the "Design Submission") / Connection Reference No: CDS19000027

Dear Brendan Manning,

Many thanks for your recent Design Submission.

We have reviewed your proposal for the connection at the Development. Based on the information provided, which included the documents outlined in Appendix A to this letter, Irish Water has no objection to your proposals.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before you can connect to our network you must sign a connection agreement with Irish Water. This can be applied for by completing the connection application form at www.water.ie/connections. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities (CRU)(https://www.cru.ie/document_group/irish-waters-water-charges-plan-2018/).

You the Customer (including any designers/contractors or other related parties appointed by you) is entirely responsible for the design and construction of all water and/or wastewater infrastructure within the Development which is necessary to facilitate connection(s) from the boundary of the Development to Irish Water's network (the "**Self-Lay Works**"), as reflected in your Design Submission. Acceptance of the Design Submission by Irish Water does not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Irish Water representative:
Name: Fionan Ginty
Phone: 01 89 25734
Email: fginty@water.ie

Yours sincerely,

Maria O'Dwyer
Connections and Developer Services

Appendix A

Document Title & Revision

- 190009-DBFL-XX-XX-DR-C-3000 Site Services Layout Sheet 1 of 3
- 190009-DBFL-XX-XX-DR-C-3001 Site Services Layout Sheet 2 of 3
- 190009-DBFL-XX-XX-DR-C-3002 Site Services Layout Sheet 3 of 3
- 190009-DBFL-XX-XX-DR-C-3005 Watermain Layout Sheet 1 of 2
- 190009-DBFL-XX-XX-DR-C-3006 Watermain Layout Sheet 2 of 2
- 190009-DBFL-XX-XX-DR-C-3031 Longitudinal Sections Through Foul Sewer Sheet 1 of 6
- 190009-DBFL-XX-XX-DR-C-3032 Longitudinal Sections Through Foul Sewer Sheet 2 of 6
- 190009-DBFL-XX-XX-DR-C-3033 Longitudinal Sections Through Foul Sewer Sheet 3 of 6
- 190009-DBFL-XX-XX-DR-C-3034 Longitudinal Sections Through Foul Sewer Sheet 4 of 6
- 190009-DBFL-XX-XX-DR-C-3035 Longitudinal Sections Through Foul Sewer Sheet 5 of 6
- 190009-DBFL-XX-XX-DR-C-3036 Longitudinal Sections Through Foul Sewer Sheet 6 of 6

*For further information, visit **www.water.ie/connections***

Notwithstanding any matters listed above, the Customer (including any appointed designers/contractors, etc.) is entirely responsible for the design and construction of the Self-Lay Works. Acceptance of the Design Submission by Irish Water will not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

ON ORIGINAL

0 5 10 20 30 40 50mm

NOTES:

1. ALL DRAWINGS TO BE CHECKED BY CONTRACTOR ON SITE AND ENGINEER INFORMED OF DISCREPENCES BEFORE WORK COMMENCES.
2. ALL DIMENSIONS AND LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
3. ALL LEVELS ARE IN METERS AND ARE RELATED TO ORDINANCE DATUM. CO-ORDINATES RELATE TO NATIONAL GRID.
4. CONTRACTOR SHALL SATISFY HIMSELF AS TO THE ACCURACY OF PAVEMENT LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORKS ON SITE.
5. WATERMAIN TO BE HDPE SDR17(108øPE), BLUE PIPE EXCEPT UNDER ROAD CROSSINGS WHERE DUCTILE IRON IS TO BE USED.
6. AT 90 DEG. TURNS USE 2 No. 45 DEG. BENDS.
7. COVER TO WATERMAIN TO BE 900mm.
8. FLANGE ADAPTOR CONNECTIONS TO BE USED AT ADPE/DUCTILE IRON JUNCTIONS.
9. ANCHOR BLOCKS TO BE POSITIONED AT DEAD ENDS, TEES, BENDS AND AT EACH SIDE OF HYDRANTS AND VALVES.
10. HYDRANT OUTLET TO BE 200mm BELOW GROUND LEVEL UNLESS REQUESTED OTHERWISE.
11. IRISH WATER APPROVED METER/BOUNDARY BOX 'ATPLAS BOUNDARY BOX' SYSTEM BY CORK PLASTICS OR EQUAL APPROVED
12. WATERMAIN DOMESTIC CONNECTION PIPE FROM MAIN DWELLING TO BE 25mm(OD) PIPE(HEAVY DUTY)
13. ALL CONNECTIONS TO COMPLY WITH THE REQUIREMENTS OF IRISH WATER.
14. CONTRACTOR TO INCLUDE FOR ADJUSTING ALL EXISTING MANHOLE, VALVE COVERS, ETC WITHIN LIMITS OF WORKS TO NEW LEVELS.
15. ALL COVER LEVELS TO MATCH FINISHED ROAD/VERGE/FOOTPATH/CYCLETRACK LEVELS UNLESS OTHERWISE STATED.

LEGEND

- PROPOSED EXTENT OF WORKS BOUNDARY
- PROPOSED ROADWAY
- PROPOSED SHARED SURFACE/RAISED TABLE
- PERMEABLE PAVING AS PER DETAIL 072116-2501 FIG C
- CONSTRUCT 3.0m WIDE RELIEVING SLAB AS PER NRA RCD/2700/51 OVER EXISTING 600ø FOUL SEWER
- DUCTILE IRON EXTENT AT ROAD CROSSING
- PROPOSED WATERMAIN AS PER NOTE 5 AND SIZE NOTED
- SV PROPOSED SLUICE VALVE AS PER 072116-3505
- AV PROPOSED AIR VALVE AS PER 072116-3505
- SCV PROPOSED SCOUR VALVE AS PER 072116-3505
- BV PROPOSED BOUNDARY VALVE AS PER 072116-3505
- H PROPOSED HYDRANT AS PER 072116-3505
- M PROPOSED WATER METER AS PER 072116-3505
- 57.15 ROAD LEVEL
- 1:20 ROAD GRADIENT
- EXISTING WATERMAIN
- EX VALVE
- PRV EX PRESSURE REDUCING VALVE
- EX MH CL 78.84 S 77.37 EX SW SEWER
- EX MH CL 78.9 S 76.84 EX FOUL SEWER

REV.	DATE	DESCRIPTION	BY	CHKD
I	20.02.19	LAYOUT UPDATED	PGC	BCM
H	08.01.19	LAYOUT UPDATED	PGC	BCM
G	18.10.18	LAYOUT UPDATED	PGC	BCM
F	19.07.18	LEVELS UPDATED	PGC	BCM
E	03.10.17	WATERMAIN UPDATED FOR PHASE 2	PGC	BCM
D	29.06.17	WATERMAIN/DRAINAGE UPDATED	PGC	DJR
C	26.05.17	WATERMAIN RELOCATED AT BRIDGE	PGC	BCM
B	22.02.17	ARCHITECTS LAYOUT/SERVICES UPDATED	PGC	BCM
A	23.01.17	CONSTRUCTION ISSUE	PGC	BCM

CONSTRUCTION

DESIGNED	DJR	PREPARED	PGC
DATE	NOV 2016	CHECKED	DJR

DBFL Consulting Engineers
DUBLIN Ormond House, Upper Ormond Quay, Dublin 7, Ireland. PHONE +353 1 400 4000 FAX +353 1 400 4050
WATERFORD Unit 2 The Chandlery, 1-2 O'Connell Street, Waterford, Ireland. PHONE +353 51 309 500 FAX +353 51 844 813
EMAIL info@dbfl.ie SITE www.dbfl.ie

PROJECT
SITE AT BRANGANSTOWN, KILCOCK

DRG. TITLE
PROPOSED WATERMAIN LAYOUT

CLIENT
McGARRELL REILLY

SCALE	1:500 @A0	FILE REF.	072116-3500

DRG. NO. 072116-3500-1 I

ESB Networks

TITLE:

20190123-059_A3

COLOUR CODE:

- BLACK - 38KV & HIGHER VOLTAGE OVERHEAD LINES
- GREEN - MV(10KV/20KV) OVERHEAD LINES
- BLUE - LV (400V/230V) OVERHEAD LINES
- CYAN - 38KV & HIGHER VOLTAGE UNDERGROUND CABLE ROUTES
- RED - MV/LV (10KV/20KV/400V/230V) UNDERGROUND CABLE ROUTES

DATE: 23-Jan-2019

** SCALE: 1:2000

** SCALE WHEN PRINTED ON AN A0 PAGE
XY COORDINATES DISPLAYED IN IRISH GRID COORDINATE SYSTEM

WARNING

THIS MAP INDICATES THE APPROXIMATE LOCATION OF ESB TRANSMISSION (400KV, 220KV, 110KV, 38KV) AND DISTRIBUTION (20KV, 10KV, 230V/400V) UNDERGROUND CABLES AND OVERHEAD LINES IN THE GENERAL AREA OF THE PROPOSED WORKS. ESB NETWORKS TAKES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE MAP. IT IS THE USER'S RESPONSIBILITY TO INDEPENDENTLY VERIFY THE INFORMATION AND THE LOCATION OF UNDERGROUND CABLES AND OVERHEAD LINES. LOW VOLTAGE (230V/400V) SERVICE CABLES (E.G. HOUSE SERVICES, FACTORY/SHOP SERVICES, PUBLIC LIGHTING LAMP SERVICES, ETC) ARE NOT INCLUDED BUT THEIR PRESENCE SHOULD BE ANTICIPATED. THE DEPTHS OF UNDERGROUND CABLES MUST NEVER BE ASSUMED. ADDITIONAL MORE DETAILED INFORMATION IS AVAILABLE FOR HIGH VOLTAGE TRANSMISSION UNDERGROUND CABLES (38KV, 110KV, 220KV, 400KV) FROM THE LOCAL ESB NETWORKS TRANSMISSION REPRESENTATIVE - SEE ATTACHED LIST FOR CONTACT DETAILS OR CALL 1850 372 757. NO WORK SHOULD BE CARRIED OUT IN THE VICINITY OF 38KV OR HIGHER VOLTAGE UNDERGROUND CABLES WITHOUT PRIOR CONSULTATION WITH ESB NETWORKS. BEFORE ANY MECHANICAL EXCAVATION IS UNDERTAKEN, THE ACTUAL LOCATION OF ALL UNDERGROUND ELECTRICITY CABLES MUST BE ESTABLISHED AND VERIFIED ON THE SITE USING:
(A) UP-TO-DATE MAP RECORDS; (B) CABLE LOCATER EQUIPMENT OPERATED IN BOTH POWER AND RADIO MODES;
(C) CAREFUL HAND DIGGING OF TRIAL HOLES USING 'SAFE DIGGING PRACTICE'. REFER ALSO TO 'HSA CODE OF PRACTICE FOR AVOIDING DANGER FROM UNDERGROUND SERVICES'. ESB TAKES NO RESPONSIBILITY FOR AND SHALL BEAR NO LIABILITY, HOWSOEVER ARISING, IN RELATION TO ANY DAMAGE, INJURY/DEATH OR LOSS OF SUPPLY AS A RESULT OF DAMAGE OR INTERFERENCE WITH ITS NETWORKS.

X,Y: 288256, 240364

X,Y: 290577, 240364

ESB NETWORKS HAS ISSUED THIS MAP AS A PDF DOCUMENT. IF VIEWING A PAPER VERSION OF THIS MAP, THE VIEWER MUST ENSURE THAT IT HAS BEEN PRINTED IN COLOUR TO FIT TO AN A0 (OR LARGER) PAGESIZE AND THAT EACH OF THE COLOURS INDICATED ON THE COLOUR CODE LEGEND ABOVE ARE CLEAR AND DISTINCT FROM EACH OTHER TO MAINTAIN A CORRECT REPRESENTATION OF THE ELECTRICAL NETWORK INFORMATION.

KILCOCK
248000
KILCOCK STN SUPPLY

METEOR
KNOCKNATULLA EAST
NEWTOWN
HARRIS HILL
MILLERSTOWN TEMP.
BRANGANSTOWN NO5
RYE ABBEY
KILCOCK PUMPING STAT
BRANGANSTOWN 7
HOEY CONST LTD
CONNOLLY CORNER
BRANGANSTOWN
NEWTOWNMOYAGHY 3
NEWTOWNMOYAGHY W
PROSPECT HO
PROSPECT NO 1
PROSPECT S
MAWS W
RYEBANK H

100 AAAC
100 ACSR
3X1/185 XLP
2X1/70 XLP

PLEASE NOTE THAT THERE ARE: HIGH VOLTAGE (38KV AND HIGHER VOLTAGES) OVERHEAD LINES AND UNDERGROUND CABLES ON THIS MAP. IF YOU INTEND WORKING, OR UNDERTAKING DEVELOPMENT WITHIN A CORRIDOR EXTENDING 40 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE OVERHEAD LINES OR WITHIN A CORRIDOR EXTENDING 5 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE UNDERGROUND CABLES YOU MUST CONTACT THE DESIGNATED PARTIES (PLEASE SEE ENCLOSED SHEET) IN ADVANCE OF THE WORKS

X,Y: 290577, 238825

NORTH.

Important Safety Notice:
Damage to gas pipelines can result in serious injury or death. Gas network information is provided as a general guide. The exact location and depth of medium or low pressure distribution gas pipes must be verified on site by carrying out necessary investigations, including, for example, hand digging trial holes along the route of the pipe.
Service pipes are not generally shown but their presence should always be anticipated.

High pressure transmission pipelines are shown in red. If a transmission pipeline is identified within 10m of any intended excavations then work must not proceed before GNI has been consulted. The true location and depth of a transmission pipeline must be verified on site by a representative of GNI. Contact can be made through 1850 427 747.

All work in the vicinity of the gas network must be completed in accordance with the current edition of the Health & Safety Authority publication, Code of Practice For Avoiding Danger From Underground Services which is available from the Health and Safety Authority (1890 289 389) or can be downloaded at www.hsa.ie.

Legal Notice:
Gas Networks Ireland (GNI) and its affiliates, accept no responsibility for the accuracy of any information contained in this document including data concerning location and technical designation of the gas distribution and transmission network (the Information). The Information should not be relied on for accurate distance or depth of cover measurements.

Any representations and warranties, express or implied, are excluded to the fullest extent permitted by law. No liability shall be accepted for any loss or damage including, without limitation, direct, indirect or consequential loss, arising out of or in connection with the use or re-use of the Information.

- Aurora Telecom Fibre Optic Cable
- Aurora Telecom Duct
- Aurora Telecom Sub-duct
- Aurora Telecom Inserted Gas Pipe

Contact Aurora Telecom on 1850-427-399 or (01)203-0120.

- Transmission Pipe (High Pressure)
- Transmission Pipe (Construction Issue)
- Distribution Pipe (Medium Pressure)
- Distribution Pipe (Low Pressure)
- Service Pipe (Medium Pressure)
- Service Pipe (Low Pressure)
- Strategic Pipe (Medium Pressure)
- Strategic Pipe (Low Pressure)
- Inserted Pipe (Medium Pressure)
- Inserted Pipe (Low Pressure)
- Distribution Pipe (Abandoned)

- .C=? Cover (depth in meters)
- CP Test Point
- End Cap
- Hot Tap
- Installation
- Valve
- Mains Verification **
- Pressure Monitor
- Protection (Sleeve)
- Protection (Slabbing)
- Reducer
- Service Terminator
- Tee
- Transition

** Please contact GNI on 1850-427747 for specific information.

0 20 40 60 80 100 m

Design Department - CORK

Gas Networks Ireland

GAS NETWORK INFORMATION

Issue: DBFL	
Location: Millerstown Phase 2 Kilcock	
Plot Date: 22/01/2019	Contact: J Butler
Plotted by: KOC	Scale: 1:1000

Important Safety Notice:
Damage to gas pipelines can result in serious injury or death. Gas network information is provided as a general guide. The exact location and depth of medium or low pressure distribution gas pipes must be verified on site by carrying out necessary investigations, including, for example, hand digging trial holes along the route of the pipe.
Service pipes are not generally shown but their presence should always be anticipated.

High pressure transmission pipelines are shown in red. If a transmission pipeline is identified within 10m of any intended excavations then work must not proceed before GNI has been consulted. The true location and depth of a transmission pipeline must be verified on site by a representative of GNI. Contact can be made through 1850 427 747.

All work in the vicinity of the gas network must be completed in accordance with the current edition of the Health & Safety Authority publication, Code of Practice For Avoiding Danger From Underground Services which is available from the Health and Safety Authority (1890 289 389) or can be downloaded at www.hsa.ie.

Legal Notice:
Gas Networks Ireland (GNI) and its affiliates, accept no responsibility for the accuracy of any information contained in this document including data concerning location and technical designation of the gas distribution and transmission network (the Information). The Information should not be relied on for accurate distance or depth of cover measurements.

Any representations and warranties, express or implied, are excluded to the fullest extent permitted by law. No liability shall be accepted for any loss or damage including, without limitation, direct, indirect or consequential loss, arising out of or in connection with the use or re-use of the Information.

- Aurora Telecom Fibre Optic Cable
- Aurora Telecom Duct
- Aurora Telecom Sub-duct
- Aurora Telecom Inserted Gas Pipe

Contact Aurora Telecom on 1850-427-399 or (01)203-0120.

- Transmission Pipe (High Pressure)
- Transmission Pipe (Construction Issue)
- Distribution Pipe (Medium Pressure)
- Distribution Pipe (Low Pressure)
- Service Pipe (Medium Pressure)
- Service Pipe (Low Pressure)
- Strategic Pipe (Medium Pressure)
- Strategic Pipe (Low Pressure)
- Inserted Pipe (Medium Pressure)
- Inserted Pipe (Low Pressure)
- Distribution Pipe (Abandoned)

.C=?	Cover (depth in meters)		Pressure Monitor
	CP Test Point		Protection (Sleeve)
	End Cap		Protection (Slabbing)
	Hot Tap		Reducer
	Installation		Service Terminator
	Valve		Tee
	Mains Verification **		Transition

** Please contact GNI on 1850-427747 for specific information.

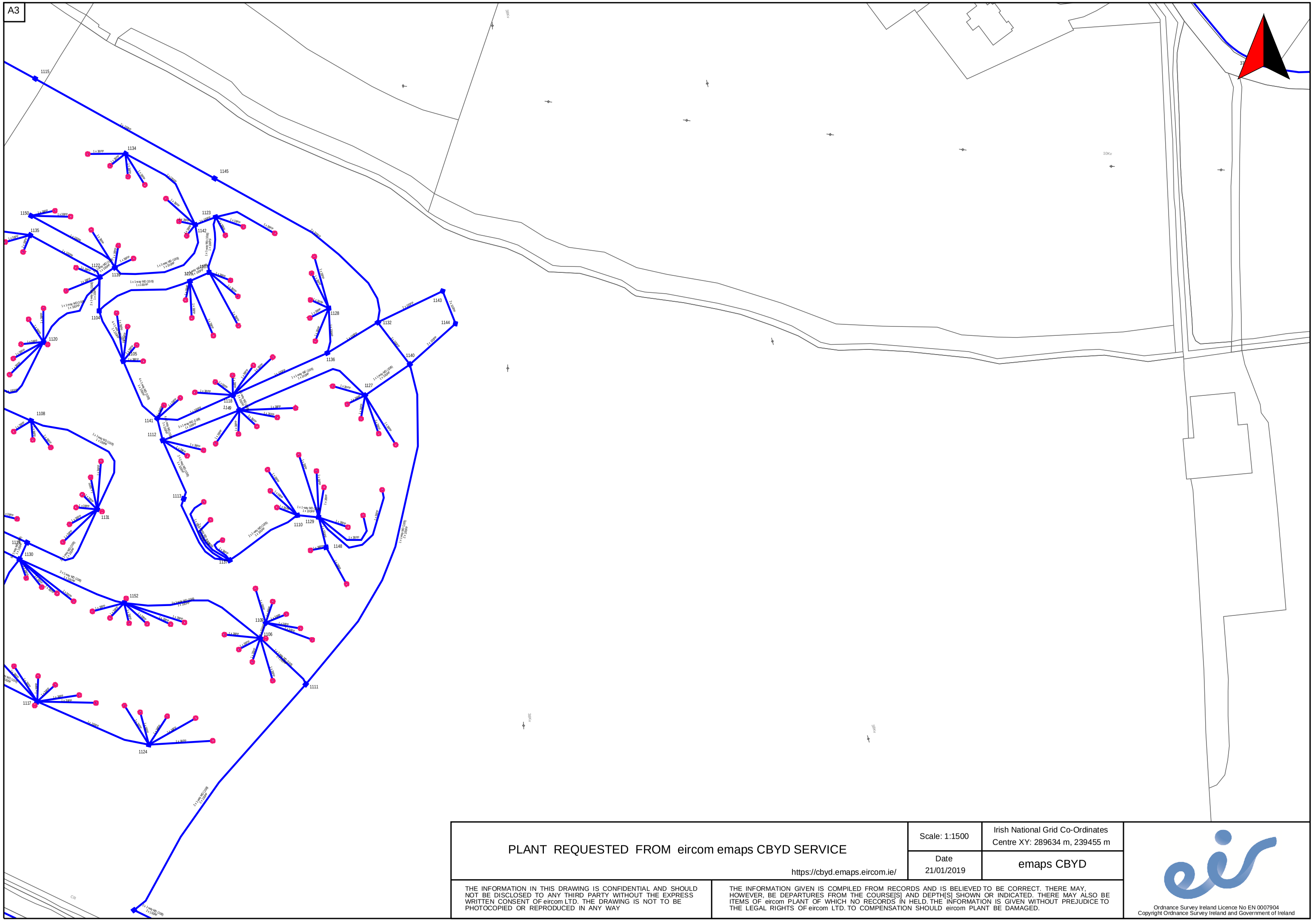
Design Department - CORK

Gas Networks Ireland

GAS NETWORK INFORMATION

Issue: DBFL	
Location: Millerstown Phase 2 Kilcock	
Plot Date: 22/01/2019	Contact: J Butler
Plotted by: KOC	Scale: 1:1000

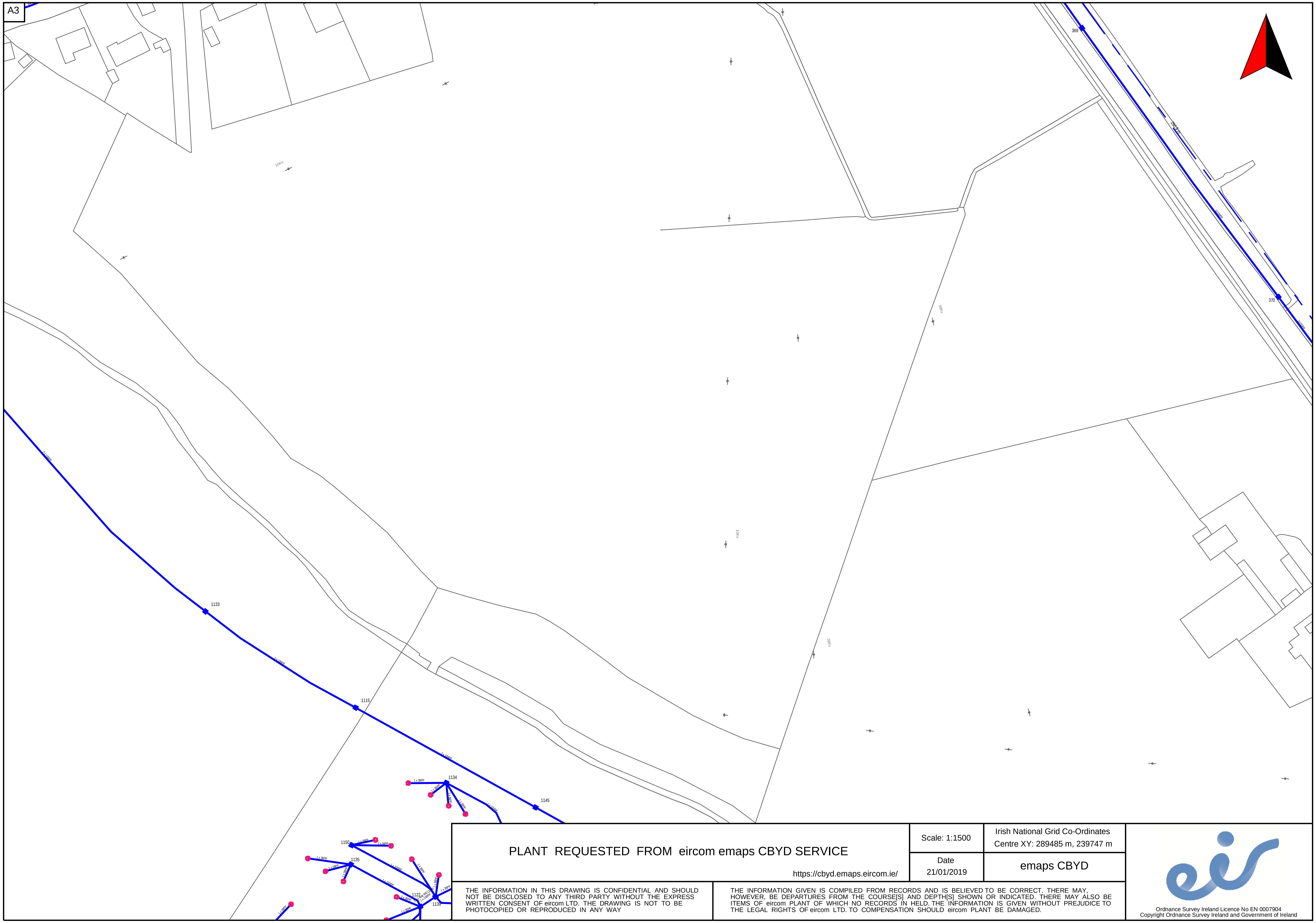
A3



PLANT REQUESTED FROM eircom emaps CBYD SERVICE

https://cbyd.emaps.eircom.ie/

Scale: 1:1500	Irish National Grid Co-Ordinates Centre XY: 289634 m, 239455 m
Date 21/01/2019	emaps CBYD



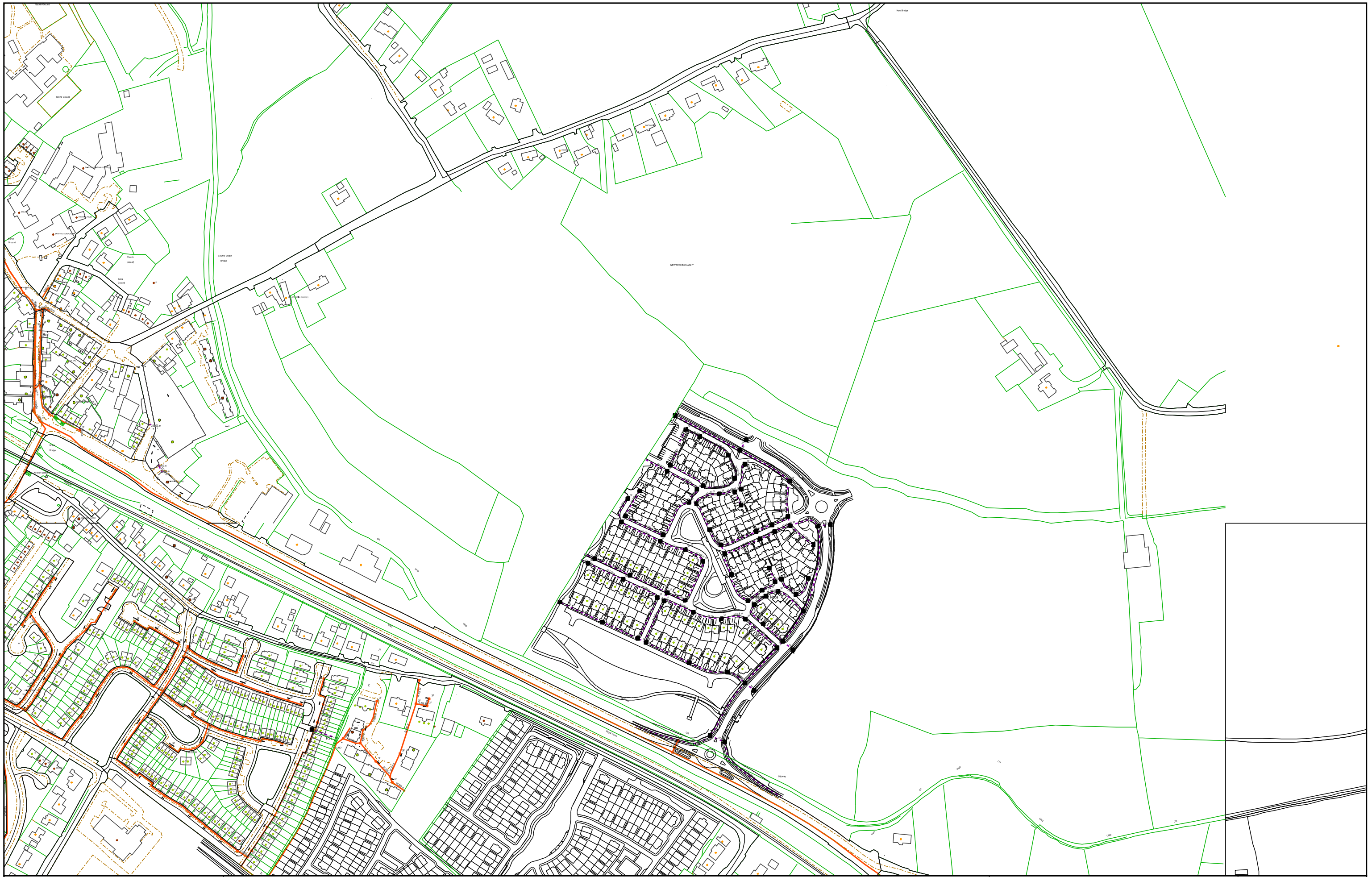
PLANT REQUESTED FROM eircom emaps CBYD SERVICE

https://cbyd.emaps.eircom.ie/

Scale: 1:1500	Irish National Grid Co-Ordinates Centre XY: 289485 m, 239747 m
Date 21/01/2019	emaps CBYD

THE INFORMATION IN THIS DRAWING IS CONFIDENTIAL AND SHOULD NOT BE DISCLOSED TO ANY THIRD PARTY WITHOUT THE EXPRESS WRITTEN CONSENT OF eircom LTD. THE DRAWING IS NOT TO BE PHOTOCOPIED OR REPRODUCED IN ANY WAY

THE INFORMATION GIVEN IS COMPILED FROM RECORDS AND IS BELIEVED TO BE CORRECT. THERE MAY, HOWEVER, BE DEPARTURES FROM THE COURSE[S] AND DEPTH[S] SHOWN OR INDICATED. THERE MAY ALSO BE ITEMS OF eircom PLANT OF WHICH NO RECORDS IN HELD. THE INFORMATION IS GIVEN WITHOUT PREJUDICE TO THE LEGAL RIGHTS OF eircom LTD. TO COMPENSATION SHOULD eircom PLANT BE DAMAGED.



Unit 7,
Westgate Business Park,
Ballymount,
Dublin 24.

PROJECT NAME

DESIGNED BY:

Produced on: 08/02/2019

@ A3

APPENDIX 8.1
PRELIMINARY GROUND INVESTIGATION

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DECEMBER 2019

Ground Investigations Ireland Ltd.,
Catherinestown House,
Hazelhatch Road,
Newcastle, Co Dublin.
Tel: 01 601 5175 / 5176 | Fax: 01 601 5173
Email: info@gii.ie | Web: gii.ie

Ground Investigations Ireland

Branganstown Kilcock

Ground Investigation Report

DOCUMENT CONTROL SHEET

Project Title	Branganstown Kilcock
Engineer	DBFL
Project No	8559-03-19
Document Title	Ground Investigation Report

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
A	Draft	S Kealy	F McNamara	F McNamara	Dublin	29 April 2019

GROUND INVESTIGATIONS IRELAND

Ground Investigations Ireland Ltd.,
Catherinestown House,
Hazelhatch Road,
Newcastle, Co Dublin.
Tel: 01 601 5175 / 5176 | Fax: 01 601 5173
Email: info@gii.ie | Web: gii.ie

CONTENTS

APPENDICES

1.0 Preamble

On the instructions of DBFL Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., in March 209 at the site of the proposed residential development in Branganstown, Kilcock Co. Kildare.

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 and is situated in Branganstown, Co. Kildare. 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 9 No. Trial Pits to a maximum depth of 3.0m BGL
- Carry out 7 No. Soakaways to determine a soil infiltration value to BRE digest 365
- 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 3CX 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 3 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 are generally comprised;

- Topsoil
- Made Ground
- Cohesive Deposits
- Granular Deposits

TOPSOIL: Topsoil was encountered in all the exploratory holes and was present to a maximum depth of 0.3m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the Topsoil in TP06 and SA07 and was present to a maximum depth of between 0.45m BGL. These deposits were described generally as *brown sandy slightly gravelly CLAY* or *a black slightly sandy gravelly clayey peat with rare fragments of brick.*

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground and were described typically as *brown sandy gravelly CLAY with occasional cobbles and boulders*. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. The strength of the cohesive deposits varied across the site but typically increased with depth in the majority of the exploratory holes. These deposits had some, occasional or frequent cobble and boulder content where noted on the exploratory hole logs.

GRANULAR DEPOSITS: The granular deposits were encountered at the base of the cohesive deposits and were typically described as G*rey brown clayey sandy sub rounded to sub angular fine to coarse GRAVEL with occasional cobbles and rare boulders.* The secondary sand/gravel and silt/clay constituents varied across the site and with depth while occasional or frequent cobble and boulder content also present where noted on the exploratory hole logs.
It should be noted that many of the trial pits where granular deposits or groundwater were encountered, experienced instability indicating that the material is loose or medium dense. This was described either as side wall spalling or as side wall collapse in the remarks section at the base of the trial pit logs.

4.2. Groundwater

Groundwater strikes are noted on the exploratory hole logs where they occurred. 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.

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

Due to the presence of the granular material across the site we would recommended carrying out a sequence of dynamic probing to determine an allowable bearing capacity.

5.3. 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 Made Ground or soft Cohesive Deposits will require to be appropriately battered or the sides supported due to the low strength of these deposits.
Any excavations which penetrate the granular deposits will require to be appropriately battered or the sides supported and are likely to require dewatering due to the groundwater seepages noted in the exploratory hole logs in the Appendices of this Report.

5.4. Soakaway Design

An Infiltration rate of 4.353×10^{-4} m/s was calculated for the soakaway at the location of SA05. At the locations of SA01, SA02, SA03, SA04, SA06 and SA07 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

Site Location

Client:

Project Code:
8559-03-19

Project Title:
Branganstown Kilcock

Drawing Title:
Figure 1 Site Location

GROUND INVESTIGATIONS IRELAND
Ground Investigations Ireland Ltd.
Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
www.gii.ie 01-6015175/5176

0 100 200 300 m

Drawn By:	Date:
SK	25/04/19

APPENDIX 2 – Trial Pit Records

Ground Investigations Ireland Ltd
www.gii.ie

Site Branganstown, Kilcock			**Trial Pit Number** SA01
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 2.0m X 0.35m X 2.65m	**Ground Level (mOD)**	**Client**	**Job Number** 8559-03-19
	Location	**Dates** 25/03/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.35)	Brown slightly sandy slightly gravelly TOPSOIL with grass rootlets.		
					0.35			
					(0.45)	Firm brown slightly sandy slightly gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
					0.80			
1.30	B				(1.85)	Firm to stiff brown mottled grey slightly sandy gravelly CLAY with rare sub-angular to sub-rounded cobbles.		
					2.65	Trial pit terminated due to encountering groundwater.		
						Complete at 2.65m		

Plan

Remarks

Trial pit stable.
Soakaway completed in trial pit.
Soakaway backfilled on completeion.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8559-03-19.SA01

Ground Investigations Ireland Ltd
www.gii.ie

Site Branganstown, Kilcock			**Trial Pit Number** SA02
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 2.20m X 0.35m X 3.00m	**Ground Level (mOD)**	**Client**	**Job Number** 8559-03-19
	Location	**Dates** 25/03/2019	**Project Contractor** GII	**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 with grass rootlets.		
					0.20	Firm light greyish brown slightly sandy slightly gravelly CLAY.		
					(0.45)			
					0.65	Firm to stiff grey mottled brown slightly sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
					(1.05)			
					1.70	Stiff brown/dark grey slightly sandy gravelly CLAY with occasional cobbles.		
					(0.20)			
					1.90	Stiff greyish brown slightly sandy gravelly CLAY with occasional sub-rounded cobbles.		
					(1.10)			
					3.00	Complete at 3.00m		

Plan

Remarks

No Groundwater encountered.
Trial pit stable.
Soakaway completed in trial pit.
Soakaway backfilled on completeion.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8559-03-19.SA02

Ground Investigations Ireland Ltd
www.gii.ie

Site Branganstown, Kilcock			**Trial Pit Number** TP03
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8559-03-19
	Location	**Dates** 25/03/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25) 0.25	Brown slightly sandy slightly gravelly TOPSOIL with grass rootlets.		
					(0.25) 0.50	Soft to firm light greyish brown slightly sandy slightly gravelly CLAY.		
					(0.40) 0.90	Firm to stiff grey mottled brown slightly sandy gravelly CLAY with rare sub-angular to sub-rounded cobbles.		
					(0.70) 1.60	Grey gravelly clayey fine to coarse SAND with rare cobbles.		
					(0.40) 2.00	Grey sandy very gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
			FI(1) at 2.10m.		(0.20) 2.20	Grey sandy sub-angular to sub-rounded fine to coarse GRAVEL with occasional sub-rounded to rounded cobbles. Trial pit terminated due to excessive groundwater and trial pit sidewall collapse. Complete at 2.20m		▽1

Plan

Remarks

Groundwater encountered at 2.10m BGL - Fast Ingress.
Trial pit spalling from 1.0m BGL.
Trial pit backfilled on completion.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8559-03-19.TP03

Ground Investigations Ireland Ltd
www.gii.ie

Site Branganstown, Kilcock			**Trial Pit Number** SA03
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 1.90m X 0.35m X 2.20m	**Ground Level (mOD)**	**Client**	**Job Number** 8559-03-19
	Location	**Dates** 25/03/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25)	Brown slightly sandy slightly gravelly TOPSOIL with grass rootlets.		
					0.25	Soft to firm light greyish brown slightly sandy slightly gravelly CLAY with rare sub-angular cobbles.		
					(0.75)			
					1.00	Dark grey slightly sandy very clayey sub-angular fine to coarse GRAVEL with occasional sub-angular cobbles.		
					(1.25)			
			SS(1) at 2.20m.		2.25	Trial pit terminated due to encountering groundwater.		▽1
						Complete at 2.25m		

Plan

Remarks

Groundwater encountered at 2.20m BGL - Slight seepage.
Trial pit sidewalls spalling below 1.0m BGL.
Soakaway completed in trial pit.
Soakaway backfilled on completeion.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8559-03-19.SA03

Ground Investigations Ireland Ltd
www.gii.ie

Site Branganstown, Kilcock			**Trial Pit Number** TP04
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 1.80m X 0.50m X 2.00m	**Ground Level (mOD)**	**Client**	**Job Number** 8559-03-19
	Location	**Dates** 25/03/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25)	Brown slightly sandy slightly gravelly TOPSOIL with grass rootlets.		
					0.25			
					(0.25)	Soft to firm light brown slightly sandy slightly gravelly CLAY.		
0.40	B				0.50			
					(0.40)	Soft to firm grey mottled brown slightly sandy gravelly CLAY with occasional cobbles.		
					0.90			
					(0.25)	Dark grey sandy very clayey sub-angular to rounded fine to coarse GRAVEL with frequent sub-rounded to rounded cobbles.		
					1.15			▼1
1.50	B				(0.85)	Grey very sandy slightly clayey sub-angular to rounded fine to coarse GRAVEL with frequent sub-rounded to rounded cobbles.		▽1
			MI(1) at 1.80m, rose to 1.20m in 20 mins.		2.00	Trial pit terminated due to sidewalls collapsing.		
						Complete at 2.00m		

Plan

Remarks

Groundwater encountered at 1.80m BGL - Medium Ingress.
Trial pit sidewalls spalling below 1.0m BGL.
Trial pit backfilled on completion.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8559-03-19.SA04

Ground Investigations Ireland Ltd
www.gii.ie

Site Branganstown, Kilcock			**Trial Pit Number** SA04
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 1.70m X 0.35m X 1.10m	**Ground Level (mOD)**	**Client**	**Job Number** 8559-03-19
	Location	**Dates** 25/03/2019	**Project Contractor** GII	**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 slightly gravelly TOPSOIL with grass rootlets.		
					0.30			
					(0.20)	Firm light brown slightly sandy slightly gravelly CLAY.		
					0.50			
					(0.30)	Firm grey mottled brown slightly sandy slightly gravelly CLAY with rare sub-angular to sub-rounded cobbles.		
					0.80			
					(0.30)	Dark grey slightly sandy very clayey angular to sub-rounded fine to coarse GRAVEL.		
					1.10	Complete at 1.10m		

Plan

Remarks

No Groundwater encountered.
Trial pit stable.
Soakaway completed in trial pit.
Soakaway backfilled on completeion.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8559-03-19.SA04A

Ground Investigations Ireland Ltd
www.gii.ie

Site Branganstown, Kilcock			**Trial Pit Number** SA05
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 2.50m X 0.50m X 2.70m	**Ground Level (mOD)**	**Client**	**Job Number** 8559-03-19
	Location	**Dates** 26/03/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30) 0.30	Brown slightly sandy slightly gravelly TOPSOIL with grass rootlets.		
					(0.20) 0.50	Firm brown sandy gravelly CLAY with occasional cobbles.		
1.50	B				(2.20) 2.70	Brown slightly clayey very sandy sub-rounded to rounded fine to coarse GRAVEL with occasional rounded cobbles.		
						Trial pit terminated due to sidewall collapse.		
						Complete at 2.70m		

Plan

Remarks

No Groundwater encountered.
Trial pit collapsing below 0.50m.
Soakaway Test completed in trial pit.
Trial pit backfilled on completion of soakaway test.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8559-03-19.SA05

Ground Investigations Ireland Ltd
www.gii.ie

Site Branganstown, Kilcock			**Trial Pit Number** SA06
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 1.90m X 0.35m X 1.20m	**Ground Level (mOD)**	**Client**	**Job Number** 8559-03-19
	Location	**Dates** 26/03/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	Brown slightly sandy slightly gravelly TOPSOIL with grass rootlets.		
					(0.30) 0.50	Black slightly sandy slightly gravelly clayey PEAT.		
					(0.70) 1.20	Grey sandy clayey sub-rounded to rounded fine to coarse GRAVEL with rare sub-rounded to rounded cobbles.		
						Trial pit terminated above groundwater.		
						Complete at 1.20m		

Plan

Remarks

No Groundwater encountered.
Trial pit collapsing below 0.50m.
Soakaway Test completed in trial pit.
Trial pit backfilled on completion of soakaway test.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8559-03-19.SA06

Ground Investigations Ireland Ltd
www.gii.ie

Site Branganstown, Kilcock			**Trial Pit Number** SA07
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 2.50m X 0.40m X 2.70m	**Ground Level (mOD)**	**Client**	**Job Number** 8559-03-19
	Location	**Dates** 26/03/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.45)	MADE GROUND: Brownish grey slightly sandy slightly gravelly CLAY.		
					0.45			
					0.50	Dark brown slightly sandy slightly gravelly peaty CLAY.		
					(0.80)	Soft to firm grey slightly sandy slightly gravelly silty CLAY.		
					1.30			
					(0.20)	Firm grey mottled light brown slightly sandy slightly gravelly silty CLAY.		
					1.50			
					(1.20)	Grey sandy clayey sub-rounded to rounded to rounded fine to coarse GRAVEL with rare sub-rounded cobbles.		
					2.70	Trial pit terminate due to sidewall collapse.		
						Complete at 2.70m		

Plan

Remarks

No Groundwater encountered.
Trial pit collapsing below 1.50m.
Soakaway Test completed in trial pit.
Trial pit backfilled on completion of soakaway test.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8559-03-19.SA07

Branganstown, Kilcock – Trial Pit Photographs

SA01

SA02

SA03

TP03

SA04

TP04

SA05

SA06

TP06

SA07

APPENDIX 3 – Soakaway Records

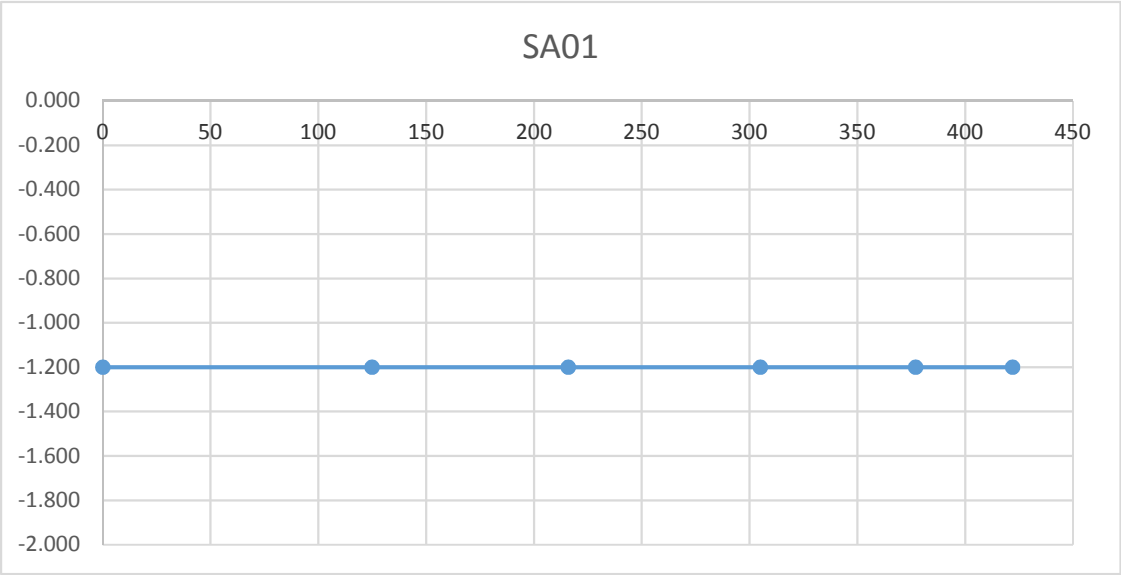
SA01

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 2.0m x 0.35m 2.65m (L x W x D)

Date	Time	Water level (m bgl)
25/03/2019	0	-1.200
25/03/2019	125	-1.200
25/03/2019	216	-1.200
25/03/2019	305	-1.200
25/03/2019	377	-1.200
25/03/2019	422	-1.200

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
1.20	2.650	1.450	1.5625	2.2875



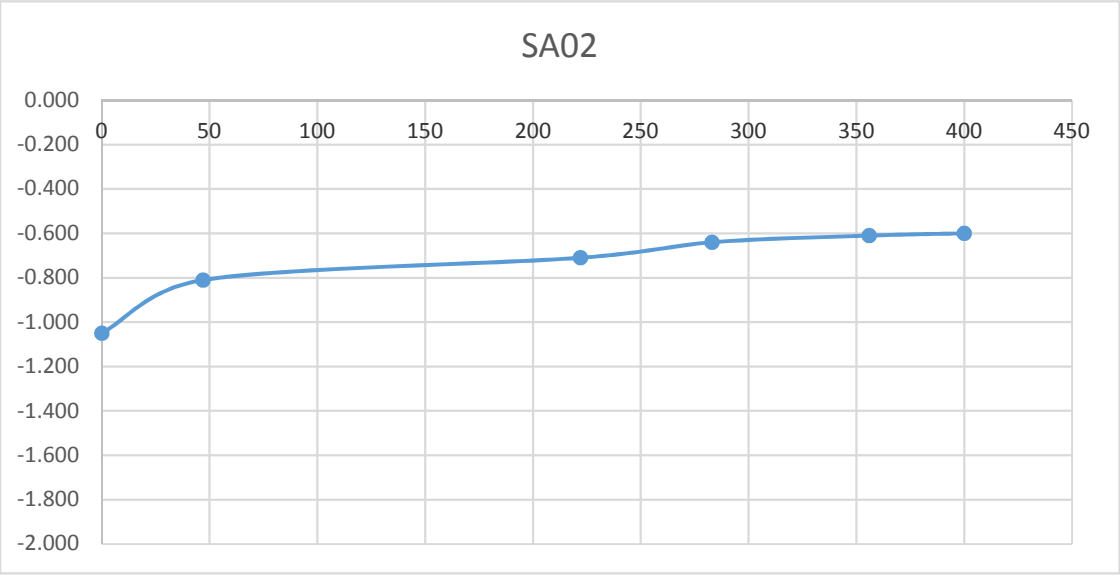
SA02

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 2.2m x 0.35m 3.0m (L x W x D)

Date	Time	Water level (m bgl)
25/03/2019	0	-1.050
25/03/2019	47	-0.810
25/03/2019	222	-0.710
25/03/2019	283	-0.640
25/03/2019	356	-0.610
25/03/2019	400	-0.600

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
1.05	3.000	1.950	1.5375	2.5125



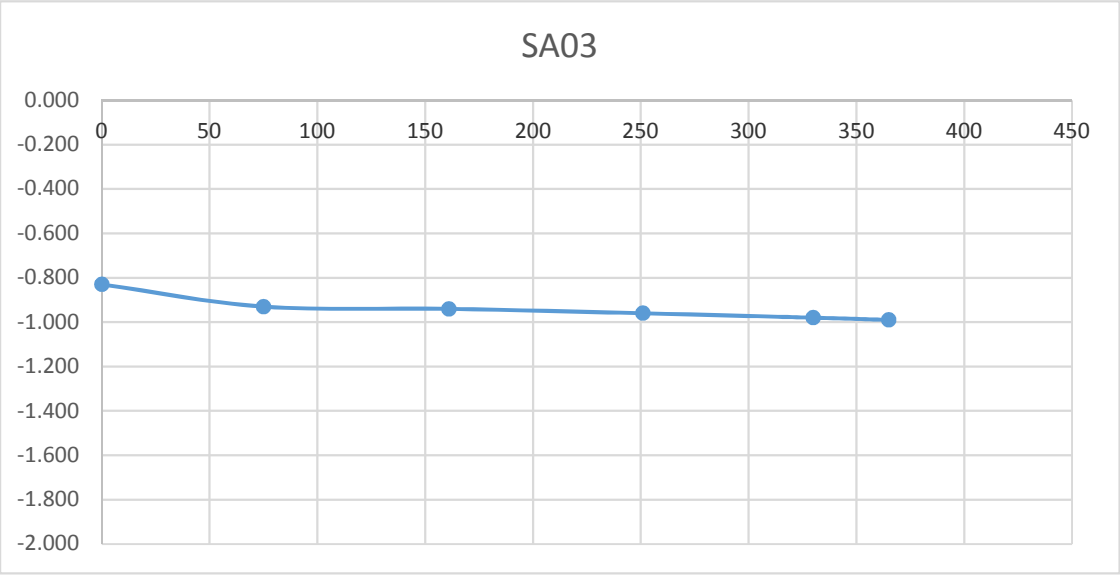
SA03

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 1.9m x 0.35m 2.25m (L x W x D)

Date	Time	Water level (m bgl)
25/03/2019	0	-0.830
25/03/2019	75	-0.930
25/03/2019	161	-0.940
25/03/2019	251	-0.960
25/03/2019	330	-0.980
25/03/2019	365	-0.990

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
0.83	2.250	1.420	1.185	1.895



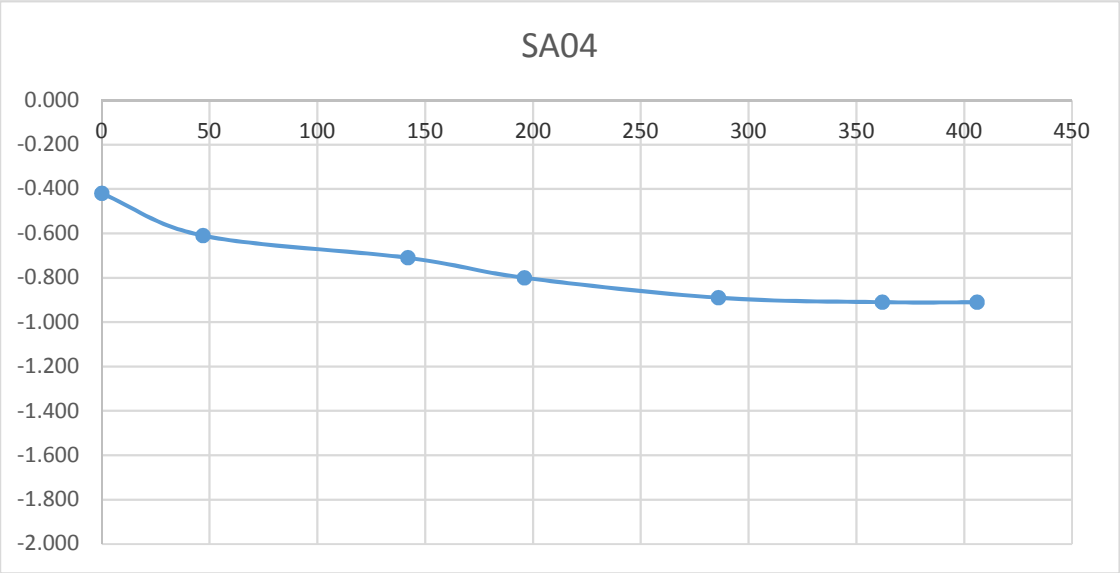
SA04

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 1.7m x 0.35m 1.10m (L x W x D)

Date	Time	Water level (m bgl)
25/03/2019	0	-0.420
25/03/2019	47	-0.610
25/03/2019	142	-0.710
25/03/2019	196	-0.800
25/03/2019	286	-0.890
25/03/2019	362	-0.910
25/03/2019	406	-0.910
25/03/2019		

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
0.42	1.100	0.680	0.59	0.93



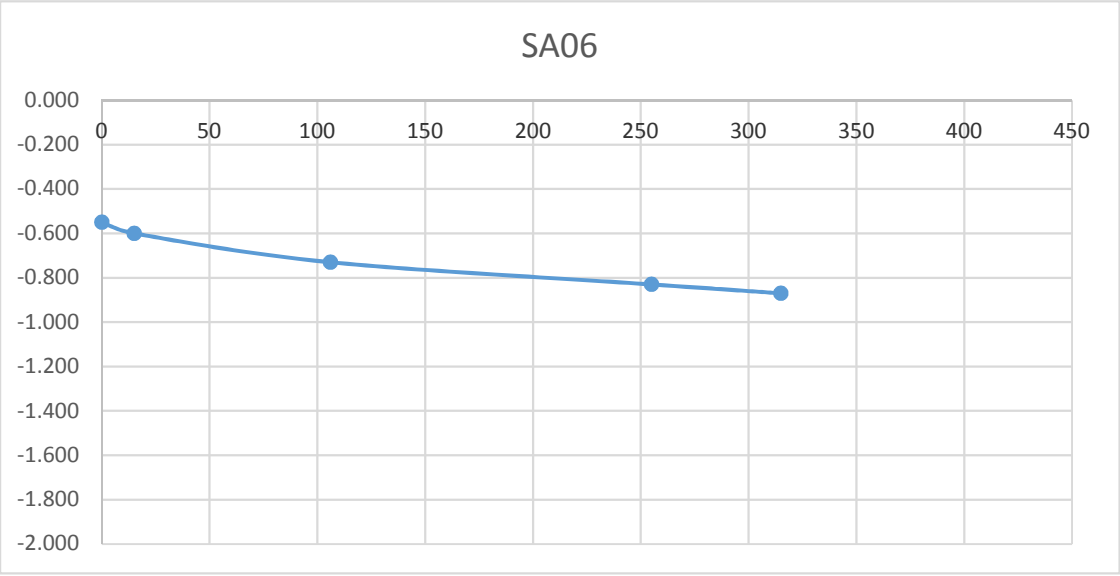
SA06

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 1.9m x 0.35m 1.20m (L x W x D)

Date	Time	Water level (m bgl)
26/03/2019	0	-0.550
26/03/2019	15	-0.600
26/03/2019	106	-0.730
26/03/2019	255	-0.830
26/03/2019	315	-0.870

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
0.55	1.200	0.650	0.7125	1.0375



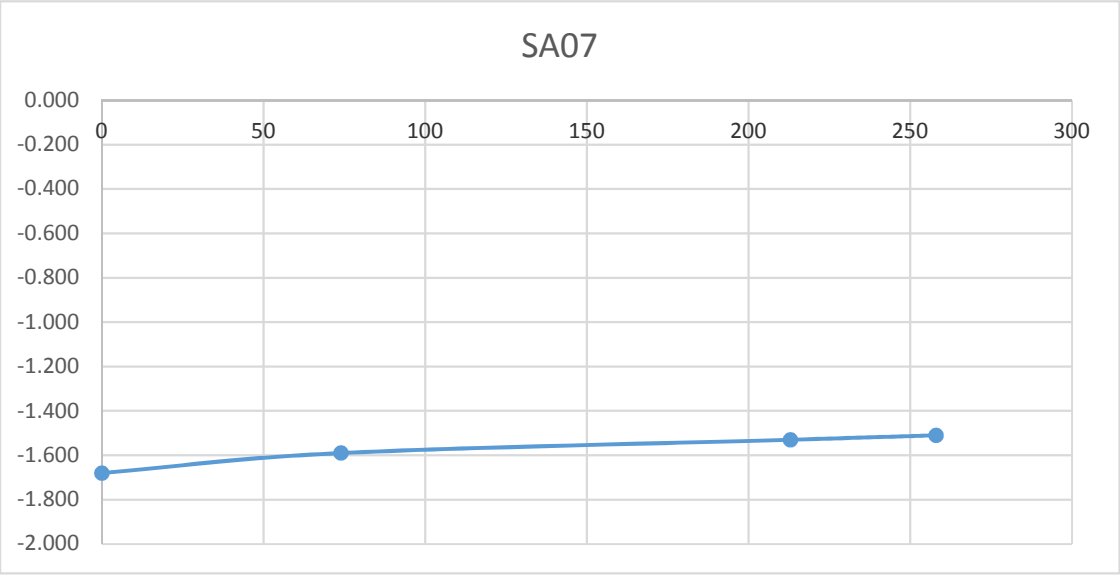
SA07

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 2.5m x 0.40m 2.7m (L x W x D)

Date	Time	Water level (m bgl)
26/03/2019	0	-1.680
26/03/2019	74	-1.590
26/03/2019	213	-1.530
26/03/2019	258	-1.510

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
1.68	2.700	1.020	1.935	2.445

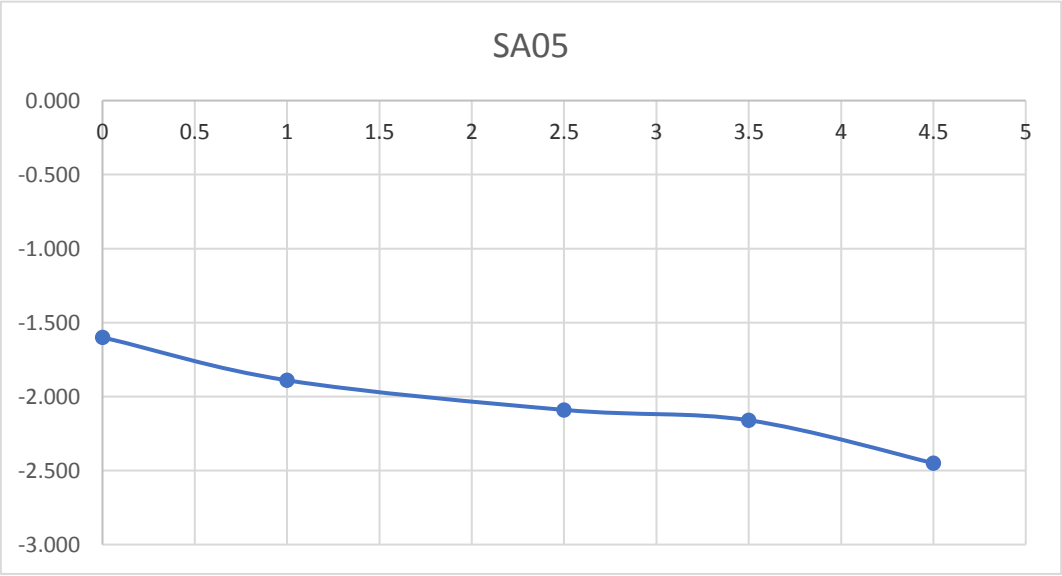


SA03 1st Fill

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 2.50m x 0.50m 2.70m (L x W x D)

Date	Time	Water level (m bgl)
26/03/2019	0	-1.600
26/03/2019	1	-1.890
26/03/2019	2.5	-2.090
26/03/2019	3.5	-2.160
26/03/2019	4.5	-2.450

Start depth	Depth of Pit		Diff	75% full	25%full
1.60	**2.450**		**0.850**	**1.8125**	**2.2375**
Length of pit (m)	Width of pit (m)			75-25Ht (m)	Vp75-25 (m3)
2.500	0.500			0.425	0.53
Tp75-25 (from graph) (s)		**150**		50% Eff Depth	ap50 (m2)
				0.425	3.8
f =	**9.320E-04**	**m/s**			



SA05 2nd Fill

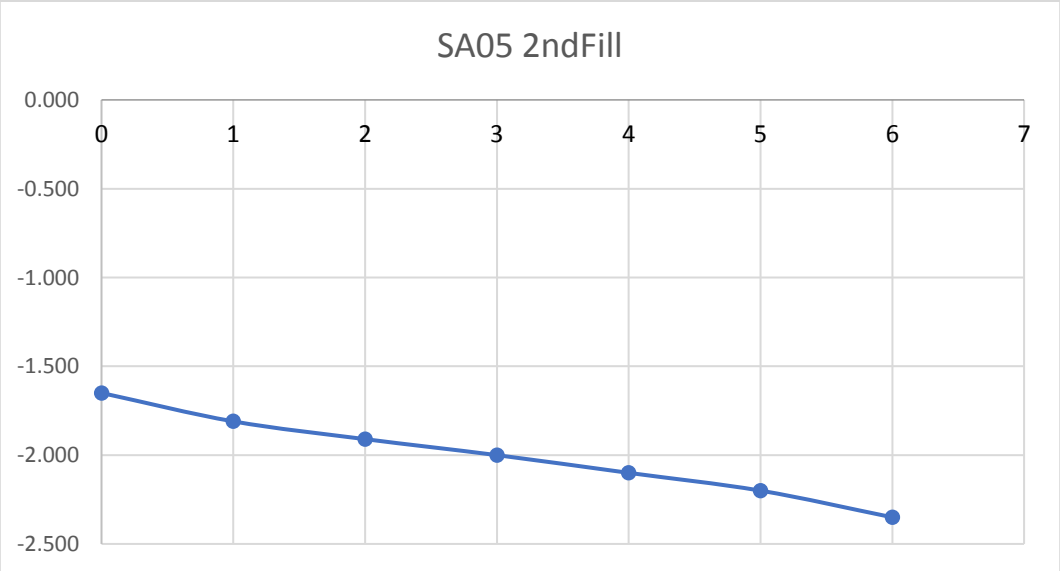
Soakaway Test to BRE Digest 365

Trial Pit Dimensions: 2.50m x 0.50m 2.35m (L x W x D)

Date	Time	Water level (m bgl)
26/03/2019	0	-1.650
26/03/2019	1	-1.810
26/03/2019	2	-1.910
26/03/2019	3	-2.000
26/03/2019	4	-2.100
26/03/2019	5	-2.200
26/03/2019	6	-2.350

Start depth	Depth of Pit		Diff	75% full	25%full
1.65	**2.350**		**0.700**	**1.825**	**2.175**

Length of pit (m)	Width of pit (m)		75-25Ht (m)	Vp75-25 (m3)
2.500	0.500		0.350	0.44
Tp75-25 (from graph) (s)		**191.5**	50% Eff Depth	ap50 (m2)
			0.350	3.35
f =	**6.820E-04**	**m/s**		



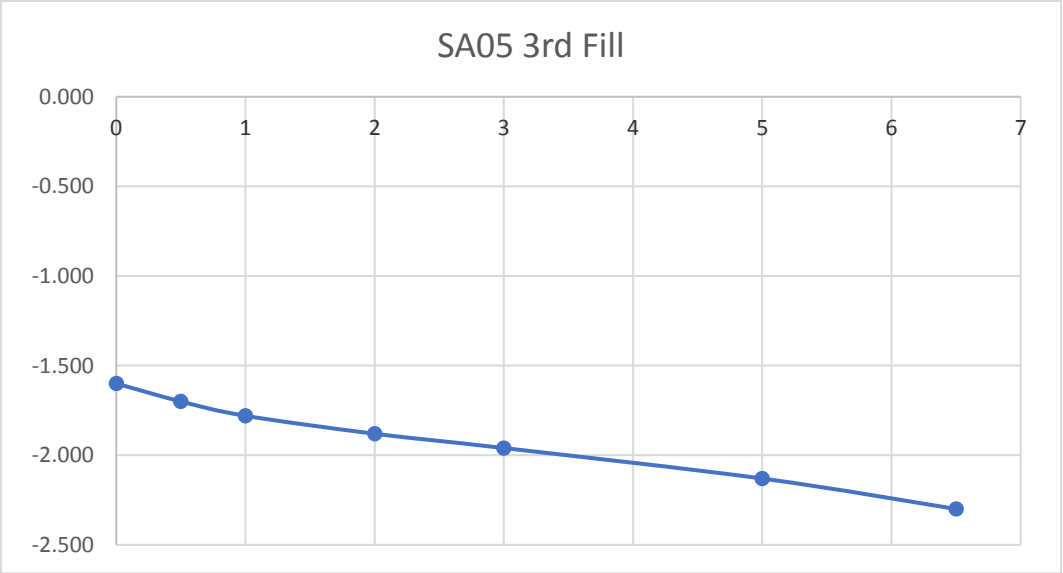
SA05 3rd Fill

Soakaway Test to BRE Digest 365

Trial Pit Dimensions: 2.50m x 0.50m 2.70m (L x W x D)

Date	Time	Water level (m bgl)
26/03/2019	0	-1.600
26/03/2019	0.5	-1.700
26/03/2019	1	-1.780
26/03/2019	2	-1.880
26/03/2019	3	-1.960
26/03/2019	5	-2.130
26/03/2019	6.5	-2.300

Start depth	Depth of Pit		Diff	75% full	25%full
1.60	**2.300**		**0.700**	**1.775**	**2.125**
Length of pit (m)	Width of pit (m)			75-25Ht (m)	Vp75-25 (m3)
2.500	0.500			0.350	0.44
Tp75-25 (from graph) (s)		**300**		50% Eff Depth	ap50 (m2)
				0.350	3.35
f =	**4.353E-04**	**m/s**			



APPENDIX 10.1
BAT ASSESSMENT REPORT

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DECEMBER 2019

A Bat Assessment of the Lands at Kilcock, Co, Meath Proposed for Development and Implications for Resident and Local Bat Fauna

Brian Keeley B. Sc. (Hons) in Zoology.

July 2019

Introduction

This report was produced by Brian Keeley for McGarrell Reilly Group. This report is an assessment of the potential impacts to bats from a proposed development of residential dwellings in the townlands of Newtownmoyaght, Kilcock, County Meath.

Most of Ireland's mammals enjoy protection under the Wildlife Act (1976) and the more recent updating of this legislation (Wildlife (Amendment) Act 2000, S.I. No. 94 of 1997, S.I. No. 378 of 2005, European Communities (Natural Habitats) (Amendment) Regulations, 2005). In conjunction with the enactment of the Habitats Directive into Irish legislation, all native mustelid species and bat species are protected with further protection given to otters and lesser horseshoe bats. Lesser horseshoe bats are not found in County Wicklow. Bats account for nine of Ireland's terrestrial mammal species, approximately one quarter of the species of the Irish land mass.

All of the species found to date and indeed all bat species that may remain undetected up to the present are afforded legal protection under Irish and EU legislation and agreements (Wildlife Act (1976), Wildlife (Amendment) Act (2000), S.I. No. 94 of 1997 and S.I. No.

378 OF 2005 implementing the EU Habitats Directive, Bonn Convention (The Convention on the Conservation of Migratory Species of Wild Animal) and the Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats).

A speedy and productive means of determining the bat fauna within a site is to walk the entire site concerned, paying particular attention to all hedgerow, woodland, watercourses, fence lines, paths etc. with the aid of an ultrasonic receiver ("bat detector").

Determining the bat fauna of the surrounding area may involve a much greater level of assessment if the aim of the survey is to catalogue all bats in all townlands but this is too detailed for the aim of creating mitigation for most developments except where the species under consideration are particularly elusive or specialised and leave few signs.

The survey undertaken within the site at Newtownmoyaght, Kilcock, County Meath allows a targeting of mitigation measures to the appropriate or most efficient sites to prevent accidental death or injury in and to assist in providing mitigation for losses brought about in feeding and commuting. The lands are within County Meath, but they run up to the border with County Kildare.

Construction and development create numerous changes to a site that usually lead to considerable vegetation loss and a change from a green site to a greater level of concrete and land management. This may alter the elements of the landscape of benefit to bats including roost sites, hedgerow, mature trees and the insects attracted by agricultural practices.

Methodology

The survey area identified for consideration included the land take of the proposed development and neighbouring houses on the perimeter. The proposed development site and the surrounding houses and lands were examined visually for evidence of bat roosts and this was followed by a night-time bat detector survey utilising ultrasonic receivers to convert bat signals used in navigation and social interaction to a recordable and measurable pulse. In the field, one piece of equipment (EM3 – see below) provided a screen for instant evaluation while the capacity to record signals allowed for bat identification to be confirmed using sound analysis software (Kaleidoscope). The analysis

was carried out by automatic identification and then evaluation of the identifications by the bat specialist.

Further evaluation of the calls was allowed by the use of a second "bat detector" at the same time that allowed signals to be heard in each ear in different ways: 1) heterodyne (a means of mixing sounds of two frequencies to bring the unknown signal into the audible range) and 2) time expansion ; the frequency of the signal is slowed by a factor (typically 10) to bring it into the audible range. The entire site was walked at and following sunset and a transect of the site covering most hedgerow was also walked prior to sunrise (see Figures 1 and 2). The adjoining houses and lands were also assessed during a driven transect on the same dates.

Equipment employed:

Echometer3 Real Time Expansion monitor with SD card recording (EM3)
Garmin GPS attachment
Songmeter2Bat+ monitor for overnight recordings within the site (SM2)
Pettersson D240X heterodyne and time expansion detector
Kaleidoscope sound analysis software
Maps of proposed development at Kilcock, Google Earth and Google Maps
Huawei Smartphone 6 with digital camera

An EM3 was held for the entire survey period and recorded all bat signals detectable by its transducer. The D240X was used as a detector but not for recording. The transducer of this monitor is more sensitive and detects bats at a greater distance. It can be used as an additional means of determining the bat fauna over a wider radius where the bats do not approach the observer within the site. Observations on Leisler's bat activity is supplemented within the report from the notes made during the survey of D240X signals.

Survey constraints

Conditions for surveying on 12th and 13th July 2019 were suited to bat activity on all occasions. At sunset (21.51 hours) the temperature was 16 degrees Celsius. There was no rain on the night of survey and temperatures were adequate for bat feeding activity. There was no strong wind on either night or morning, but some areas of the site were exposed to a crosswind and conditions would be best described as breezy. Brief technical failure due to improperly charged batteries led to the absence of hand-held EM3 recordings at the

very start of the survey. However, the D240X and the static monitor (SM2) were operating throughout the survey period. Thus, there was no reduction in the intensity of the survey and no bat activity was overlooked.

Bat species noted in 2019 in the Kilcock proposed site

Common pipistrelle	***Pipistrellus pipistrellus***
Soprano pipistrelle	***Pipistrellus pygmaeus***
Leisler's bat	***Nyctalus leisleri***
Brown long-eared bat	***Plecotus auritus***

Other bats noted in the general Meath / Kildare area based on Bat Conservation Ireland data

Daubenton's bat	*Myotis daubentonii*
Natterer's bat	*Myotis nattereri*
Whiskered bat	*Myotis mystacinus*
Brandt's bat	*Myotis brandtii*
Nathusius' pipistrelle	*Pipistrellus nathusii*

Bat activity at the two derelict houses indicated that bats were not roosting within the building closest to the development area at the time of survey and could have been using another house on the perimeter (which was unapproachable due to dense vegetation). A common pipistrelle circling the building prior to sunrise suggests that it may on occasion serve as a roost to this species. Bats may examine a number of structures before choosing which to roost in on any given dawn. The swarming at the house suggests that this is occasionally used as a roost.

The most likely destination for bats on the morning of survey is within the same line of buildings.

A soprano pipistrelle was seen to enter a dormer window further west than the derelict building nearest the subject site. This was unlikely to be a maternity roost as individual bats rather than larger numbers of bats were seen to return to the building.

Brown long-eared bat activity was noted by the static monitor on one occasion (22.34 hours). This species was not encountered during the active transect survey but as this species has a very faint and directional signal, it may easily be overlooked.

Hedgerow running north-south from the northern section east of the midline was the most active site for bats as well as the gardens north of the site running westwards (see Figure 1).

Modifications or Features introduced by the proposed development

✦Vegetation alterations

The proposed development will require the removal some of the vegetation from the site to facilitate the project. This will include mature ash and sycamore trees. Oak trees in the north-eastern corner lie outside of the site and would not be removed as part of this project (see Arboricultural Assessment Report Residential Development, Newtownmoyaghy, Kilcock, Co. Meath by CMK Horticulture and Arboriculture Ltd.).

✦Lighting

There will be an increased level of lighting as there will be an introduction of housing to an agricultural site. There will be increased lighting for the construction and operation of the new buildings. This would lead to the disturbance of light intolerant or shy species while the more urban-adapted species will be affected to a lesser extent.

Pipistrelles and Leisler's bats are less affected by light than all other species, but Pipistrelles will avoid light where possible. Leisler's bats may be attracted to lighting later into the night-time to feed on moths that themselves are attracted or disorientated by the lights. Species such as brown long-eared bat typically avoid light and *Myotis* species are also typically intolerant of light.

Impacts of The Proposed Development

Potential roost loss

Tree removal creates a risk of roost loss. and could lead to injury or death to any bat roosting within a felled tree protected under the Wildlife Act and Habitats Directive (if a roost were present and not identified) and would therefore constitute a breach of the Irish and EU legislation. There is no evidence that the trees within the site are in use as bat roosts from the survey of 12th July 2019. The houses on the perimeter of the site may serve as roosts at some stage in the year including both derelict and occupied houses. Bats move in and out of roosts on a regular basis and individuals may be present at times other than during a specific survey. Given that the arborist report (Arboricultural Assessment Report Residential Development, Newtownmoyaghy, Kilcock, Co. Meath by CMK Horticulture and Arboriculture Ltd.) states that the condition of the hedgerows within the survey boundary is moderate to poor overall with most unmanaged or poorly maintained. This impact (tree roost loss) is likely to be moderate and long-term were it to occur and there was no obvious equivalent replacement for the roost loss. No significant roost loss is considered likely based on the tree loss proposed for the site and as no buildings would be removed for the proposal.

Disturbance from lighting

Lighting will be utilised for two different functions:

1. Access and safety and 2) Security and policing. The former is to allow ease of access and use at night. The latter is to ensure a perceived higher security level. This may affect light-intolerant bat species during foraging and if directed at emergence points of a roost site (e.g. house on the perimeter or tree within the site) would affect all bat species, even those that will feed in illuminated areas.

Species such as Leisler's bat and common pipistrelles are less affected than almost all other Irish bat species and this would not be a significant impact. At worst, illumination of the lands would be a permanent moderately negative impact.

Reduced Feeding

Reduced vegetation including the removal of any of the trees within the site may lead to reduced insect abundance. On the night of survey, five species were noted.

This will be a permanent slight negative impact.

Proposed Mitigation

Incorporation of 12 bat boxes (Schwegler types 2F or 2FN or equivalent) is proposed into the site to provide bat roost opportunities. All bat boxes must be *unlit* and should be at least 2.5 metres above ground height and preferably 3 metres or higher.

2F 2FN

Plate 1: Schwegler Bat Boxes proposed for trees (or buildings)

The bat boxes shall be installed on mature trees that are to be retained or on buildings (or poles if there are no options of the above type). Three boxes shall be attached as a maximum to any of 4 or more suitable trees away from lighting and scrub and must be undertaken unless there are better opportunities created by modifying this arrangement according to the bat specialist.

All mature trees shall be checked for the presence of bats prior to felling

All mature trees within the site shall be examined for the presence of bats prior to felling by a bat specialist. Should bats be using any tree, it is effectively a protected structure and a derogation must be sought as noted above.

Planting of vegetation

Where there is an opportunity to provide vegetative cover, native and local plant species will be employed including typical plants such as oak (the greatest value for most wildlife), hawthorn, blackthorn, elder, gorse, bramble, in addition to other species such as dog rose with an encouragement of species such as *Clematis* and other species attractive to moths and thus of potential benefit to bats.

Lighting

Lighting should be controlled to avoid light pollution of green areas and should be targeted to areas of human activity and for priority security areas.

Motion-activated sensor lighting is preferable to reduce light pollution.

- None of the remaining mature trees shall be illuminated.
- Dark corridor for movement of bats along the grounds of the site. Lighting should be directed downwards away from the treetops.
- All luminaires shall lack UV elements when manufactured and shall be LED.
- A warm white spectrum (ideally <2700Kelvin but as low as the Council limitations allow) shall be adopted to reduce blue light component.
- Luminaires shall feature peak wavelengths higher than 550nm.
- Tree crowns shall remain unilluminated.
- Planting shall provide areas of darkness suitable for bats to feed and commute through the site.

IMPACTS OF THE DEVELOPMENT AFTER MITIGATION

It is predicted that the residual impacts of this development will have no direct impact upon the conservation status of bats. There will be a slight loss in feeding opportunities for bats due to vegetation loss and increased building density. Over time, this will reduce with the implementation of the landscape planting plan for the proposed development and as vegetation and trees matures.

APPENDICES

Figure 1: Bat activity within the proposed Kilcock development area after sunset on 12th July 2019

Legend

Green paddle	*Common pipistrelle*	*Blue paddle*	*Soprano pipistrelle*
"2" paddle	*2 pipistrelle species*	*Yellow paddle*	*Leisler's bat*

Direction of flight of two common pipistrelles and a soprano pipistrelle after sunset

Location of overnight monitor and hence of common and soprano pipistrelle, Leisler's and brown long-eared bat activity

White Line Transect covered during active survey within and around the site

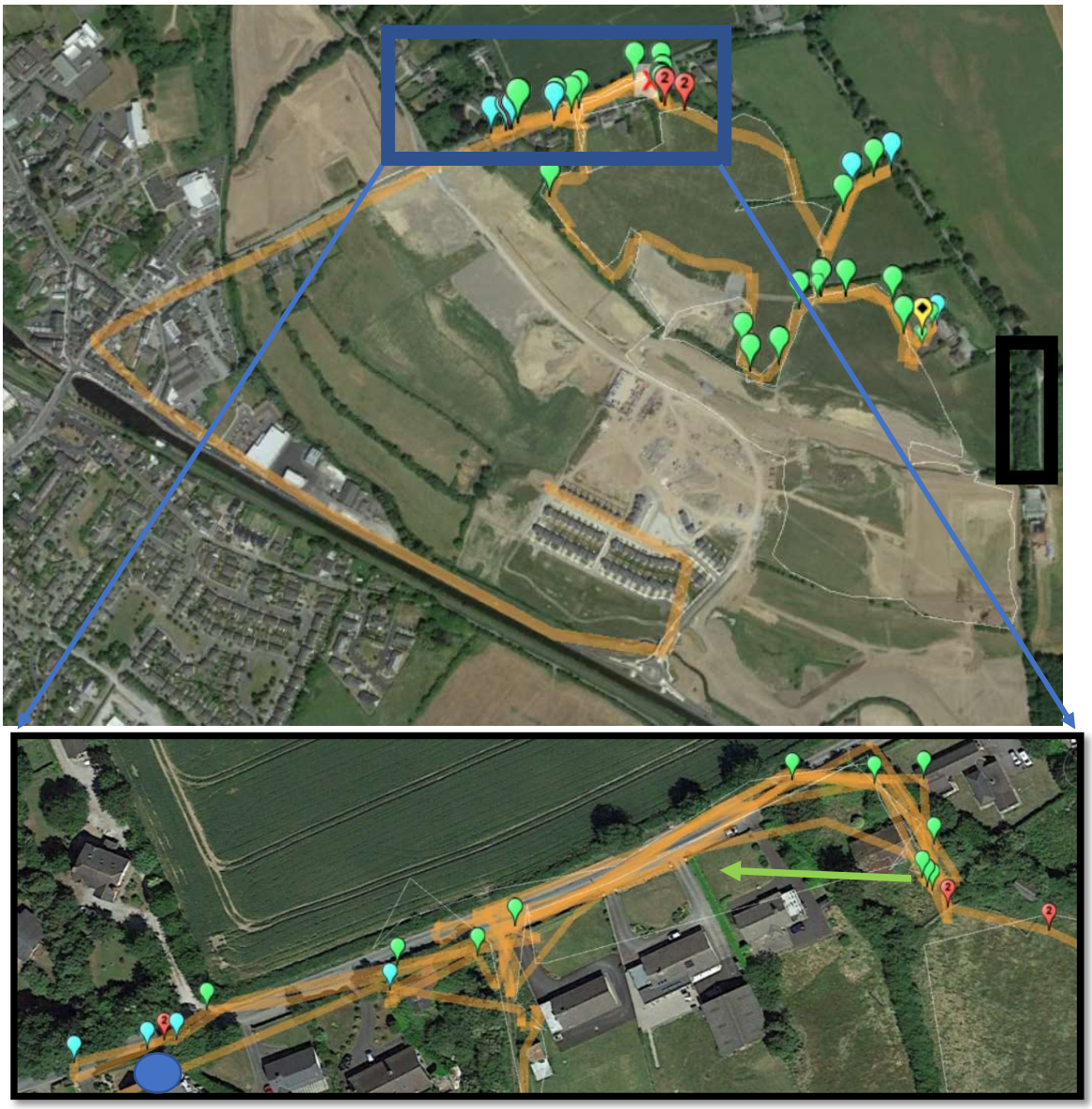
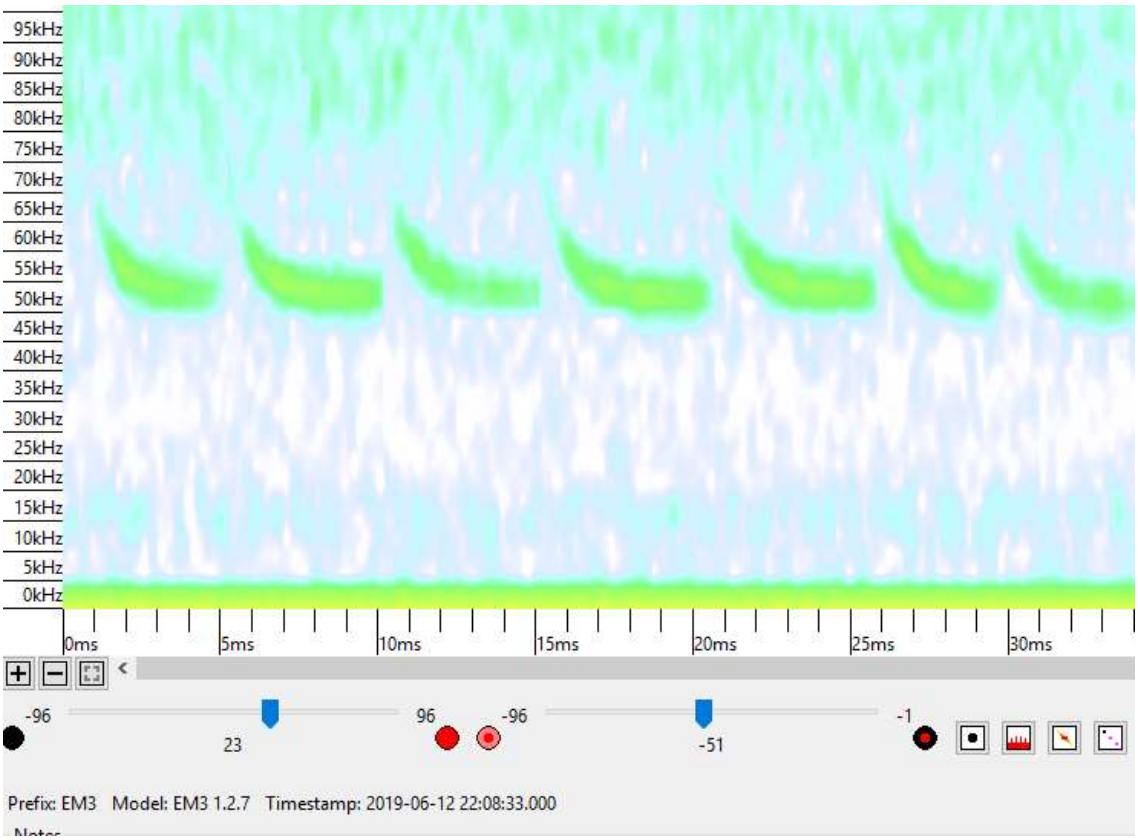
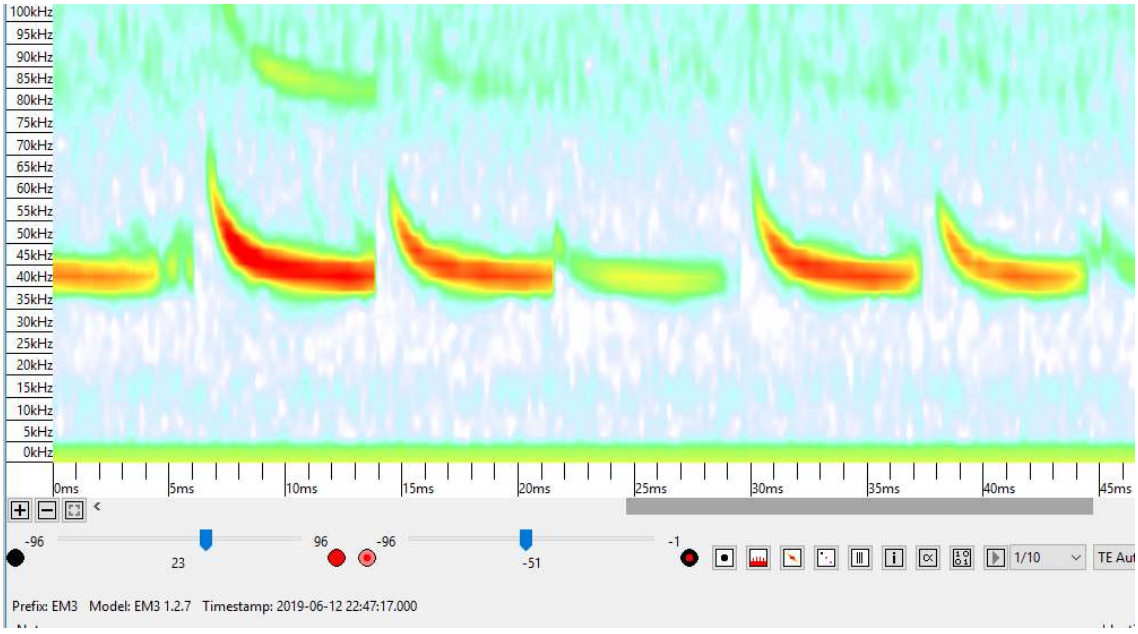


Figure 2: Bat activity noted Prior to sunrise on 13th July 2019

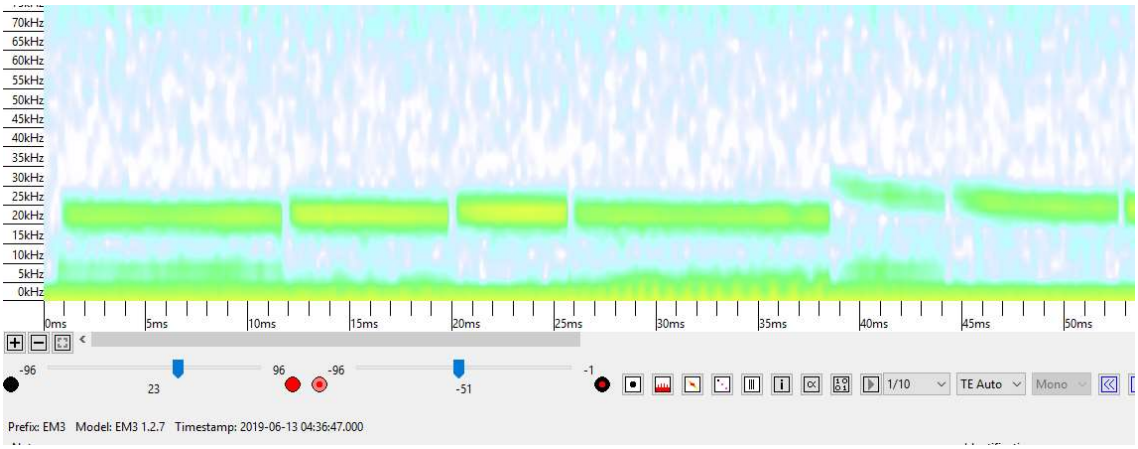
Green paddle	Common pipistrelle	Blue paddle	Soprano pipistrelle
"2" paddle	both pipistrelle species	White paddle	One of the above species
Yellow paddle	Leisler's bat	Blue oval	Soprano pipistrelle roost
	Direction of flight prior to sunrise		
White Line	Transect covered during active survey within the site after sunset		
Orange Line	Transect covered during active survey within the site prior to sunrise		
Black box	Area within which bat boxes shall be erected		



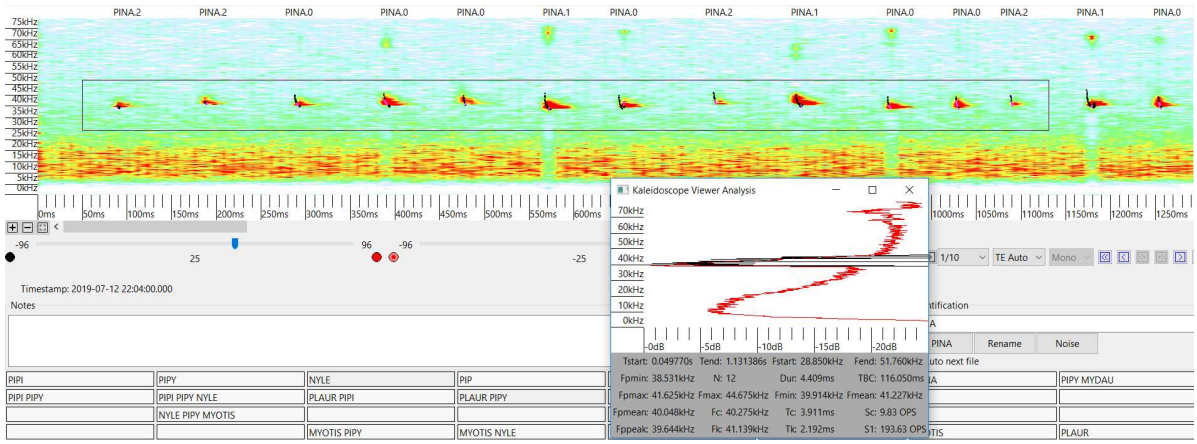
Soprano pipistrelle at 22:08 hours in Kilcock noted during the walked transect



Common pipistrelle at 22:47 hours noted during the walked transect



Leisler's bat prior to sunrise at 04:36 hours. noted during the walked transect



Pipistrelle signal suggested as Nathusius' pipistrelle by auto-identification but possibly a low frequency common pipistrelle call noted on the static monitor.

Bat activity noted with the hand-held monitor (EM3)

56		9106_20190711_045100.wac	9106_0_20190711_050355_468	NYLE	2	2	0.345601	Noise
57		EM3___20190612_215427.wav	EM3___0_20190612_215427_000	NYLE	11	7	0.241638	NYLE
58		EM3___20190612_220833.wav	EM3___0_20190612_220833_000	PIPY	7	6	0.541821	PIPY
59		EM3___20190612_221334.wav	EM3___0_20190612_221334_000	PIPY	13	13	0.629599	PIPY
60		EM3___20190612_222609.wav	EM3___0_20190612_222609_000	PIPY	25	19	0.215456	PIPY
61		EM3___20190612_222709.wav	EM3___0_20190612_222709_000	PIPY	28	28	0.415619	PIPY
62		EM3___20190612_223713.wav	EM3___0_20190612_223713_000	PIPI	3	3	0.378837	PIPI
63		EM3___20190612_224647.wav	EM3___0_20190612_224647_000	PIPY	15	15	0.725348	PIPY
64		EM3___20190612_224717.wav	EM3___0_20190612_224717_000	PINA	24	13	0.185834	PIPI
65		EM3___20190612_225048.wav	EM3___0_20190612_225048_000	PIPY	26	24	0.295445	PIPY
66		EM3___20190612_225118.wav	EM3___0_20190612_225118_000	PIPI	17	17	0.337607	PIPI
67		EM3___20190612_225148.wav	EM3___0_20190612_225148_000	PINA	3	3	0.307567	PIPI
68		EM3___20190612_225249.wav	EM3___0_20190612_225249_000	PIPI	3	3	0.695051	PIPI
69		EM3___20190612_225349.wav	EM3___0_20190612_225349_000	PIPY	14	14	0.285546	PIPY
70		EM3___20190612_230523.wav	EM3___0_20190612_230523_000	PIPI	7	5	0.278110	PIPI
71		EM3___20190612_230954.wav	EM3___0_20190612_230954_000	PIPY	31	30	0.337681	PIPY
72		EM3___20190613_035303.wav	EM3___0_20190613_035303_000	NoID	2	0	0.000000	Noise
73		EM3___20190613_035404.wav	EM3___0_20190613_035404_000	NoID	2	0	0.000000	Noise
74		EM3___20190613_035805.wav	EM3___0_20190613_035805_000	PIPI	26	26	0.463259	PIPI
75		EM3___20190613_040638.wav	EM3___0_20190613_040638_000	NYNO	33	14	0.145850	NYLE
76		EM3___20190613_043347.wav	EM3___0_20190613_043347_000	PIPY	29	21	0.182889	PIPY
77		EM3___20190613_043647.wav	EM3___0_20190613_043647_000	NYLE	17	11	0.167287	NYLE
78		EM3___20190624_225801.wav	EM3___0_20190624_225801_000	NYLE	18	9	0.139589	NYLE
79		EM3___20190624_230335.wav	EM3___0_20190624_230335_000	NoID	3	0	0.000000	NYLE
80		EM3___20190624_230736.wav	EM3___0_20190624_230736_000	NYNO	6	3	0.201780	NYLE
81		EM3___20190624_230807.wav	EM3___0_20190624_230807_000	NYLE	7	6	0.351947	NYLE
82		EM3___20190624_231540.wav	EM3___0_20190624_231540_000	NoID	2	0	0.000000	NYLE

Bat activity noted on the SM2 overnight around the derelict house within and adjacent to the subject site.

DATE	TIME	AUTO ID	MANUAL ID
12/07/2019	22:00:30	NYLE	NYLE
12/07/2019	22:04:00	PINA	PIPI
12/07/2019	22:04:30	PINA	PIPI
12/07/2019	22:05:00	PIPI	PIPI
12/07/2019	22:07:00	NYLE	NYLE
12/07/2019	22:07:30	PINA	PIPI
12/07/2019	22:10:00	PIPY	PIP
12/07/2019	22:10:30	PIPI	PIPI
12/07/2019	22:14:00	PIPI	PIPI
12/07/2019	22:14:30	PIPI	PIPI NYLE
12/07/2019	22:17:30	NoID	NYLE
12/07/2019	22:18:00	NYLE	NYLE
12/07/2019	22:19:30	PIPI	PIPI PIPY
12/07/2019	22:21:30	PIPI	PIPI
12/07/2019	22:22:00	PIPY	PIPY
12/07/2019	22:28:00	PIPY	PIPY
12/07/2019	22:33:30	MYBR	Noise
12/07/2019	22:34:00	PIPY	PIPY
12/07/2019	22:34:30	PLAUR	PLAUR
12/07/2019	22:39:00	NYLE	NYLE
12/07/2019	22:40:00	PIPY	PIPY
12/07/2019	22:40:30	PIPI	PIPI
12/07/2019	22:43:00	PIPI	PIPI
12/07/2019	22:45:30	NYLE	NYLE
12/07/2019	22:49:30	NYLE	NYLE
12/07/2019	22:50:00	PIPI	PIPI
12/07/2019	22:51:30	NYLE	NYLE
12/07/2019	22:52:00	PIPI	PIPI
12/07/2019	22:55:30	PIPY	PIPY
12/07/2019	22:59:30	NYLE	NYLE
12/07/2019	23:11:00	NoID	Noise
12/07/2019	23:12:00	PIPI	PIPI
12/07/2019	23:12:30	PIPI	PIPI
12/07/2019	23:13:30	PIPI	PIPI
12/07/2019	23:14:00	PIPI	PIPI
12/07/2019	23:17:00	PIPI	PIPI
12/07/2019	23:20:00	NYLE	NYLE
12/07/2019	23:20:30	NYLE	NYLE
12/07/2019	23:21:30	NYLE	NYLE
12/07/2019	23:22:00	NoID	NYLE
12/07/2019	23:22:30	NYLE	NYLE
12/07/2019	23:23:00	NYLE	NYLE
12/07/2019	23:23:30	NYLE	NYLE

12/07/2019	23:24:00	PIPI	PIPI
12/07/2019	23:24:30	NYLE	NYLE
12/07/2019	23:25:00	NYLE	NYLE
12/07/2019	23:26:30	NYLE	NYLE
12/07/2019	23:27:00	NYLE	NYLE
12/07/2019	23:37:30	NYLE	NYLE
12/07/2019	23:58:00	PIPY	PIPY
12/07/2019	23:58:30	PIPI	PIPI
13/07/2019	00:03:00	PIPY	PIPY
13/07/2019	00:13:30	PIPY	PIPY
13/07/2019	00:18:30	PIPY	PIPY
13/07/2019	00:26:00	NYLE	NYLE
13/07/2019	00:29:00	PIPY	PIPY
13/07/2019	00:42:00	PIPY	PIPY
13/07/2019	00:42:30	PIPY	PIPY
13/07/2019	00:45:30	PIPI	PIPI
13/07/2019	00:57:30	PIPI	PIPI
13/07/2019	01:22:00	NYLE	NYLE
13/07/2019	02:07:30	PIPY	PIPY
13/07/2019	02:12:00	PIPI	PIPI
13/07/2019	02:42:00	NYLE	NYLE
13/07/2019	02:53:00	PIPY	PIPY
13/07/2019	03:02:30	PIPI	PIPI
13/07/2019	03:08:00	NoID	NYLE
13/07/2019	03:13:00	PINA	PIPI
13/07/2019	03:24:00	PIPI	PIPI
13/07/2019	03:29:30	NYLE	
13/07/2019	03:37:30	NYLE	
13/07/2019	03:43:00	PIPI	
13/07/2019	03:56:30	NYLE	
13/07/2019	04:00:00	PIPI	
13/07/2019	04:00:30	PIPI	
13/07/2019	04:02:00	NYLE	
13/07/2019	04:04:30	PIPY	
13/07/2019	04:13:30	PIPI	
13/07/2019	04:16:30	PIPI	
13/07/2019	04:19:30	PIPI	
13/07/2019	04:20:00	PIPI	
13/07/2019	04:22:00	PIPI	
13/07/2019	04:24:30	PIPI	
13/07/2019	04:26:00	PIPI	
13/07/2019	04:27:00	NYLE	
13/07/2019	04:28:00	PIPI	
13/07/2019	04:29:00	PIPY	
13/07/2019	04:31:00	PIPI	
13/07/2019	04:33:00	PIPI	

13/07/2019	04:33:30	PIPY	
13/07/2019	04:34:30	PIPI	
13/07/2019	04:35:00	PIPY	
13/07/2019	04:36:30	PIPY	
13/07/2019	04:37:00	PIPI	
13/07/2019	04:38:30	PIPI	
13/07/2019	04:39:30	PIPI	
13/07/2019	04:40:00	PIPI	
13/07/2019	04:41:00	PIPI	
13/07/2019	04:42:00	PIPI	
13/07/2019	04:42:30	PIPI	
13/07/2019	04:43:00	PIPI	
13/07/2019	04:44:00	PIPI	
13/07/2019	04:45:00	PIPY	
13/07/2019	04:48:30	PIPI	
13/07/2019	04:49:00	PIPI	
13/07/2019	04:49:30	PIPI	
13/07/2019	04:50:00	PIPI	
13/07/2019	04:50:30	PIPI	
13/07/2019	04:51:00	PIPI	
13/07/2019	04:52:00	PIPY	
13/07/2019	04:54:00	PIPI	
13/07/2019	04:54:30	PIPI	

Legend

PIPI	Common pipistrelle	PINA	Nathusius' pipistrelle		
PIPY	Soprano pipistrelle	NYLE	Leisler's bat	PLAUR	Brown long-eared bat

Plate 1: Bat roost potential close to the site
(top) Derelict house outside of the land take with roost potential
(middle) Overgrown derelict house outside the land take and Houses passed by bats at emergence
(bottom left) Soprano pipistrelle roost
(bottom right) Feeding opportunities behind the house in the land take

APPENDIX 12.1
AMBIENT AIR QUALITY STANDARDS

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DECEMBER 2019

Appendix 12.1 - Ambient Air Quality Standards

National standards for ambient air pollutants in Ireland have generally ensued from Council Directives enacted in the EU (& previously the EC & EEC). The initial interest in ambient air pollution legislation in the EU dates from the early 1980s and was in response to the most serious pollutant problems at that time which was the issue of acid rain. As a result of this sulphur dioxide, and later nitrogen dioxide, were both the focus of EU legislation. Linked to the acid rain problem was urban smog associated with fuel burning for space heating purposes. Also apparent at this time were the problems caused by leaded petrol and EU legislation was introduced to deal with this problem in the early 1980s.

In recent years the EU has focused on defining a basis strategy across the EU in relation to ambient air quality. In 1996, a Framework Directive, Council Directive 96/62/EC, on ambient air quality assessment and management was enacted. The aims of the Directive are fourfold. Firstly, the Directive's aim is to establish objectives for ambient air quality designed to avoid harmful effects to health. Secondly, the Directive aims to assess ambient air quality on the basis of common methods and criteria throughout the EU. Additionally, it is aimed to make information on air quality available to the public via alert thresholds and fourthly, it aims to maintain air quality where it is good and improve it in other cases.

As part of these measures to improve air quality, the European Commission has adopted proposals for daughter legislation under Directive 96/62/EC. The first of these directives to be enacted, Council Directive 1999/30/EC, has been passed into Irish Law as S.I. No 271 of 2002 (Air Quality Standards Regulations 2002), and has set limit values which came into operation on 17th June 2002. The Air Quality Standards Regulations 2002 detail margins of tolerance, which are trigger levels for certain types of action in the period leading to the attainment date. The margin of tolerance varies from 60% for lead, to 30% for 24-hour limit value for PM_{10}, 40% for the hourly and annual limit value for NO_2 and 26% for hourly SO_2 limit values. The margin of tolerance commenced from June 2002, and started to reduce from 1 January 2003 and every 12 months thereafter by equal annual percentages to reach 0% by the attainment date. A second daughter directive, EU Council Directive 2000/69/EC, has published limit values for both carbon monoxide and benzene in ambient air. This has also been passed into Irish Law under the Air Quality Standards Regulations 2002.

The most recent EU Council Directive on ambient air quality was published on the 11/06/08 which has been transposed into Irish Law as S.I. 180 of 2011. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive and its subsequent daughter directives. Provisions were also made for the inclusion of new ambient limit values relating to $PM_{2.5}$. The margins of tolerance specific to each pollutant were also slightly adjusted from previous directives. In regards to existing ambient air quality standards, it is not proposed to modify the standards but to strengthen existing provisions to ensure that non-compliances are removed. In addition, new ambient standards for $PM_{2.5}$ are included in Directive 2008/50/EC. The approach for $PM_{2.5}$ was to establish a target value of 25 µg/m^3, as an annual average (to be attained everywhere by 2010) and a limit value of 25 µg/m^3, as an annual average (to be attained everywhere by 2015), coupled with a target to reduce human exposure generally to $PM_{2.5}$ between 2010 and 2020. This exposure reduction target will range from 0% (for $PM_{2.5}$ concentrations of less than 8.5 µg/m^3 to 20% of the average exposure indicator (AEI) for concentrations of between 18 - 22 µg/m^3). Where the AEI is currently greater than 22 µg/m^3 all appropriate measures should be employed to reduce this level to 18 µg/m^3 by 2020. The AEI is based on measurements taken in urban background locations averaged over a three year period from 2008 - 2010 and again from 2018-2020. Additionally, an exposure concentration obligation of 20 µg/m^3 was set to be complied with by 2015 again based on the AEI.

Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions. The Alert Threshold is defined in Council Directive 96/62/EC as "a level beyond which there is a risk to human health from brief exposure and at which immediate steps shall be taken as laid down in Directive 96/62/EC". These steps include undertaking to ensure that the necessary steps are taken to inform the public (e.g. by means of radio, television and the press).

The Margin of Tolerance is defined in Council Directive 96/62/EC as a concentration which is higher than the limit value when legislation comes into force. It decreases to meet the limit value by the attainment date. The Upper Assessment Threshold is defined in Council Directive 96/62/EC as a concentration above which high quality measurement is mandatory. Data from measurement may be supplemented by information from other sources, including air quality modelling.

An annual average limit for both NO_X (NO and NO_2) is applicable for the protection of vegetation in highly rural areas away from major sources of NO_X such as large conurbations, factories and high road vehicle activity such as a dual carriageway or motorway. Annex VI of EU Directive 1999/30/EC identifies that monitoring to demonstrate compliance with the NO_X limit for the protection of vegetation should be carried out distances greater than:

- 5 km from the nearest motorway or dual carriageway
- 5 km from the nearest major industrial installation
- 20 km from a major urban conurbation

As a guideline, a monitoring station should be indicative of approximately 1000 km^2 of surrounding area.

Under the terms of EU Framework Directive on Ambient Air Quality (96/62/EC), geographical areas within member states have been classified in terms of zones. The zones have been defined in order to meet the criteria for air quality monitoring, assessment and management as described in the Framework Directive and Daughter Directives. Zone A is defined as Dublin and its environs, Zone B is defined as Cork City, Zone C is defined as 23 urban areas with a population greater than 15,000 and Zone D is defined as the remainder of the country. The Zones were defined based on among other things, population and existing ambient air quality.

EU Council Directive 96/62/EC on ambient air quality and assessment has been adopted into Irish Legislation (S.I. No. 33 of 1999). The act has designated the Environmental Protection Agency (EPA) as the competent authority responsible for the implementation of the Directive and for assessing ambient air quality in the State. Other commonly referenced ambient air quality standards include the World Health Organisation. The WHO guidelines differ from air quality standards in that they are primarily set to protect public health from the effects of air pollution. Air quality standards, however, are air quality guidelines recommended by governments, for which additional factors, such as socio-economic factors, may be considered.

Air Dispersion Modelling

The inputs to the DMRB model consist of information on road layouts, receptor locations, annual average daily traffic movements, annual average traffic speeds and background concentrations (UK DEFRA 2016). Using this input data the model predicts ambient ground level concentrations at the worst-case sensitive receptor using generic meteorological data.

The DMRB has recently undergone an extensive validation exercise (UK DEFRA 2018) as part of the UK's Review and Assessment Process to designate areas as Air Quality Management Areas (AQMAs). The validation exercise was carried out at 12 monitoring sites within the UK DEFRAs national air quality monitoring network. The validation exercise was carried out for NO_X, NO_2 and PM_{10}, and included urban background and kerbside/roadside locations, "open" and "confined" settings and a variety of geographical locations (UK DEFRA 2018).

In relation to NO_2, the model generally over-predicts concentrations, with a greater degree of over-prediction at "open" site locations. The performance of the model with respect to NO_2 mirrors that of NO_X showing that the over-prediction is due to NO_X calculations rather than the NO_X:NO_2 conversion. Within most urban situations, the model overestimates annual mean NO_2 concentrations by between 0 to 40% at confined locations and by 20 to 60% at open locations. The performance is considered comparable with that of sophisticated dispersion models when applied to situations where specific local validation corrections have not been carried out.

The model also tends to over-predict PM_{10}. Within most urban situations, the model will over-estimate annual mean PM_{10} concentrations by between 20 to 40%. The performance is comparable to more sophisticated models, which, if not validated locally, can be expected to predict concentrations within the range of $\pm$50%.

Thus, the validation exercise has confirmed that the model is a useful screening tool for the Second Stage Review and Assessment, for which a conservative approach is applicable (UK DEFRA 2018).

APPENDIX 12.2
TRANSPORT INFRASTRUCTURE IRELAND SIGNIFICANCE CRITERIA

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DECEMBER 2019

Appendix 12.2 - Transport Infrastructure Ireland Significance Criteria

Table A12.1 Definition of Impact Magnitude for Changes in Ambient Pollutant Concentrations

Magnitude of Change	**Annual Mean NO_2 / PM_{10}**	**No. days with PM_{10} concentration > 50 µg/m³**	**Annual Mean $PM_{2.5}$**
Large	Increase / decrease ≥4 µg/m³	Increase / decrease >4 days	Increase / decrease ≥2.5 µg/m³
Medium	Increase / decrease 2 - <4 µg/m³	Increase / decrease 3 or 4 days	Increase / decrease 1.25 - <2.5 µg/m³
Small	Increase / decrease 0.4 - <2 µg/m³	Increase / decrease 1 or 2 days	Increase / decrease 0.25 - <1.25 µg/m³
Imperceptible	Increase / decrease <0.4 µg/m³	Increase / decrease <1 day	Increase / decrease <0.25 µg/m³

Table A12.2 Air Quality Impact Significance Criteria For Annual Mean NO_2 and PM_{10} and $PM_{2.5}$ Concentrations at a Receptor

Absolute Concentration in Relation to Objective/Limit Value	Change in Concentration [Note 1]		
	Small	**Medium**	**Large**
Increase with Scheme			
Above Objective/Limit Value With Scheme (≥40 µg/m^3 of NO_2 or PM_{10}) (≥25 µg/m^3 of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value With Scheme (36 - <40 µg/m^3 of NO_2 or PM_{10}) (22.5 - <25 µg/m^3 of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value With Scheme (30 - <36 µg/m^3 of NO_2 or PM_{10}) (18.75 - <22.5 µg/m^3 of $PM_{2.5}$)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value With Scheme (<30 µg/m^3 of NO_2 or PM_{10}) (<18.75 µg/m^3 of $PM_{2.5}$)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objective/Limit Value With Scheme (≥40 µg/m^3 of NO_2 or PM_{10}) (≥25 µg/m^3 of $PM_{2.5}$)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value With Scheme (36 - <40 µg/m^3 of NO_2 or PM_{10}) (22.5 - <25 µg/m^3 of $PM_{2.5}$)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value With Scheme (30 - <36 µg/m^3 of NO_2 or PM_{10}) (18.75 - <22.5 µg/m^3 of $PM_{2.5}$)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value With Scheme (<30 µg/m^3 of NO_2 or PM_{10}) (<18.75 µg/m^3 of $PM_{2.5}$)	Negligible	Negligible	Slight Beneficial

Note 1 Well Below Standard = <75% of limit value.

Table A12.3 Air Quality Impact Significance Criteria For Changes to Number of Days with PM_{10} Concentration Greater than 50 µg/m^3 at a Receptor

Absolute Concentration in Relation to Objective / Limit Value	**Change in Concentration** Note 1		
	Small	**Medium**	**Large**
Increase with Scheme			
Above Objective/Limit Value With Scheme (≥35 days)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value With Scheme (32 - <35 days)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value With Scheme (26 - <32 days)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value With Scheme (<26 days)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objective/Limit Value With Scheme (≥35 days)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value With Scheme (32 - <35 days)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value With Scheme (26 - <32 days)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value With Scheme (<26 days)	Negligible	Negligible	Slight Beneficial

Note 1 Where the Impact Magnitude is Imperceptible, then the Impact Description is Negligible

APPENDIX 12.3
DUST MINIMISATION PLAN

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DECEMBER 2019

Appendix 12.3 - Dust Minimisation Plan

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK (IAQM 2014, BRE 2003, Scottish Office 1996 and UK ODPM 2002). and the USA (USEPA 1997).

Site Management

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 12.1 for the windrose for Casement Aerodrome). As the prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (BRE 2003, UK ODPM 2002). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods were care will be needed to ensure that dust nuisance does not occur. The following mitigation measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent will monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised;
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details;
- It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses;
- A complaints register will be kept on site and will keep a record of all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein;
- At all times, the procedures put in place will be strictly monitored and assessed.
- The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory

procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

Site Roads / Haulage Routes

Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80%(UK ODPM 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads;
- Access gates to the site shall be located at least 10m from sensitive receptors where possible;
- Bowsers or suitable watering equipment will be available during periods of dry weather throughout the construction period. Research has found that watering can reduce dust emissions by 50% (USEPA, 1997). Watering shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use;
- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

Land Clearing / Earth Moving

Land clearing / earth-moving works during periods of high winds and dry weather conditions can be a significant source of dust.

During dry and windy periods, and when there is a likelihood of dust nuisance, watering shall be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust;

During periods of very high winds (gales), activities likely to generate significant dust emissions should be postponed until the gale has subsided.

Storage Piles

The location and moisture content of storage piles are important factors which determine their potential for dust emissions.

- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles should be located downwind of sensitive receptors;
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. The regular watering of stockpiles has been found to have an 80% control efficiency (UK ODPM 2002);
- Where feasible, hoarding will be erected around site boundaries. This will have the benefit of reducing the impact of larger particles on nearby sensitive receptors.

Site Traffic on Public Roads

Spillage and blow-off of debris, aggregates and fine material onto public roads should be reduced to a minimum by employing the following measures:

- Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times when practicable to restrict the escape of dust;
- At the main site traffic exits, a wheel wash facility will be installed. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be

regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary.

Summary of Dust Mitigation Measures

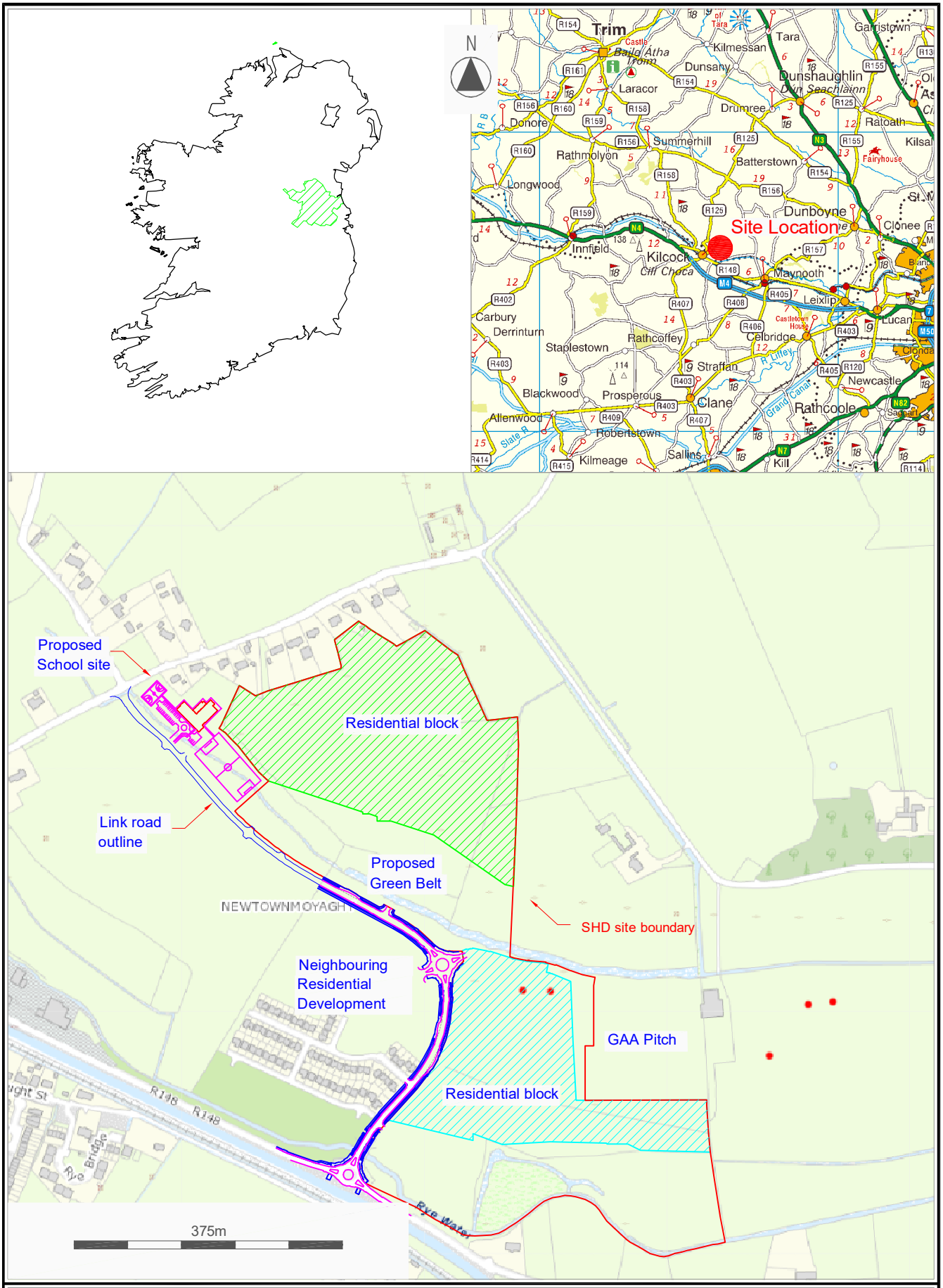
The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be:

- The contractor will adhere to the dust minimisation measures outlined within this EIAR and within the CEMP. The contractor shall identify specific individuals responsible for:
    - Ensuring that all site workers are familiar with the dust minimisation measures;
    - Regularly assessing the efficacy of the measures (through visual inspections and dust deposition monitoring);
    - Documenting the implementation of the dust minimisation measures including logging all inspections and complaints received including details on how any issues were resolved.

APPENDIX 13.1
FIGURES AND PLATES

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DECEMBER 2019



Archer Heritage Planning	Unit 8 Beat Centre Stephenstown, Balbriggan, Co. Dublin	Newtownmoyaghy, Co. Meath Archaeological Impact Assessment	Scale: 1:7500 A4 Date: October 2019
		CLIENT: McGarrell Reilly Group Ltd	Origin: www.archaeology.ie Ref: 2019_13

Figure 13.1: Site location

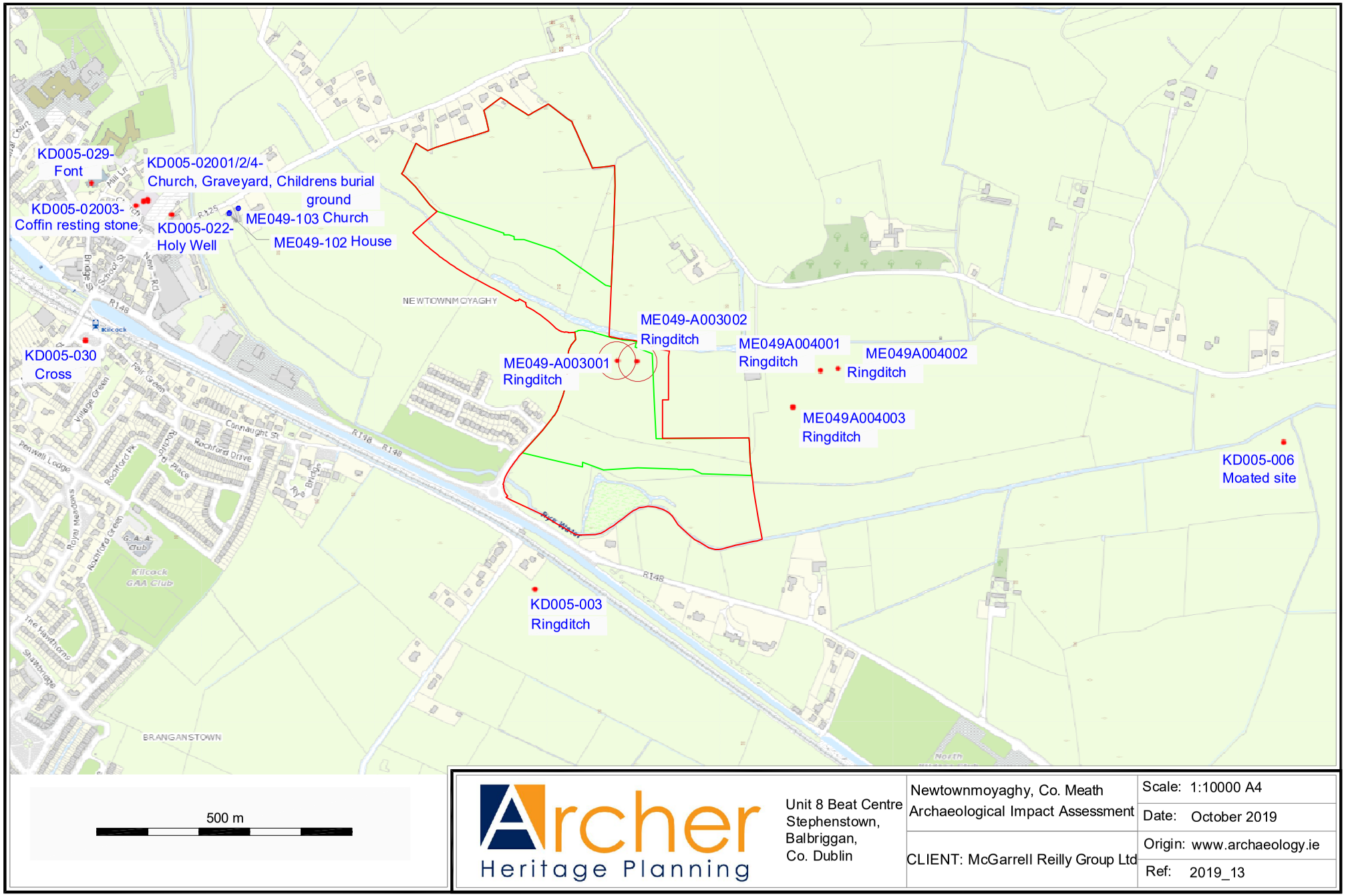
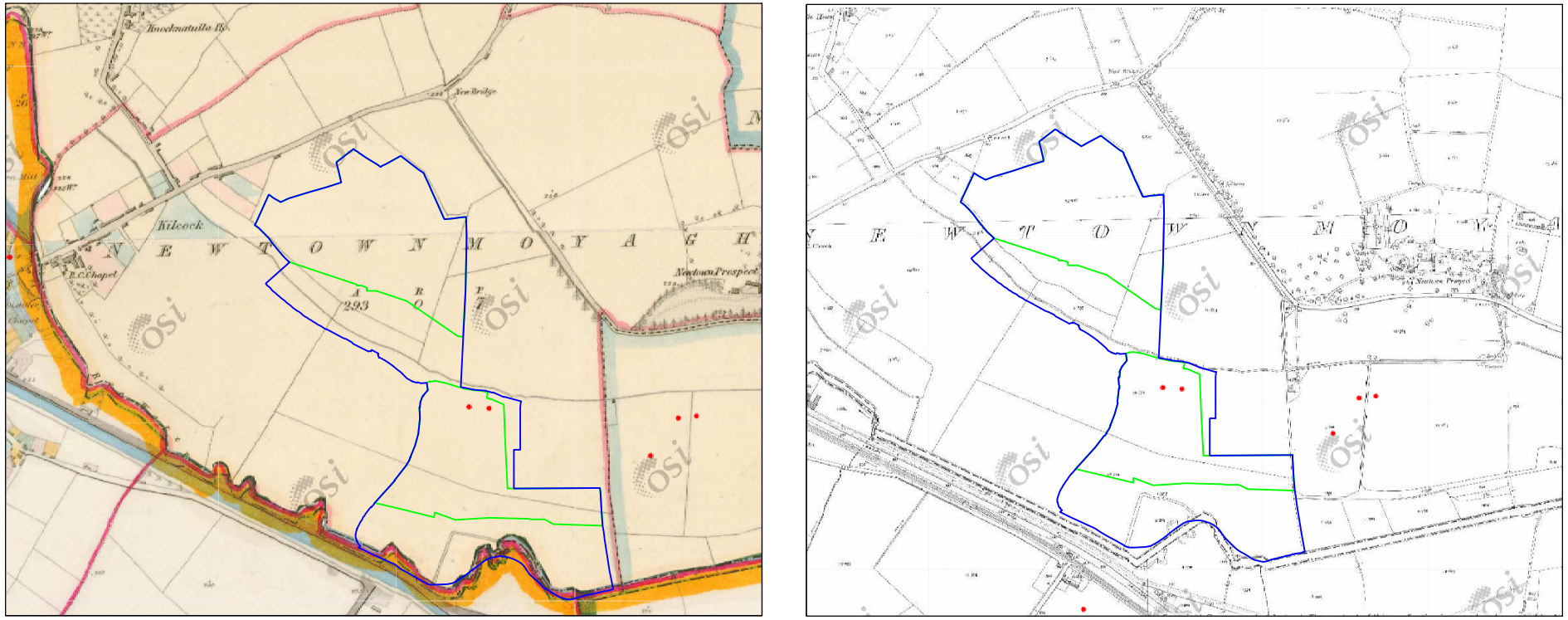


Figure 13.2: Surrounding RMP/SMR sites



(l) 1st Edition OS Map (1838)

(r) 3rd Edition OS Map (1907-11)

Archer Heritage Planning	Unit 8 Beat Centre Stephenstown, Balbriggan, Co. Dublin	Newtownmoyaghy, Co. Meath Archaeological Impact Assessment	Scale: Not to scale
			Date: October 2019
		CLIENT: McGarrell Reilly Group Ltd	Origin: OSI
			Ref: 2019_13

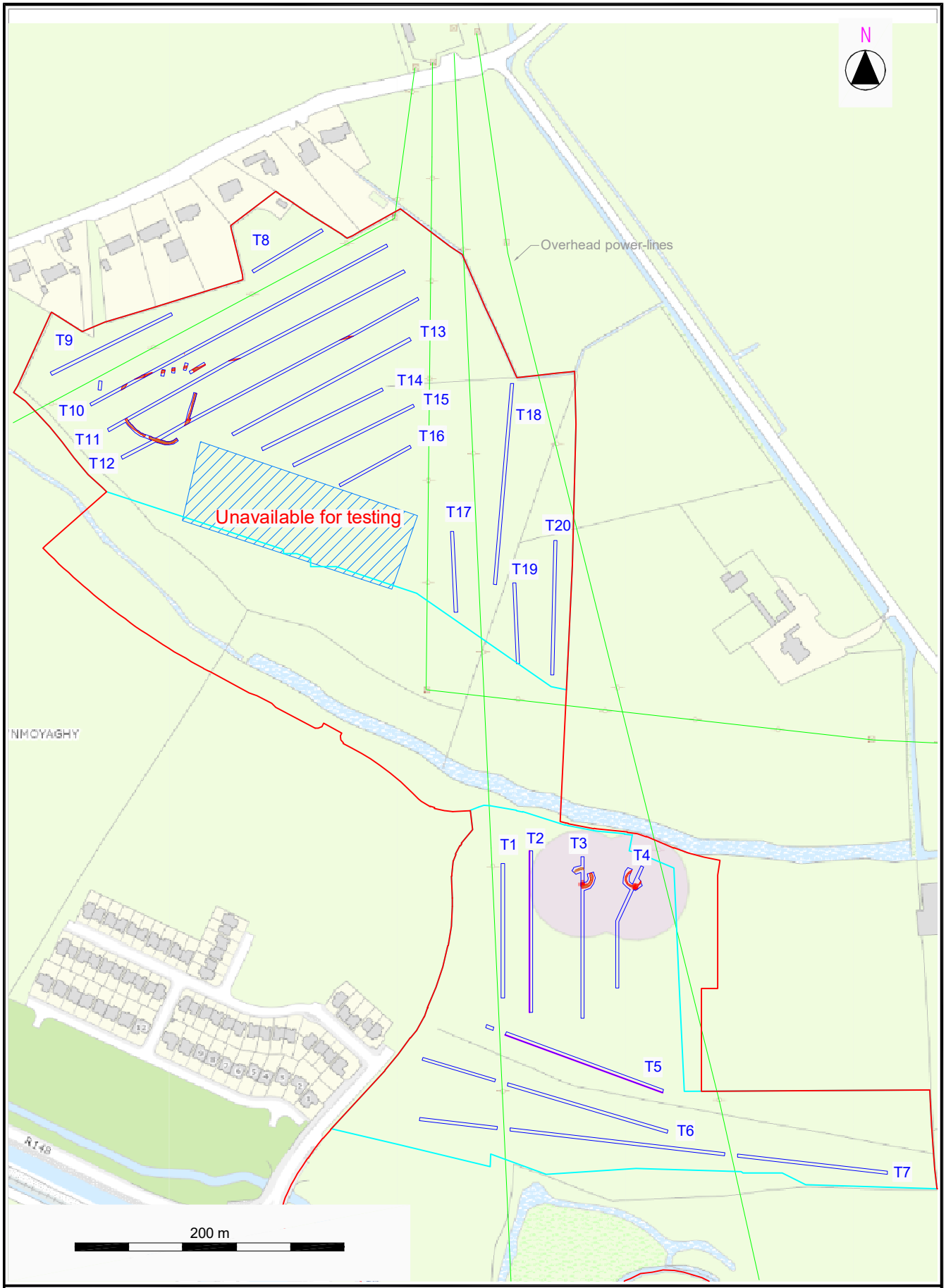
Figure 13.3: Extracts from early historical maps

(l) 1995 Aerial Photograph OSi

(r) 2018 Google Earth

Archer Heritage Planning	Unit 8 Beat Centre Stephenstown, Balbriggan, Co. Dublin	Newtownmoyaghy, Co. Meath Archaeological Impact Assessment	Scale: Not to scale
			Date: October 2019
		CLIENT: McGarrell Reilly Group Ltd	Origin: OSi/Google Earth
			Ref: 2019_13

Figure 13.4: Aerial photographs



Archer Heritage Planning	Unit 8 Beat Centre Stephenstown, Balbriggan, Co. Dublin	Newtownmoyaghy, Co. Meath Archaeological Impact Assessment	Scale: 1:4000 A4 Date: October 2019
		CLIENT: McGarrell Reilly Group Ltd	Origin: Archer Heritage Ref: 2019_13

Figure 13.5: Test trench layout

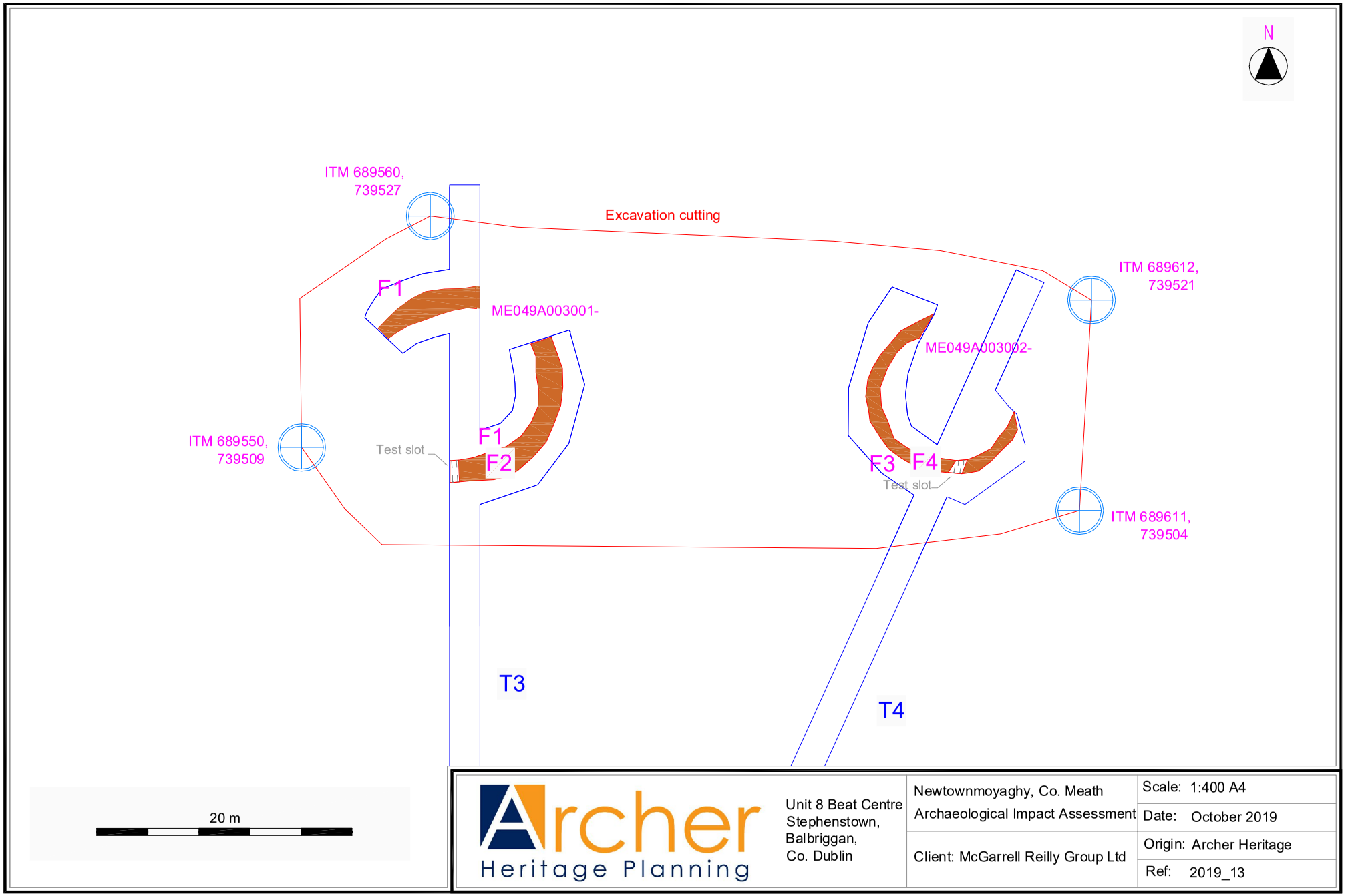


Figure 13.6: Area 1 details with proposed excavation cutting

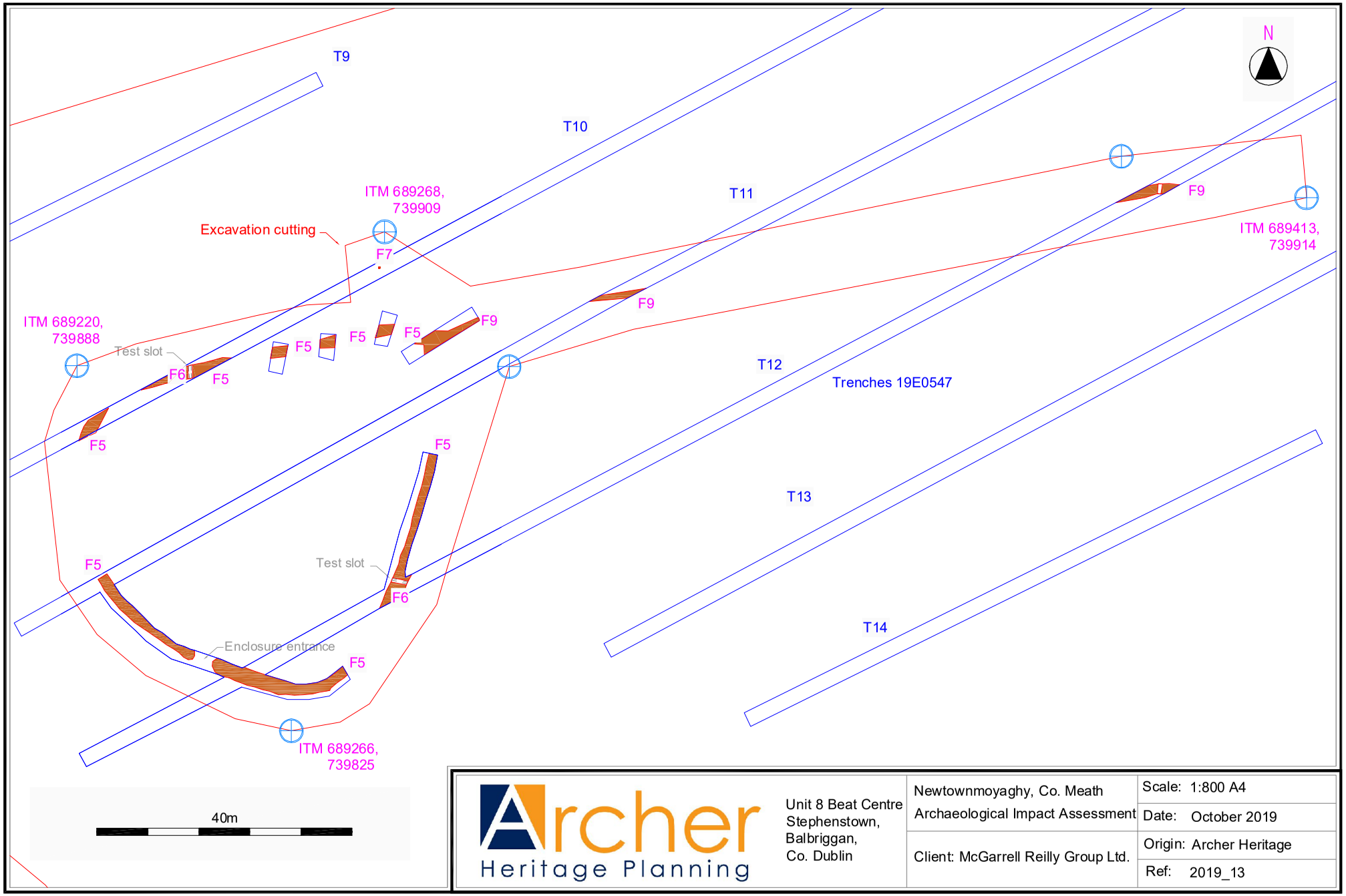


Figure 13.7: Area 2 details with proposed excavation cutting


Plate 1: Disturbed area of southern field in southern block


Plate 2: Western arc of ring-ditch F1 looking N


Plate 3: Southern arc of ring-ditch F3 looking W


Plate 4: Area of disturbance, southern part of northern block


Plate 5: Western facing section in enclosure ditch F5 in Trench 10


Plate 6: Southern arc of enclosure ditch F5 in Trench 12 extension looking W


Plate 7: Smelting pit, F7, in Trench 10


Plate 8: West facing slot in ditch F9 in Trench 12

APPENDIX 13.2
GEOPHYSICAL SURVEY REPORT

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DECEMBER 2019

Geophysical Survey Report

Site At Branganstown & Newtownmoyaghy Townlands
Kilcock, Counties Meath & Kildare

Detection License No. 10R138
Planning Reference: Kildare County Council 10/571
Meath County Council 1086/10

TAG Project No. 10013

Client:

IAC Irish Archaeological Consultancy

On Behalf Of:
McGarrell Reilly Homes

TARGET Geophysics

Specialists In Geophysical Prospection For Archaeological Assessment

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

NON-TECHNICAL SUMMARY

Project Area & Background

Geophysical survey was conducted across 9 fields at the site of a proposed mixed use development in Branganstown and Newtownmoyaghy townlands, to the E of Kilcock, in Counties Kildare & Meath. The investigation was undertaken on behalf of McGarrell Reilly Homes, and follows a request for further information in connection with proposed development at the site. Irish Archaeological Consultancy Ltd (IAC Ltd.) are currently undertaking an Archaeological Impact Assessment at the site on behalf of the client (Kildare & Meath County Council Planning References: 10/571 & 1086/10).

This survey was conducted under license to the Department of Environment, Heritage, & Local Government (Detection License 10R138).

Summary of Results

Geophysical investigation at the site has identified the remains of 1 suspected enclosure. This is located in the south-western portion of the proposed development (Field 7, Area K), and anomalies indicative of burnt/fired remains and pit type features have also been recorded.

Further responses have been highlighted from survey within the site boundary, a number of which may be of potential interest. The majority, however, demonstrate characteristics more typically associated with natural variation in the underlying soils and geology, and responses from modern ferrous debris. For the purposes of clarification a number of these anomalies may require further investigation by archaeological testing or monitoring prior to the proposed development of the site.

Remains of several disused boundaries and former cultivation have also been recorded.

*** This summary should be read in conjunction with the main report.**

1 INTRODUCTION

Geophysical survey was undertaken over a section of agricultural land located in Branganstown & Newtownmoyaghy townlands, to E of Kilcock, in Co's Kildare & Meath. The survey was conducted in connection with a proposed mixed use development by McGarrell Reilly Homes. The objective of survey at the site was to provide preliminary information on the location, form and extent of buried archaeological remains, where present, within the investigation area. The results from this survey will advise further archaeological works to be undertaken in advance of proposed development at the site.

2 SURVEY LOCATION

The proposed development extends across 9 fields (Fields 1–9), over c.36.7ha of pasture land situated at NGR 289513 239588 (central coordinate), c.0.7km due E of Kilcock. The survey area is bound to the NW by the R125 Dunsaughlin road, to the N and NE by a minor road leading to Maynooth, and to the S by the Rye Water, Royal Canal and N4.

2.1 Landscape, Soils & Geology

The investigation area traverses generally level pasture land, slightly S facing, and characterised by wet mineral and organic soils, typically gleys, with grey brown podzolics occurring locally. Underlying geology for this region E of Kilcock comprises till of Irish Sea origin with limestone and shale (Association 40: National Soil Survey of Ireland, 1980).

2.2 Archaeological Background

The proposed development lands contain no recorded monuments. 1 section of dry elevated ground described in the architectural, archaeological, and cultural heritage chapter of the EIS has been described as a 'suitable location for a range of past activities' (Arch-Tech, 2009). This area lies to the NW, in Field 1. No further evidence to support the presence of significant archaeological activity within the site boundary was identified at EIS stage.

The proposed development is however, situated within a region of which can be described as being of significant archaeological potential. Details of the recorded monuments within a 1km radius of the site are provided below in Table 2.2.1 in order to highlight this potential.

Table 2.2.1 Recorded Monuments

RMP	NGR	Townland	Class
KD005-002	28873 23978	Kilcock	Church site & graveyard
KD005-003	28949 23903	Branganstown	Enclosure site
KD005-004	28780 23709	Gragadder	House/castle site
KD005-006	29092 23931	Maws	Moated site
KD005-029	NW of Mill Lane NGR unavailable	Kilcock	Fort (Mediaeval)
ME049-017	28800 24112	Balfeaghan	church

3 METHODOLOGY

3.1 Gradiometer Scanning

Gradiometer scanning totalling 36.7ha was undertaken throughout the investigation area (Fields 1–9). The scan objective was to identify areas of potential archaeological response where present within the site boundary.

The scan was undertaken employing a Bartington Grad601 dual sensor gradiometer, examining the entire survey area along traverses spaced at 10m intervals, whilst monitoring instrumentation for significant fluctuations in response. Where these occurred the responses were examined in closer detail, and their locations referenced to the national grid using a differential global positioning system (DGPS). Anomalies deemed to be of potential archaeological interest were subsequently highlighted for further analysis by detailed gradiometer survey.

3.2 Detailed Gradiometry

13 areas of detailed gradiometry were undertaken in Fields 1–3 & 5-7 (Areas A-M), totalling 3.7ha of recorded survey. Each survey block was positioned to investigate the responses noted during scanning, and to conduct a degree of 'blank sampling' across the site.

Data was recorded using a Bartington Grad601 dual sensor gradiometer at 0.25m by 1m intervals, on a 0.1nT resolution setting. 2 lines of data were recorded per traverse, totalling to 3600 measurements per $30m^2$ grid.

Each detailed gradiometry survey block was tied in to the national grid by DGPS. The coordinates for these survey blocks will be made available to the client on request.

4 DATA DISPLAY

The location of anomalies noted during scanning through Fields 1–9, and the blocks from detailed survey in Areas A-M are displayed in Figure 1 at a scale of 1:6000 with all DGPS scan data and tie-in points indicated.

The results from detailed survey in Areas A-M are presented in Figures 2-5 in greyscale format (scale 1:1500). Interpretations are provided in Figures 6-9 at the same scale with key anomalies highlighted.

5 GROUND CONDITIONS & GENERAL CONSIDERATIONS

The survey area was generally suitable for geophysical investigation, the site comprising mostly open and accessible pasture land with few obstructions present to impact on the progress of fieldwork. Scanning through Field 8 noted extensive magnetic disturbance throughout, suggesting this section of the site had been subjected to extensive landscaping. Ground conditions throughout Field 9 were poor: scanning was completed in this area, however the uneven ground surface precluded undertaking of detailed survey.

Responses from small-scale ferrous debris are present in the results from detailed gradiometry in Areas A-M. These are common place in gradiometer survey, and unless otherwise stated, are deemed to represent modern ferrous debris contained within the topsoil.

6 GRADIOMETER SCANNING RESULTS

Background magnetic response across the site was found to be within a range of +/- 1.5nT, with slight elevation beyond caused by soil/geological interference, remains of former ploughing, disused boundaries and modern ferrous.

One group of magnetically strong positive responses was noted in the south-western corner of Field 6 at the edge of Rye Water. These responses demonstrated characteristics typical of buried archaeological remains, and they were therefore targeted for further examination by detailed gradiometry (Area K).

No definitive concentrations of archaeological type anomlaies were noted elsewhere during the scan of Fields 1–9. Groups of indiscrete response and areas of irregular enhancement were noted, notably in Fields 1, 5, 6 & 7. These demonstrated no clear form, character or grouping to suggest they represented locations of significant buried archaeological features. However, for the purposes of clarification these

responses were selected for further examination by detailed gradiometry (Areas A-J, L & M).

Table 6.1 below summarises observations made from scanning through Fields 1-9.

Table 6.1 Observations From Scanning

Field	Direction From Centre	Summary	Detail
1	NW, NE & E	Low-level variations, with no typical archaeological patterns recorded. Highlighted responses suspected to derive from natural, modern ferrous or cultivation.	A-C
2	NA	No archaeological type anomalies noted.	D
3	NA	No significant anomalies noted. Blank sample conducted.	NA
4	NA	Disturbance to from drainage works to SE & NW. No significant anomalies noted.	NA
5	NW & SE	Persistent weak variations & occasional irregular responses - suspected cultivation & natural. Several linear anomalies/possible former boundaries noted.	E-H
6	NW & SE	Occasional weak irregular responses interpreted as cultivation & natural. 1 possible linear E of survey centre.	I & J
7	NW & SE	Expected enclosure & possible burnt fired remains at Rye Water edge & further strong localised enhancement to SE. Blank sampling also undertaken as Area L.	K-M
8	NE	Modern landscaping disturbance noted throughout.	NA
9	NA	No archaeological type anomalies noted. Ground conditions unsuitable for detailed survey	NA

7 DETAILED GRADIOMETRY RESULTS

The results from detailed survey in Areas A–M display a low level of background response throughout, with remains of former cultivation visible as closely spaced parallel linear anomalies aligned NE to SW, NW to SE and E to W in Areas A-F & I. Responses from soil/geological variation are also discernible in Areas E, F, I, J & L, as incoherent anomalies marginally above 1.5nT in magnitude.

7.1 Area A

A weak linear response (1) extends NE to SW across the approximate centre of Area A. This is expected to represent a former boundary. Further positive/negative trends to the NE and SW are likely to be of minimal significance, most likely the cause of natural variation and/or former cultivation.

No further responses of note have been recorded from detailed survey in Area A.

7.2 Area B

A weak linear response (2), possibly remnants of a former boundary, extends NW to SE across the NE corner of Area B. 3 isolated positive anomalies (3) also indicated in

Area B are on the basis of their isolation deemed to represent interference from natural variation, modern ferrous or cultivation. A potential pit origin for some of these should not be dismissed.

No further responses of note have been recorded from detailed survey in Area B.

7.3 Area C

1 isolated pit type (4) is apparent SW of survey centre in Area C. An archaeological source for this anomaly should not be dismissed. However, the absence of any significant archaeological type patterns in the data suggests 4 most likely derives from a natural, modern ferrous or cultivation source.

No further responses of interest have been recorded from Area C.

7.4 Area D

The location of an in-filled service trench is indicated as a magnetically disturbed linear aligned E to W across the northern section of Area D. 1 further weak trend occurring to the S is expected to be the result of data processing.

No significant responses have been recorded from survey in Area D.

7.5 Area E

2 curvilinear trends (5 & 6) have been recorded from survey in Area E. These anomalies may be significant, potentially representing plough damaged archaeological remains, and they should therefore be investigated further by testing or monitoring.

A disused field boundary, apparent as a series fragmented linear anomalies and small-scale positives, is indicated at the south-eastern edge of Area E.

No further responses of interest have been recorded from detailed survey in Area E.

7.6 Area F

A probable further disused boundary is indicated extending NE to SW to the SE in Area F. Weak trends E of anomaly 8 represent continuing natural variation.

No significant responses have been recorded from detailed survey in Area F.

7.7 Area G

Detailed survey from Area G demonstrates the location of 1 pair of discrete positive anomalies (9) to the NE, and a rectilinear response (10) to the SE. No clear enclosure type anomalies or clusters of responses are present in the data. However

further investigation of anomalies 9 & 10 by testing or monitoring should be undertaken for the purpose of clarification.

Weak trends extending throughout Area G are the likely result of natural soil/geological variation.

7.8 Area H

Linear anomaly 11 in Area H extends NE to SW through the centre of survey block, should also be investigated by archaeological testing or monitoring. This anomaly may represent remains of a modern field boundary.

Numerous weak trends extending through Area H suggest further low-level interference from natural soil/geological variations.

No further responses of note are present in Area H.

7.9 Area I

3 isolated positive responses (12) occur within detailed survey Area I. An archaeological source for these anomalies should not be dismissed. However, a natural or modern ferrous source is expected.

A disused boundary to the SE in Area E (Field 5) continues through the south-eastern portion of Area I as linear response 13.

No further responses of interest are apparent in the results from Area I.

7.10 Area J

Two poorly defined positive anomalies (14) to the NE and SW in Area J generally conform to the patterns of natural variation occurring across the site. These responses are therefore deemed to be of limited interest.

The remains of a former boundary recorded from survey in Area F (Field 5) are also visible extending NE to SW through the centre of Area J.

Magnetic disturbance occurs at the northern survey edge due to the proximity of an existing field boundary.

No anomalies of archaeological interest have been recorded from survey in Area J.

7.11 Area K

A group of strong magnetic responses extending eastwards from the south-eastern corner of detailed survey Area K (Field 7) has been recorded. The anomalies suggest the location of an enclosure site (16) extending northwards from the edge of the Rye Water. Remains of burnt/fired features, potentially kilns or hearths, and pit/linear (17

& 18) features have also been recorded. Anomalies 16-18 should be subjected to testing to determine their character and extent.

No further anomalies of interest have been recorded from detailed survey in Area K.

7.12 Area L

1 isolated anomaly to the E in Area L may represent a possible pit type feature. However, the absence of any specific grouping of anomalies in this location suggests a natural or modern ferrous origin more likely.

No further anomalies of interest have been recorded from survey in Area L.

7.13 Area M

A group of irregular magnetically strong positive anomalies and weak trends (20) extends through the northern portion of Area M. These anomalies should be subjected to further examination by testing or monitoring to investigate their significance. A natural soil/geological source for 20 should not be dismissed.

No further responses of note have been recorded from detailed survey in Area M.

8 CONCLUSIONS

Gradiometer scanning and detailed survey recorded 1 concentration of suspected archaeological remains in the south-western portion of proposed development, in Field 7, Area K (16-18). These responses suggest the location of enclosure features, burnt/fired remains, and pit/linear anomalies at the edge of the Rye Water.

Further anomalies of interest have been recorded within the proposed development, notably weak curving trends 5 & 6 (Area E, Field 5), discrete and rectilinear responses 9 & 10 (Area G, Field 5), positive anomalies 12 & 14 (Areas I & J, Field 6), and a cluster of magnetically strong anomalies (20) in Area M, Field 7. None of these anomalies display typical patterns, close grouping or magnitude of response to warrant a definite archaeological interpretation. However, further investigation through testing or monitoring has been recommended for clarification.

Elsewhere in the results from survey patterns of former cultivation, former boundary alignments and natural variation predominate.

Report Author John Nicholls MSc MIAI

9 BIBLIOGRAPHY

Arch-Tech Ltd. *Archaeology & Cultural Heritage Chapter (11), Kilcock Lands, Co. Meath*. Environmental Impact Assessment, Declan Brassil & Company Ltd Ref. 09/045.

National Soil Survey of Ireland (1980), *General Soil Map 2nd Edition (1:575,000*). (An Foras Taluntais).

10 DIGITAL ARCHIVE

A complete digital archive for this project is provided on CD with this report. The archive includes the report text with digital versions of all drawings and displays relating to this work.

All report figures are included in AutoCad format (.DWG, Version 2004), and can be re-referenced to the raw and processed data included as part of this archive. Gradiometry greyscale and XY Trace displays forming part of this archive are provided at –1.5/2nT and 15nT/cm respectively unless otherwise stated. Display parameters used are as indicated.

A complete PDF version of this report is also included.

Table 10.1 below details the various file types provided.

Table 10.1 Digital Archive

Description	File Type
Survey Location	.DWG
Greyscale (Interpolated Data)	.DWG
Interpretation	.DWG
Greyscale (Raw Data)	.BMP
XY Trace (Raw Data)	.TIF
Area Interpretation	.DWG
Report Text	.DOC
Entire report as PDF	.PDF

Gradiometry Technical Information

This information is provided as a summary of the gradiometer technique employed in Target projects, the displays utilised for presentation of the results from these surveys, and the terms of reference used for interpretation. If you have any queries in relation to this documentation or geophysical survey in general please contact Target by email at survey@targetgeophysics.ie.

Note: All Target services adhere to English Heritage guidelines for geophysical survey in archaeological evaluation (2008).

Background

Gradiometry is a soil magnetic technique used to define the location and determine the extent of buried archaeological sites. Such remains may include enclosure systems, former dwellings, pits, hearths, kilns, furnaces and metal working sites. These remains typically exhibit contrasts in magnetic response above background soil/geological variation due to burning/depositional activities deriving from site occupation. These contrasts are measured by gradiometers as units of the local magnetic field in nanoTesla (nT).

Instrumentation

Bartington Grad-601 dual sensor fluxgate instruments are used for all Target gradiometer surveys. Each instrument comprises two 1m vertical separation gradiometer sensors connected to a light weight data logger, within which survey parameters are configured and data is stored. Target gradiometers are capable of 0.03nT resolution, and employed within a wide range of soil, geological and archaeological contexts, for both reconnaissance in *scanning* mode, and for targeted investigation by *detailed* survey.

Survey Methodology

Target uses gradiometry in *scanning and detailed* mode as a means of locating buried archaeological sites. The majority of Target projects commence with gradiometer scanning followed by percentage detailed survey based on the basis of scanning.

Scanned responses in red.

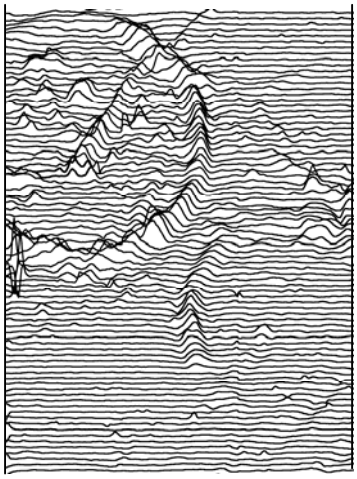
Gradiometer *scanning* entails a systematic reconnaissance survey of a site using two instruments to investigate the survey area along traverses spaced at 10m intervals. Instruments are constantly monitored for responses above background soil/geological variation, with interference from modern ferrous and natural sources discounted where possible. During the scan of the site responses of definite archaeological character and anomalies requiring further clarification are marked with canes, and then tied-in to the OS by DGPS. These responses are subsequently targeted for detailed gradiometry.

Detailed gradiometry is conducted to investigate responses observed during scanning and to carry out full mapping of on sites which may prove problematic to the scanning technique. Survey data is collected at 0.25m x 0.5m or 0.25m x 1.0m intervals to maximize resolution of underlying features. On completion of fieldwork data is downloaded on site and compiled to produce greyscale maps of survey results. These greyscale maps and their accompanying interpretations are used by clients to form a basis from which plans for archaeological testing or excavation can be made.

Data Display

XY Trace

XY Trace displays comprise a series of linear traces, enabling a semi-profile display of the respective anomalies along the X and Y-axes. This display option is essential for distinguishing between modern ferrous materials (buried metal debris) and potential archaeological responses. The XY trace plot provides a linear display of the magnitude of the response within a given data set. Target normally displays XY traces at 15nT/cm unless otherwise specified.

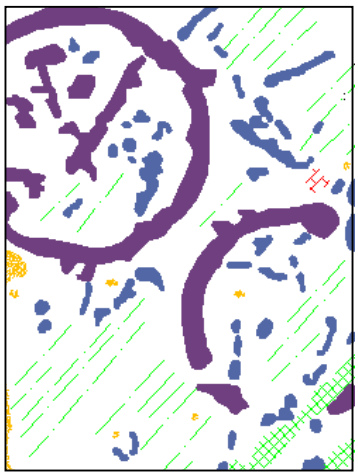


Greyscale

Greyscale formats assign a cell to each datum according to its location on the grid. The display of each data point is conducted at very fine increments, allowing the full range of values to be displayed within the given data set. This display method also enables the identification of discrete responses that may be at the limits of instrument detection. Target normally displays greyscales at -1 to 1.5nT unless otherwise specified.

Interpretation

The interpretations provided in all Target reports follow in depth analysis of survey data, and are designed to assist in highlighting the immediate archaeological concerns relating to each project. A concise legend describing all responses present is provided, and a glossary of terms used accompanies the technical information section provided with each report. It is highly recommended that Target reports are read in their entirety, including all text and figures.



Interpretation Terms

Archaeology

This category refers to responses usually supported by comparative archaeological evidence (i.e. photographic transcriptions, excavation, etc), or for anomalies which display clearly recognisable archaeological patterns. The term is generally associated with significant concentrations of former settlement, such as ditched enclosures, storage pits and associated features.

?Burnt / Fired

Such anomalies are mostly recorded in association with concentrations of settlement activity, possess a strong magnetic response and may equate with archaeological features such as kilns, furnaces, concentrations of fired debris and industrial material.

?Archaeology

This term refers to anomalies considered to be of potential archaeological interest, but for which a possible more recent landuse, modern ferrous or natural origin cannot be discounted.

Increased Response

This category applies to poorly defined responses of potential archaeological origin. This poor definition may be caused by disturbance from more recent cultivation or represent magnetically enhanced deposits which have a low capacity for magnetic enhancement. Natural or modern sources of interference causing these anomalies should not be discounted.

Trend

This category refers to low-level magnetic responses which are at the limits of instrument detection. In the absence of any clear archaeological context these anomalies are more commonly associated with natural variations in the underlying soils and geology.

Cultivation

Visible as a series of closely spaced parallel linear responses, these anomalies equate with patterns of former cultivation.

?Natural

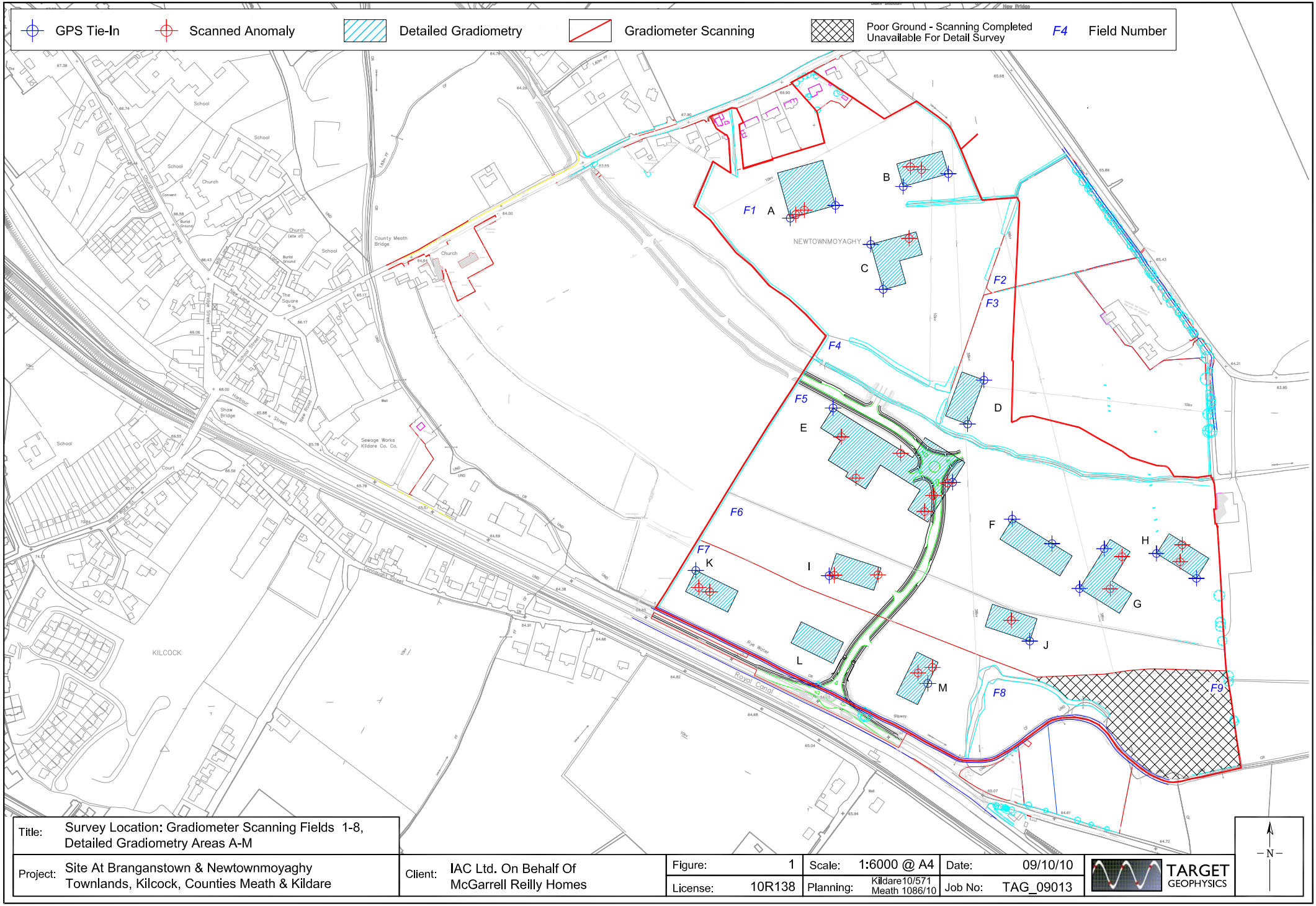
Resulting from variations caused by regional soil and geological variations the widespread occurrence of these fluctuations in response can mask anomalies of potential archaeological interest.

Ferrous

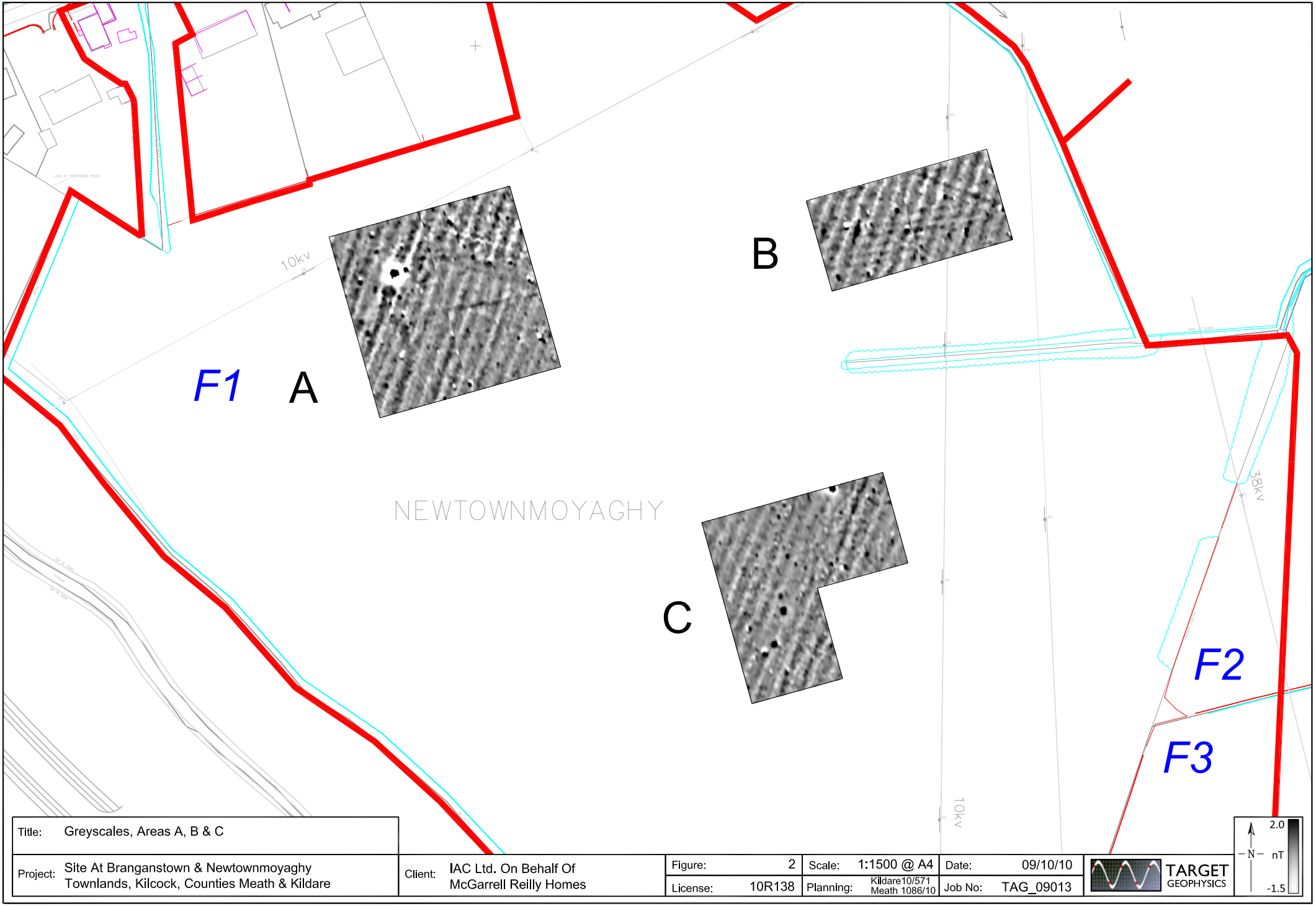
These anomalies exhibit a typically strong magnetic dipolar response, often referred to as ‘iron spikes,’ and represent modern metal debris contained within the topsoil.

Strong Magnetic Disturbance

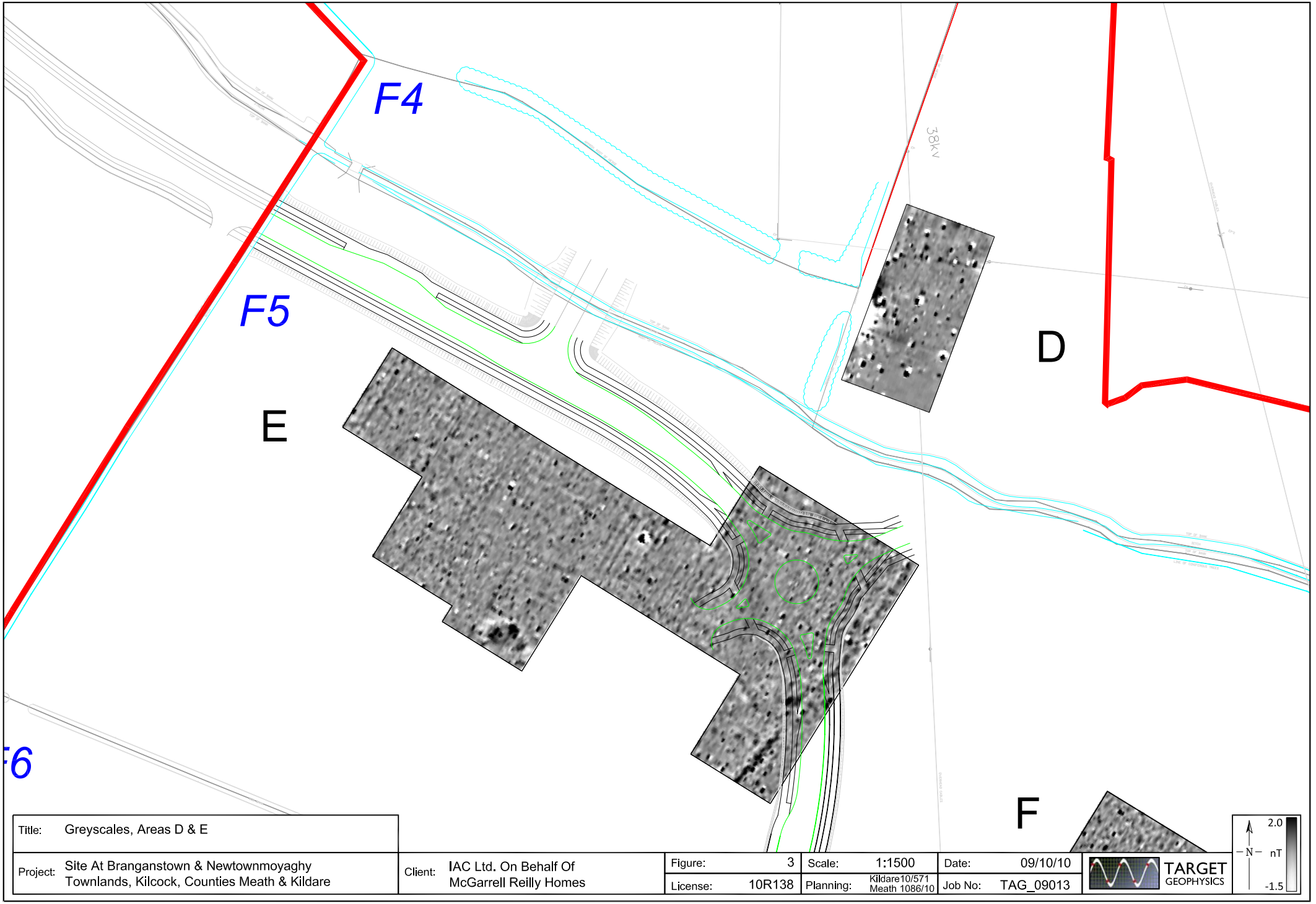
This term refers to regions of magnetic interference for which no immediate modern ferrous or natural source can be identified. A possible archaeological source for these responses may be assigned for individual anomalies on a project by project basis.



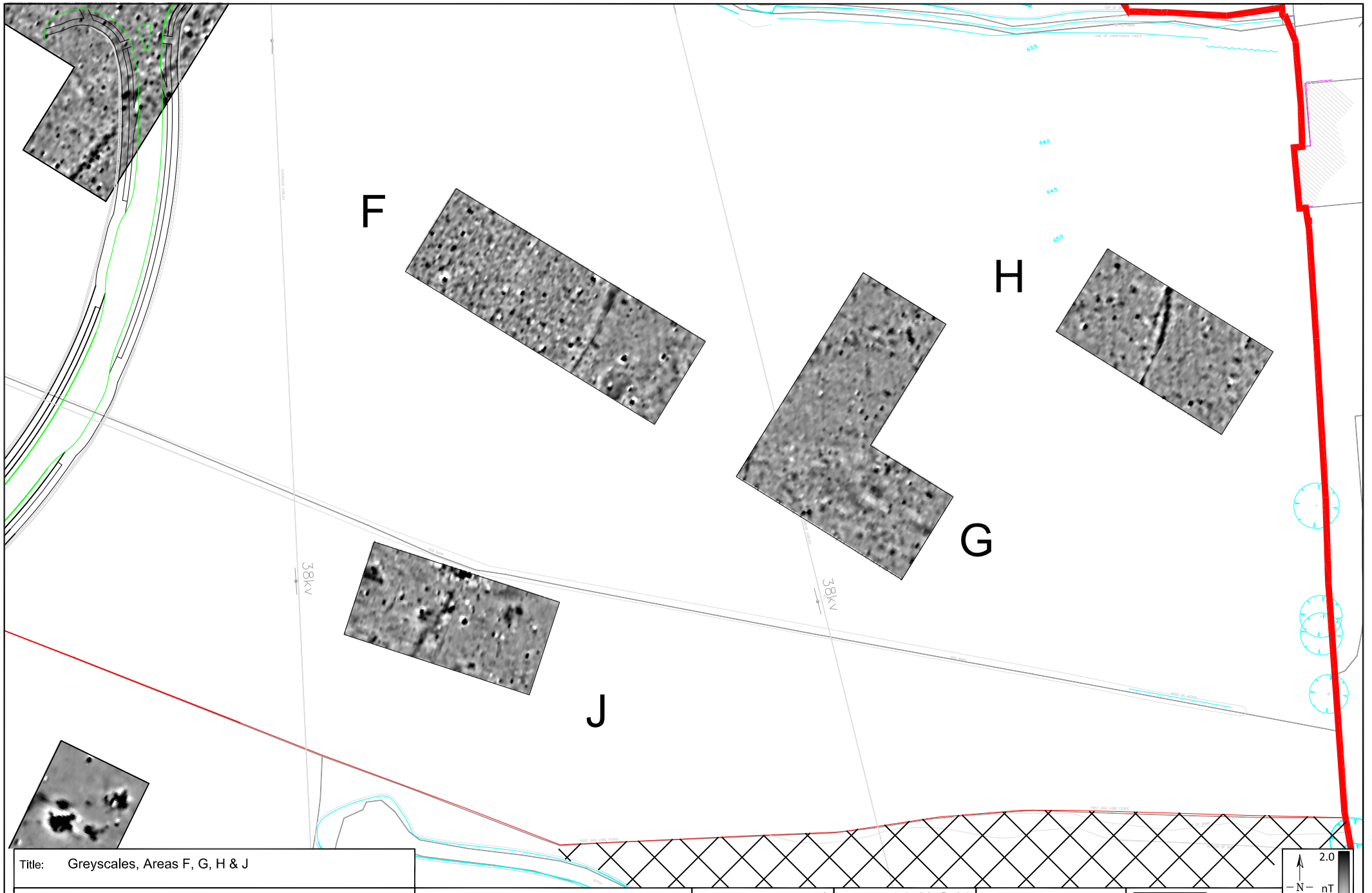
Title:	Survey Location: Gradiometer Scanning Fields 1-8, Detailed Gradiometry Areas A-M						
Project:	Site At Branganstown & Newtownmoyaghy Townlands, Kilcock, Counties Meath & Kildare	Client:	IAC Ltd. On Behalf Of McGarrell Reilly Homes	Figure: 1	Scale: 1:6000 @ A4	Date: 09/10/10	TARGET GEOPHYSICS
				License: 10R138	Planning: Kildare10/571 Meath 1086/10	Job No: TAG_09013	



Title:	Greyscales, Areas A, B & C						
Project:	Site At Branganstown & Newtownmoyaghy Townlands, Kilcock, Counties Meath & Kildare	Client:	IAC Ltd. On Behalf Of McGarrell Reilly Homes	Figure: 2	Scale: 1:1500 @ A4	Date: 09/10/10	TARGET GEOPHYSICS
				License: 10R138	Planning: Kildare10/571 Meath 1086/10	Job No: TAG_09013	

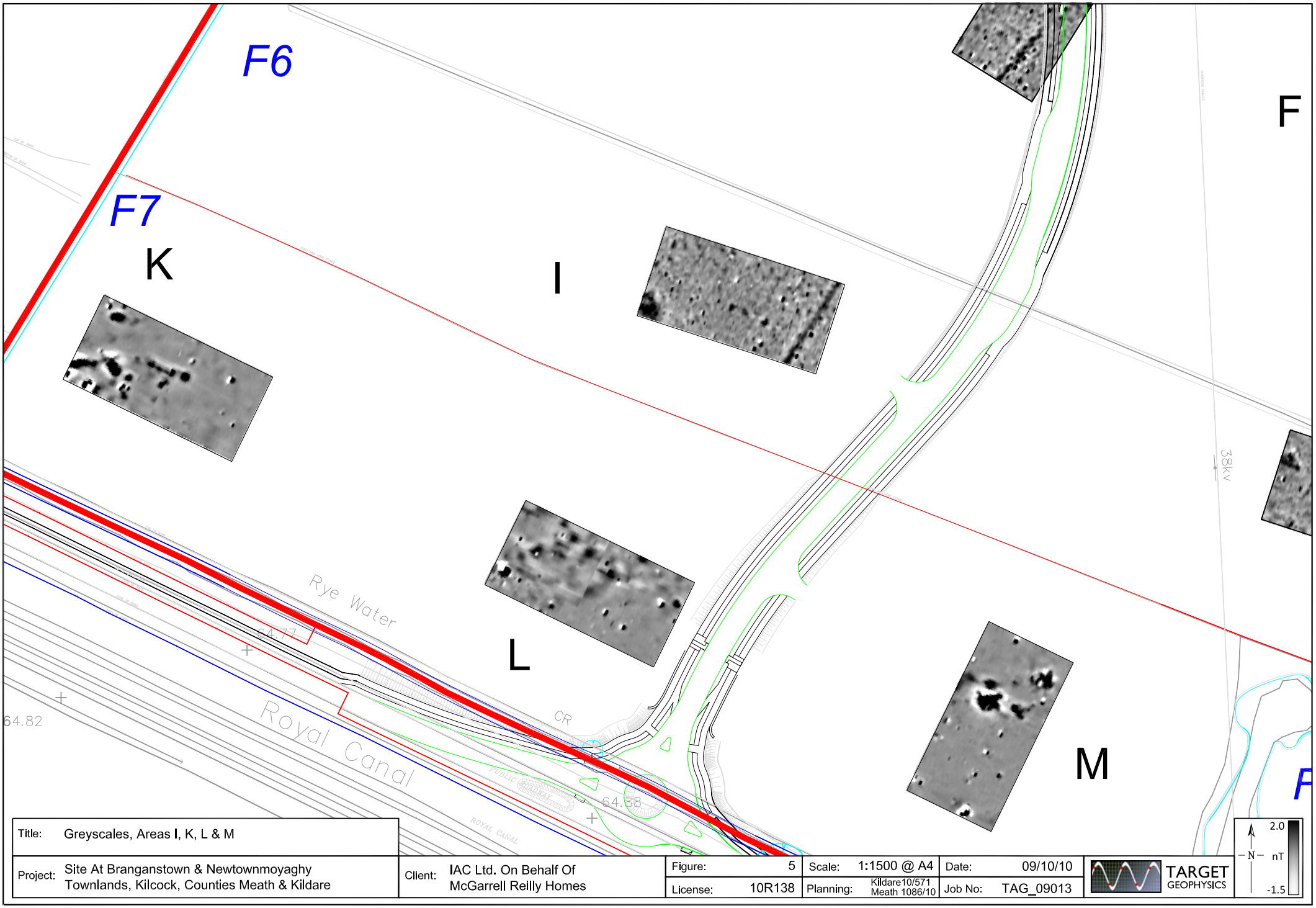


Title: Greyscales, Areas D & E					
Project: Site At Branganstown & Newtownmoyaghy Townlands, Kilcock, Counties Meath & Kildare	Client: IAC Ltd. On Behalf Of McGarrell Reilly Homes	Figure: 3	Scale: 1:1500	Date: 09/10/10	TARGET GEOPHYSICS
		License: 10R138	Planning: Kildare10/571 Meath 1086/10	Job No: TAG_09013	



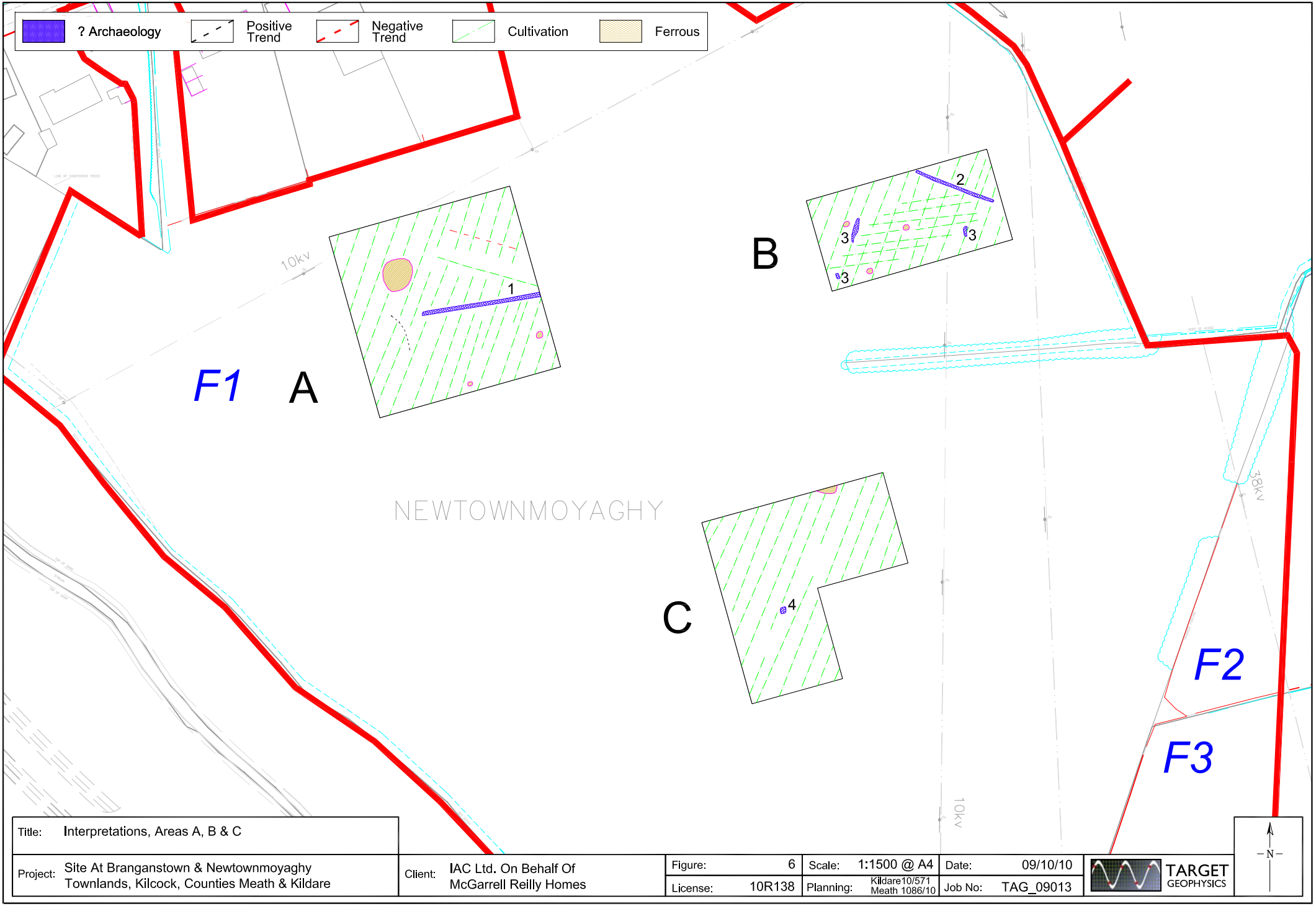
Title:	Greyscales, Areas F, G, H & J						
Project:	Site At Branganstown & Newtownmoyaghy Townlands, Kilcock, Counties Meath & Kildare	Client:	IAC Ltd. On Behalf Of McGarrell Reilly Homes	Figure: 4	Scale: 1:1500 @ A4	Date: 09/10/10	TARGET GEOPHYSICS
				License: 10R138	Planning: Kildare10/571 Meath 1086/10	Job No: TAG_09013	

N
2.0
nT
-1.5

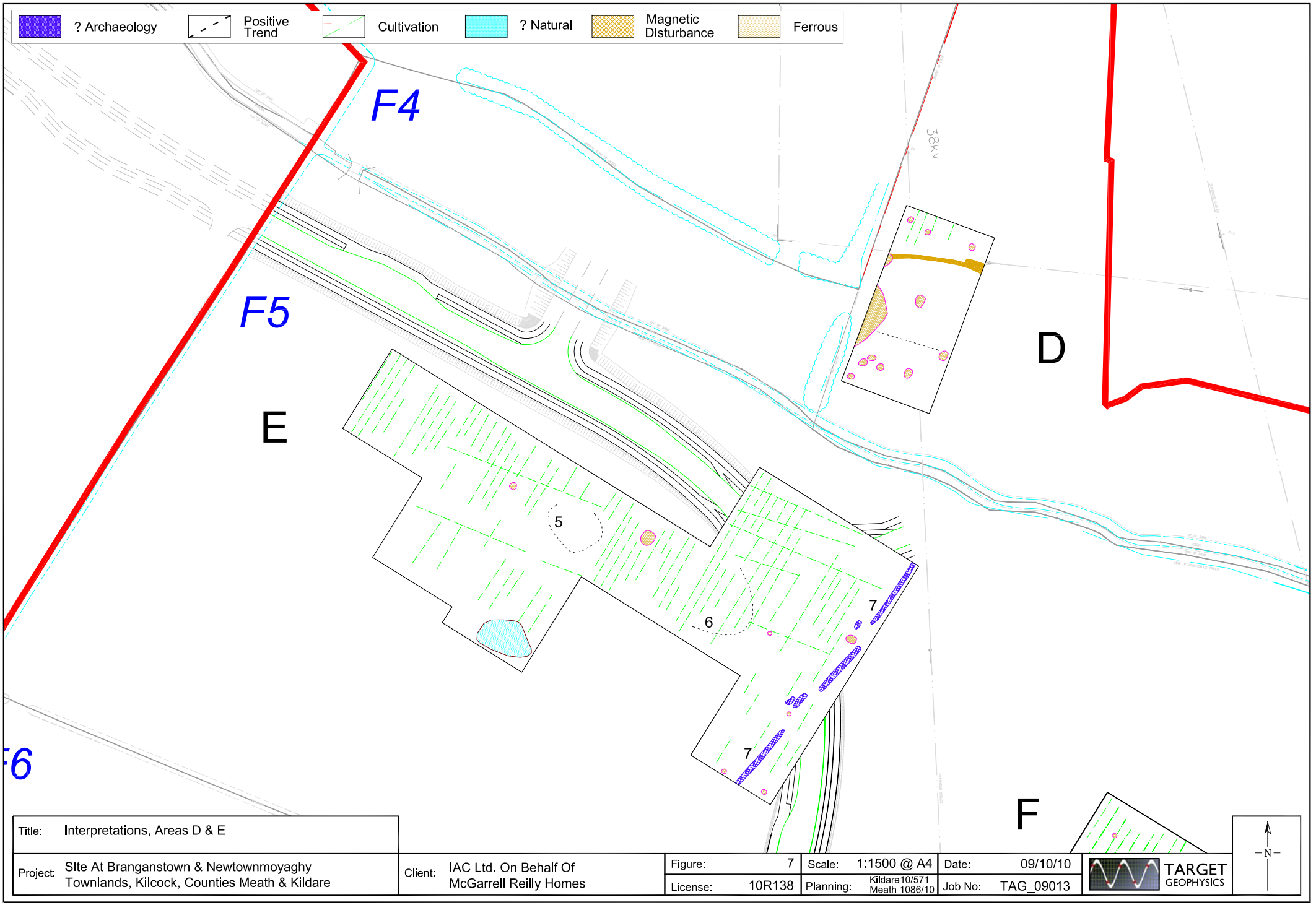


Title:	Greyscales, Areas I, K, L & M						
Project:	Site At Branganstown & Newtownmoyaghy Townlands, Kilcock, Counties Meath & Kildare	Client:	IAC Ltd. On Behalf Of McGarrell Reilly Homes	Figure: 5	Scale: 1:1500 @ A4	Date: 09/10/10	TARGET GEOPHYSICS
				License: 10R138	Planning: Kildare10/571 Meath 1086/10	Job No: TAG_09013	

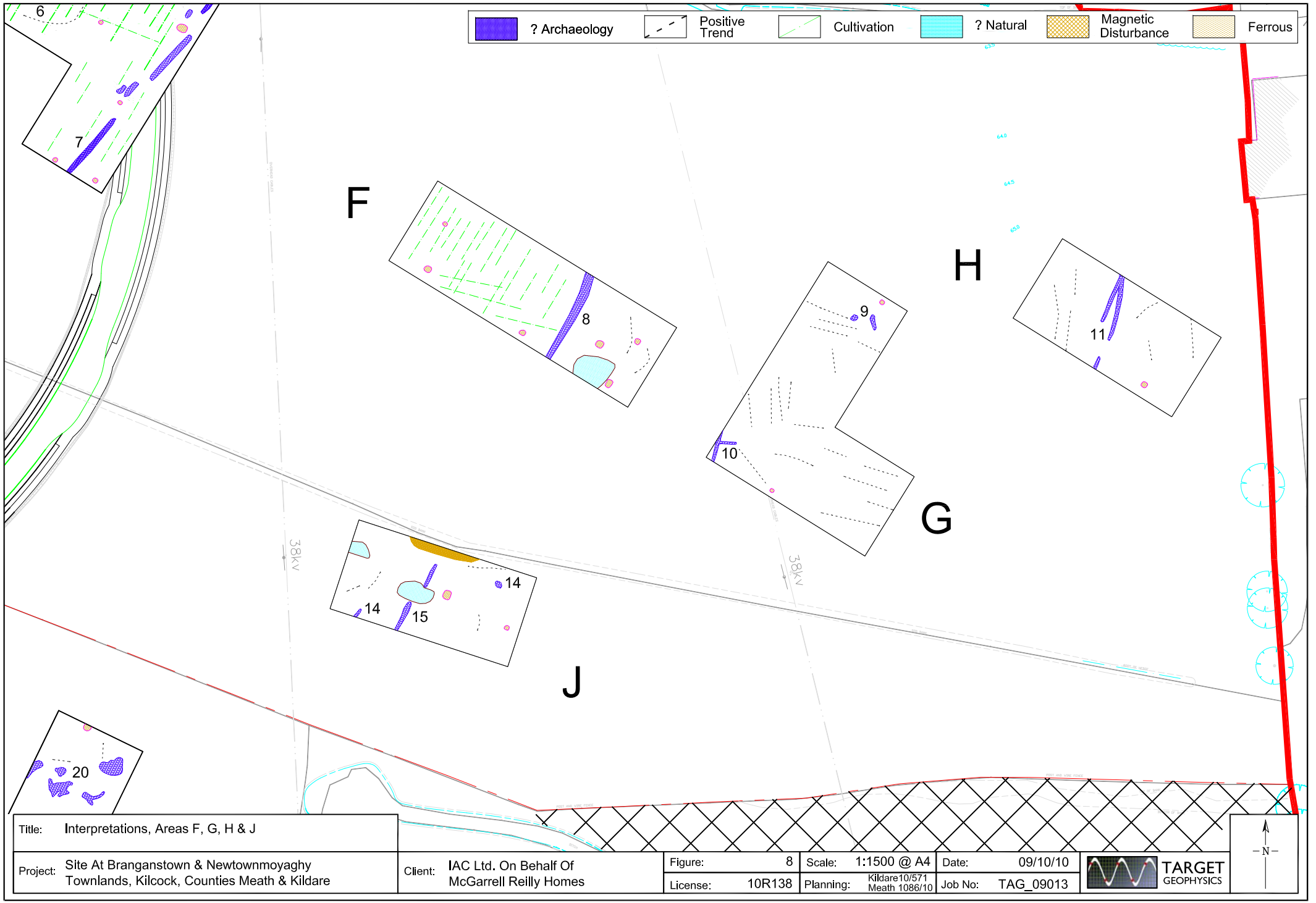
N
2.0
nT
-1.5



Title: Interpretations, Areas A, B & C					
Project: Site At Branganstown & Newtownmoyaghy Townlands, Kilcock, Counties Meath & Kildare	Client: IAC Ltd. On Behalf Of McGarrell Reilly Homes	Figure: 6	Scale: 1:1500 @ A4	Date: 09/10/10	TARGET GEOPHYSICS
		License: 10R138	Planning: Kildare10/571 Meath 1086/10	Job No: TAG_09013	

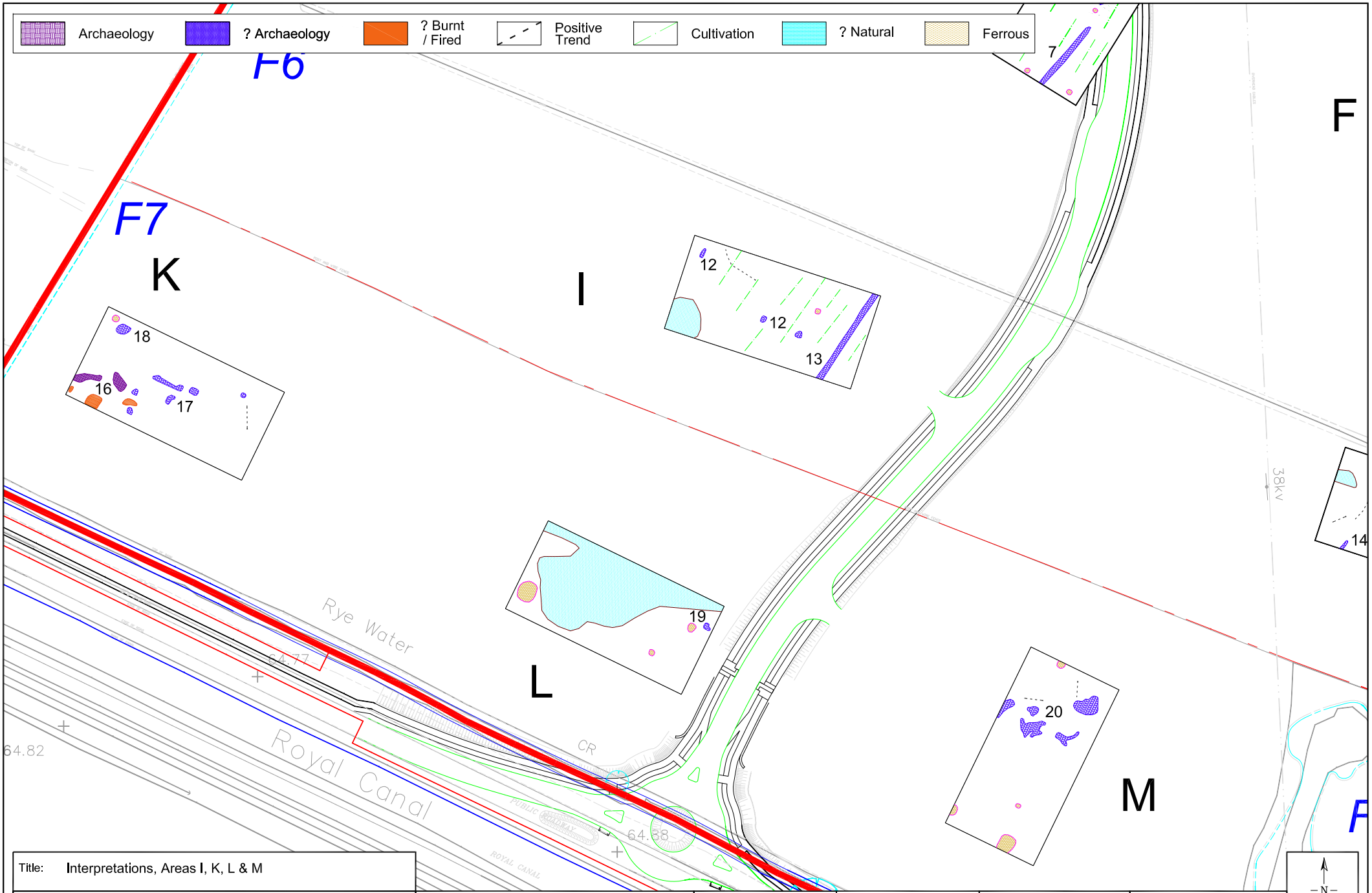


Title: Interpretations, Areas D & E					
Project: Site At Branganstown & Newtownmoyaghy Townlands, Kilcock, Counties Meath & Kildare	Client: IAC Ltd. On Behalf Of McGarrell Reilly Homes	Figure: 7	Scale: 1:1500 @ A4	Date: 09/10/10	TARGET GEOPHYSICS
		License: 10R138	Planning: Kildare10/571 Meath 1086/10	Job No: TAG_09013	

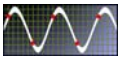


Title: Interpretations, Areas F, G, H & J					
Project: Site At Branganstown & Newtownmoyaghy Townlands, Kilcock, Counties Meath & Kildare	Client: IAC Ltd. On Behalf Of McGarrell Reilly Homes	Figure: 8	Scale: 1:1500 @ A4	Date: 09/10/10	TARGET GEOPHYSICS
		License: 10R138	Planning: Kildare10/571 Meath 1086/10	Job No: TAG_09013	

N



Title:	Interpretations, Areas I, K, L & M						
Project:	Site At Branganstown & Newtownmoyaghy Townlands, Kilcock, Counties Meath & Kildare	Client:	IAC Ltd. On Behalf Of McGarrell Reilly Homes	Figure: 9	Scale: 1:1500 @ A4	Date: 09/10/10	TARGET GEOPHYSICS
				License: 10R138	Planning: Kildare10/571 Meath 1086/10	Job No: TAG_09013	



TARGET Geophysics

Apt. 25, Block 11, Gallery Quay, Dublin 2
Telephone +353 (0)1 441 8818 / +353 (0)87 858 0112

www.targetgeophysics.ie
survey@targetgeophysics.ie