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Environmental Impact Assessment Report (EIAR)



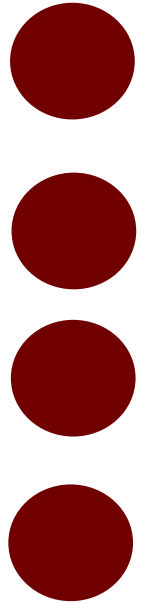
Clongriffin EIAR Appendices: Proposed Mixed Use Development Lands at Clongriffin, Dublin 13

Applicant: Gerard Gannon Properties



Appendix 3.1

Clongriffin Planning Applications
Planning & Development Context



Clongriffin Applications History

Reg. Ref.	Date of Application	Description	Granted Y/N	Grant Date	Applicant
0169/97	03/02/1997	Erection of a single storey prefabricated building for school use to the rear.	Y	20/05/1997	County Dublin V.E.C.
1025/97	01/05/1997	Physical Education Hall with viewing gallery and ancillary accommodation (two storey) at rear.	Y	12/08/1997	Co Dublin VEC
2404/97	19/09/1997	1 dwelling	Y	08/06/1998	Norman Church
2807/97	06/11/1997	New function room to front and temporary entrance.	Y	17/02/1998	The Management Committee
0558/99	26/02/1999	To install on the roof antennae for mobile telephony together with a support pole, a container at ground level and ancillary equipment, as part of a digital mobile telecommunications network.	Y	03/06/1999	Meteor Mobile Communications
2683/99	20/08/1999	Pre-fabricated building 200 sq.m. to be erected at left rear of Trinity Sports & Leisure Centre for childcare facility.	Y	06/01/2000	Lorraine Corr & Michelle Murphy
0949/00	03/04/2000	To construct two line termination masts under The Grange - Collinstown 38kv overhead line.	Y	29/06/2000	ESB
1641/00	26/05/2000	Two storey extension to rear, to include a new function room of approx 544 sq m, site works and additional car parking spaces on site.	Y	04/12/2000	Trinity Sports & Leisure Club
0311/01	09/02/2001	Erection of a second vehicular entrance located 100m east of the existing entrance.	Y	16/05/2001	Dublin Vocational Education Committee
1482/01	21/05/2001	Erection of a 1.5 metre high fence and gate located 100 metres north of the second vehicular entrance.	Y	23/08/2001	Dublin Vocational Education Committee
1810/01	18/06/2001	Install an additional 110kV transformer and associated equipment at the existing 110kV substation.	Y	12/03/2002	Electricity Supply Board
4068/02	25/11/2002	Permission for continuation of use of a pre-fabricated building, 200 sq.m., at rear of Trinity Sports and Leisure Centre, Hole in the Wall Road, Dublin 13 for childcare facility as approved under planning permission no. 2683/99 for Lorraine Corr and Michelle Murphy.	Y	05/03/2003	Lorraine Corr & Michelle Murphy
0132/02 PL 29N.131058 (Parent Permission)	25/01/2002	Gannon Homes LTD are submitting additional information with reference to planning application (reg. ref. 0132/02) with 10 year duration for a residential mixed use town development on lands North of grange road, Donaghmede, Dublin 13, bounded by the Dublin-Belfast railway, Mayne river Father Collins Park providing for a total of 3576 dwellings and 80600sqm of mixed retail, commercial, leisure and community uses, associated car parking and engineering works and with provision for a new railway station. Consequent upon the request for additional information the proposed development now provides 783 one, 1900 two, 311 three, 82 four bedroom dwellings comprising 838 houses (including one special needs house for St Mary's Hospital and school, Baldoyle) 428 Duplex units and 2310 apartments ranging from 2 to 6 storeys, plus penthouse. The mixed use town development includes 73 retail units, (8719sqm.), Supermarket (1,692sqm), offices (44,036sqm) and media-associated uses,(8,386sqm), 2 banks (471sqm), 2 restaurants (2576sqm), 3 public Houses (993sqm), a 25 bed day hospital with 2 operating theatres, associated facilities and consulting rooms (2198sqm), doctors/ dentists surgery, (222sqm) veterinary Surgery (271sqm), 4 child care facilities (875sqm), community centre (566sqm), provision for Garda Services unit(66sqm), public stairway and lift and escalator	Y	27/06/2003	Gannon Homes LTD
2502/03	03/06/2003	We, County Dublin V.E.C. intend to apply for permission for the erection of a free Standing triangular Sign measuring 1.2 x 1.2m on each side and 3.7m in height, at the entrance of Gaelcholaiste Reachrann, Grange Road, Donaghmede, Dublin 13.	Y	29/08/2003	Dublin VEC

3108/04	02/06/2004	The Electricity Supply Board intends to apply to Dublin City Council for permission under the Local Government (Planning & Development) Acts to construct 4 no. 12m high 38kV Line Termination Masts in the Townland of the Grange, Dublin 13. The site location is bounded to the south by the Grange Road to the Esat by the Dublin - Belfast Railway line, to the west by the Hole in by the Mayne River. This work is required in order to underground sections of the existing Grange -- mountgorry 38kV Overhead Lines in the area.	Y	06/10/2004	Electricity Supply Board (ESB)
4583/04	15/09/2004	Gannon Homes Ltd. seeks revised planning permission for sub-division of 1 no. 2 bed third floor penthouse apartment type D, to 2 no. 1 bed apartments at apartment block Site B1, with no external change to building save 1 no. additional car space. Site B1 is bounded by road numbers 23, 25 and 26 and located within approved residential mixed use town development Re. Ref. 0132/02 (02PL.29N.131058) on lands north of Grange Road, Donaghmede, Dublin 13 and bounded by the Dublin - Belfast Railway, Mayne River and father Collins Park.	Y	10/12/2004	Gannon Homes Ltd.
3743/04	16/07/2004	Planning permission is sought by Gannon Homes Limited for 44 one bedroom and 120 two bedroom apartments, 9 of which are duplex, all with private roof terraces, terraces and/or balconies in a six storey building with 2 seven storey corners including setback penthouse units, with basement car park underneath comprising 195 car spaces, bicycle and bin storage, also including ground floor creche (c 267 m2) and external public recycle facility on lands north of Father Collins Park, Hole In The Wall Road, Dublin 13, with access from Hole In The Wall Road both directly and by a new distributor Road under construction approved under Planning Permission Reg. Ref. 0132/02 for a large mixed residential development with railway station at Grange, Dublin 13.	Y	09/03/2005	Gannon Homes Ltd.
3167/04	04/06/2004	Planning permission is sought by Gannon Homes Limited for 29 one bedroom and 161 two bedroom apartments, all with private roof terraces, terraces and / or balconies in two terraces of three and six blocks respectively, ranging in height from 5 storeys to 6 storeys including set back penthouse, and with one tower element at 9 storeys including set back penthouse , all with 2 no basement car parks underneath, comprising 240 car spaces, bicycles and bin storage on lands north of Father Collins Park, Hole in The Wall Road, Dublin 13 accessed from Hole in The Wall Road by a new distributor road under construction, approved under planning permission Reg. Ref. 0132/02 for a large mixed residential development with railway station at Grange, Dublin 13.	Y	09/03/2005	Gannon Homes Ltd.
1656/05	23/02/2005	Menolly Homes Ltd. seeks revised planning permission for the sub-division of 1 no. 2 bed third floor penthouse apartment type D, into 2 no. 1 bed apartments at apartment block Site B, and 1 no additional car space. Site B is bounded by Grange Lodge Avenue and Beau Park Terrace and located within approved residential mixed used town development reg. ref. 0132/02 (02PL.29N.131058) to be known as Clongriffin on lands north of Grange Road, Donaghmede, Dublin 13 and bounded by the Dublin/Belfast Railway, Mayne River and Father Collins Park.	Y	23/05/2005	Menolly Homes

2243/05	06/04/2005	Planning Permission is sought by Gannon Hpmes Ltd. for Stone Faced surrounds and shopfront fenestration to the south, east and west elevations of the 6 ground floor retail units of Block 01 of the approved mixed-use town development Reg Ref 0132/02 (PL29N.131058) on lands north of Grange Road, Donaghmede, Dublin 13 and bounded by the Dublin-Belfast railway, Mayne river and Fr. Collins Park, in accordance with condition No. 34 of that permission which requires a separate planning application for each shop front.	Y	04/07/2005	Gannon Homes Ltd.
5945/04	20/12/2004	Planning permission is sought by Gannon Homes Ltd. for revisions to Blocks 12, 16, roads, car parks, town square and associated site works in the previously approved development (Ref. 0132/02 & PL 29N131058) for a large mixed use residential development on lands north of Grange Road, Donaghmede, Dublin 13, bounded by the Dublin-Belfast Railway, Mayne River and Father Collins Park. Access is provided from approved distributor roads under construction from Hole in the Wall Road. The approved design of the town square is redesigned and includes the following: 5 no. pavilion buildings comprising; 2 no. retail kiosks, 2 no. stairs and 1 no. lifts/stairs to park and ride (115 sq.m.), performance stage, playground, canopy covered bike parking spaces, water feature, seating, ventilation grilles and lighting, bus taxi pick up/set down points, taxi rank, vehicular entrance and exit to Park and Ride car park under. The approved provision for a future underpass road link to lands east of the railway is to be omitted and replaced by: A civic pedestrian route south of Block 16 and a vehicular road north and east of Block 16 both of which link the town square to the lands east of the railway via a proposed overbridge and railway station (subject of a current planning application, Dublin City Council Ref. 5050/04 and Fingal County Council Ref. F04A/1484). The approved: (6-8 storey Block 12 comprising: supermarket, cafe, public house	Y	15/07/2005	Gannon Homes Ltd.
5050/04	19/10/2004	Gannon Homes Ltd. intend to apply for planning permission for the development of a railway station , circa 515 metres north of Grange Road Bridge, to include; overbridge, 2 No. train platform structures, temporary pedestrian and vehicular access from permitted roads infrastructure (Ref. 0132/02), temporary car park, bus and taxi set-down points and associated ancillary works. Ancillary works include public lighting, bicycle stands, associated signage and relocation of existing railside boundary fencing at Grange Townland, Donaghmede, Dublin 13. The Bridge structure will accommodate 6 No. retail kiosks and 2 No. bin stores with toilet facilities on the south side. The north side of the bridge will accommodate a single storey station entrance building, ticket kiosk, lifts and stairs to the passenger platforms. The structures will extend into the Fingal County Council administrative area and a simultaneous application by Helsingor Ltd. has been made to that authority in relation to the station, overbridge, access and associated site works in that administrative area.	Y	15/08/2005	Gannon Homes Ltd.
3408/05	17/06/2005	We, County Dublin VEC, intend to apply for planning permission for the location of Temporary School Accommodation of a single storey structure consisting of three general classrooms and one single storey structure consisting of toilets at the rear of the school and between the school and the football pitch for Gaelcholaiste Reachrann, Donaghmede, Dublin 13.	Y	02/09/2005	Dublin Vocational Educational Committee
4422/05	22/08/2005	Permission sought for the retention of single storey flat roof pigeon loft at the rear of 6 Railway Mews, Beaupark, Clongriffin, Dublin 13 for Mr Keith Brennan.	Y	10/11/2005	Keith Brennan

6034/05	09/12/2005	Gannon Homes Ltd intend to apply for the construction of the shopfront north, east and west elevations in a stone, metal and glazed treatment at nos 25,27,31,35 and 39 Main St. which comprise the five units of permitted retail use which form the northern ground floor of block 21 (bounded by Main Street, Beau Park Avenue, Beau Park Street and Grange Lodge Avenue) of approved mixed use development reg. ref. 0132/02 in accordance with condition no. 34 of that permission (which requires a separate planning application for the shopfronts), on lands (now called Clongriffin) North of Grange Road, Donaghmede, Dublin 13.	Y	29/03/2006	Gannon Homes Ltd.
6253/05	21/12/2005	Ganon Homes Ltd intend to apply for planning permission for the change of use of No 39 Main Street Clongriffin Dublin 13 from retail to Cafe / Restaurant use including sale of hot food for consumption off the premises No 39 Main Street forms part of Block No 21 (bounded by Main Street, Beau Park Avenue, Beau Park Street and Grange Lodge Avenue) of approved mixed use development Reg Ref 0132/02 on lands (now called Clongriffin) north of Grange Road Donaghmede, Dublin 13. This application proposes no changes to the shopfront elevations which are currently the subject of a separate planning application (Reg Ref 6034/05).	Y	29/03/2006	Gannon Homes Ltd.
3195/05	03/06/2005	Gannon Homes Ltd. seek planning permission for 179 residential units and a creche (368 m2) in three blocks ranging in height from two to five and six storeys, comprising 29 one-bedroom, 100 two-bedroom and 50 three-bedroom apartments, 10 of which are two-bedroom duplex units with private roof terraces. All apartments have terraces and/or balconies to the north, south, east and west elevations and basement car parking comprising 188 car spaces, bicycle and bin storage. The application also includes two external ESB substations. All proposed development is located on lands north east of Father Collins Park, Hole in The Wall road, Dublin 13, within approved planning permission Reg. Ref. 0132/02 (02PLN.131085) for a large mixed use development at Grange Road, Dublin 13; access is from the Hole In the Wall Road by a new distributor road under construction.	Y	20/04/2006	Gannon Homes Ltd.
1691/06	22/02/2006	Gannon Homes LTD. Seek Planning Permission for an amendment to previously approved mixed-use on lands (now called Clongriffin) north of Grange Road, Donaghmede, Dublin 13, Reg Ref. 0132/02 (02PL.29N.131058). The area concerned comprises 0.6 Hectares and is the south eastern corner of the previously approved development where the site boundary meets the N32 road to the south, the Dublin-Belfast Railway to the East and the existing Grange Road and Grange Abbey Drive to the west. The proposed amendment includes an increase in residential units from the previously permitted 33 to 41 no. units and comprises: 1.The Removal of previously approved end-of-terrace house no. 87 and its back garden (a three-bedroom 'type p' house) of Road no. 23A (now called Railway Road) to provide additional area to the gardens of the previously approved adjacent houses nos. 80 to 86 inclusive. 2. A re-alignment of the previously approved terrace of houses nos. 80-86 incl. moving it c. 1.6m to the east at its northern end and c. 4.4m to the east at its southern end. 3. A re-alignment of the previously approved apartment block (unit nos. 60-77 incl.) moving it c. 3.9m to the south. 4. The changing of the ring road layout around the apartment block to a T-Shape arrangement to the north of the apartment block, aligned with the re-aligned terrace and the apartment block, with the previously approved associated car parking spaces now	Y	18/05/2006	Gannon Homes Ltd.

1782/06	28/02/2006	Menolly Homes seeks Retention Permission for one 3 storey 4 bedroom end of terrace house and associated site works, previously approved (Reg. Ref. 0132/02 PL 29N.131058) as 2-storey 3 bedroom end of terrace house and associated site works at 71, Grange Lodge Avenue, Clongriffin, Dublin 13.	Y	25/05/2006	Menolly Homes
1783/06	28/02/2006	Menolly Homes seeks Retention Permission for one 3 storey 4 bedroom end of terrace house and associated site works, previously approved (Reg. Ref. 0132/02 PL 29N.131058) as 2-storey 3 bedroom end of terrace house and associated site works at 41, Grange Lodge Avenue, Clongriffin, Dublin 13.	Y	25/05/2006	Menolly Homes
2008/06	14/03/2006	Pennon Homes Ltd., seek planning permission for one number four bedroom two storey dwelling house with on site parking and associated works on Grange Abbey Road, Donaghmede, on lands north of Fr. Collins Park, Hole in the Wall Road, Dublin 13, within approved Planning Permission Reg. Ref. 0132/02.	Y	13/06/2006	Pennon Homes Limited
2176/06	24/03/2006	Planning permission is sought by Gannon Homes Ltd for stone faced surrounds and shopfront fenestration to the north, south, east and west elevations of the 8 ground floor retail units of block 16 of the approved mixed use town development application no 5945/04 (decision order no p2773) on lands north of Grange Road, Donaghmede, Dublin 13, and bounded by the Dublin - Belfast railway, Mayne River and Fr Collins Park, in accordance with condition no 6 of that permission which requires a separate planning application for each shopfront.	Y	19/06/2006	Gannon Homes Ltd.
5641/06	14/11/2005	We, Norman Church & Mulligan Holdings Ltd., intend to apply for planning permission for development at this site: Windermere, Hole In The Wall Road, Dublin 13. The development will consist of the following, a) The demolition of existing 1 no. single storey dwelling & associated outbuildings & 1 no. 2 storey dwelling and associated outbuildings. b) The Construction of a basement carpark with provision for 61 car parking spaces, bicycle and bin storage. c) The construction of a 4 - storey apartment building with 5 storey elements on corners, including set back penthouse units, comprising of 23 no. 2-bed and 17 no. 3-bed apartments with associated projecting balconies and roof terraces to all elevations. d) Associated drainage. e) Ancillary site works, landscaping & boundary wall treatment. f) New vehicular entrance to the Hole in The Wall Road.	Y	01/06/2006	Norman Church & Mulligan Holdings Ltd.

2448/06	11/04/2006	<p>Killoe Developments Ltd intend to apply for planning permission for Block 20 bounded by Main Street Beau Park Avenue, Beau Park Street and Railway Road on lands (now called Clongriffin) north of Grange Road, Donaghmede, Dublin 13. This development is bounded by the N32 road to the South, the Dublin Belfast Railway to the east, the Hole In The Wall Road to the west and the Mayne River to the north. The area concerned comprises 0.5 hectares in the town centre of the previously approved development Reg Ref 0132/02 (02PL.29N.131058). The development consist of an amendment to the east and west wings on 3rd, 4th and 5th floors of Block 20 apartments, (8 no. townhouses are unaffected) previously containing 38 no. 1 bed, 72 no. 2 bed, 6 no. 3 bed apartments. The proposed amendment comprises the replacement of 4 no. 1 bed apartments with 4 no. 3 bed residential units, each now over two floors; the upper floors of which are within previously permitted roof space. The alterations include; 1: Apartment No. 11 on Beau Park Avenue and Apartment No. 115 on Railway Road both contain an additional 52sqm of new floor area in the former 4th floor attic space over their respective units each with 3 no. new windows on the set back gable to Beau Park Street with modification of window and door openings at third floor level. 2. Apartment No.s 30 & 31 on Beau Park Avenue containing an additional 52sqm & 60sqm respectively of</p>	Y	07/07/2006	Killoe Developments
2754/06	28/04/2006	<p>Gannon Homes Limited seek Planning permission for a new mixed use building and associated works at a greenfield site of 0.811 hectares surrounded by Clongriffin Road, Market Street, Lake Street and Dargan Street and incorporating Market Square, at Clongriffin, Dublin 13. The proposed building is 27,138msq (including a single-storey basement of 6814msq) including landscaping treatment to the adjoining public square (Market Square) at the junction of Lake St. and Market St. The main uses comprise 1 no. 8 screen Cinema of 7,677msq, 4 no. Retail Units totalling 3,810msq with associated internal Loading Bay and Stores of 815msq, 1 no. Cafe/Bar of 460msq, Offices of 5,857msq, 1 no. Community Centre of 605msq, 1 no. Sessional Creche of 280msq and 1 no. automated teller machine (ATM). Associated works include the provision of an ESB substation and switchroom, a gated vehicular loading bay exit and a gated car entrance/exit to the basement all on the Clongriffin Rd. elevation as well as a gated vehicular loading bay entrance to the Lake Street elevation. 36 no. off-street car parking spaces are proposed in the basement to serve the staff of all the uses. No provision for public car parking is proposed on this site. The building height varies from 5.6m to 24.55m from street level. The south elevation (Market St.) will have the cafe/bar and the double-height retail units along its full length each with mezzanine floors below the partially cantilevered cinema</p>	Y	20/11/2006	Gannon Homes Ltd.
5358/06	03/10/2006	<p>Gannon Homes Ltd intend to apply for planning permission for the construction of the shop fronts on the north, east and west elevations in a stone, metal and glazed treatment at Nos. 1, 5, 9, 13, 17 and 21 Main Street which comprises the six units of permitted retail use which form the northern ground floor of Block 20 (bounded by Main Street, Beau Park Avenue, Beau Park Street and Railway Road) of approved mixed use development Reg. Ref. 0132/02, in accordance with condition no. 34 of that permission (which requires a seperate planning application for the shop fronts), on lands (now called Congriffin) north of Grange Road, Donaghmede, Dublin 13. The construction of the shopfronts on the north, east and west elevations in a stone, metal and glazed treatment.</p>	Y	03/01/2007	Gannon Homes Ltd.

5674/06	20/10/2006	We Thomas and Richard Quinn intend to apply for planning permission for development at this site Block 1 52 Main Street, Clongriffin, (within new town under construction north of Grange Road) Dublin 13. The development consists of clear glazed screen with automatic sliding doors to the shop front opening on Main Street, clear glazed screens / opaque graphics to glazed screens to the adjoining shop front panes to the left hand side of the main entrance, opaque graphics and screening to two of the three glazed panels of the shopfront screen to the left of the Main Street shopfront elevation, clear glazed screens / opaque graphics and screening to glazed screens to the shopfront along the King Dermott Street elevation, the inclusion of 1 no sign to the stone fascia at high level on both Main Street & King Dermott Street elevations, along with 1 no projecting off licence sign to the stone fascia at high level over the main entrance on the Main Street elevation. All to previously approved Retail Unit under planning permissions reg ref nos 0132/02 & pl29n 131058 & 2243/05.	Y	26/01/2007	Thomas & Richard Quinn
5701/06	23/10/2006	Change of use for part of previously approved Retail Unit, under planning permissions Reg. Ref. No.'s 0132/02 & PL29N.131058 & 2243/05, for use as an off-licence, c. 21.8sq.m in area.	Y	03/01/2007	Thomas and Richard Quinn
3922/06	10/06/2006	Planning permission sought by Gannon Homes Ltd. for the 8 No. retail unit shopfronts at ground level to North, South, East and West Elevations of Block 12 of the approved mixed use town development Application no. 5945/04 (Decision order no. P2773) on lands north of the Grange Road, Donaghmede, Dublin 13 and bounded by the Dublin-Belfast railway, Mayne River and Fr. Collins Park, in accordance with Condition No. 6 of that permission which requires a separate planning application for each shop front.	Y	31/01/2007	Gannon Homes Ltd.
6637/06	18/12/2006	Extension will consist of additional storage and quiet room on the ground floor, with an external concrete escape stairs accessing an escape door in the roof from the first floor.	Y	28/03/2007	Gannon Homes Ltd.
1286/07	24/01/2007	Change of use from previously permitted retail to off-licence. It is situated on the ground floor of Block 20 of the approved mixed use development reg. ref. 0132/02 & 5385/06 on lands north of Grange Road, Donaghmede, Dublin 13.	Y	20/04/2007	Gannon Homes Ltd.
1760/07	14/02/2007	Permission is sought for 109 units comprising : (Block 2a) 8 no 3 bed duplex apartments, 16 no 1 bed, 30 no 2 bed & 9 no 3 bed apartments in a 5-6 storey building with ground floor commercial comprising: retail 1 (107 msq) cafe with retail for sale of related goods incorporating the sale of hot food/beverages for consumption on/off the premises (108msq) retail 2 (268msq) Garda Community Office (99msq) & substation. (Block 2b) 20 no 1bed 20 no 2 bed & 6 no 3 bed units in 3 storey duplex units enclosing private open space & associated site works. The approved permission for the 78 units on this site comprises: 23 no 3 bed & 2 no 4 bed houses, 14 no 1 bed 38 no 2 bed & 1 no 3 bed apartments & 473msq of ground floor commercial uses. A section of the approved Friars Lane between Dermot Street and Friars Street is to be omitted. The existing approved 52 no on street spaces are to be reconfigured with 74 no spaces and replacement is sought for the existing 50 no basement carparking spaces with 49 no spaces at ground floor level accessed from Dermot Street under a podium courtyard garden for Block 2b. Balconies and terraces are proposed to all elevations.	Y	14/05/2007	Gannon Homes Ltd.

1850/07	26/02/2007	Change of use from previously approved Retail Unit (166sqm) to Betting Office at ground floor level together with external signage to front and 3 no. satellite dishes located on flat roof above.	Y	22/05/2007	Paddy Power PLC
2163/07	15/03/2007	New 2 storey detached dwelling with new vehicular entrance onto public road in existing side garden.	Y	22/06/2007	Mike Russell
1866/07	27/02/2007	Internal changes to Block 12 of approved mixed use town development Application number 5945/04, (Decision Order no. P2773) consisting of 1) rearranging supermarket ancillary accommodation resulting in the increase of floor area of supermarket from 2592msq (27900sq.ft) to 2910msq (31322sq.ft), by relocating a vertical vent between the existing supermarket and multi-storey car park; 2) provide direct access for shoppers between the supermarket and the cafe, by removing part of the party wall and 3) removal of permanent screen between supermarket and common circulation area of shopping centre.	Y	02/08/2007	Gannon Homes Ltd.
3862/07	26/06/2007	Alterations to vehicle access of Blocks 22 & 23, previously approved under planning permission Reg Raf. 0132/02. The alterations comprise closure of the vehicle entrance to Block 22 from Grange Lodge Avenue, and the provision of a new vehicle entrance to Block 22 from Main Street via approved entrance to Block 23, all on lands north of Grange Road, Donaghmede, Dublin 13.	Y	24/09/2007	Barina Construction Ltd
2767/07	20/04/2007	Retention permission is sought for existing single storey extension (circa 30sqm) comprising of granny flat to rear of existing dwelling.	Y	20/09/2007	Michael Scannell
4812/07	15/08/2007	Alteration to the fourth floor of Block 22, previously approved under Reg.Ref: 0132/02. The alteration comprises the subdivision of 1 no. 2-bedroom apartment into 2 no. 2 bedroom apartments, each with private terraces; and consequent revisions to the north, south, east and west elevations. The total number of units in this block will therefore increase from 30 to 31.	Y	15/11/2007	Barina Construction Limited
5150/07	06/09/2007	RETENTION - (A) Balcony structure including support structure, fixtures & fittings at front of building. (B) Retractable awning / canopy & flat roof structure at front of building, (C) Door at first floor level leading out onto balcony at front of building all in present form and all ancillary site works.	Y	13/12/2007	Trinity Sports & Leisure Club
5160/07	07/09/2007	Construction of 5 no. shop fronts to the north and east elevations of Block 22 in accordance with condition no. 34 of previously approved planning permission reg ref 0132/02.	Y	13/12/2007	Barna Construction Ltd
5447/07	26/09/2007	Planning permission for an alteration to the fourth floor of Block 23, previously approved under planning permission reg. ref. 0132/02. The alteration comprises the subdivision of 1 no. 2-bedroom apartment into 2 no. 2-bedroom apartments, each with private terraces; and consequent revisions to the north, south, east and west elevations. The total number of units in this block will therefore increase from 33 to 34.	Y	07/01/2008	Barina Construction Ltd

5995/07	05/11/2007	<p>The proposed development consists of: (A) Double storey extension to the front of building with windows facing front at ground & first floor levels & new main entrance doors with canopy to front at ground floor level. Consisting of: (1) At ground floor level, 79.8sqm toilets/changing/shower area, 18.44sqm storage, 34.2sqm recreational, 81.5sqm circulation. (2) At first floor level: 22.12sqm kitchen, 52.2sqm recreational - including bar, 52.65sqm smoking area, 27.12sqm toilets, 29.05sqm circulation. (B) Double storey extension to rear of building with windows facing rear at first floor level. Door to side at ground floor level. Door to rear at ground and first floor levels & relocation of existing fire-escape stairs consisting of: (1) At ground floor level, 37sqm toilets/changing/shower area, 86.3sqm boxing club training area. (2) At first floor level, 125.7sqm boxing club gym. (C) Demolition of existing 48.6sqm smoking area to front (which is currently subject of Planning Application reference no. 5150/07) & existing 21.5sqm services area to side. Removal of decommission chimneys at side & rectangle awnings/canopies to front and all ancillary site works.</p>	Y	19/02/2008	Trinity Sports & Leisure Club
6024/07	07/11/2007	<p>Construction of the ground floor shop front south, east and west elevations in a stone, metal and glazed treatment at the 4 no. permitted commercial units (2 no retail, 1 no. cafe & 1 no. Garda Community Office) which comprise the southern ground floor of approved development reg ref 1760/07 (bounded by Main Street, Friars Street, Priory Street and Dermot Street, Clongriffin, Dublin 13), approved development reg ref 1760/07 being block 2 of approved mixed use development reg ref 0132/02.</p>	Y	20/02/2008	Gannon Homes Ltd.
6247/07	23/11/2007	<p>Planning permission is sought for the erection of a double sided illuminated sign for the Clongriffin Park & Ride Carpark, located to the south west corner of Station Square - approved development application no. 5945/04. (Decision Order No. P2773).</p>	Y	27/02/2008	Gannon Homes Ltd.
4502/07	26/07/2007	<p>Planning permission for development within approved planning permission reg. ref. 0132/02 of a large mixed use development at Clongriffin, Dublin 13. The development will consist of 98 units comprising: 7 no. 1 bed, 65 no. 2 bed & 26 no. 3 bed apartments in a 5-7 storey building over basement car park with ground and first floor commercial use, comprising; Unit 1: shop (257sqm), Unit 2: shop (295sqm), Unit 3: shop (327sqm), Unit 4: restaurant/take away with retail for sale of related goods incorporating the sale of hot food/beverages for consumption on/off the premises (229sqm), services (278sqm). The basement car park comprises 107 car parking spaces, bicycle and bin storage. Vehicular access from Station Way for car park and loading bay, the existing approved 18no. on street parking spaces on Station Way are to be reconfigured with 16no. spaces. Entrances, windows, balconies and terraces are proposed to all elevations.</p>	Y	25/02/2008	Gannon Homes Ltd.
1472/08	14/02/2008	<p>Construction of an ESB substation and consumer switchroom with associated parking to rear of blocks 22 and 23 Main Street, with access off Grange Lodge Avenue Clongriffin Dublin 13.</p>	Y	12/05/2008	Barina Construction Ltd

5259/07	13/09/2007	Change of use of previously approved planning permissions, reg. references: 0132/02, 5945/04, 3922/06 and 1866/07 relating to the large shop unit (supermarket), to now provide ancillary to the supermarket use: 1) the sale of hot food for consumption off the premises, and 2) the sale of intoxicating liquor (off licence) for consumption off the premises.	Y	20/05/2008	Gannon Homes Ltd.
2225/08	07/04/2008	For the location of Temporary School Accommodation of a single storey structure consisting of two Resource rooms at the rear.	Y	11/07/2008	County Dublin VEC
3283/08	18/06/2008	Permission for alterations to previously approved planning permission (reg ref. 0132/02) consisting of alterations 41 no. dwelling units on south, west and north wings of Block 10 (lands bounded by Dargan Street, Clongriffin Road and Bagwell Street), Station St. Clongriffin, Dublin 13. Alterations comprise : omission of split levels in 13 no. 3 storey 3-bed townhouses (triplexes) on south wing and 4 no. 3 storey 3-bed townhouses on west wing; omission of 12 no. townhouses (8 no. 2-bed & 4 no. 3 bed) and 12 no. 2-bed apartments in north wing, to be replaced with 30 (26 no. 2-bed & 4 no. 1-bed) apartments, including 6 no. additional units resulting relocation of 29 car spaces from ground to basement level; provision of 21 additional carparking spaces at street level; and associated alterations to north, south and west elevations, including south and west facing private roof terraces with total no. of dwellings for block 10 increased from 136 to 142.	Y	18/09/2008	Barina Construction Ltd
5973/07	02/11/2007	Planning permission is sought for revisions to block 17 existing permission (Ref. 0132/02 & PL29N131058). The approved (5-14 no. levels over basement level comprising retail, restaurant & offices) is to be omitted and replaced by mixed use development consisting 5-14 no. levels over 2 level basement comprising: 1 no. restaurant unit accessed from Bridge Street to include the sale of hot food for consumption off the premises (unit no. 1, 3 levels, 608sqm total) with outdoor seating to north elevation and external seating to second floor podium; 3 no. retail units each to include i) the sale of hot food for consumption off the premises and ii) for the sale of intoxicating liquor (off-license) for consumption off the premises (unit no. 2 accessed from Bridge Street, 2 levels, 486sqm total; unit no. 3 accessed from Dargan Lane, 209sqm; unit no. 4 accessed from Dargan Lane, 134sqm); offices (7678sqm) with 2 no. street entrances (at Station Sq. and Dargan Lane), external balconies to west elevation at second, third and fourth floor and external terrace to north elevation at second floor and external terrace to second floor podium and external terraces at roof level to fifth, eight and thirteenth floors; loading dock below podium accessed from road to east; 2 no. substations; 70 car-parking spaces within 2 level basement entered via Dargan Lane to east.	Y	02/09/2008	Gannon Homes Ltd.
4050/08	13/08/2008	Planning retention permission for change of use of ground floor apartment to an estate office and community meeting room facility with entrance to office from Grange Lodge Avenue.	Y	13/11/2008	Trustees of The Iveagh Trust

4727/08	14/10/2008	Planning permission for revisions to approved development, previously approved under planning permission reg. ref. 0132/02; to omit 12no. duplex units (6no. 2-bed and 6no. 3-bed unit) and a single 4-bed house, and to now provide a 3-storey block of 16 dwellings (4no. 1-bed units, 9no. 2-bed units, 3no. 3-bed units) with doors and windows on the west, east and north facades, private terraces and balconies on the west and east side and a single 3-bed 2-storey detached house with windows and doors on the west, east and south facades and terrace on the west and south side. The development includes 17no. ground level car spaces, 17no. cycle spaces and associated ancillary site works, with access from Grange Lodge Avenue.	Y	20/01/2009	Gannon Homes Ltd.
5408/08	19/12/2008	Amendments to approved plans Reg Ref 5945/04 for change of use of a 3 storey office building over basement, No 11 Station Street Clongriffin Dublin 13 (part of an approved mixed use development on lands north of Grange Road Donaghmede Dublin 13) to use for the provision of medical & health services which incorporates a new vehicle drop off point to the main entrance area at Ground Level & a new public entrance with part glazed lobby at first floor level. New external signage to the existing east elevation will consist of individually mounted stainless steel lettering with the words Primary Care Centre along with 2 no Corporate Logos to the existing east elevation glazing.	Y	03/04/2009	Gannon Homes Ltd.
3565/09	27/07/2009	Convert a double garage to a bedroom and single garage which will include alterations to existing front elevation.	Y	28/10/2009	Sean & Diane Keogh
3655/09	11/08/2009	The development will consist of 2 no. single one storey temporary accommodation structures consisting of an Art Room 99.4sqm and a classroom 49sqm at the rear of the existing school building.	Y	13/11/2009	Co Dublin VEC
5470/08	23/12/2008	Planning permission for a 4-7 storey building over single basement level, and associated works, with commercial at ground floor and residential on upper floors, on a 0.6 hectare site in Clongriffin, Dublin 13, bounded to the west by Station Street, to the south by Station Hill, to the east by the Dublin-Belfast railway, and to the north by 'Block 11' of approved planning permission reg. ref. 0132/02 of a large mixed-use development at Clongriffin, Dublin 13. The commercial comprises: Unit 1-shop (140sqm); Unit 2-supermarket (1490sqm gross of which 1170sqm is net sales area) plus supermarket lobby (110sqm) with lifts accessing a new covered pedestrian bridge over Station Street linking in at first floor level to the approved multi-storey public car park in 'Block 12' of approved permission 5945/04; Unit 3-fitness centre (2960sqm gross) of which is 25m swimming pool hall (525sqm), changing facilities (320sqm), gym (250sqm), aerobics room (150sqm), sauna & steam rooms (30sqm), reception area with hot beverage servery and spectator seating (175sqm), associated staff & ancillary rooms, toilets and stores (210sqm), and associated plant rooms at basement level (1300sqm). The residential is 75no. dwelling units comprising 8no. 3-bed units, 63no. 2-bed units and 4no. 1-bed units with landscaped podium at first floor. Direct podium access is from Station Street and Station Hill. 75no. car parking spaces and bicycle and bin storage are provided at	Y	28/10/2009	Gannon Homes Ltd.

5470/08/x1 <i>(EOD to 10/12/2019)</i>	10/12/2014	EXT OF DURATION: Planning permission for a 4-7 storey building over single basement level, and associated works, with commercial at ground floor and residential on upper floors, on a 0.6 hectare site in Clongriffin, Dublin 13, bounded to the west by Station Street, to the south by Station Hill, to the east by the Dublin-Belfast railway, and to the north by 'Block 11' of approved planning permission reg. ref. 0132/02 of a large mixed-use development at Clongriffin, Dublin 13. The commercial comprises: Unit 1-shop (140sqm); Unit 2-supermarket (1490sqm gross of which 1170sqm is net sales area) plus supermarket lobby (110sqm) with lifts accessing a new covered pedestrian bridge over Station Street linking in at first floor level to the approved multi-storey public car park in 'Block 12' of approved permission 5945/04; Unit 3-fitness centre (2960sqm gross) of which is 25m swimming pool hall (525sqm), changing facilities (320sqm), gym (250sqm), aerobics room (150sqm), sauna & steam rooms (30sqm), reception area with hot beverage servery and spectator seating (175sqm), associated staff & ancillary rooms, toilets and stores (210sqm), and associated plant rooms at basement level (1300sqm). The residential is 75no. dwelling units comprising 8no. 3-bed units, 63no. 2-bed units and 4no. 1-bed units with landscaped podium at first floor. Direct podium access is from Station Street and Station Hill. 75no. car parking spaces and bicycle and bin storage	Y	10/02/2015	Gannon Homes Ltd.
3765/09	26/08/2009	Amendments to approved plans reg refs 5954/04 & 5408/08, consisting of the horizontal sub division of retail unit 6 by the introduction of a new floor (93sqm) at mezzanine (upper ground floor) level & the change of use of the new area formed, from retail use to use for the provision of medical & health services. This new area is directly connected to the adjacent Primary Care Centre at first floor level.	Y	27/11/2009	Gannon Homes Ltd.
2513/10	29/03/2010	To erect 3 no. antennae, 1 no. dish, shrouding panels including associated equipment and cabinets which will be enclosed within the circular roof level extension of Block 12, Station Street, Clongriffin, Dublin 13 to form part of a third generation (3G) telecommunications network.	Y	29/06/2010	Meteor Mobile Communications Ltd
WEB1068/10	19/04/2010	The construction of a single-storey extension to the side.	Y	16/07/2010	John & Roisin Murray
2760/10	10/05/2010	Storey and a half extension to the rear comprising of an extended kitchen and family room at ground floor level and 1 no. bedroom / study at first floor level including alterations works to the existing dwelling house at no. 2 Railway Mews, with the proposed North elevation facing onto Beau Park Road all at no. 2 Railway Mews, Clongriffin, Dublin 13.	Y	05/08/2010	Robert Houraghand & Louise Simmonson
4477/09	15/12/2009	Planning permission for the construction of an 83-bedroom nursing home (5214sqm gross internal floor area) on a 0.46ha site bounded by Park Avenue, Park Terrace South and Park Row, Clongriffin, Dublin 13. The proposed development is a revision to approved planning permission reg. ref. 0132/02 (PL29N.131058) for a large mixed-use development at Clongriffin Dublin 13 and proposes to omit 47 dwellings (7no. 3-bed houses, 2 no. 4-bed houses, 2no. 1-bed duplex units, 12no. 2-bed duplex units, 10no. 3-bed triplex units, 10no. 1-bed apartments and 4no. 2-bed apartments) originally permitted for this site and replace with proposed nursing home. The nursing home comprises a single building ranging in height from 2 to 3 storeys, arranged around a private courtyard garden. The main entrance is on Park Terrace South with staff and service entrances on Park Row. There are doors and windows to all street and courtyard elevations, there are balconies on the west elevation overlooking Park Avenue and on the internal east elevation overlooking the courtyard. The development includes 21no. on-street car parking spaces on Park Avenue, Park Terrace South and Park Row, 20no. bicycle parking spaces on Park Terrace South and Park Row, an ESB sub-station, a service area and bin storage accessed from Park Row, and ancillary works.	Y	26/07/2010	Gannon Homes Ltd.

2864/10	26/05/2010	The development will consists of 2 no. structures; A single storey temporary accommodation consisting of a science room 101.5sq.m and a single storey structure containing two classroom 98.7sq.m at the rear of the existing school building.	Y	24/08/2010	Co Dublin VEC
2913/10	02/06/2010	For amendments to block 21 of approved permission Reg. Ref. 0132/02 of a large mixed use development comprising: 1) The change of use of 25 Main St. from shop to cafe / restaurant including the sale of hot food for consumption off the premises. 2) The change of 27 Main St. from shop to cafe / restaurant including the sale of hot food for consumption off the premises. 3) The construction of an external vertical clad extract duct on the south courtyard elevation of Block 21.	Y	30/08/2010	Clearwater Properties Ltd
3212/10	16/07/2010	For a single storey extension (33.3sq.m) to the rear comprising of an extended kitchen and family room at ground floor level including alteration works to the existing dwelling house, with the proposed North elevation facing onto Beau Park Road.	Y	14/10/2010	Robert Houraghan & Louise Simmonson
2918/10	03/06/2010	To erect 6 no. panel antennas (3 no. GSM/2G and 3 no. UMTS/3G) and 2 no. link dishes, together with associated equipment cabinets all enclosed within the existing circular penthouse as part of the operator's mobile phone networks.	Y	26/10/2010	Telefonica O2 Ireland Ltd
2054/11	19/01/2011	Install a telecommunications base station site comprising antennas, link dishes, ancillary equipment and telecommunications exchange containers to the roof of the building with access over an existing route. The development will form part of Vodafone (Irl) Ltd GSM & 3G Broadband Telecommunications Network.	Y	18/04/2011	Vodafone (Irl) Ltd
2442/11	30/03/2011	The development will consist of a single storey temporary accommodation structure consisting of two disabled toilets 11.1sq.m at the rear of the existing school building.	Y	30/06/2011	Co Dublin VEC
2515/11	13/04/2011	The development will consist of 1 no. Single one storey Temporary Accommodation Structure, consisting of 3 classrooms 148.4sq.m at the rear of the existing school building and existing prefab.	Y	14/07/2011	Co Dublin VEC
2781/11	01/06/2011	For the provision of a single storey extension to the side and rear with velux roof windows to the side, lowering the side window cill level and all associated site works.	Y	02/09/2011	Mark Kelly
2780/11	01/06/2011	For the provision of a single storey extension to the side and rear with velux roof windows to the side, lowering the side window cill level and all associated site works.	Y	02/09/2011	Sharon Fowler
2820/12	26/06/2012	Change of use from previously approved shop to doctor's surgery.	Y	26/09/2012	Gannon Properties
3281/12	27/09/2012	RETENTION: The development consists of retention of (1) a 17.0 sq.m single storey extension to the rear (2) a 4.0 sq.m timber storage shed in the rear garden (3) 17.4 sq.m of attic storage space including two rooflights on the rear slope of the main roof.	Y	03/01/2013	Gareth McGinn

3325/12	05/10/2012	New development on lands at Panhandle Park, Clongriffin, Dublin 13 comprising: (a) a 3-storey domed mosque and cultural centre (5573sqm) which includes main prayer hall, prayer rooms, meeting rooms, general purpose room, administrative offices, 1 ground floor 1-bed apartment, crèche, bookshop, library, mortuary, ancillary accommodation and two minarets which is linked to: (b) a 2-storey conference centre (2849sqm) which includes reception foyer, 600-seat conference room, 130 seat restaurant, 200-seat single-storey banquet hall, kitchens and ancillary accommodation; (c) a 2 to 3-storey 16-classroom primary school and a 2 to 3-storey 12-classroom secondary school, each with its own administrative and ancillary accommodation. shared multi-use community hall, storage, ancillary accommodation and plant (total area 6809sqm), outdoor play space and ball courts; (d) a 2-storey fitness centre (1392sqm) which includes a 25m indoor swimming pool, gym, sauna, steam room, administrative and ancillary accommodation, plant; (e) a 3-storey block of 6 no. 2-bed apartments with balconies on the south and west elevations; and (f) a 4-storey block of 2 no. 1-bed apartments, 5 no. 2-bed apartments with balconies on the east and south elevations, and ground floor shop (231sqm). The development is accessed from Main Street, Park Avenue and Marshfield Avenue Clongriffin via the internal road	Y	27/08/2013	Dublin Welfare Society Limited
2472/13	17/04/2013	The development will consist of 1no. single storey temporary accommodation unit, containing 2no. 49sqm classrooms to the rear of the existing main school building and all associated site works.	Y	22/07/2013	Co Dublin VEC
2701/13	04/06/2013	Planning permission is sought for the construction of: 1. A two storey extension with pitched tiled roof to the side (East) and rear (North), with 2 No. composite high level / velux roof windows in North facing elevation. 2. A single storey extension with pitched tiled roof with 1 No. velux roof window to the rear (North facing). 3. A single storey extension with flat roof to the side (East) fronting proposed two storey extension described at No.1 above. 4. The conversion of existing attic space to storage room with 2 No. velux roof windows in the rear (North facing) roof. The development will consist of: The reorganisation and extension of the ground floor level to provide a dining room, an extended kitchen, a utility room, and the relocation of ground floor toilet facilities. The extension of the first level to provide an additional bedroom with en-suite shower room. the conversion of the existing attic room to a storage room with 2 No. velux roof windows in the rear (North) facing roof and associated site works including, drainage and alteration of existing car parking area.	Y	04/09/2013	Thomas Byrne & Louise Carthy
2726/13	07/06/2013	RETENTION: Of a free standing 2-sided advertisement sign with an advertising area of 18.3sq.m each side and an overall height of 7m.	Y	04/09/2013	Gannon Properties
2262/13	01/03/2013	Construction of a terrace of 11 no. 3 storey, 3 bedroom house, each with a private roof terrace at second floor level on the west side, and each with its own car parking space in its front garden. This would amend 11 no. previously permitted house types (9 no. 0 type and 2 no. 01 type) of Reg Ref 0132/02 at the same addresses.	Y	11/09/2013	Gannon Properties
2487/13	18/04/2013	For the construction of a pair of semi detached, 2-storey, 3-bedroom houses with 4no. ancillary off-street car parking spaces in place of the previously permitted, but as yet unbuilt Housetype K1 of reg ref. 0132/02 at 31 Dermot St, Clongriffin, Dublin 13. The development includes the construction of off-street car parking ancillary to previously permitted houses at 15 Priory Street, Clongriffin, Dublin 13 (Housetype Q of Reg. Ref. 0132/02) and 19,21,23,25,27 and 29 Dermot Street, Clongriffin, Dublin 13 (all housetype P of Reg. Ref. 0132/02) and associated site works.	Y	16/09/2013	Gannon Properties

3216/13	10/09/2013	The development will consist of a proposed ground & first floor extension to the rear of the existing building and a proposed ground & first floor extension to the front of the existing building and all associated ancillary works.	Y	09/12/2013	Trinity Sports & Leisure Club
3329/13	03/10/2013	For the temporary change of use and internal alteration, from previously approved shop to a community hall of 1,340sqm gross No. 4 Station Square is located on the first floor of the previously approved mixed-use building called Block 12 (Reg. Ref. 5945/04). No external alterations are proposed.	Y	15/01/2014	Gannon Properties
3358/13	07/10/2013	RETENTION: Retention of change of use from previously approved shop unit to prayer hall.	Y	07/01/2014	Gannon Properties
3154/13	26/08/2013	Planning permission for change of use of part of permitted hotel (Reg Ref 5945/04) to 32 residential apartments. 7 no. one bedroom, 23 no. two bedroom and 2 no. three bedroom apartments are proposed on the third, fourth and fifth floors accessed from Station Square via the existing third floor residential courtyard podium. Works include re-designating existing parking spaces at basement level from hotel to residential, landscaping to central podium, new windows to existing south elevation to Station Square, alterations to north and east elevations to central podium including new balconies and access walkways and stairs, completion of lift and stair cores to the residential and alterations to the hotel/restaurant access and foyer (area 209.33sqm) from Station Square and all associated engineering works.	Y	03/02/2014	Gannon Properties
3653/13	06/12/2013	Construction of 9 no. 3-storey 3-bedroom houses & 11 no. 2-storey 3-bedroom houses, each with its own car parking space in its front or side garden, and all associated site works.	Y	21/03/2014	Gannon Properties
2755/14	29/05/2014	The development will consist of 1no single storey temporary accommodation unit containing 2no 56 sq.m classrooms to the rear of the existing school building and all associated site works.	Y	01/09/2014	Dublin & Dun Laoghaire Education Board
3725/14	20/11/2014	Revisions to development permitted under Reg.Ref.: 5945/04. Revisions consist of change of use of No. 9 Station Square (608 sq.m) from a Retail Unit use, to use as a Gym with a total floor area of 608 sq.m., & all ancillary works to facilitate this proposed use. Car parking provision is as permitted under Planning Reg. Ref. 5945/04 & Signage is as permitted under Planning Reg.Ref. 2176/06.	Y	02/03/2015	Gannon Properties
3247/14	14/08/2014	Planning permission for 29 one bedroom, 164 two bedroom apartments, and 15 three bedroom apartments, all with private roof terraces, terraces and/or balconies in two terraces of three and six blocks respectively, ranging in height from 5 storeys to 6 storeys including setback penthouse, all with basement car parks underneath, comprising 222 carspaces, bicycle and bin storage, including requisite engineering site works, ESB stub-station, 27 street carspaces and landscaping including the extension of the Mayne River linear park, all on lands at Marrisfield Avenue, North of Father Collins Park, Clongriffin, Dublin 13, accessed from Marrisfield Avenue.	Y	04/03/2015	Hollybrook New Homes Ltd

2016/15	07/01/2015	Construction of a 3-storey block of 16 dwellings (4 no. 1-bed apartments, 4 no. 2-bed apartments, 5 no. 2-bed duplex units and 3 no. 3-bed duplex units), with doors and windows on the west, east and north facades, and private terraces and balconies on the west and east sides; and a single 3-bed, 2 storey detached house with windows and doors on the west, east and south facades, and terraces on the west and south sides. The development includes 17 no. ground level car spaces and 17 no. cycle spaces and associated ancillary site works, with access from Grange Lodge Avenue.	Y	13/04/2015	Gannon Properties
3380/15	07/08/2015	22 one bedroom, 83 two bedroom apartments, 14 two bedroom apartments (excess 100 sq.m) and 5 three bedroom apartments, all with private roof terraces, terraces and/ or balconies in three blocks, ranging in height from 5 storeys & 6 storeys with a setback penthouse, all with basement car parks underneath, comprising 186 carspaces accessed from the Balgriffin Park, bicycle and bin storage, including requisite engineering site works, 8 street carspaces and landscaping including the extension of the Mayne River linear park.	Y	13/11/2015	Hollybrook New Homes Ltd
3455/15	19/08/2015	RETENTION: Retention permission is sought for the retention of 1. Single storey extension to the rear of the original house (c.26sqm). 2. A timber storage shed in the rear garden (Barna Shed c.6sqm).	Y	23/11/2015	Mark Kelly & Ms Etain Brady-Kelly
3697/15	25/09/2015	Planning permission for revisions to permitted development Reg. Ref. 3802/14 to amend on-street car parking to off-street car parking for No. 15 Belltree Avenue, Nos. 1 to 27 (odds) Belltree Place & No. 37 Marrisfield Avenue, Clongriffin, Dublin 13.	Y	11/01/2016	Gannon Properties
4037/15	18/11/2015	Planning permission for revisions to permitted development Reg. Ref. 2405/12 to omit 7 no. 3-bedroom 2.5 storey houses, 6 no. 4-bedroom 2 storey houses and 4 no. 4-bedroom 2.5 storey houses and now to provide 17 no. 3-bedroom 2 storey houses with 22 on-curtilage residential car parking spaces, 8 on-street visitor car parking spaces, and all ancillary and associated site works.	Y	11/04/2016	Gannon Properties
3776/15	08/10/2015	Planning permission for the construction of 84 no. dwellings, 1 no. shop and 1 no. coffee shop on lands bounded by Main Street, Dermot Street, Park Street and Friars' Street, Clongriffin, Dublin 13. The proposed development comprises 19 one bedroom apartments, 30 two bedroom apartments, 12 three bedroom apartments, 6 two bedroom duplexes and 17 three bedroom duplexes, together with a ground floor coffee shop (183sqm) and shop (183sqm). The development consists of two blocks: a 5-storey element fronting Main Street (block 2a) and a 3-storey element backing onto Park Street (block 2b). The development includes a landscaped podium garden to block 2a above 56 off street car-parking spaces and bin storage, accessed via Friars' Street, in addition to 56 on-street spaces. All units are to be provided with either private roof terraces, garden terraces and/or balconies. The development includes associated site works and infrastructure which includes landscaped open space, paths, public lighting, utilities, drainage and surface water attenuation.	Y	13/04/2016	Gannon Properties

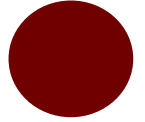
2610/16	04/04/2016	Planning Permission for the construction of 19 no. 3-bedroom 3-storey houses, 58 no. 3-bedroom 2-storey houses, 21 no. 3-bedroom 2.5-storey houses, 4 no. 1-bedroom apartments and 11 no. 2-bedroom apartments in a 4-storey block with windows to all elevations, and balconies to the east and south elevations (113 dwellings in total). The development includes 152 car spaces both on-curtilage and on-street, associated and ancillary site works.	Y	08/07/2016	Gannon Properties
2876/16	13/05/2016	Permission for change of use from previously approved shop unit to Day Activity Centre and associated minor alterations to front elevation including new double doors and signage panel.	Y	16/08/2016	Gannon Properties
3199/16	24/06/2016	Planning Permission for revisions to permitted development Reg. Ref. 3802/14 to omit 4 no. 2-bedroom apartments, 8 no. 3-bedroom duplex units and 3 no. 3-bedroom triplex units (15 dwellings in total) and to now provide 13 no. 4-bedroom 3-storey houses (13 dwellings in total). The development includes 13 on-street car spaces, associated and ancillary site works.	Y	18/11/2016	Gannon Properties
3117/16	14/06/2016	Planning Permission for revisions to permitted development Reg. Ref. 2405/12 to omit 23 no. 3-bedroom 2-storey houses, 3 no. 3-bedroom 2.5 storey houses, 7 no. 4-bedroom 2-storey houses, 6 no. 4-bedroom 2.5 storey houses and 36 no. 2-bedroom apartments (75 dwellings in total) and to now provide 33 no. 3-bedroom 2-storey houses, 17 no. 3-bedroom 2.5 storey houses and 25 no. 3-bedroom 3-storey houses (75 dwellings in total). The development includes 106 car spaces both on-curtilage and on-street, associated and ancillary site works.	Y	12/12/2016	Gannon Properties
4016/16	28/10/2016	Permission for 48 one bedroom, 157 two bedroom, & 29 three bedroom apartments, all with private roof terraces, terraces and/or balconies in two terraces of two and four blocks respectively, ranging in height from 5 storeys to 6 storeys including setback penthouse, retail (289m2)/ office space (887m2) at ground & first floors, located at the eastern end of the proposed development, all with basement car park underneath, comprising 210 car spaces, bicycle and bin storage, including requisite engineering site works, ESB sub-station, 28 street car spaces and landscaping including the extension of the Mayne River linear park (amending previous permission 3247/14) all on lands at Marrsfield Avenue, North of Father Collins Park, Clongriffin, Dublin 13, accessed from Marrsfield Avenue.	Y	17/02/2017	Hollybrook New Homes Ltd
4101/16	11/11/2016	Planning permission for 5 no. 3-bedroom 2-storey houses and 18 no. 3 bedroom 3 storey houses (23 dwellings in total). The development includes 30 car spaces (both on-street and off-street), associated and ancillary site works.	Y	27/02/2017	Gannon Properties
4266/16	06/12/2016	Proposed amendments to previously permitted scheme Reg.Ref. 3380/15. The changes consist of revision/ alterations of Block A to include floor plan and elevational changes with the increase in apartment units from 34 to 42, (12 No. 1 bed units, 26 No. 2 bed units, 4 No. 3 bed units) ranging in height from 5 storeys and 6 storeys with a setback penthouse & minor revision/ alterations of Block B to include floor plan and elevational (East) changes with no change in apartment numbers/ bedspaces to this block (total increase in apartment numbers from 124 to 132).	Y	24/03/2017	Hollybrook New Homes Ltd

2173/17	02/02/2017	The development will consist of the following: (A) Relocation of an existing temporary classroom to the rear of the main school building to accommodate the construction of 1 no. single storey detached semi-permanent general purpose room of 15 sqm (B) Block A - Single storey detached temporary building containing 2 no. 49sqm classrooms to the north of the main school building (C) Block B - Single storey detached temporary building containing 2 no. 49sqm classroom to the west of the main school building (D) Free standing canopy over external footpaths serving temporary accommodation to the rear of the main school building (E) All associated site works including connection to existing foul and storm drainage.	Y	26/04/2017	Dublin & Dun Laoghaire Education Board
2569/17	27/03/2017	Permission is sought for development of a new hotel, located at the site known as Block 19, Station Square, Clongriffin, Dublin 13. The site is located on the south side of Station Square, Clongriffin, Dublin 13 and is bounded by station square to the North, Railway Road to the west and south west, Station Way to the south east and the proposed Block 17 (current planning application reg.Ref.3634/16) to the east. Heights vary from 7 storeys over basement carpark on Station Square to 4 and 5 storeys over basement on the other street frontages. The development will comprise principally. 209 guest bedrooms, hotel bar/restaurant/front of house reception areas, main and secondary function rooms and meeting rooms, kitchen/service/ancillary facilities, fitness suite, service and plant areas, 20 apartments (with balconies) for short term letting for holiday and business use, (4 x 3 bed, 8 x 2 bed, 4 x2 bed+study, 4 x 1 bed), basement carpark, controlled carpark access ramps, electrical substation, external illuminated signage, site services and site development works, minor repositioning of existing bus stop, soft and hard landscaping. Applicant: Gannon Properties.	Y	28/06/2017	Gannon Properties
2613/17	03/04/2017	Change of use from 2 no. existing retail shop units (120 sq.m), to provide 2 no. professional service offices.	Y	05/07/2017	Gannon Properties
3634/17	01/09/2016	Planning permission is sought for a development consisting of 28 one bedroom, 97 two bedroom and 14 three bedroom apartments with ancillary common facilities including meeting rooms, gym, cycle park, concierge, entrance courtyard and roof gardens; 5 retail units (c.427 sqm total); and with 139 carspaces and ancillary engineering facilities at basement level; ESB substation and provision for antennae at top roof level. All comprised in a building ranging in height from 6 to 16 floors accessed from Station Square, Station Hill and Dargan Lane, Clongriffin with parking access off existing Block 16 down ramp from Dargan Lane.	Y	23/11/2017	Gannon Properties

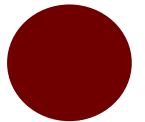
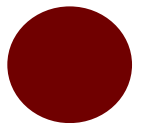
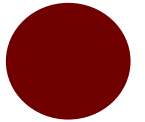
4054/16	02/11/2016	The development will consist of the change of use of retail space to office space which was previously permitted under planning references 0132/02 and 5945/04 and for the provision of additional floor area as mezzanine and associated minor alterations, including new signage panel to front elevation and roof lights at third floor podium roof level. The proposed office space is to provide for general offices and / or business & technology uses and / or office based industry uses and is designed to be suitable for a single user or multiple users with subdivisions.	Y	10/07/2017	Gannon Homes Ltd.
2955/17	19/05/2017	Revisions to development permitted under Reg.Ref.: 5945/04. Revisions consist of change of use (136 sq.m) from a retail unit use to use as a Community Meeting Room with a total floor area of 136 sq.m, and all ancillary works to facilitate this proposed use. Car parking provision is as permitted under Planning Reg. Ref. 5945/04 and signage is as permitted under Planning Reg.Ref. 2176/06.	Y	23/08/2017	Gannon Properties
2478/17	15/03/2017	Proposed amendments to previously permitted scheme Reg.Ref. 4016/16. The amendments consist of the change of use and revisions/ alterations to Block A located at the Eastern end of the proposed development to include internal floor plan and elevational alterations and a change of use on the ground/ first floor from retail/ office use to residential use, thereby increasing the apartment units from 234 to 246, providing 2 no. 1 bed units and 10 no. 2 bed additional units. Block A building height will be reduced accordingly to take account of the retail/ office omission, minor internal basement layout changes are also proposed.	Y	11/08/2017	Hollybrook New Homes Ltd
3330/17	05/07/2017	Planning permission for development at this site, No. 15 Kingstreet currently under construction at lands at Beltree Walk, Beltree Avenue, Park Street & Park Terrace North, Clongriffin, Dublin 13. The development will consist of a single storey extension (circa 14sqm) to side of existing dwelling (currently under construction reg/ref 2610/16) and conversion of attic (circa 41sqm) to provide 2 No. Bedrooms with 2 No. Dormer windows to front and 1 No. Dormer to the rear to allow access to converted space, internal alterations and associated site works.	Y	06/10/2017	Eva & Gavin McGreal
2628/17	6th April 2017	3 residential blocks: Block 25 (B25), Block 26 (B26) and Block 27 (B27) and all associated works required, including 181 car parking spaces over the 3 sites at Marsfield Crescent, Clongriffin, Dublin 13. Block 25 consists of 48 units over 7 stories at a height of 31.5 m. Block 26 consists of 71 units over 14 stories and is 56.4 m at its highest point. Block 27 consists of 48 units over 6 stories with a height of 27.85 m. Block 27 also consists of a single storey underground basement car park and a crèche facility incorporated to part of Ground Floor Level. The 167 apartment units are made up of 42 one bedroom units, 99 two bedroom units, and 26 three bedroom units. The 3 residential blocks form part of the overall development plan for the Clongriffin development.	Y	05/01/2018	Gannon Homes Ltd
4004/17	06/10/2017	The development will consist of the change of use from retail to cafe/restaurant use including the sale of hot food for consumption off the premises.	Y	17/01/2018	Gannon Properties

3048/17	31/05/2017	Dublin and Dun Laoghaire Education and Training Board, intend to apply for planning permission for construction of a two storey post primary school building (6,966 sq.m gross floor area) with associated external signage for Gaelcholaiste Reachrann, Grange, Donaghmede. The constituent elements of the new school building comprise: (a) a two storey 38 No. classroom building including lecture and workshop rooms and 3 No. pastoral offices; (b) two storey general purpose element including assembly hall / dining area, administration offices and meeting room at ground floor; staff room, library and music room at first floor; (c) double height multi-use hall, (for school and community use) with associated changing / storage / toilet / fitness room & ancillary areas at ground floor; (d) Site development works including new vehicular / pedestrian & cycle access arrangements separated from existing Grange Community College, car and bus set-down spaces; 60 No. standard car parking spaces, 3 No. universally accessible parking spaces and 108 No. cycle parking spaces; (iii) 4 No. outdoor hard play courts; (iv) external store (50 sq. m.) with external covered area (30 sq. m.), ESB substation (23.5 sq. m.) opening onto Grange Abbey Road. The proposed development also includes removal of existing Gaelcholaiste Reachrann temporary accommodation buildings at the rear of Grange Community College and replacement with 3 No. Hard Play Courts:	Y	18/12/2017	Dublin & Dun Laoghaire Education Board
2256/18	08/02/2018	Change of use from retail to yoga studio	Y	16/05/2018	Gannon Properties
4003/17	06/10/2017	Change of use from retail to veterinary surgery.	Y	29/05/2018	Gannon Properties
2977/18	11/05/2018	The development will consist of the change of use from retail to community day activity centre use including signage and lighting to shop front.	Y	14/08/2018	Gannon Properties
3545/18	20/07/2018	RETENTION: Planning Permission is sought for the construction of a single storey detached garden shed to the rear of 26 Dermot Street, Clongriffin, Dublin 13.	Y	18/10/2018	Lan Weng & Kai Yu
3696/18	09/08/2018	Amendments to the previously approved Planning Permissions Ref. No. 3247/14 & Ref No. 2478/17. The amendments consist of plans and elevation changes to two ground floor apartments (181.75sqm) and an area of the basement (334.05sqm) comprising of a total 515.77sqm in Block 32 to communal residential facilities, which includes reception, postal room, cafe, cinema room, gym, lounge/club room, changing room facilities with toilet facilities and an outdoor terrace area for basement and ground floor levels of an area 65.21sqm and 92.46sqm respectively reducing the amount of carparking by 12 spaces all on a site area of 19,627sqm.	Y	22/11/2018	Stormborn Devco Ltd.

Appendix 3.2



Residential Development Schedule
Planning & Development Context



Residential Development Schedule for Clongriffin

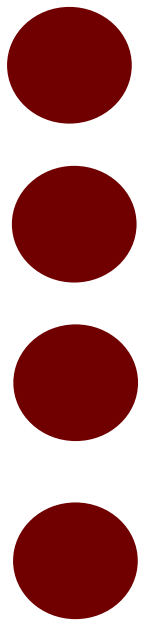
Development	No. of Units	Commercial Area (Gross)	Reg. Ref.	Developer	Status
Constructed					
Beau Park	411	223	0132/02	Killoe Developments/Menolly Homes	Complete
Block 1	69	548	0132/02	Menolly Homes	Complete
Block 20	124	1056	0132/02	Killoe Developments	Complete
Block 21	128	692	0132/02	Menolly Homes	Complete
Grange Road	18	0	0132/02	Gannon Homes Ltd	Complete
B18 Affordable	98	0	5847/03	Gannon Homes Ltd	Complete
Site B1 Social	36	0	0132/02	Gannon Homes Ltd	Complete
Block 16	87	1811	5945/04	Gannon Homes Ltd	Complete
Plot A	28	0	0132/02	Pennon Homes	Complete
Block 34, 35	140	0	3195/05	Pierse Homes	Complete
Block 36	39	368	3195/05	Gannon Homes Ltd	Complete
Block 12	33	8614	5945/04	Gannon Homes Ltd	Complete
Site C	41	0	1691/06	Pennon Homes	Complete
Block 22	31	638	0132/02	Barina Construction Ltd.	Complete
Block 23	34	0	0132/02	Barina Construction Ltd.	Complete
Parkedge Plot B	32	0	0132/02	Gannon Homes Ltd	Complete
Parkedge Plot C	20	0	3653/13	Gannon Homes Ltd	Complete
Block 12 (Apartments)	30	0	3154/13	Gannon Homes Ltd	Complete
Parkedge Plot D	8	0	2405/12	Gannon Homes Ltd	Complete
Belltree	99	0	3802/14	Gannon Homes Ltd	Complete
Marrsfield Avenue	13	0	3199/16	Gannon Homes Ltd	Complete
Belltree Park	98	0	2610/16	Gannon Homes Ltd	Complete
Beltree Green	51		3117/16	Gannon Homes Ltd	Complete
Plot E Park Terrace South	17		4037/15	Gannon Homes Ltd	Complete
Sub Total	1685	13950			
Under Construction					
Park Terrace South/Park Street	45	0	2903/16	Gannon Homes Ltd	Granted
Blocks 32, 33 Marrsfield Avenue	242	340	2478/17	Hollybrook New Homes	Planning granted
Block 31 Marrsfield Avenue	132	0	4266/16	Hollybrook New Homes	Planning granted
Block 2 Main Street	84	366	3776/15	Gannon Homes Ltd	Under construction
Sub Total	503	706			
Permitted - To be implemented					
Beltree Park (Block A)	15	0	2610/16	Gannon Homes Ltd	Granted (15 of 113 not yet built)
Beltree Green	24		3117/16	Gannon Homes Ltd	Granted (24 of 75 not yet built)
Belltree Avenue	23	0	4101/16	Gannon Homes Ltd	Granted
Block 19 (Hotel)	20	8080	2569/17	Gannon Homes Ltd	Granted
Sub Total	82	8080			
Permitted - Not Being Implemented					
Block 17	139	425	3634/16	Gannon Homes Ltd	Granted
Block 29	18	0	2016/15	Gannon Homes Ltd	Granted
Block 25	40	0	2648/17	Gannon Homes Ltd	Granted
Block 26	32	300	2648/17	Gannon Homes Ltd	Granted
Block 27	48	504	2648/17	Gannon Homes Ltd	Granted

Block 28	75	4691	5470/08	Gannon Homes Ltd	Granted
Sub Total	352	5920			

Proposed (New Application/Revisions)					
Block 3	141	4523		Gerard Gannon Properties	
Block 4	74	799		Gerard Gannon Properties	
Block 5	138	393		Gerard Gannon Properties	
Block 6	270	418		Gerard Gannon Properties	
Block 8	114	0		Gerard Gannon Properties	
Block 11	96	0		Gerard Gannon Properties	
Block 13	187	6108		Gerard Gannon Properties	
Block 14	288	1933		Gerard Gannon Properties	
Block 15	92	6686		Gerard Gannon Properties	
Block 17	210	430.5		Gerard Gannon Properties	
Block 25	63	0		Gerard Gannon Properties	
Block 26	78	0		Gerard Gannon Properties	
Block 27	57	508		Gerard Gannon Properties	
Block 28	122	929		Gerard Gannon Properties	
Block 29	20	0		Gerard Gannon Properties	
Sub Total	1950	22727.5			
Units Outside Control Of Applicant					
<i>Block 7</i>	<i>86</i>			In Receivership	Previously permitted
<i>Block 9</i>	<i>70</i>			In Receivership	Previously permitted
<i>Block 10</i>	<i>142</i>			In Receivership	Previously permitted
Sub Total	298				

Appendix 3.3

Overall Development Schedule
Planning & Development Context

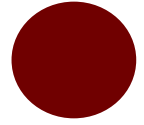
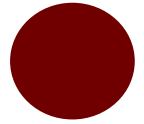


Residential Development Schedule for Clongriffin – January 2019

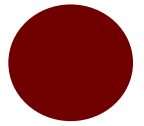
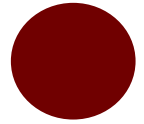
Development	No. of Units Permitted			Commercial Area Permitted (Gross)			Reg. Ref.	Developer	Status	Notes
Beau Park	411			223			0132/02	Killoe Developments/Menolly Homes	Complete	Creche
Block 1	69			548			0132/02	Menolly Homes	Complete	Retail
Block 20	124			1056			0132/02	Killoe Developments	Complete	Retail, Pharmacy, Doctor
Block 21	128			692			0132/02	Menolly Homes	Complete	Retail & Cafe/Takeaway
Grange Road	18			0			0132/02	Gannon Homes Ltd	Complete	
B18	98			0			5847/03	Gannon Homes Ltd	Complete	
Site B1	36			0			0132/02	Gannon Homes Ltd	Complete	
Block 16	87			1811			5945/04	Gannon Homes Ltd	Complete	Gym, Chiropractor
Plot A	28			0			0132/02	Pennon Homes	Complete	
Block 34, 35	140			0			3195/05	Pierse Homes	Complete	
Block 36	39			368			3195/05	Gannon Homes Ltd	Complete	Creche
Block 12	33			8614			5945/04	Gannon Homes Ltd	Complete	Retail, Pub, Offices, Day Centre
Site C	41			0			1691/06	Pennon Homes	Complete	
Block 22	31			638			0132/02	Barina Construction Ltd.	Complete	Retail, Solicitor, Yoga
Block 23	34			0			0132/02	Barina Construction Ltd.	Complete	
Parkedge Plot B	32			0			0132/02	Gannon Homes Ltd	Complete	
Parkedge Plot C	20			0			3653/13	Gannon Homes Ltd	Complete	
Block 12 (Apartments)	30			0			3154/13	Gannon Homes Ltd	Complete	
Parkedge Plot D	8			0			2405/12	Gannon Homes Ltd	Complete	
Belltree	99			0			3802/14	Gannon Homes Ltd	Complete	
Marrsfield Avenue	13			0			3199/16	Gannon Homes Ltd	Complete	
Belltree Park	98			0			2610/16	Gannon Homes Ltd	Complete (98 of 113)	
Belltree Green	51			0			3117/16	Gannon Homes Ltd	Complete (51 of 75)	
Plot E Park Terrace South	17			0			4037/15	Gannon Homes Ltd	Complete	
Sub Total	1685			13950						
Under Construction										
Park Terrace South/Park Street	45			0			2903/16	Gannon Homes Ltd	Granted	
Block 2 Main Street	84			366			3776/15	Gannon Homes Ltd	Under construction	
Blocks 32, 33 Marrsfield Avenue	242			340			2478/17	Hollybrook New Homes	Planning granted	
Block 31 Marrsfield Avenue	132			0			4266/16	Hollybrook New Homes	Planning granted	
Sub Total	503			706						
Permitted – not yet implemented										
Belltree Park (Block A)	15			0			2610/16	Gannon Homes Ltd	Granted (15 of 113 not yet built)	
Belltree Green	24			0			3117/16	Gannon Homes Ltd	Granted. (24 of 75 not yet built)	
Belltree Avenue	23			0			4101/16	Gannon Homes Ltd	Granted	
Block 19 (Hotel)	20			8080			2569/17	Gannon Homes Ltd	Granted – 209 hotel beds	
Sub Total	82			8080						
Total Permitted/Under construction/Complete Outside of Application Area	2270			22736						
Proposed SHD 1, SHD 2 & Clongriffin Planning Applications	No. of Units Permitted (not being implemented)	No. of Additional Units Proposed	Total Units Proposed	Commercial Area Permitted (Gross)	Commercial Area Proposed	Commercial Area Permitted & Proposed				
Block 3		141	141		4523	4523				GF retail & offices over
Block 4		74	74		799	799				Community centre, creche, café, men's shed
Block 5		138	138		393	393				GF Retail units
Block 6		270	270		418	418				Creche
Block 8		114	114		0	0				
Block 11		96	96		0	0				Part V – 96 units
Block 13		187	187		6108	6108				Ground floor retail/office over

Block 14		288	288		1933	1933				Ground floor retail. 97 nr. Part V units.
Block 15		92	92		6686	6686				Retail & cinema for c.1230 patrons
Block 17 – additional units	139	71	210	425	5.5	430.5	3634/16	Gannon Homes Ltd	Granted – 139 units	
Block 25 – additional units	40	23	63	0	0	0	2648/17	Gannon Homes Ltd	Granted – 40 units	
Block 26 – additional units	32	46	78	300	-300	0	2648/17	Gannon Homes Ltd	Granted – 32 units	Creche
Block 27 – additional units	48	9	57	504	4	508	2648/17	Gannon Homes Ltd	Granted – 48 units	
Block 28 – additional units	75	47	122	4691	-3747	929	5470/08	Gannon Homes Ltd	Granted - 75 units (extension of	GF retail
Block 29 – additional units	18	2	20	0	0	0	2016/15	Gannon Homes Ltd	Granted – 18 units	Proposed 20 units
Sub Total	352	1598	1950	5920	16822.5	22727.5				
Total (Complete/Permitted/Proposed)			4220			45463.5				
Expired Planning Permissions										
<i>Block 7</i>	<i>86</i>							In Receivership	Previously permitted	
<i>Block 9</i>	<i>70</i>							In Receivership	Previously permitted	
<i>Block 10</i>	<i>142</i>							In Receivership	Previously permitted	
<i>Sub Total</i>	298									
Overall Total (Including B7,9&10)			4518			45463.5				
Original Masterplan Grant 0132/02 & amendment permissions			3520			100,000				
			(28% increase in residential unit			(53% decrease in commercial a				

Appendix 6.1



Soil Investigations
Soil, Land & Geology





GROUND INVESTIGATIONS IRELAND LTD

CLONGRIFFIN, PLOT C & PLOT D

GROUND INVESTIGATION REPORT

DOCUMENT CONTROL SHEET

Engineer	Waterman Moylan
Project Title	Clongriffin Plots C & Plot D
Project No	4064-1-14
Document Title	Ground Investigation Report

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
A	Final	C Finnerty	F McNamara	F McNamara	Dublin	3 rd February 2014

Clongriffin Plots C & D - Ground Investigation Report

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1.0 Preamble

2.0 Overview

- 2.1 Background
- 2.2 Purpose and Scope

3.0 Subsurface Exploration

- 3.1 General
- 3.2 Cable Percussion Boreholes
- 3.3 Trial Pits
- 3.4 Dynamic Probing
- 3.5 Soakaway Testing

4.0 Ground Conditions

- 4.1 General
- 4.2 Ground Conditions
- 4.3 Groundwater

5.0 Recommendations and Conclusions

- 5.1 General
- 5.2 Foundations

Appendices

Appendix 1 Site Location Plan

Appendix 2 Cable Percussion Records

Appendix 3 Trial Pit Records

Appendix 4 Dynamic Probe Records

Appendix 5 Soakaway Test Records

1.0 Preamble

On the instructions of Waterman Moylan Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., between the 7th and the 13th of December 2013 on Plots C and D of the proposed development in Clongriffin in Dublin 13.

2.0 Overview

2.1 Background

The site is located adjacent to Fr Collins Park as shown in the location plan in Appendix 1. It is proposed to develop the proposed sites construct two and/or three story residential dwellings. The site slopes gradually from north to south and has previously been landscaped as part of the development of Fr. Collins Park and during recent phase of developments at adjacent sites.

2.2 Purpose and Scope

The purpose of the site investigation was to investigate subsurface soil conditions by means of trial pitting, dynamic probing and soak away testing. The scope of the work undertaken for this project included the following:

- Visit project site to observe existing conditions
- Carry out 17 No. Trial Pit to a maximum depth of 3.0m BGL

- Carry out 20 No. Dynamic Probes to a maximum depth of 4.1m BGL
- Carry out 3 No. Soakaway tests to BRE Digest 365

3.0 Subsurface Exploration

3.1 General

During the ground investigation in December 2013 a programme of trial pitting, dynamic probing and soakaway testing was undertaken to determine the sub surface conditions at the proposed site. Soakaway testing was carried out in accordance with BRE Digest 365 to determine the infiltration characteristics of the site. Regular sampling and in-situ testing was undertaken in the trial pits to facilitate the geotechnical descriptions and to enable laboratory testing to be carried out on the soil samples recovered during excavation.

3.2 Cable Percussion Boreholes

The three cable percussive boreholes were carried out at locations specified by the Consulting Engineer and went to depths of between 4.6m and 6.0m BGL. These boreholes were completed with a Dando 2000 boring rig to undertake insitu testing and to recover geotechnical samples for description and laboratory testing.

The standard method of boring in soil for site investigation is known as the Cable Percussion method. It consists of using a Shell in non-cohesive soils and a clay

cutter in cohesive soils, both operated on a wire cable. Very hard soils, boulders and other hard obstructions are broken up by chiselling and the fragments removed with the Shell. Where ground conditions made it necessary, the borehole was lined with 200mm diameter steel casing. While the use of the Cable Percussion method of boring gives the maximum data on soil conditions, some mixing of laminated soil is inevitable. For this reason thin lenses of granular material may not be noticed.

Disturbed samples were taken from the boring tools at suitable depths, so that there is a representative sample at the top of each change in stratum and thereafter at regular intervals down the borehole until the next stratum was encountered. The disturbed samples were then sealed and sent to the laboratory where they were visually examined to confirm the description of the relevant strata.

Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records. The test consists of a thick wall sampler tube, 50mm external diameter, being driven into the soil by a drop weight weighing 63.5kg and with a free drop of 760mm. For gravels and glacial till the driving shoe was replaced by a solid 60° cone.

The Standard Penetration Test number referred to as the 'N' value is the number of blows required to drive the tube 300mm, after an initial penetration of 150mm. The number gives a guide to the consistency of the soil and can also be used to estimate

the relative strength/density at the depth of the test and also to estimate the bearing capacity and compressibility of the soil.

Borehole water levels were recorded, together with the depths at which seepage of water or inflows can be detected and the observations are noted in the borehole logs. In general these observations do not give an accurate indication of the actual ground water conditions as the borehole is rarely left standing at the relevant depth for a sufficient time for the water level to reach equilibrium, a permeable stratum may have been sealed off by the borehole casing or water may have been added to the borehole to facilitate progress. For this reason groundwater monitoring standpipes were installed in the boreholes to permit the equilibrium groundwater level to be established.

The borehole logs including installation details are included in Appendix 2 of this Report.

3.3 Trial Pits

Twenty trial pits were excavated using a JCB 3 CX 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 logged and photographed by an Engineering Geologist prior to backfilling with arisings.

The trial pit logs are provided in Appendix 3 of this Report.

3.4 Dynamic Probes

The dynamic probe tests (DPH) were carried out beside the trial pits using Terrier 2000 rig in accordance with B.S. 1377: Part 9 1990. The test consists of mechanically driving a cone with a 50kg weight in 100mm intervals and monitoring the number of blows required. An equivalent Standard Penetration Test (SPT) 'N' value may be calculated by dividing the total number of blows over a 300mm drive length by 2. The probes were undertaken adjacent to the trial pits locations with probes A, B, C & D undertaken adjacent to TP17.

The dynamic probe logs are provided in Appendix 4 of this Report.

3.5 Soakaway Testing

The soakaway pits were excavated to a maximum depth of 1.7m BGL 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 recorded over time as required by BRE Digest 365. The pits were logged and photographed prior to completing the soakaway test and were backfilled with arisings and reinstated upon completion.

The soakaway test results are provided in Appendix 5 of this Report.

The above notes outline the procedures used in this site investigation and are in accordance with Eurocode 7 Part 2: Ground Investigation and testing (ISEN 1997 – 2:2007) and B.S. 5930:1999 + A2:2010.

4.0 Ground Conditions

4.1 General

The recommendations given and opinions expressed in this report are based on the findings as detailed in the borehole and trial pit 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.

4.2 Ground Conditions

The ground conditions encountered during the investigation are summarised below with the full details of the strata encountered during the ground investigation provided in the borehole, trial pit and dynamic probe records included in the appendices of this report. The sequence of strata encountered are generally consistent across the site and are generally consisted of;

- Made Ground
- Cohesive Deposits
- Granular Deposits

Made Ground: Made Ground deposits consisting of Fill of Clay and Gravel containing occasional fragments of red brick, wire, plastic and metal pipes. The made ground was typically present to less than 1m BGL however there were significant depths at particular locations in the site. These locations are outlined below;

- TP4, TP5, TP6 & TP7 had Made Ground deposits from 1.3m to 1.9m deep and may be indicative of an in filled depression, ditch or stream at this location.
- TP8, TP9 and TP15 had Made Ground deposits present from 1.3m to 3.0m deep. TP15 had the deepest occurrence of Made Ground which had debris such as metal pipes, plastic bags and fragment of trees which may be indicative of previous landscaping or land filling activity at this location.
- BH3 had Made Ground to a depth of 6.0m BGL with plastic bags noted between 1.7m and 2.7m BGL. This borehole was completed some distance away from the trial pits and may be indicative of an area of previous landscaping or land filling activity at this location.

Cohesive Deposits: Cohesive deposits were encountered beneath the Made Ground and were quite variable, described typically as brown or light brown *slightly sandy sandy gravelly CLAY*. The strength of the cohesive deposits generally increased

with depth and was typically firm or firm to stiff at shallow depths increasing to stiff with depth in the majority of the trial pits. These deposits had occasional cobble and boulder content where noted on the trial pit logs.

Granular Deposits: Granular deposits were encountered in the trial pits on the site either as lenses within the cohesive deposits or as strata underlying upper cohesive deposits to the base of the trial pits. These deposits were typically described as *brown clayey gravelly fine to coarse SAND and sandy sub angular to rounded fine to coarse GRAVEL with possible clay lenses*. These deposits had occasional cobble and boulder content where noted on the trial pit logs.

4.3 **Groundwater**

The groundwater strikes were noted during the investigation and were generally encountered as slow to moderate seepage within the cohesive deposits and as moderate to fast seepage within the granular deposits. We would point out that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the time of year, rainfall nearby construction and other factors.

4.4 Soakaway Testing

At the test locations a trial pit was excavated and filled with water to a nominal invert level. The pits were allowed to drain and the rate of fall in water level was monitored to determine the time for the water level to drop from 75% to 25% the pit volume.

The locations SP1 to SP3 did not drop the required amount and indicate that the ground conditions are not favourable for soakaway design.

5.0 Recommendations and Conclusions

5.1 General

The recommendations given and opinions expressed in this report are based on the findings as detailed in the trial pit 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.

An allowable bearing capacity of 70kN/m² is recommended at a depth of 1.5m BGL for the foundations in the vicinity of BH1, TP1, TP2 & TP3. Any soft spots encountered at this depth should be excavated and replaced with lean mix concrete.

The foundations in the vicinity of TP4, TP5, TP6, TP7, TP8 & TP9 are recommended to be taken down below the deeper made ground deposits in this area to bear on the stiff cohesive deposits at 2.0m BGL where an allowable bearing capacity of 100kN/m² is recommended. The possibility for variation in the depth of the made ground in the vicinity of these foundations should be considered and foundation inspections should be carried out.

An allowable bearing capacity of 70kN/m² is recommended for the foundations in the vicinity of BH2, TP10, TP11, TP12 at 1.0m BGL while an increased value of 100kN/m² is recommended at 1.0m BGL for TP13, TP14 & TP16. Any soft spots encountered at this depth should be excavated and replaced with lean mix concrete.

Piled foundations are recommended for any development carried out in the vicinity of TP15 and BH3 where the base of the made ground was not proven, and extended to depths of 3.0 to 6.0m respectively. Further investigation should be carried out in these locations to assess the depth to a competent stratum and the nature of the ground for concrete specification and pile design.

An allowable bearing capacity of 70kN/m² is recommended for the foundations of the proposed semi-detached houses in the vicinity of TP17.

Excavations for services which are required to be go below the cohesive deposits may require temporary support and dewatering if they encounter the water bearing granular deposits.

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

NOTES

1. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS
3. STANDPIPES TO BE MIN. 150mm DIA. AND SUITABLY PROTECTED IN ACCORDANCE WITH THE ENGINEERING SPECIFICATION AND AS PER THE QUOTATIONS RECEIVED.



SITE INVESTIGATION LAYOUT

Location of Semi Detached Houses

LEGEND:

- TP INDICATES PROPOSED TRIAL PIT LOCATION AND DYNAMIC PENETROMETER LOCATION
- SK INDICATES SANDWICH TEST LOCATION
- SP INDICATES BOREHOLE & STANDPIPE LOCATION

NOTE: Probes A-D were carried out adjacent to TP17

REV. DATE	DESCRIPTION	DK	EL
A	UPDATED INVESTIGATION WORKS LOCATIONS	DK	EL
REV. DATE	DRN	APP.	
CAD REF: \\A\Projects\13\13-203\Coord\Structural\Sheets\			

STATUS	PRELIMINARY
--------	-------------

CLIENT	GERARD GANNON PROPERTIES ARCHITECT COK	TITLE	SITE INVESTIGATION LAYOUT
PROJECT	PLOT C & PLOT D, CLONGRIFIN DUBLIN 13	DRWN	DK
SCALE	NTS	DESIGNED	DK
JOB NO.	13-203	APPROVED	RO
DRG. NO.	SK02	DATE	25.11.2013
REVISION	A		

Waterman Moylan
 Engineering Consultants
 MARINE HOUSE CLANNAMILL PLACE DUBLIN 2
 Tel: (01) 664 8600 Fax: (01) 661 3048
 Email: info@waterman-moylan.ie www.waterman-moylan.ie

Appendix 2: Cable Percussion Records

Project Name: Plot C&D Clongriffin **Hole ID: BH1**

Client: Gannon Properties	Co-ordinates: -
Consultant: Waterman Moylan	Elevation: -
Location: Dublin	Project no. 4064-12-13
Start date: 08/01/2014	Drilled by: JMcArdle
End date: 09/01/2014	Logged by: F McNamara
Type of drilling: CP	Hole diameter: 200 mm

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of clay and cobbles								
Firm brown slightly sandy gravelly CLAY with occasional cobbles		0.80	1	SPT-C B	1.00 1.00	N=8		
Firm dark brown gravelly CLAY with occasional gravel lenses		2.00	2	SPT-C B	2.00 2.00	N=7	∇ 2.40	08/01/2014
Loose and dense dark brown clayey sandy GRAVEL		2.60	3	SPT-C B	3.00 3.00	N=18		
			4	SPT-C B	4.00 4.00	N=8		
			5	SPT-C B	5.00 5.00	N=15		
Obstruction - possible BOULDER		5.60		B	5.60			
End of Borehole at 5.70 m		5.70						
			6					
			7					
			8					
			9					

Remarks:
Standpipe installed to 5.6m BGL with pea gravel surround bentonite seal and cover




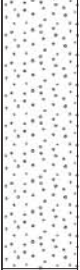
KEY

- B Bulk disturbed sample.
- D Small disturbed sample
- U Undisturbed sample
- SPT-S Standard Penetration Test, split spoon.
- SPT-C Standard Penetration Test, solid cone.
- ∇ Groundwater strike
- Water level 20mins after strike.



Project Name: Plot C&D Clongriffin **Hole ID: BH2**

Client: Gannon Properties	Co-ordinates: -
Consultant: Waterman Moylan	Elevation: -
Location: Dublin	Project no. 4064-12-13
Start date: 13/01/2014	Drilled by: JMcArdle
End date: 13/01/2014	Logged by: F McNamara
Type of drilling: CP	Hole diameter: 200 mm

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
Fill of brown clay and cobbles							▽ 0.00	13/01/2014
Firm dark brown slightly sandy gravelly CLAY		0.50		B	0.50			
		1		SPT-C B	1.00 1.00	N=8		
		2.00		SPT-C B	2.00 2.00	N=21		
Stiff dark brown sandy gravelly CLAY		2.80		B	2.60			
		3		SPT-C B	3.00 3.00	N=6		
Loose grey brown clayey slightly sandy fine & medium GRAVEL		4		SPT-C B	4.00 4.00	N=8		
		4.60		B	4.60			
End of Borehole at 4.60 m		5						
		6						
		7						
		8						
		9						

Remarks:
Standpipe installed to 4.60M BGL with pea gravel surround bentonite seal and cover.

KEY

- B Bulk disturbed sample.
- D Small disturbed sample
- U Undisturbed sample
- SPT-S Standard Penetration Test, split spoon.
- SPT-C Standard Penetration Test, solid cone.
- ▽ Groundwater strike
- Water level 20mins after strike.



Project Name: Plot C&D Clongriffin **Hole ID: BH3**

Client: Gannon Properties	Co-ordinates: -
Consultant: Waterman Moylan	Elevation: -
Location: Dublin	Project no. 4064-12-13
Start date: 07/01/2014	End date: 07/01/2014
Type of drilling: CP	Hole diameter: 200 mm
	Drilled by: J McArdle
	Logged by: F McNamara

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of brown clay and red brick fragments.	[Cross-hatch pattern]	1		SPT-C B	1.00 1.00	N=12	▽ 0.00	07/01/2014
FILL of brown and grey clay with glass fragments plastic bags.	[Dotted pattern]	1.70 2		B SPT-C B	1.70 2.00 2.00	N=14		
Possible FILL of soft dark brown gravelly clay.	[Cross-hatch pattern]	2.70 3		SPT-C B	3.00 3.00	N=8		
End of Borehole at 6.00 m	[Cross-hatch pattern]	4 5 6.00		SPT-C B SPT-C B	4.00 4.00 5.00 5.00 6.00 6.00	N=7 N=11 N=8		

Remarks:
Standpipe installed to 6.00m BGL with pea gravel surround bentonite seal and gravel.

KEY

- B Bulk disturbed sample.
- D Small disturbed sample
- U Undisturbed sample
- SPT-S Standard Penetration Test, split spoon.
- SPT-C Standard Penetration Test, solid cone.
- ▽ Groundwater strike
- Water level 20mins after strike.



Project Name: Plot C&D Clongriffin

Hole ID: BH4

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Start date: 08/04/2014
 Type of drilling: CP

End date: 08/04/2014
 Hole diameter: 200 mm

Co-ordinates: -
 Elevation: -
 Project no. 4064-12-13
 Drilled by: J McArdle
 Logged by: F McNamara

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
TOPSOIL		0.15					0.00	08/04/2014
Stiff brown Sandy gravelly CLAY		1.00		SPT-C B	1.00 1.00	N=10		
		1.60		B	1.60			
		2.00		SPT-C B	2.00 2.00	N=26		
Stiff dark brown slightly sandy gravelly CLAY		2.40						
		3.00		SPT-C B	3.00 3.00	N=34		
		4.00		SPT-C B	4.00 4.00	N=36		
		5.00		SPT-C B	5.00 5.00	N=41		
End of Borehole at 6.00 m		6.00		SPT-C B	6.00 6.00	N=41		

Remarks:
 Standpipe installed to 6.0m BGL with pea gravel surround bentonite seal and cover.

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample
 SPT-S Standard Penetration Test, split spoon.
 SPT-C Standard Penetration Test, solid cone.
 Groundwater strike
 Water level 20mins after strike.



Appendix 2: Trial Pit Records



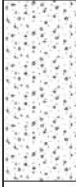
TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 1

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 09/01/2014
 Excavator used: JCB

Co-ordinates: -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S.Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests		Water Depth	Date
				Type	Depth		
FILL of clay and gravel					0.00		
Firm brown slightly sandy slightly gravelly CLAY with occasional cobbles		0.30					
Dense brown fine to coarse angular to sub-angular clayey SAND with occasional cobbles		1.90				∇ 1.90	09/01/2014
End of Trial pit at 2.50 m		2.50					
		3					
		4					

Remarks:
 Stability: Trial pit stable
 Water: Trickle at 1.9m
 Remarks: Trial pit terminated at 2.5m due to flowing sandy gravel

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth:
 2.50



TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 2

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 09/01/2014
 Excavator used: JCB

Co-ordinates: -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S.Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of clay and gravel								
Firm to stiff brown sandy gravelly CLAY with occasional cobbles		0.25						
Dense brown fine to coarse angular to sub-angular clayey SAND with occasional cobbles		1.80						
End of Trial pit at 2.20 m		2.20				∇ 2.20	09/01/2014	
		3						
		4						

Remarks:
 Stability: Trial pit stable
 Water: Flowing at 2.20m
 Remarks: Trial pit terminated due to flowing sandy gravel

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth:



TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 3

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 09/01/2014
 Excavator used: JCB

Co-ordinates: -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S.Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of clay and gravel	[Cross-hatch pattern]							
Stiff to firm brown sandy gravelly CLAY with occasional cobbles	[Dotted pattern]	0.30						
Dense brown fine to coarse angular to sub-angular clayey SAND with occasional cobbles	[Dotted pattern]	1.60						
End of Trial pit at 2.20 m		2.20				∇ 2.20	09/01/2014	
		3						
		4						

Remarks:
 Stability: Trial pit stable
 Water: Flowing 2.20m
 Remarks: Trial pit terminated at 2.20m due to flowing sandy gravel

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth:



TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 4

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 10/01/2014
 Excavator used: JCB

Co-ordinates: -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S. Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of clay and gravel	[Cross-hatch pattern]	1						
Firm to stiff brown slightly sandy slightly gravelly CLAY with occasional cobbles	[Dotted pattern]	1.40				∇ 1.60	10/01/2014	
Medium dense brown fine to coarse angular to sub-angular clayey SAND with occasional cobbles	[Dotted pattern]	2.10						
End of Trial pit at 2.50 m	[Dotted pattern]	2.50				∇ 2.40	10/01/2014	
		3						
		4						

Remarks:
 Stability: Trial pit stable
 Water: Trickle at 1.6m, Flowing at 2.40 m
 Remarks: Trial pit terminated at 2.50m due to flowing sandy gravel

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth:



TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 5

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 09/01/2014
 Excavator used: JCB

Co-ordinates: -
 -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S. Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests		Water Depth	Date
				Type	Depth		
FILL of clay and gravel containing roots and wires	[Cross-hatch pattern]	0.00		B			
Firm brown slightly sandy gravelly CLAY with occasional cobbles	[Dotted pattern]	1.90				∇ 1.90	09/01/2014
Stiff brown slightly sandy gravelly CLAY with occasional cobbles	[Dotted pattern]	2.40					
End of Trial pit at 2.90 m	[Dotted pattern]	2.90					
		3					
		4					

Remarks:
 Stability: Trial pit stable
 Water: Trickle at 1.9m
 Remarks: Trial pit terminated at 2.9m

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth:



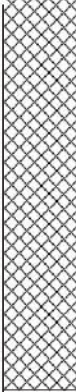
TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 6

Client: Gannon Properties
Consultant: Waterman Moylan
Location: Dublin
Date: 10/01/2014
Excavator used: JCB

Co-ordinates: -
Elevation: -
Project no. 4064-12-13
Logged by: S. Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of clay and gravel containing wire and plastic							0.00	10/01/2014
End of Trial pit at 1.30 m			1.30					

Remarks:

Stability: Stable
Water: No groundwater
Remarks: Trial pit terminated at 1.30m due to ESB lines located 1m in front of the back fence.

KEY

- B Bulk disturbed sample.
- D Small disturbed sample
- U Undisturbed sample

Dimensions:
Depth:






TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 7

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 10/01/2014
 Excavator used: JCB

Co-ordinates: -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S. Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of clay and gravel containing plastic bags and golf balls		0.00		D				
Stiff brown slightly sandy gravelly CLAY		1.80						
Brown fine to coarse angular to sub-angular clayey SAND with occasional cobbles End of Trial pit at 2.40 m		2.20				2.20	10/01/2014	

Remarks:
 Stability: Trial pit stable
 Water: Flowing at 2.20
 Remarks: Trial pit terminated at 2.40m due to flowing sandy gravel

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth:



TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 8

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 09/01/2014
 Excavator used: JCB

Co-ordinates: -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S. Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of clay gravel and cobbles	[Pattern]	0	0				0.80	09/01/2014
Stiff light brown slightly sandy slightly gravelly CLAY with occasional cobbles	[Pattern]	1.60						
Dense grey/brown fine to coarse rounded to sub angular GRAVEL with possible clay lenses	[Pattern]	2.30						
End of Trial pit at 2.70 m		2.70						
		3						
		4						

Remarks:
 Stability: Trial pit stable
 Water: Flowing at 0.80m from halfway down in the fill possibly surface water runoff
 Remarks: Trial pit terminated at 2.70

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth:



TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 9

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 10/01/2014
 Excavator used: JCB

Co-ordinates: -
 -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S. Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of clay gravel and sand	[Pattern]	1	1.30					
Medium dense brown fine to coarse sub-rounded to angular clayey gravelly SAND with occasional cobbles	[Pattern]	1.60	1.70			Σ	10/01/2014	
Stiff brown slightly gravelly sandy CLAY with possible sand lenses	[Pattern]	2	2.90					
End of Trial pit at 2.90 m	[Pattern]	3	4					

Remarks:
 Stability: Trial pit stable
 Water: Trickle at 1.7m
 Remarks: Trial pit terminated at 2.90m

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth:




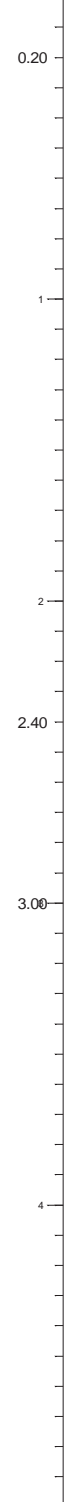
TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 10

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 10/01/2014
 Excavator used: JCB

Co-ordinates: -
 -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S. Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of sand gravel and clay <hr/> Stiff brown slightly sandy gravelly CLAY with occasional cobbles. <hr/> Medium dense brown fine to coarse angular to sub-angular clayey gravelly sand with occasional cobbles <hr/> End of Trial pit at 3.00 m			0.20				∇ 1.30	10/01/2014

Remarks:
 Stability: Trial pit stable
 Water: Trickle at 1.30m
 Remarks: Trial pit terminated at 3.0m

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth:



TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 11

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 10/01/2014
 Excavator used:

Co-ordinates: -
 -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S. Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of gravel and sand	[Cross-hatch pattern]							
Firm to stiff slightly sandy gravelly CLAY with possible sand lenses and occasional cobbles	[Stippled pattern]	0.60						
End of Trial pit at 2.90 m		2.90						
		3						
		4						

Remarks:
 Stability: Trial pit stable
 Water: No groundwater
 Remarks: Trial pit terminated at 2.90m

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth: -
 2.90



TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 12

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 09/01/2014
 Excavator used: JCB

Co-ordinates: -
 -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S. Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests		Water Depth	Date
				Type	Depth		
FILL of sand and gravel containing pieces of wire	[Cross-hatch pattern]			D	0.00		
Firm to stiff brown sandy gravelly CLAY with occasional cobbles	[Stippled pattern]	0.25					
		1					
		2					
		2.60				▽ 2.25	09/01/2014
End of Trial pit at 2.60 m		3					
		4					

Remarks:
 Stability: Trial pit stable
 Water: Trickle at 2.25m
 Remarks: Trial pit terminated at 2.60m

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth:





TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 13

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 10/01/2014
 Excavator used: JCB

Co-ordinates: -
 -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S. Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of clay sand and gravel <hr/> Firm to stiff slightly sandy slightly gravelly CLAY with occasional cobbles								
End of Trial pit at 3.00 m		3.00						

Remarks:
 Stability: Trial pit stable
 Water: No groundwater
 Remarks: Trial pit terminated 3.0m

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth:



TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 14

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 09/01/2014
 Excavator used: JCB

Co-ordinates: -
 -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S. Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of gravel and cobbles	[Cross-hatch pattern]							
Stiff brown slightly sandy gravelly CLAY with occasional cobbles	[Dotted pattern]	0.60						
Firm light brown slightly sandy gravelly CLAY	[Dotted pattern]	1.80						
Medium to Dense brown fine to coarse grained angular to sub-angular SAND with clay lenses and occasional cobbles	[Dotted pattern]	2.20				∇ 2.20	09/01/2014	
End of Trial pit at 2.80 m	[Dotted pattern]	2.80						
		3						
		4						

Remarks:
 Stability: Trial pit stable
 Water: Strong flow at 2.20m
 Remarks: Trial pit terminated at 2.8m due to flowing sand and gravel

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth:



TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 15

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 10/01/2014
 Excavator used: JCB

Co-ordinates: -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S .Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests		Water Depth	Date
				Type	Depth		
FILL of brown sand and gravel with metal pipes, plastic bags and pieces of trees		0.40 0.40		D D			
End of Trial pit at 3.00 m		1.80 2.80				10/01/2014 10/01/2014	

Remarks:
 Stability: Left side collapsed at 1m
 Water: Trickle at 1.80m and flowing at 2.8m
 Remarks: Trial pit terminated at 2.80m

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth:



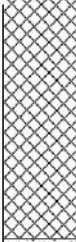


TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: TRIAL PIT 17

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 09/01/2014
 Excavator used:

Co-ordinates: -
 -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S. Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of clay and gravel								
Firm brown slightly sandy slightly gravelly CLAY		0.80	1					
Medium dense brown clayey SAND and GRAVEL (flowing)		2.00						
End of Trial pit at 2.50 m		2.50				∇ 2.50	09/01/2014	
		3						
		4						

Remarks:
 Stability: Stable
 Water: Flowing at 2.5
 Remarks: Trial pit terminated at 2.5m due to flowing sandy gravel

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions:
 Depth:
 2.50



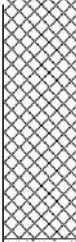


TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: S1

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 09/01/2014
 Excavator used: JCB

Co-ordinates: -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S.Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of clay and cobbles								
Firm to stiff brown slightly sandy gravelly CLAY		0.80						
Brown slightly clayey sandy GRAVEL End of Trial pit at 1.70 m		1.60 1.70				∇ 1.60	09/01/2014	
		2						
		3						
		4						

Remarks:
 Stability: Stable
 Water: Trickle at 1.6m
 Remarks:

KEY

B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample

Dimensions: 2.14
 Depth: 0.63



TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: S2

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 09/01/2014
 Excavator used: JCB

Co-ordinates: -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S. Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
FILL of topsoil and clay	[Cross-hatched pattern]	0.30						
Firm to stiff slightly sandy gravelly CLAY	[Stippled pattern]	1						
End of Trial pit at 1.70 m		1.70						
		2						
		3						
		4						

Remarks:
 Stability: Stable
 Water: No groundwater
 Remarks:

KEY
 B Bulk disturbed sample.
 D Small disturbed sample
 U Undisturbed sample





TRIAL PIT RECORD

Project Name: Plot C&D Clongriffin

Hole ID: S3

Client: Gannon Properties
 Consultant: Waterman Moylan
 Location: Dublin
 Date: 09/01/2014
 Excavator used: JCB

Co-ordinates: -
 Elevation: -
 Project no. 4064-12-13
 Logged by: S. Kealy

Strata Description	Legend	Depth	Level (mOD)	Samples / tests			Water Depth	Date
				Type	Depth	Result		
<p>TOPSOIL</p> <hr/> <p>Stiff brown slightly sandy gravelly CLAY with occasional cobbles</p> <hr style="border-top: 1px dashed black;"/> <p style="text-align: center;">End of Trial pit at 1.70 m</p>								

Remarks:
 Stability: Stable
 Water: No groundwater
 Remarks:

KEY

- B Bulk disturbed sample.
- D Small disturbed sample
- U Undisturbed sample

Dimensions: 2.30
 Depth: 0.54



Appendix 3: Dynamic Probe Records

DYNAMIC PROBING LOG

Probe No **DP A**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

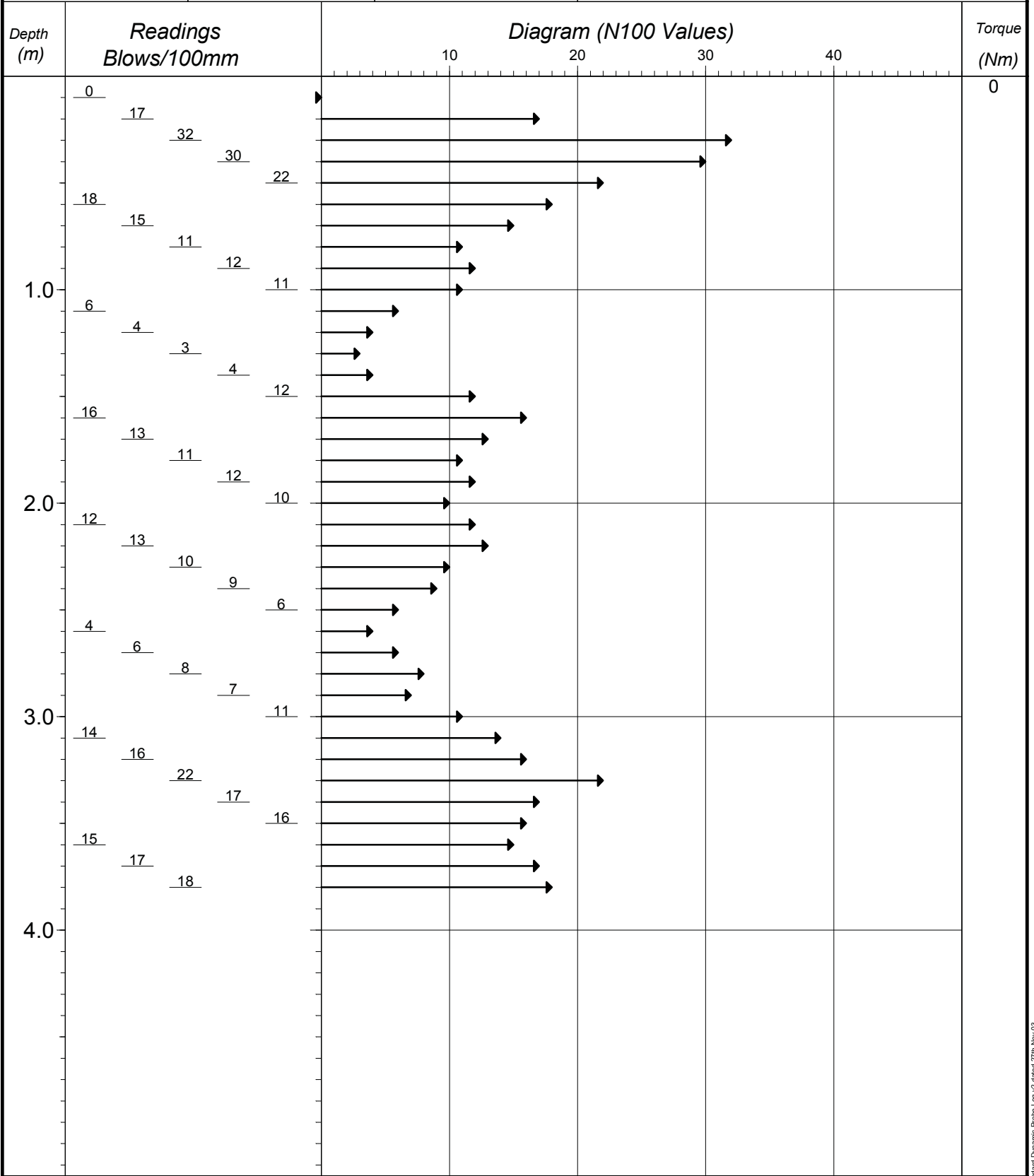
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **10/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:
Refusal at 3.80mBGL, 30Blows

Fall Height **500mm**
Hammer Wt **50 Kg**
Probe Type **DCP**

Cone Base Diameter **43.7mm**
Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP B**

Client **Gannon Properties**

Sheet 1 of 1

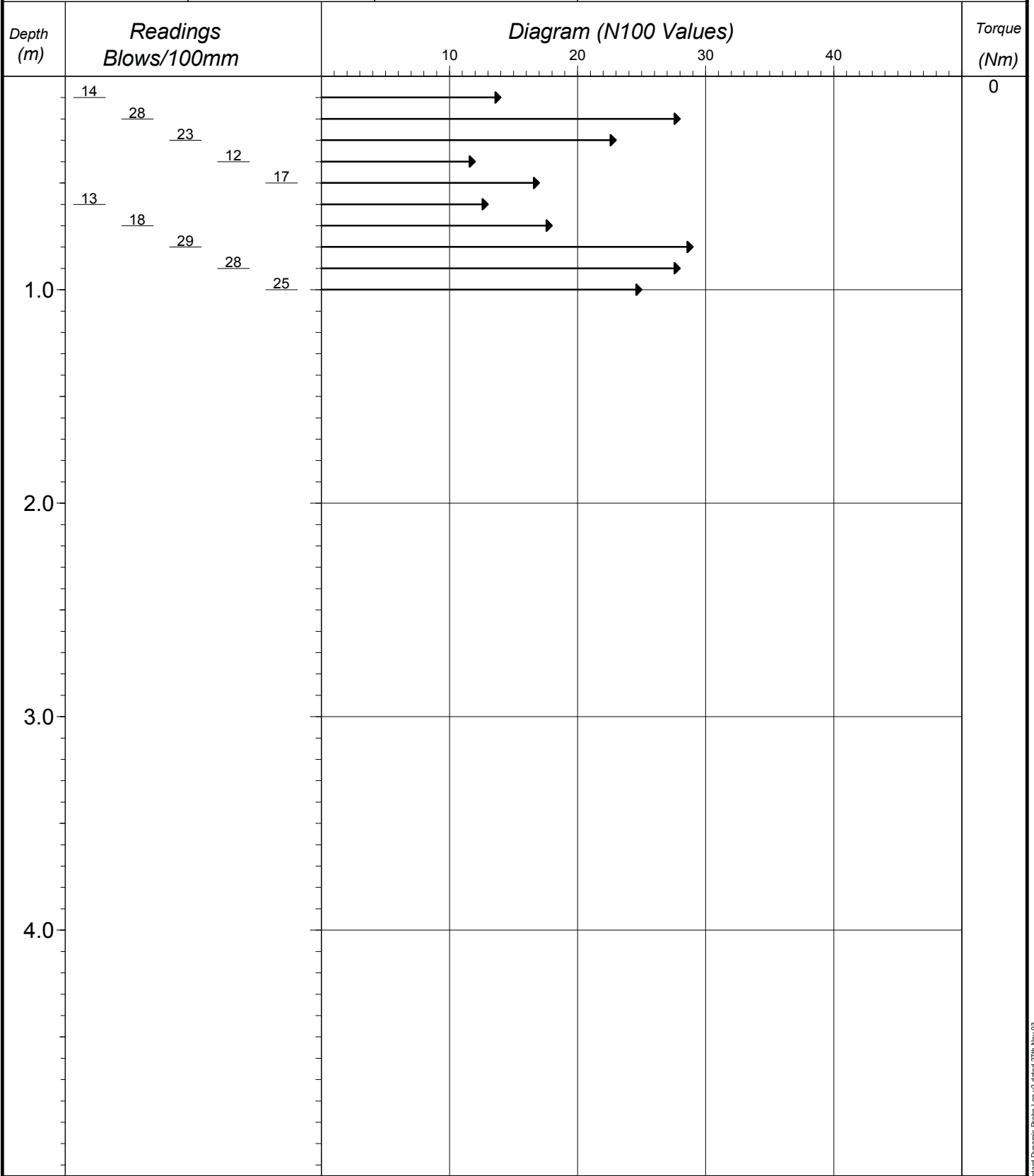
Consultant **Waterman Moylan**

Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **10/01/2014**

E - N - Level - Logged by **J. McArdle**



Remarks:
Refusal at 1.00mBGL, 33 Blows

Fall Height **500mm**
Hammer Wt **50 Kg**
Probe Type **DCP**

Cone Base Diameter **43.7mm**
Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP C**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

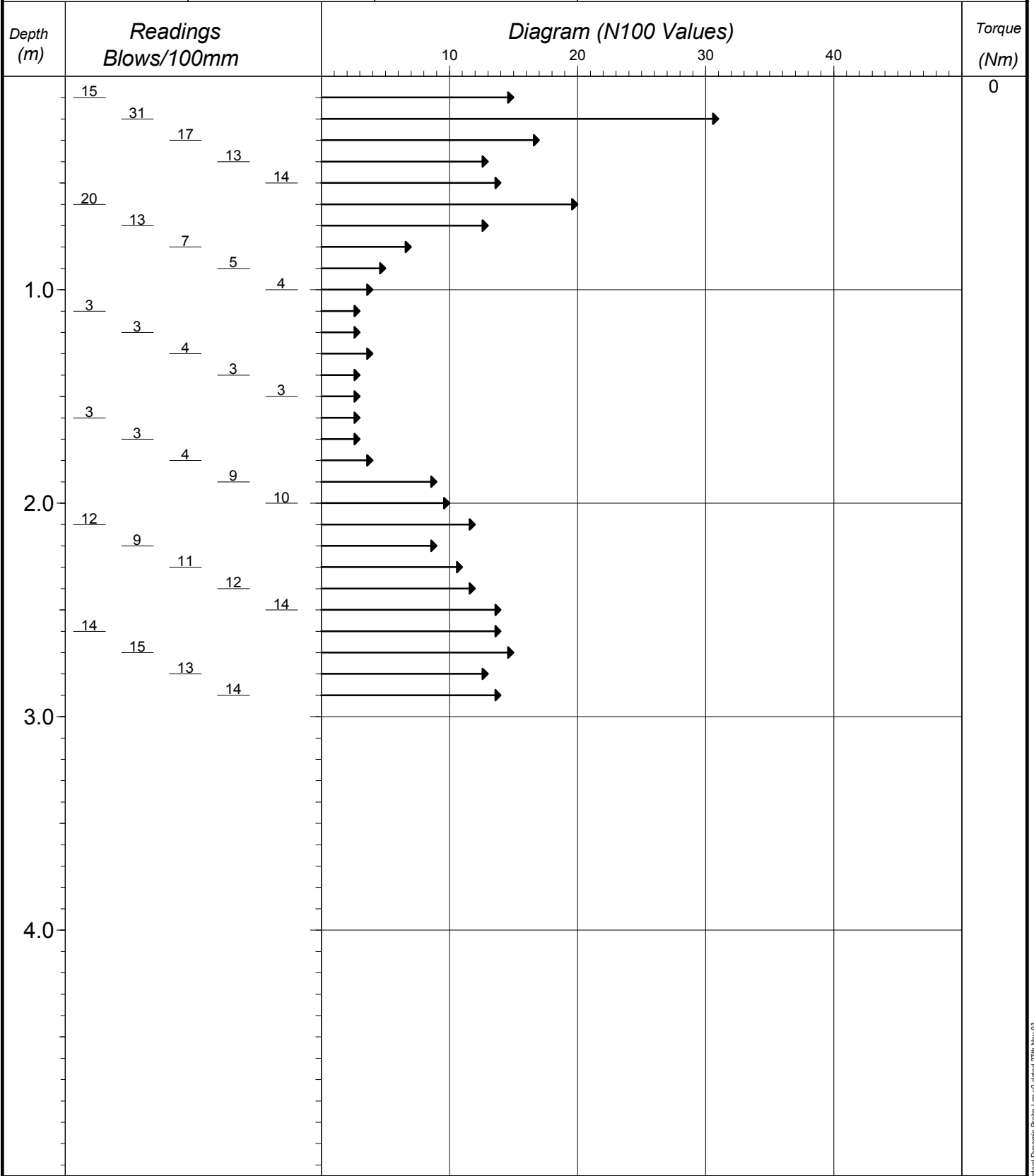
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **10/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:
Refusal at 2.90mBGL , 30 Blows

Fall Height **500mm**
Hammer Wt **50 Kg**
Probe Type **DCP**

Cone Base Diameter **43.7mm**
Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP D**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

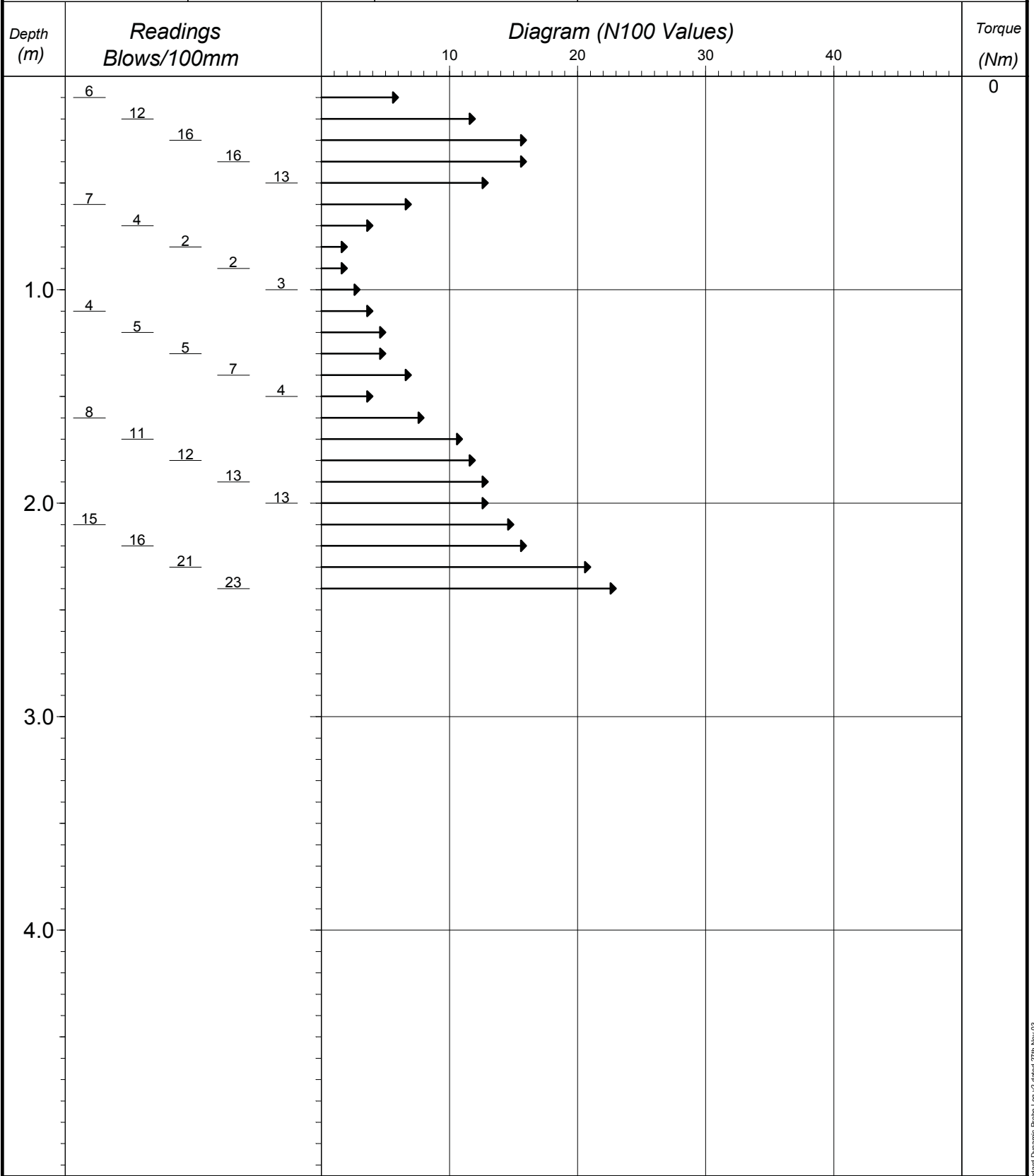
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **10/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:
Refusal at 2.40mBGL, 30 Blows

Fall Height **500mm**
Hammer Wt **50 Kg**
Probe Type **DCP**

Cone Base Diameter **43.7mm**
Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP1**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

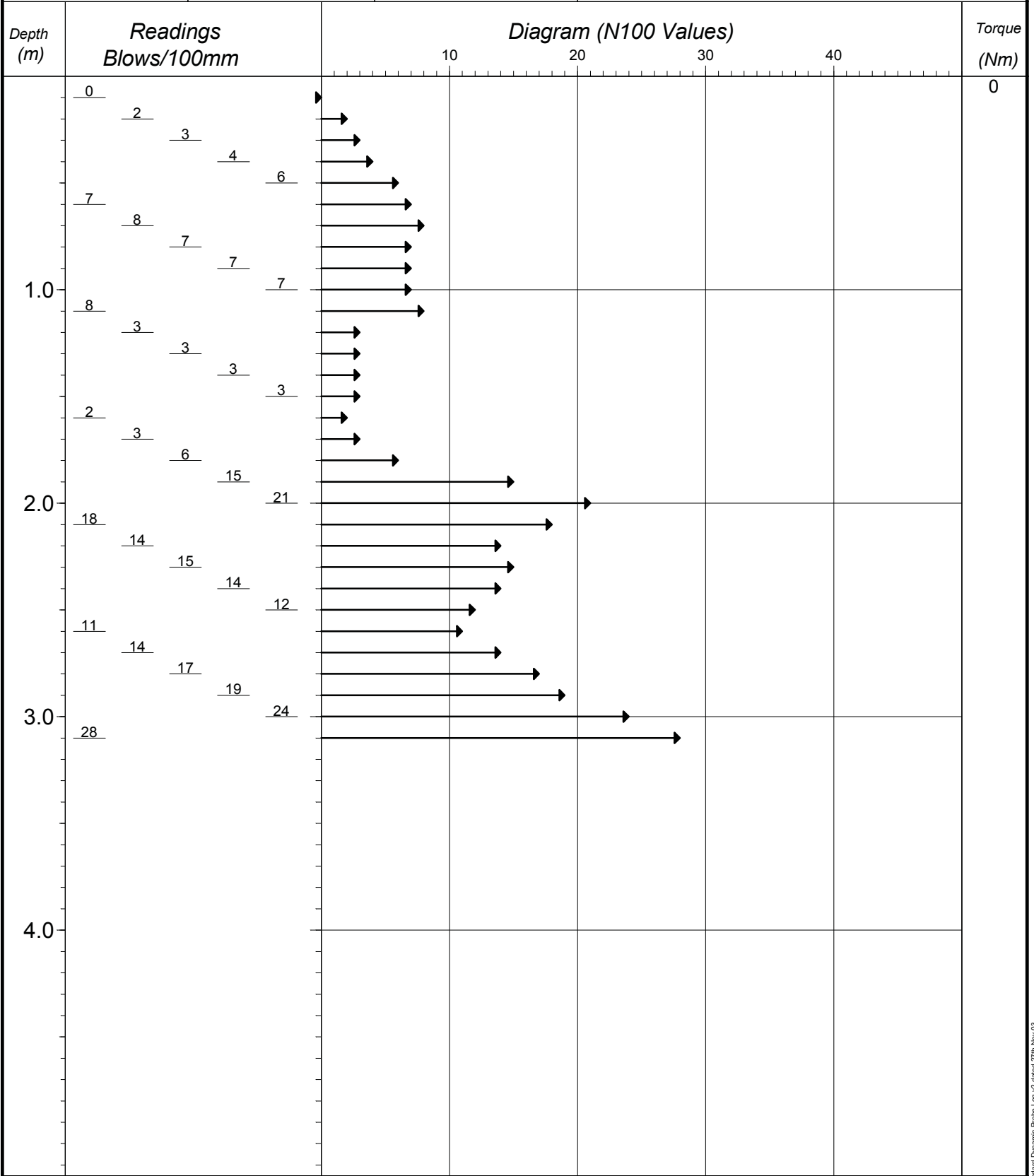
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **10/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:
Refusal at 3.10mBGL, 35 Blows

Fall Height **500mm**
Hammer Wt **50 Kg**
Probe Type **DCP**

Cone Base Diameter **43.7mm**
Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP2**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

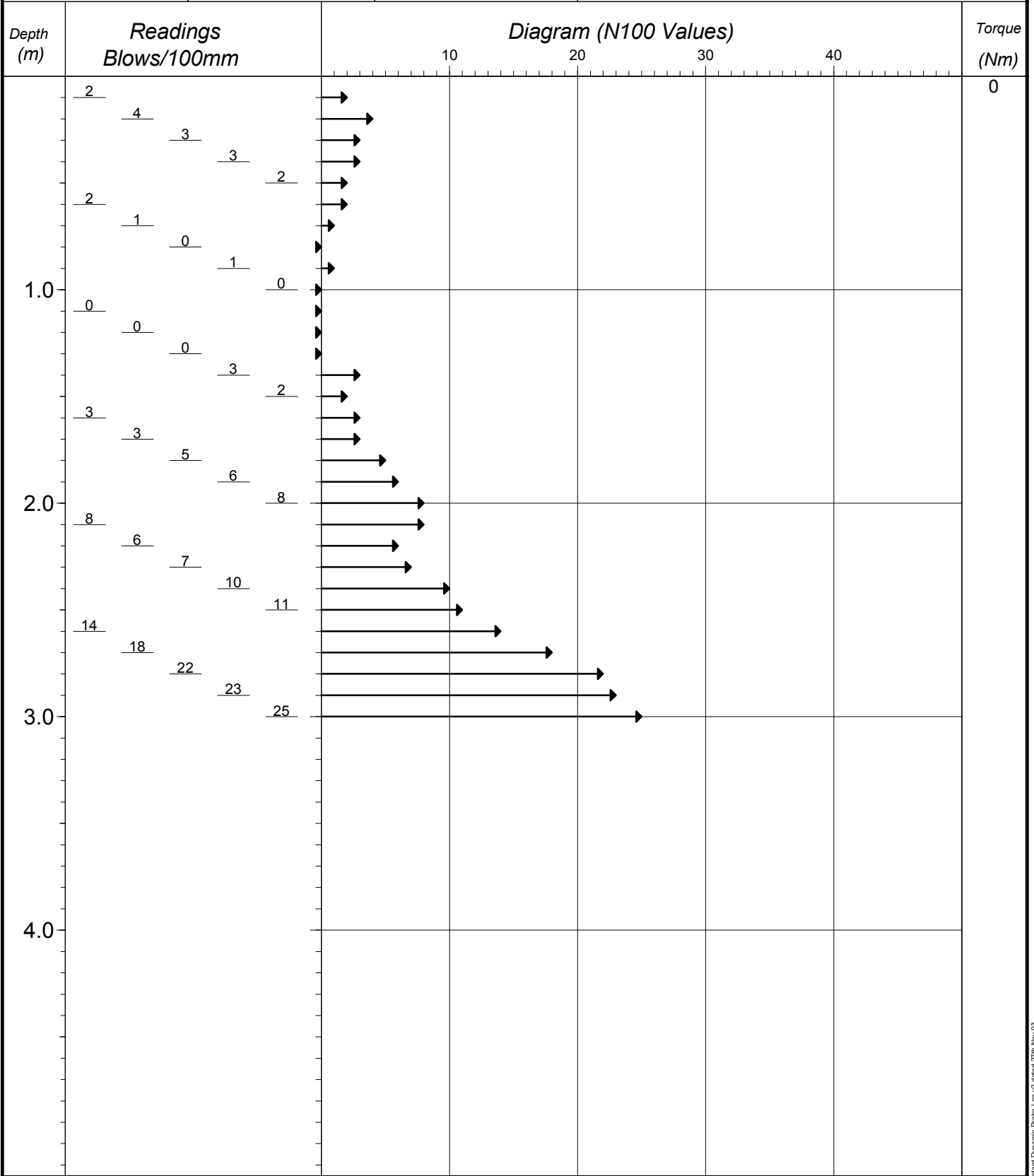
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **14/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:

Fall Height **500mm**
 Hammer Wt **50 Kg**
 Probe Type **DCP**

Cone Base Diameter **43.7mm**
 Log Scale **1:25**



HOMEBASE III (Bld. 426-48) Standard Dynamic Probe Log v2 dated 27th Nov 03

DYNAMIC PROBING LOG

Probe No **DP3**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

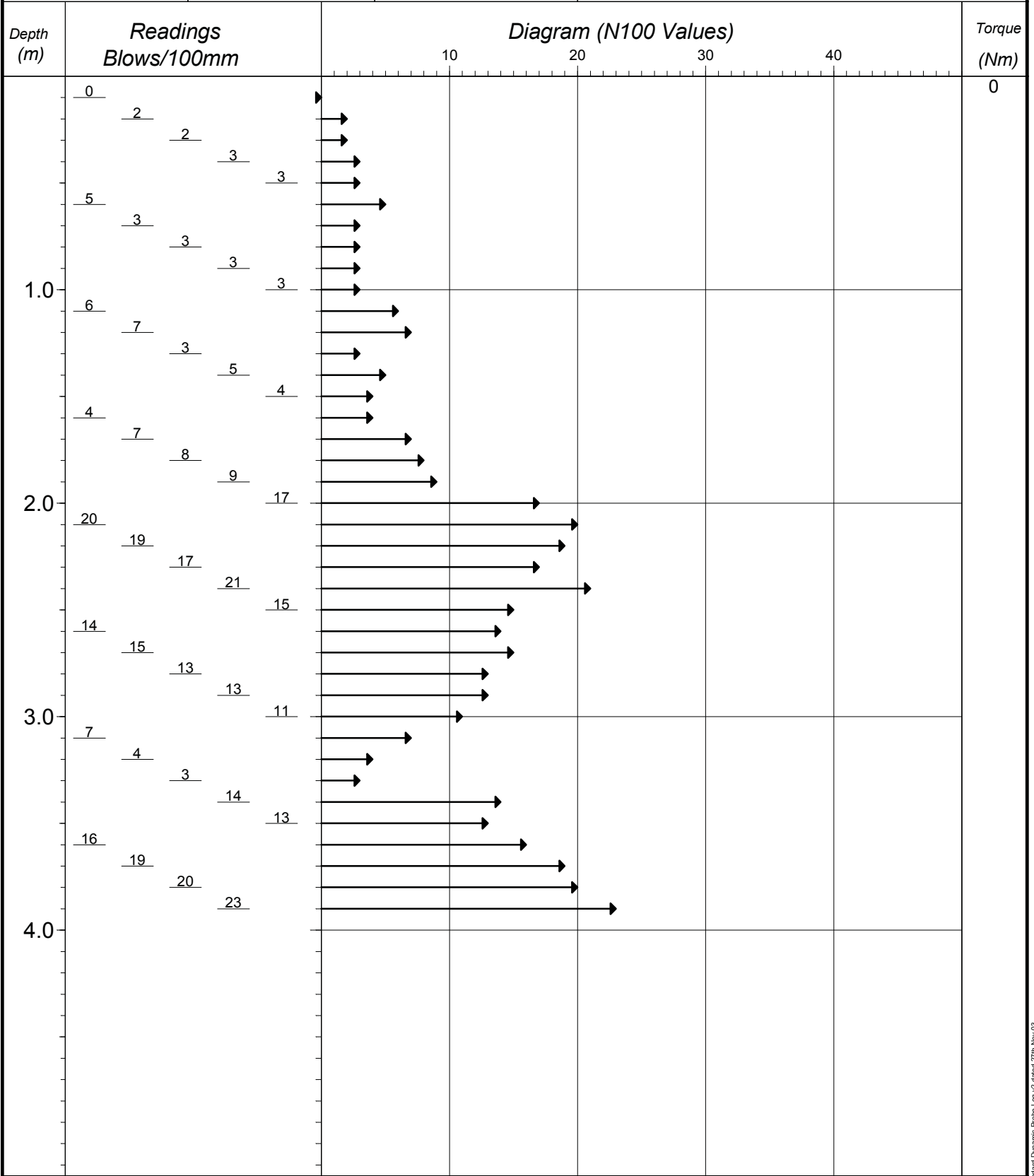
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **10/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:
Refusal at 3.90mBGL, 36 blows

Fall Height **500mm**
Hammer Wt **50 Kg**
Probe Type **DCP**

Cone Base Diameter **43.7mm**
Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP4**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

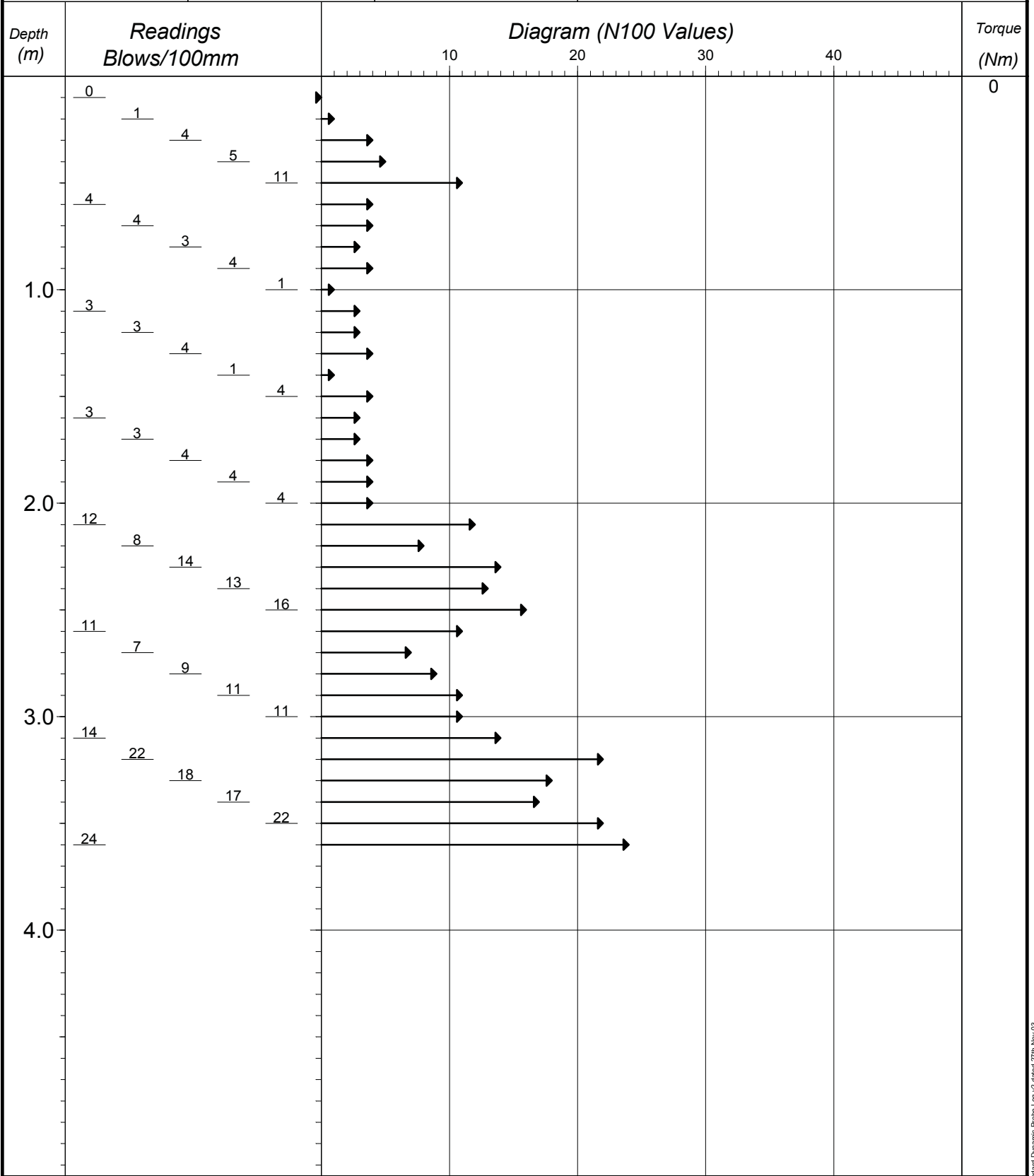
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **10/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:
Refusal at 3.60mBGL 30 Blows

Fall Height	500mm
Hammer Wt	50 Kg
Probe Type	DCP

Cone Base Diameter	43.7mm
Log Scale	1:25



DYNAMIC PROBING LOG

Probe No **DP5**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

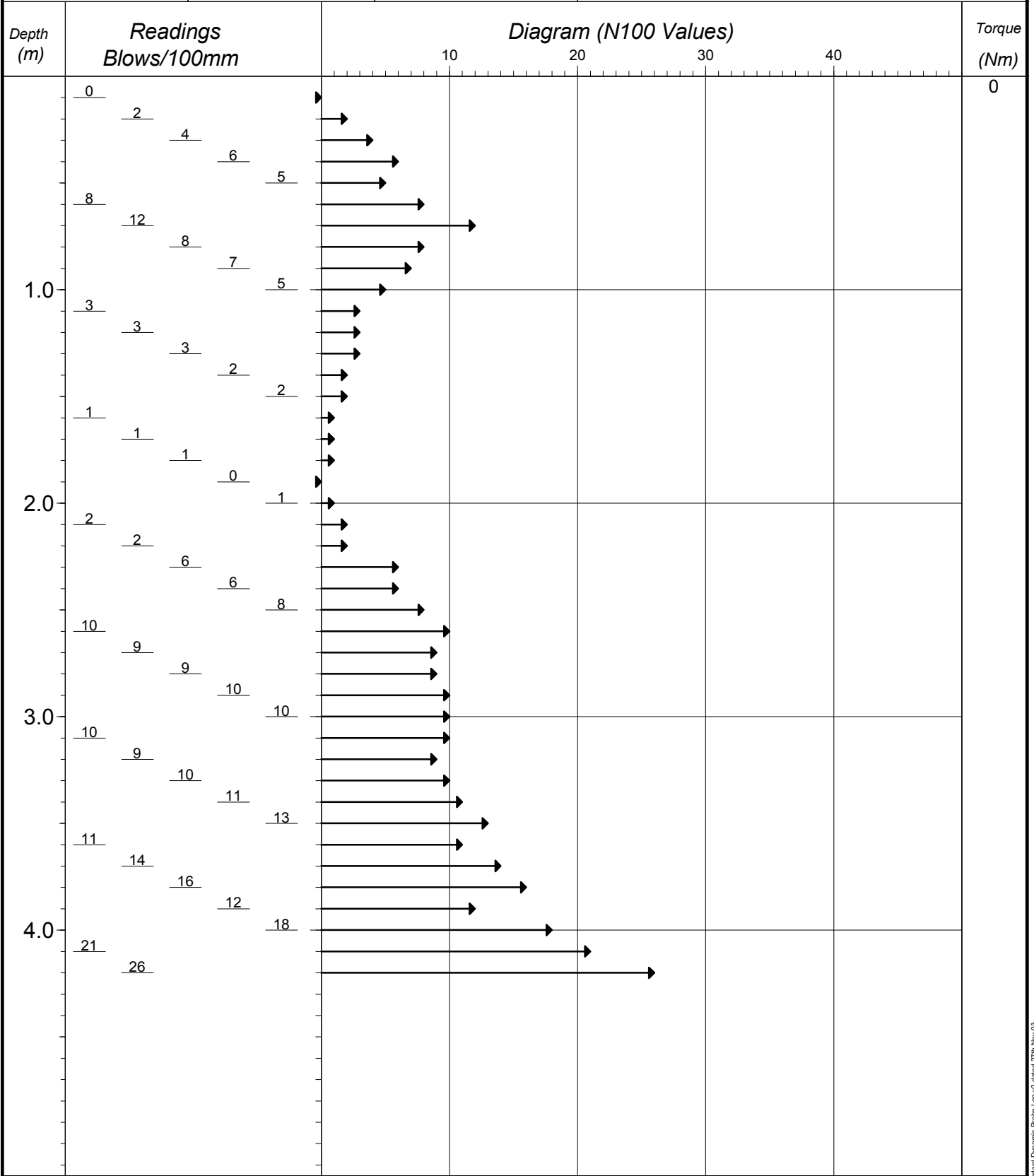
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **10/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:
Refusal at 4.20mBGL 35 Blows

Fall Height **500mm**
Hammer Wt **50 Kg**
Probe Type **DCP**

Cone Base Diameter **43.7mm**
Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP6**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

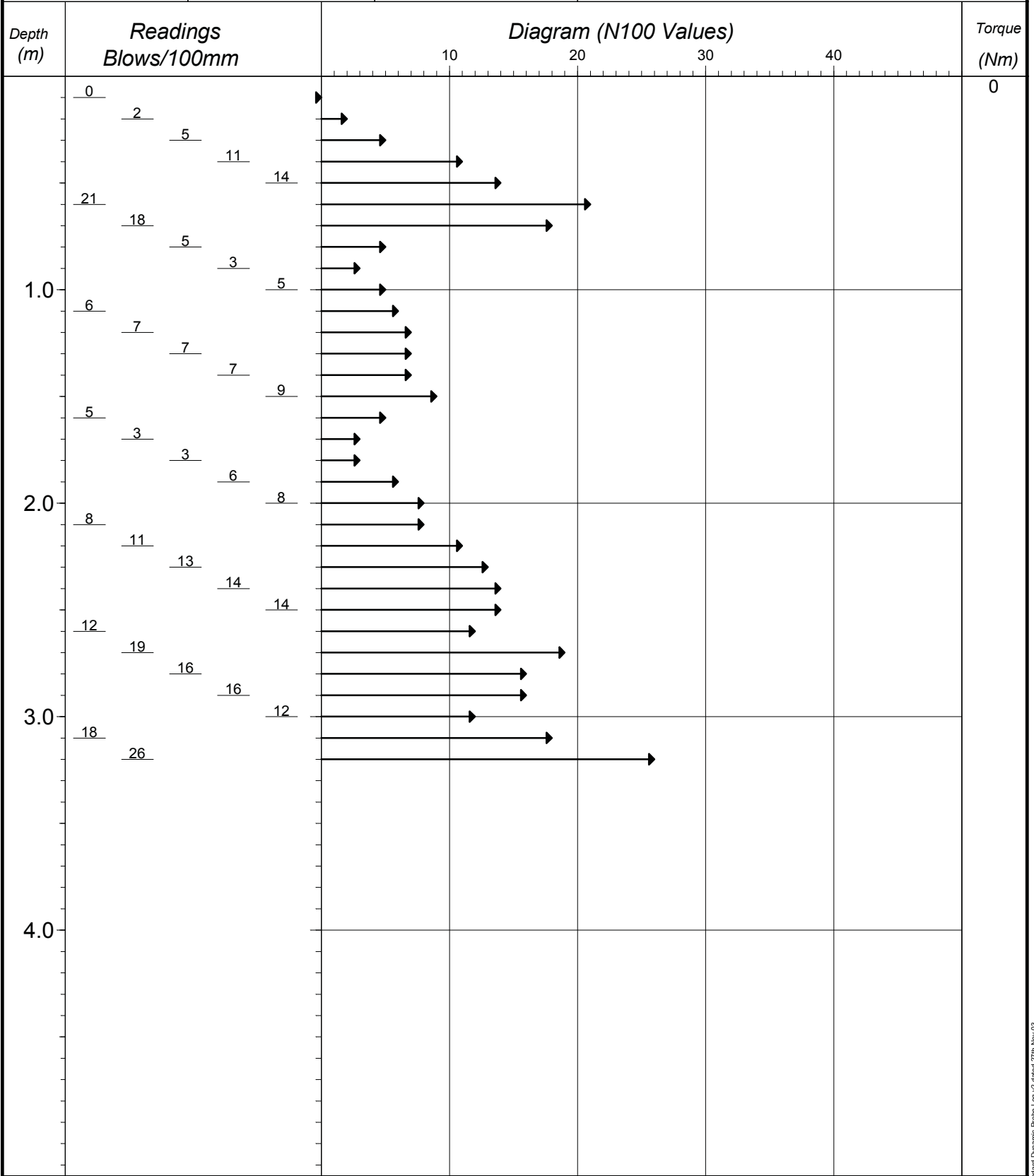
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **10/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:
Refusal at 3.20mBGL 28 Blows

Fall Height	500mm
Hammer Wt	50 Kg
Probe Type	DCP

Cone Base Diameter	43.7mm
Log Scale	1:25



DYNAMIC PROBING LOG

Probe No **DP7**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

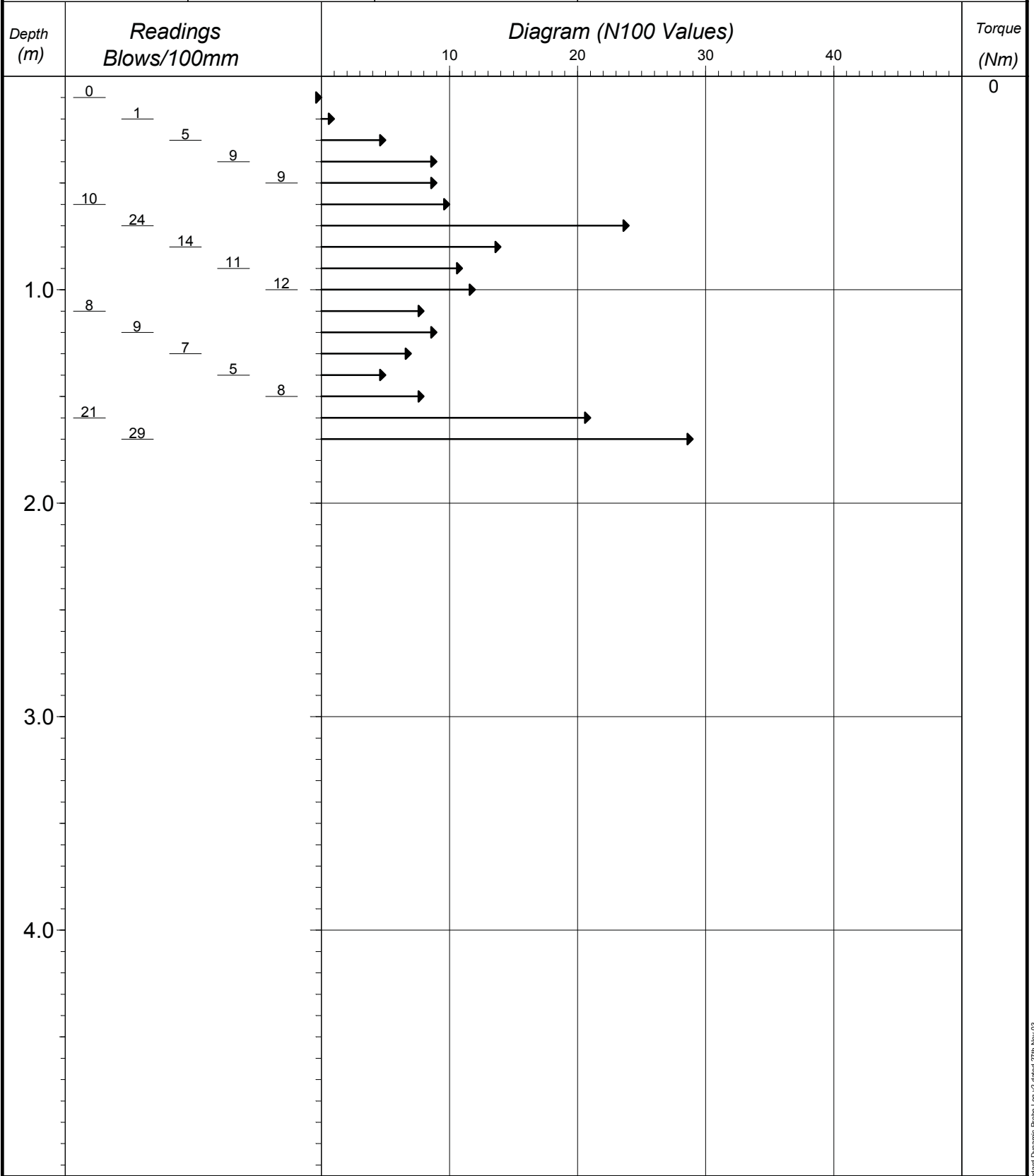
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **10/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:
Refusal at 1.70mBGL 30 Blows

Fall Height **500mm**
Hammer Wt **50 Kg**
Probe Type **DCP**

Cone Base Diameter **43.7mm**
Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP8**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

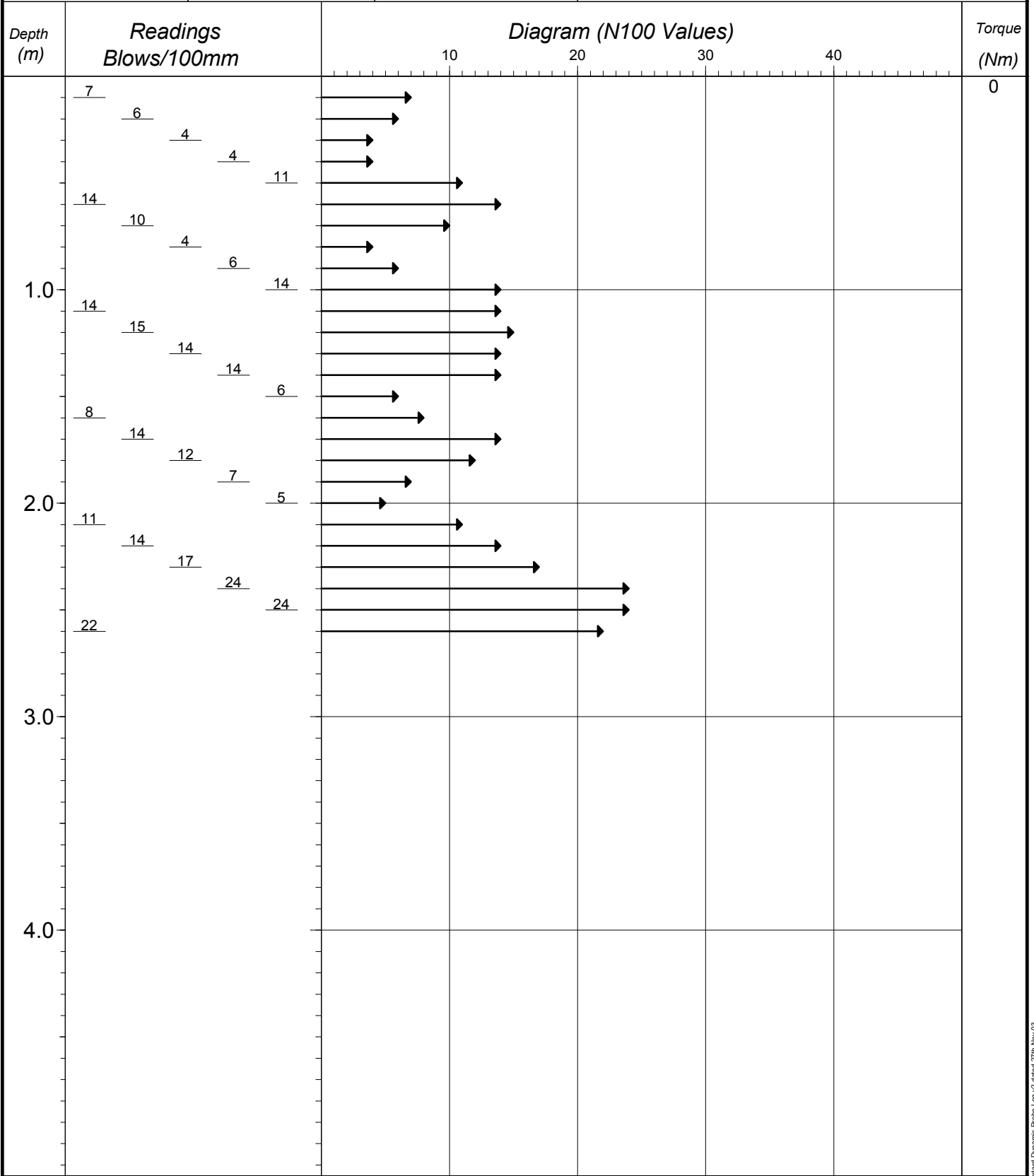
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **14/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:

Fall Height **500mm**
 Hammer Wt **50 Kg**
 Probe Type **DCP**

Cone Base Diameter **43.7mm**
 Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP9**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

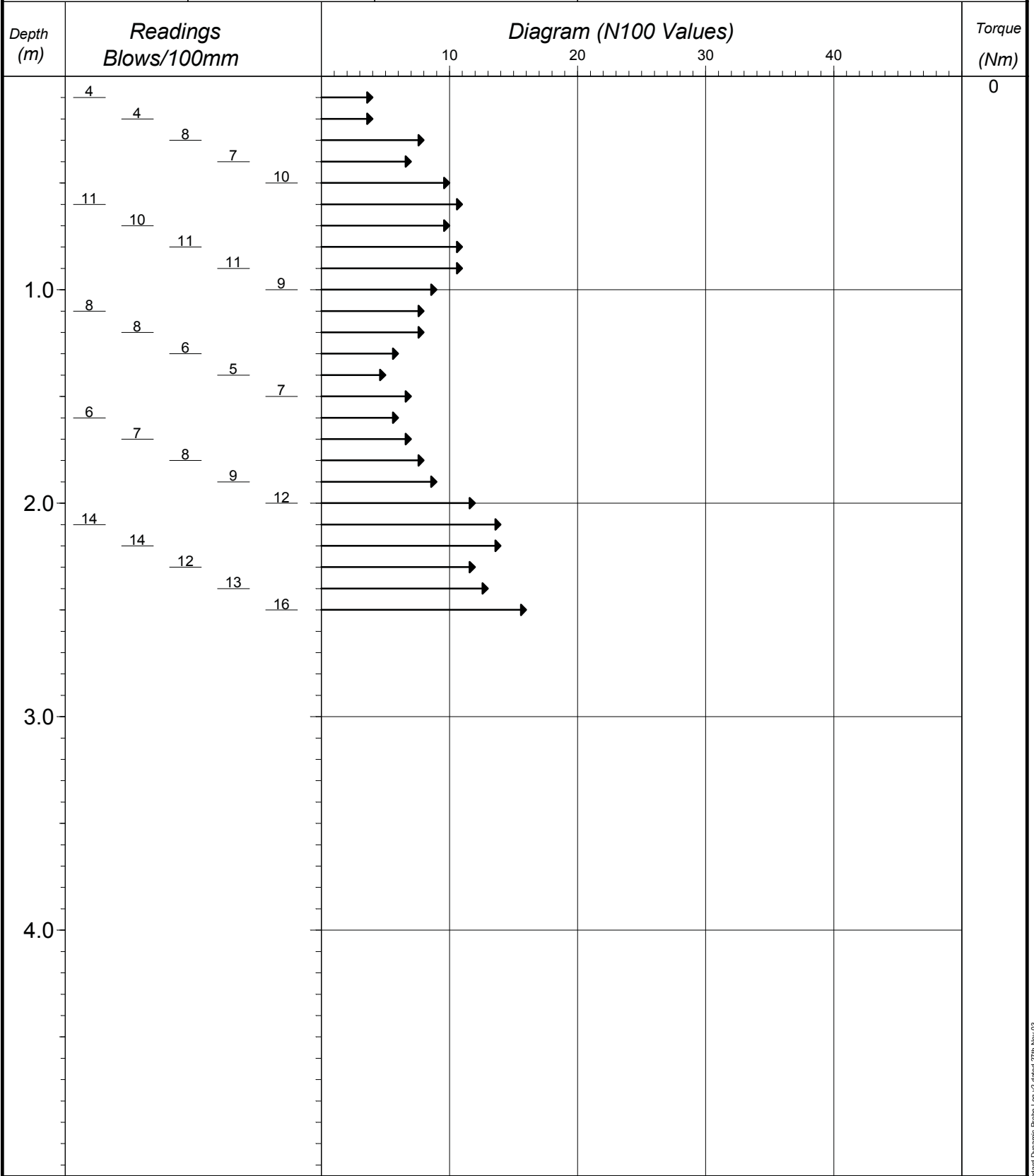
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **14/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:
Refusal at 2.50mBGL , 30 Blows

Fall Height **500mm**
Hammer Wt **50 Kg**
Probe Type **DCP**

Cone Base Diameter **43.7mm**
Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP10**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

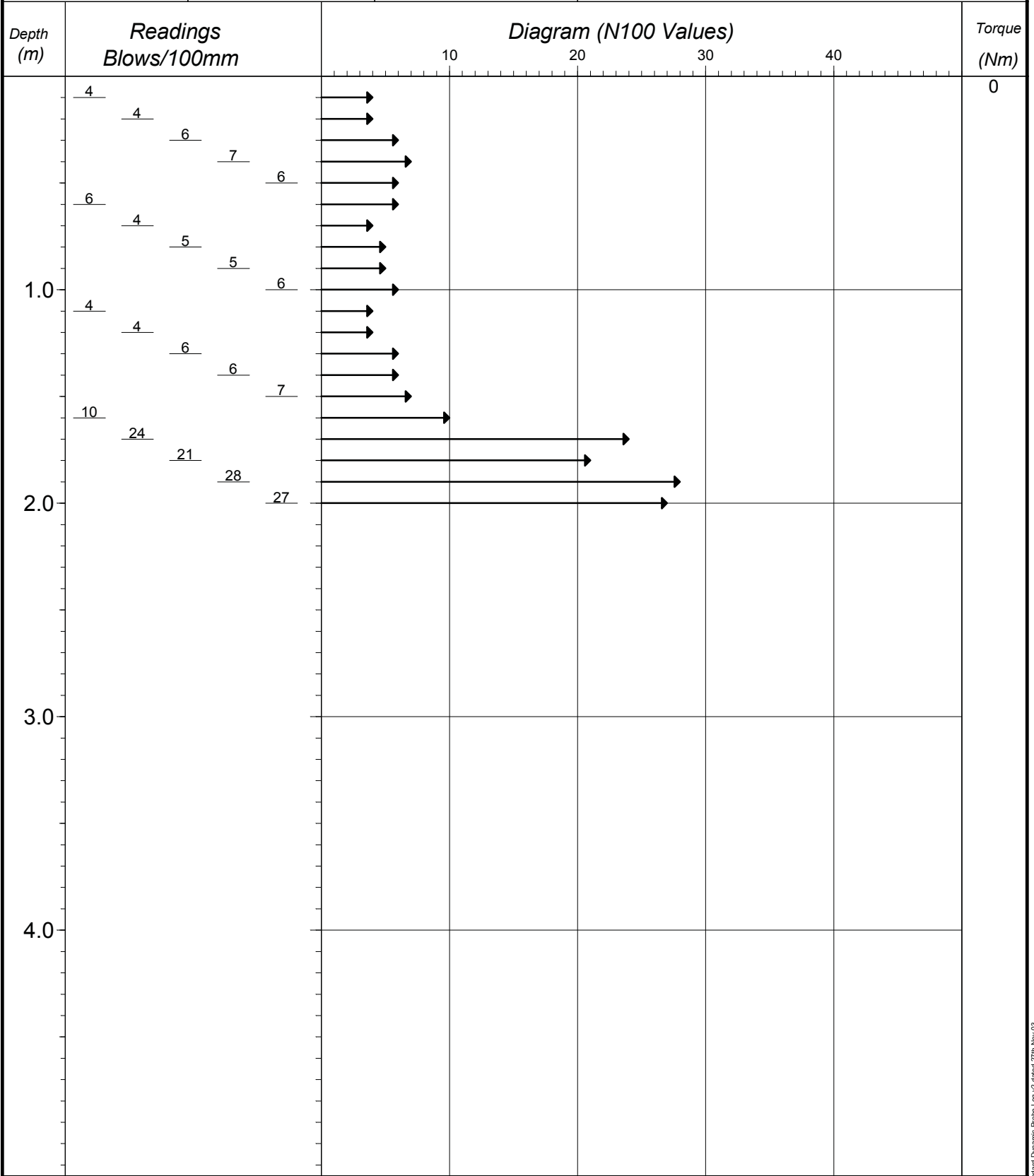
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **14/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:

Fall Height **500mm**
 Hammer Wt **50 Kg**
 Probe Type **DCP**

Cone Base Diameter **43.7mm**
 Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP11**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

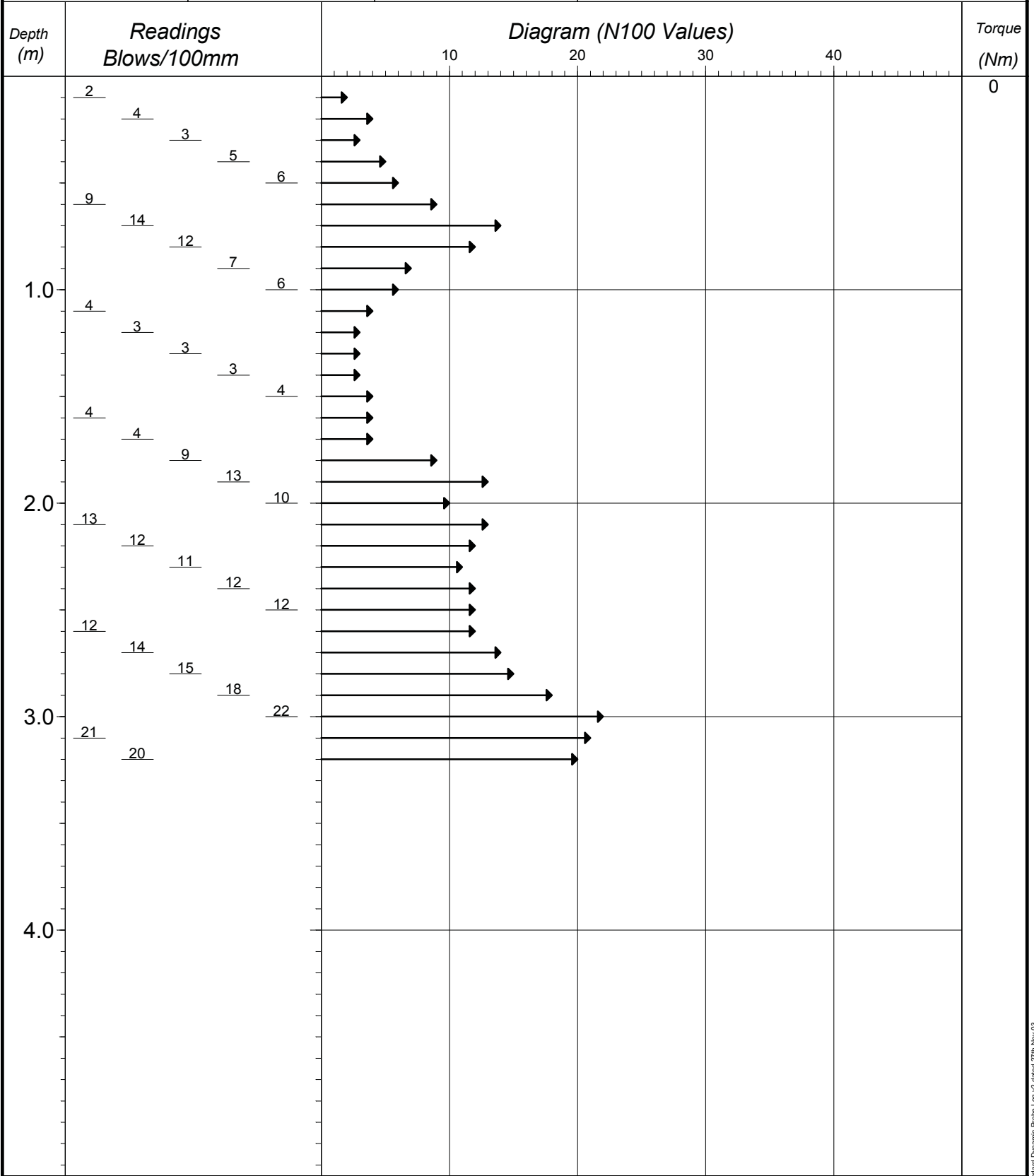
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **14/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:

Fall Height **500mm**
 Hammer Wt **50 Kg**
 Probe Type **DCP**

Cone Base Diameter **43.7mm**
 Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP12**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

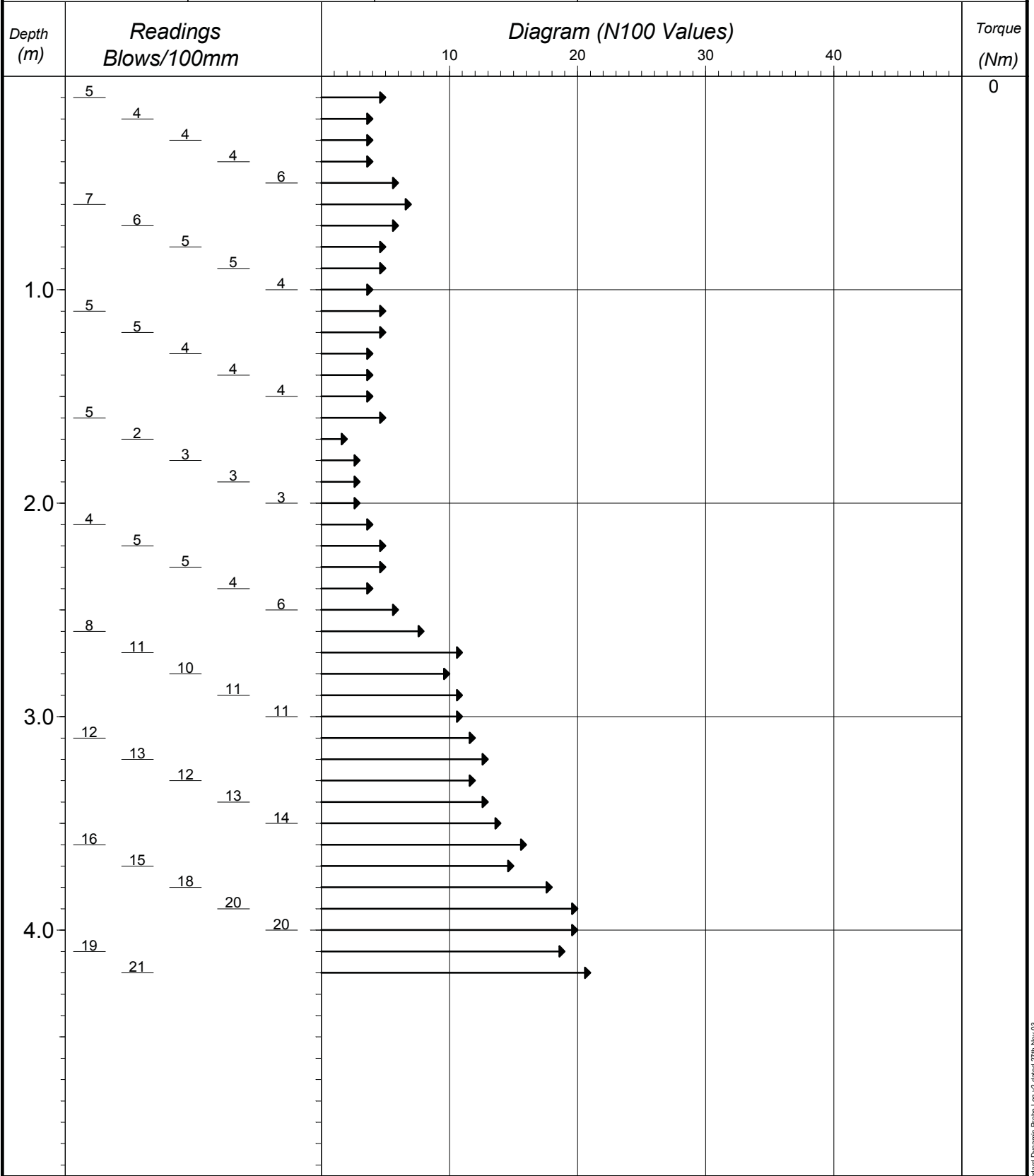
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **14/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:

Fall Height **500mm**
 Hammer Wt **50 Kg**
 Probe Type **DCP**

Cone Base Diameter **43.7mm**
 Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP13**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

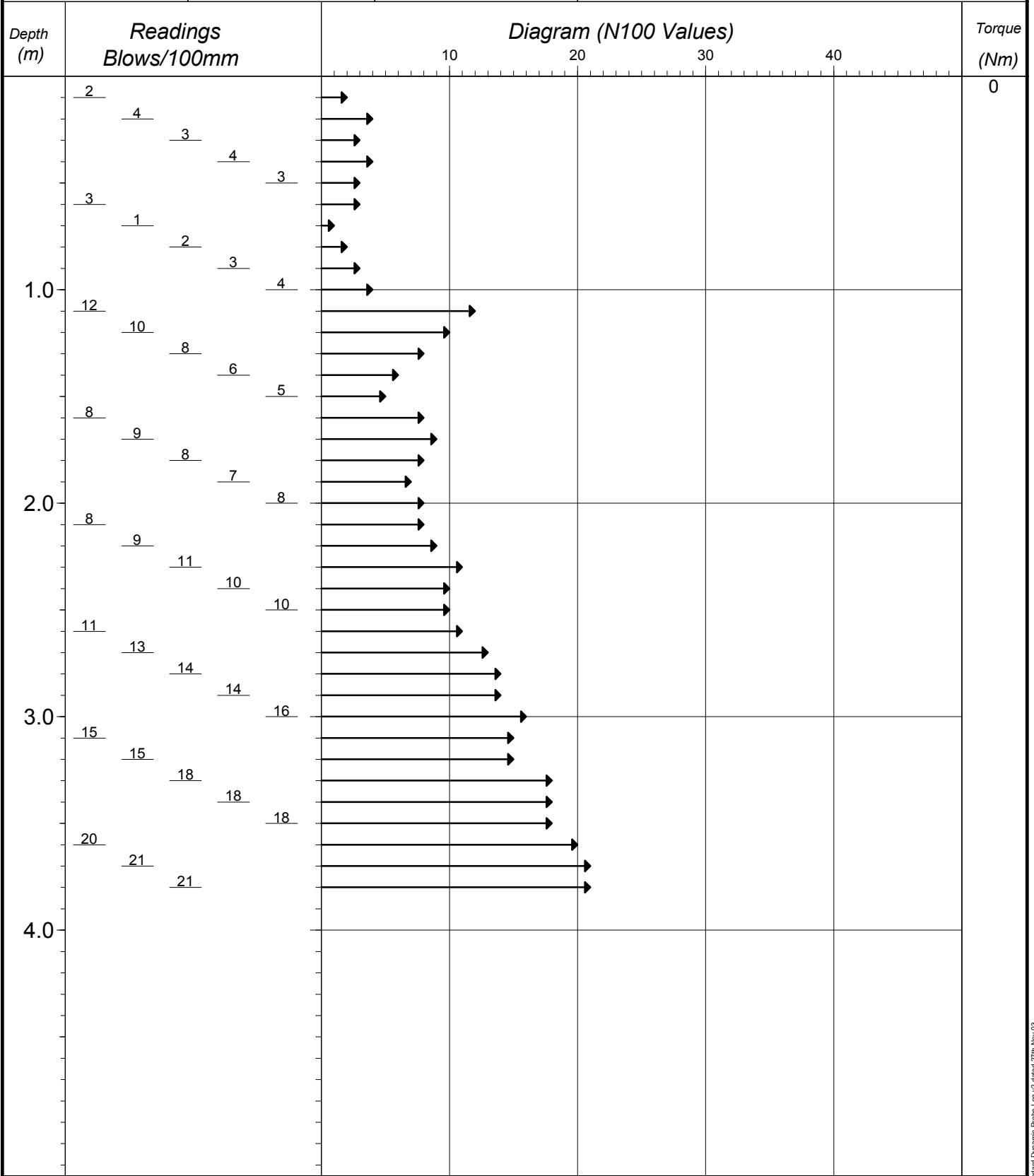
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **14/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:

Fall Height **500mm**
 Hammer Wt **50 Kg**
 Probe Type **DCP**

Cone Base Diameter **43.7mm**
 Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP14**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

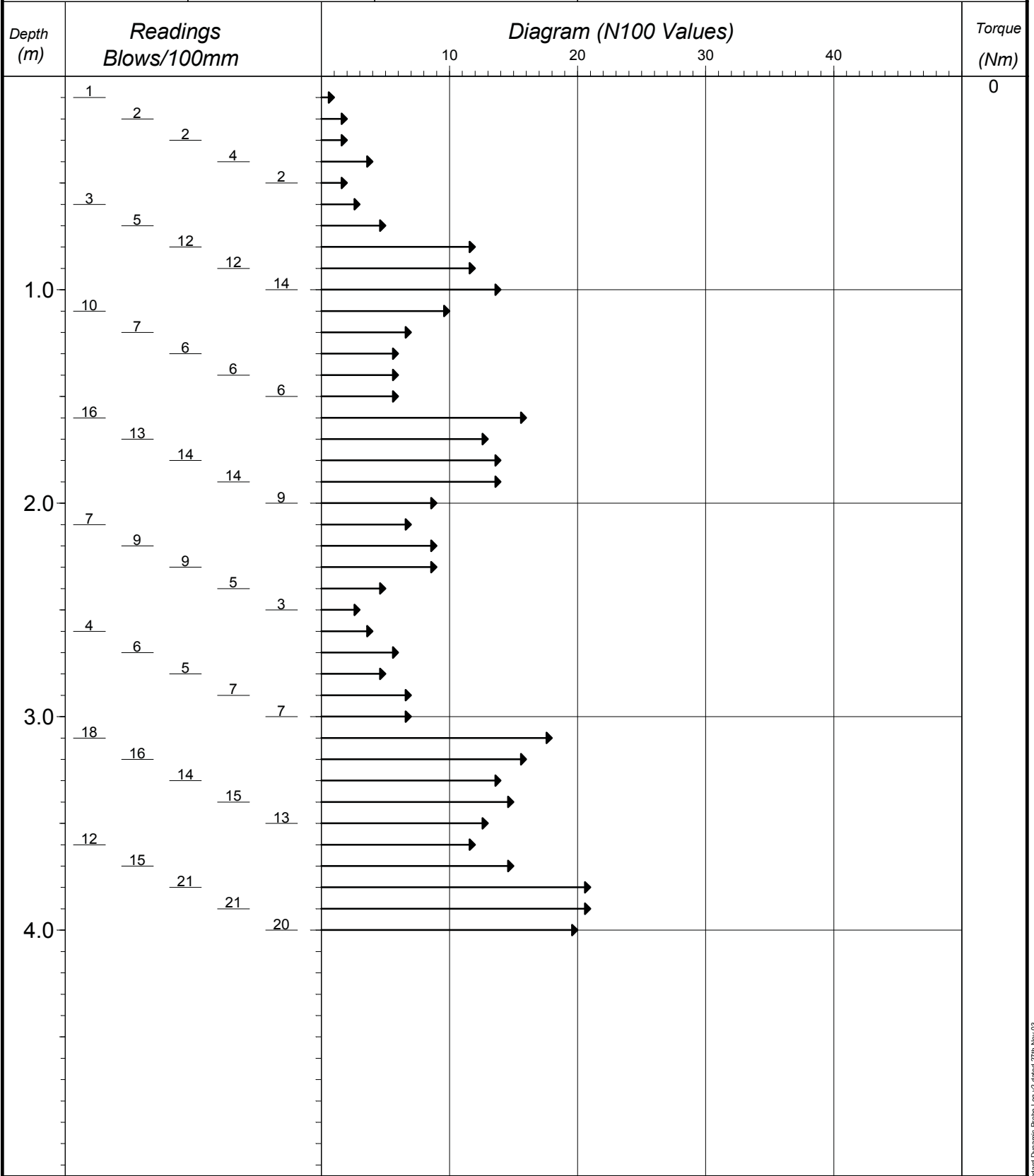
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **14/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:

Fall Height **500mm**
 Hammer Wt **50 Kg**
 Probe Type **DCP**

Cone Base Diameter **43.7mm**
 Log Scale **1:25**



HOMEBASE III (Bld. 428-48) Standard Dynamic Probe Log v2 dated 27th Nov 03

DYNAMIC PROBING LOG

Probe No **DP15**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

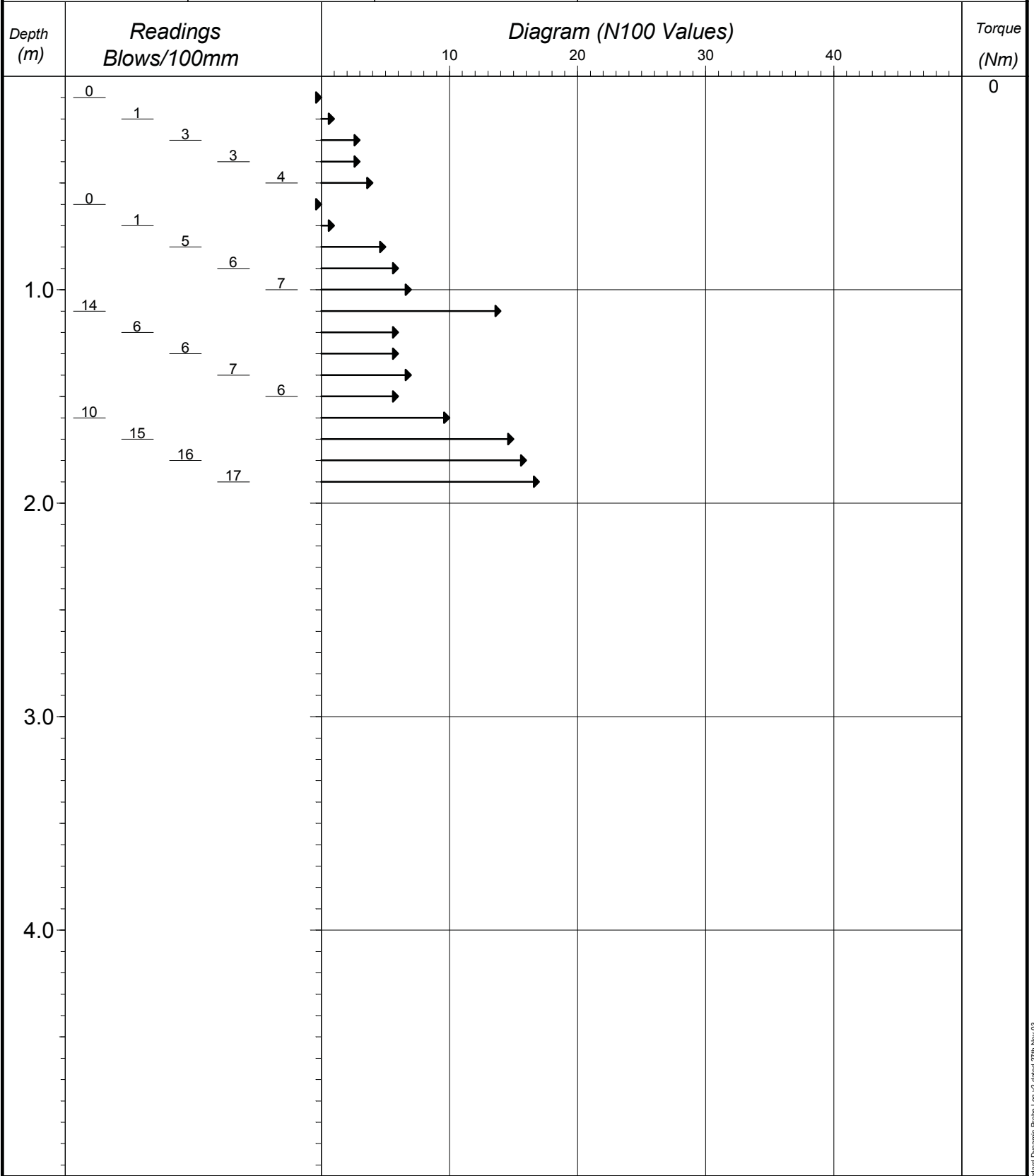
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **14/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:
Refusal at 1.90mBGL, 30 Blows

Fall Height **500mm**
Hammer Wt **50 Kg**
Probe Type **DCP**

Cone Base Diameter **43.7mm**
Log Scale **1:25**



DYNAMIC PROBING LOG

Probe No **DP16**

Client **Gannon Properties**

Sheet 1 of 1

Consultant **Waterman Moylan**

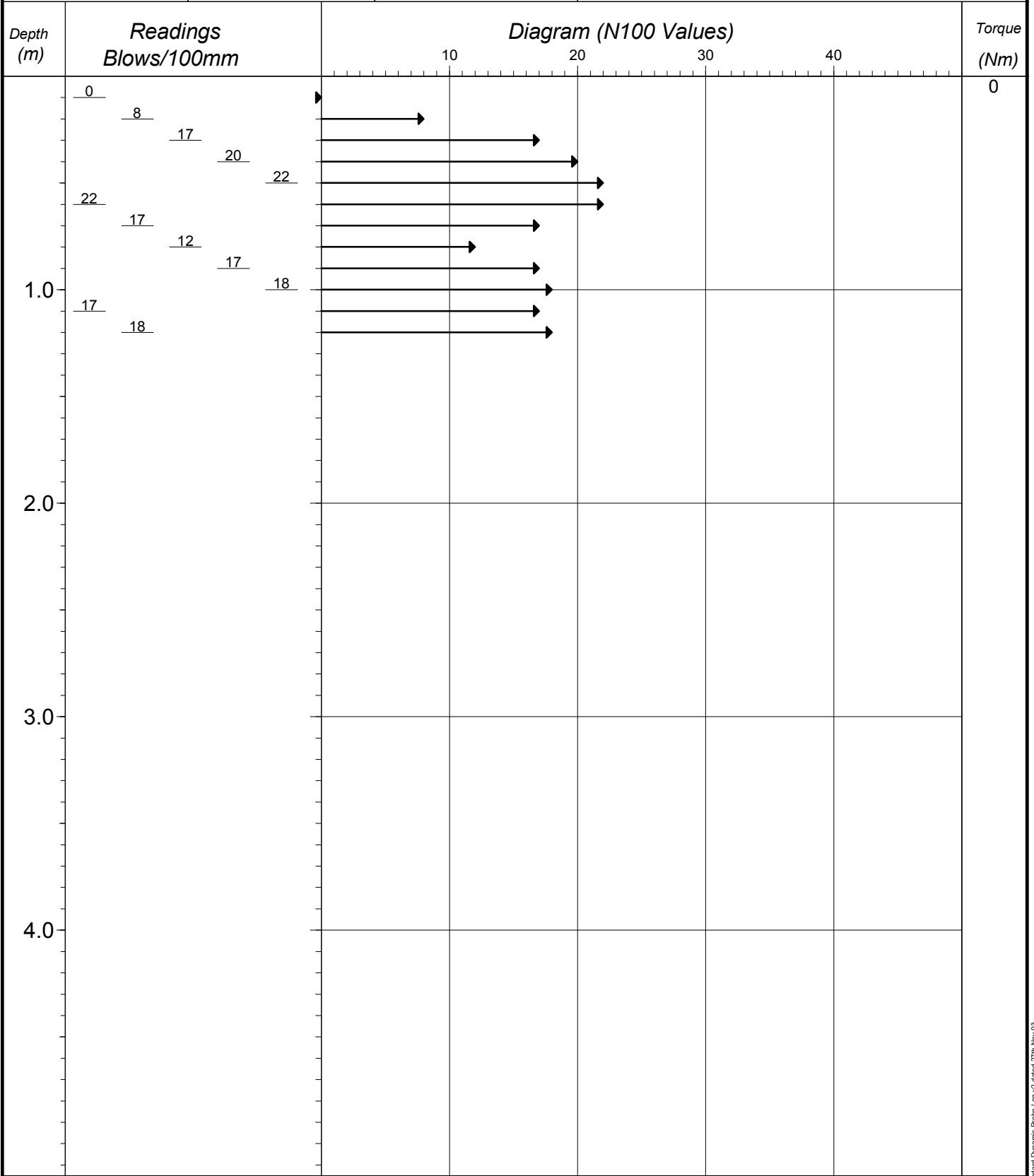
Project No **4064-12-13**

Site **Plot C&D Clongriffin**

Date **14/01/2014**

E - N - Level -

Logged by **J. McArdle**



Remarks:
Refusal at 1.20mBGL, 25 Blows

Fall Height **500mm**
Hammer Wt **50 Kg**
Probe Type **DCP**

Cone Base Diameter **43.7mm**
Log Scale **1:25**



Appendix 4: Soakaway Records

Soakaway Test Results Clongriffin

SP1

Soakaway Test to BRE Digest 365

The Trial pit was filled with water to 0.64mBGL and the drop in water level with time was recorded below.

Elapsed Time Minutes	Water Level mBGL	Remarks
0	0.40	Hole filled with water
171	0.57	
272	0.67	
1286	1.09	Test Complete

SP2

Soakaway Test to BRE Digest 365

The Trial pit was filled with water to 0.64mBGL and the drop in water level with time was recorded below.

Elapsed Time Minutes	Water Level mBGL	Remarks
0	0.64	Hole filled with water
202	0.64	
1257	0.60	Test Complete

Soakaway Tests Clongriffin

SP3

Soakaway Test to BRE Digest 365

The Trial pit was filled with water to 0.78mBGL and the drop in water level with time was recorded below.

Elapsed Time Minutes	Water Level mBGL	Remarks
0	0.78	Hole filled with water
122	0.78	
1299	0.74	Test Complete

S.I. Ltd Contract No: 5309

Client: Gannon Homes Ltd
Engineer: Waterman Moylan
Contractor: Site Investigations Ltd

Grange Lodge,
Clongriffin, Dublin 13
Site Investigation Report

Prepared by:

.....

Stephen Letch

Issue Date:	24/08/2016
Status	Final
Revision	0

Contents:

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1.	Introduction	1
2.	Fieldwork	1
3.	Laboratory Testing	2
4.	Ground Conditions	3
5.	Recommendations and Conclusions	4

Appendices:

1.	Cable Percussive Borehole Logs
2.	Trial Pit Logs and Photographs
3.	Laboratory Test Results
4.	Survey Data

1. Introduction

On the instructions of Waterman Moylan, Site Investigations Ltd (SIL) were appointed to complete a ground investigation at Grange Lodge, Clongriffin, Dublin 13. The investigation was completed for the residential development of the site and was completed on behalf of the Client, Gannon Homes Ltd.

The fieldworks comprised a programme of cable percussive boreholes, trial pits and California Bearing Ratio tests. All fieldwork was carried out in accordance with Eurocode 7: Geotechnical Design and the IEI Specification & Related Documents for Ground Investigation in Ireland (2006). Laboratory testing has been performed on representative soil samples recovered from the boreholes and trial pits and these were completed in accordance of BS1377: 1990.

This report presents the factual geotechnical data obtained from the field and laboratory testing with interpretation of the ground conditions discussed.

2. Fieldwork

The geotechnical fieldworks were started in March and completed in April 2016 and comprised the following:

- 4 No. cable percussive boreholes
- 5 No. trial pits
- 2 No. California Bearing Ratio locations

2.1. Cable Percussive Boreholes

Cable percussion boring was undertaken at 4 No. locations using a Dando 150 rig and constructed a 200mm diameter borehole. A shallow obstruction was encountered at BH01 and the borehole was moved approximately 3m and a reattempt made to advance at the location. The boreholes terminated at the scheduled depth of 6.00m. It was not possible to collect undisturbed samples due to the gravel and cobble content of the strata so bulk disturbed samples were recovered at regular intervals.

In order to test the strength of the stratum, Standard Penetration Tests (SPT's) were performed at 1.00m intervals in accordance with BS 1377 (1990). In soils with high gravel and cobble content it is appropriate to use a solid cone (60°) (CPT) instead of the split spoon and this was used throughout the testing. The test is completed over 450mm and the cone is driven 150mm into the stratum to ensure that the test is conducted over an undisturbed zone. The cone is then driven the remaining 300mm and the blows recorded to report the N-Value. The report shows the N-Value with the 75mm incremental blows listed in brackets (e.g.

BH01A at 2.00mbgl where N=24-(7,7,5,5)). Where refusal of 50 blows across the test zone was encountered was achieved during testing, the penetration depth is also reported (e.g. BH01 at 1.00mbgl where N=50/0mm-(50/0mm)).

The logs are presented in Appendix 1.

2.2. Trial Pits

5 No. trial pits were completed using a wheeled excavator and were logged by SIL geotechnical engineer. Representative disturbed bulk samples were recovered as the pits were excavated and they were returned to the laboratory for geotechnical testing.

The trial pit logs and photographs are presented in Appendix 2.

2.3. California Bearing Ratio tests

At 2 No. locations, undisturbed cylindrical mould samples were taken to complete California Bearing Ratio tests in the laboratory. The results facilitate the designing of the access roads and associated areas. These tests were completed to BS1377: 1990: Part 4, Clause 7 'Determination of California Bearing Ratio'. The results are presented as part of Appendix 3 with the laboratory test data.

2.4. Surveying

Following the completion of all the fieldworks works, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log and the locations are shown on the site plan in Appendix 4.

3. Laboratory Testing

Geotechnical laboratory testing has been carried out on representative soil samples in accordance with BS 1377 (1990). Testing included:

- 2 No. Moisture content
- 2 No. Atterberg limits
- 2 No. Particle size gradings
- 4 No. pH and sulphate
- 4 No. Chloride content
- 4 No. Organic content

Environmental testing was completed by Alcontrol Laboratories Ltd. and consisted of the following:

- 2 No. WAC Analysis

The laboratory test results are presented in Appendix 3.

4. Ground Conditions

4.1. Overburden

A generalised summary of the ground profile at BH02 is shown below. Reference should be made to the individual borehole and trial pit records in Appendices 1 and 2 for the full strata information at specific locations.

- TOPSOIL.
- Medium dense light brown silty very gravelly medium SAND.
- Medium dense light brown slightly silty sandy subrounded to subangular, fine GRAVEL of varied lithologies interbedded with very silty medium sand.
- Very stiff grey brown slightly sandy slightly gravelly silty CLAY with medium cobble content.

MADE GROUND was encountered in 3 of the borehole locations to a maximum depth of 1.80mbgl (BH03) and was not recorded at BH02 as shown above. It was also encountered in the trial pit locations to approximately 0.50mbgl but did extend to 1.20mbgl at TP01. It generally consisted of a sand soil with some builders waste e.g. red brick and concrete fragments, plastic and glass.

The natural deposits across the site encountered a SAND stratum overlying GRAVEL overlying CLAY. The thickness of each stratum varied from location to location and represents the outwash deposits from the Ireland's glacial history.

4.2. Groundwater

Groundwater details in the boreholes and trial pits during the fieldworks are noted on the logs in Appendices 1 and 2. Groundwater was not encountered in the borehole locations but was encountered 4 of the 5 trial pits approximately 2.50mbgl. The strike at TP01 is at 2.40mbgl when the stiff CLAY is encountered and this would have a low permeability. The other strikes were all recorded within the granular SAND strata encountered across the site. The strikes were recorded as seepages and therefore the borehole casings may have kept the water from entering into the boreholes as they progressed.

5.0. Recommendations and Conclusions

Please note the following caveats:

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 the exploratory hole locations or below the final level of excavation, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for adjacent unexpected conditions that have not been revealed by the exploratory holes. It is further recommended that all bearing surfaces when excavated should be inspected by a suitably qualified Engineer to verify the information given in this report.

Excavated surfaces in clay strata should be kept dry to avoid softening prior to foundation placement. Foundations should always be taken to a minimum depth of 0.50mBGL to avoid the effects of frost action and possible seasonal shrinkage/swelling.

If it is intended that on-site materials are to be used as fill, then the necessary laboratory testing should be specified by the Client to confirm the suitability. Also, relevant lab testing should be specified where stability of side slopes to excavations is a concern, or where contamination may be an issue.

5.1. Foundations

Due to the unknown depth of foundation and no longer term groundwater information, this analysis assumes the groundwater will not have an effect on the construction or performance of these foundations.

The plan for the site is to build three storey apartment blocks with a two storey building to the south of the site. Due to the granular material lying above the cohesive soil and the heavy loads that are anticipated from the building, it would be recommended to pile to foundations. This will provide the best solution for the foundations and reduce any possible settlement of the building.

5.1.1. Pile Foundations

No loadings of any structures have been provided for this report and therefore all the information provided is to be used for guidance purposes only and a piling contractor or Temporary Works Designer (TWD) should be consulted to provide the most cost effective pile design.

5.1.1.1. Applicable Pile Types

This section discusses a number of possible piling solutions frequently used in Ireland to support heavily loaded structures. The pile designer or TWD should satisfy themselves that the piling platform is adequate to support the piling rigs to be used on the site. All concreted

piles (and open boreholes) should be protected to prevent operatives and others from falling into the hole.

5.1.1.2. Driven Pre-Cast or Steel Piles

The boreholes undertaken in all phases of this project have indicated the presence of significant proportions of cobbles and boulders within the glacial strata.

Pile breakage, false set, non-vertical piles and short piles may result when driving piles in these strata, requiring additional piles to be installed. The relocation of these additional piles may require redesign of pile caps that might affect the project programme. Further, integrity testing cannot always verify the structural integrity of piles, leaving a level of uncertainty with the installed piles.

For these reasons driven piles are not considered appropriate for the ground conditions encountered.

5.1.1.3. Bored (drilled) Cast-in-Place Concrete Piles

Bored piles are frequently used in ground conditions similar to those encountered on site. Due to the nature of this boring (drilling) equipment, cobbles, boulders, granular and cohesive soil strata can be penetrated successfully. However, advancing piles using this method is relatively slow.

Piling Contractors using this method frequently advance a number of pile holes prior to concreting for efficiency purposes. If this approach is adopted it is recommended that all uncreted bores be protected from collapse by leaving the casings in place until the concrete is poured and reinforcing in place.

The pile designer should consider the hazard of an open bore as part of the piling risk assessment and the possibility of an operative falling into the open hole.

Pile lengths and pile capacities are limited by the torque of each particular machine. We would recommend that a requirement be made that the selected rig can successfully bore well beyond the final pile design length.

5.1.1.4. Continuous Flight Auger (CFA) Cast-in-Place Concrete Piles

CFA, along with bored piles, are the two most common methods of installing heavily loaded piles in Ireland. The CFA method most commonly used is the Hollow-Stem Auger, which allows concrete to be pumped under pressure to the bottom of the drilled hole while the annulus of the hole is stabilised by the auger.

The depth that CFA rigs can bore is generally limited by two items:

1. The capacity (torque) of the rig
2. The mast height. (Sometimes using a longer Kelly Bar can extend this.)

The piling contractor should give confirmation that their equipment is capable of advancing through the hard strata, potentially laden with cobbles and boulders, encountered on the site.

We would also recommend that a requirement be made that the selected rig can successfully bore well below the final pile design length. This makes allowance for some unforeseen ground conditions requiring deeper piles.

5.1.1.5. Pile Testing

Piles should be tested in order to determine their actual constructed capacity and to verify their structural integrity. Integrity testing should also be undertaken on selected piles. Consideration should be given to dynamic testing of selected piles.

5.1.1.5.1 Static Load Testing

The actual pile lengths determined by the pile designer should be verified as adequate prior to the installation of contract piles by the use of sacrificial (preliminary) piles. Therefore sacrificial piles should be installed and tested to destruction and their performance evaluated to allow changes in pile design, usually changes in length, if required.

A minimum of one sacrificial pile should be installed in each of the dominant layers where piles are to be supported namely the stiff to very stiff glacial till.

Along with sacrificial piles it is good practice to test 1 + 1% of contract piles to be installed across the site where conditions are uniform across the site. The number of piles tested should be increased to take account of the variation on ground conditions across this site.

5.1.1.5.2. Dynamic Load Testing

Consideration should be given to the use of dynamic testing of contract and sacrificial piles. CASE testing and CAPWAP analysis should be considered with a minimum of 5% contract piles being CASE tested and 20% of the CASE tested piles having a CAPWAP analysis.

5.1.1.5.3 Integrity Testing of Piles

Consideration should be given to integrity testing of all contract and sacrificial piles – 100% of piles to be tested. Any of the following could be considered:

- Impulse method
- Sonic Echo, transient dynamic steady state vibration method
- Transient dynamic response (frequency response) method, with simulations and impedance profiles carried out on piles having anomalous results
- Sonic coring (logging) method
- Statmamic method

5.2. Groundwater

The caveats overleaf relating to interpretation of groundwater levels should be noted:

There is always considerable uncertainty as to the likely rates of water ingress into excavations in clayey soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water.

Furthermore, water levels noted on the borehole and trial pit logs do not generally give an accurate indication of the actual groundwater conditions as the borehole or trial pit is rarely left open for sufficient time for the water level to reach equilibrium.

Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period of groundwater monitoring using any constructed standpipes is required to provide more accurate information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.

Pumping tests would be required to determine likely seepage rates and persistence into excavations taken below the groundwater level. Deep trial pits also aid estimation of seepage rates.

As discussed previously there were no water strikes in the boreholes but water entered the trial pits when the excavations reached approximately 2.50mbgl. No long term monitoring is available so it should be anticipated that the groundwater level would be around this level.

Due to the presence of granular soils at shallow depths, any excavation that is opened will have the possibility for water to ingress. Therefore, it should be anticipated that any excavation will have an ingress into it and although the rate of the ingress into the pits was relatively slow, this could increase during periods of wet weather.

If groundwater is encountered during excavations then mechanical pumps will be required to remove the groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

5.3. Pavement Design

The summary of the CBR test results in Appendix 3 indicates values generally of 6.1% or more. The CBR tests samples were collected at 1.00mbgl and 1.50mbgl and inspection of the formation strata should be completed prior to construction of the pavement. Once the exact formation levels are finalised then additional in-situ testing could be completed to assist with the detailed pavement design.

5.4. Contamination

Environmental testing was carried out on two samples from the investigation and the results are shown in Appendix 3. For material to be removed from site, landfill acceptability testing (WAC) was carried out to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill. The results were compared with the published waste acceptance limits of BS EN 12457-2.

The disposal suite results indicate that the material would generally be able to be treated as Inert Waste. However, discussions about the acceptance of the material must be undertaken with individual landfills before removal of any material from site.

Only two samples were tested for analysis and although no major contamination was noted at the fieldwork locations, any localised contamination may have been missed. The site was also previously used as a compound for a construction company which may have caused localised pockets of contamination that were missed by this investigation. Therefore, a testing regime designed by an environmental engineer should be designed on any material that is to be removed from site to ensure that the material stays within the landfill acceptance criteria.

5.5. Aggressive Ground Conditions

The chemical tests results in Appendix 3 indicate a general pH value between 7.67 and 7.94, which is close to neutral and below the level of 9, which could cause possible concern, therefore no special precautions are required.

The maximum value obtained for acid soluble sulphate was 112mg/l as SO₃. The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground*' guidelines require SO₄ values and after conversion ($SO_4 = SO_3 \times 1.2$), the maximum value of 134mg/l shows Class 1 conditions and no special precautions are required.

Appendix 1
Cable Percussive Borehole Logs

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Grange Lodge

HOLE ID: BH01

Client: Gannon Homes Ltd

Co-ordinates: E:722695.966

Consultant: Waterman Moylan

N:740707.311

Site Address: Clongriffin, Dublin 13

Elevation: 9.91 m.O.D.

Boring Started: 14/07/2016

Hole Diameter: 200 mm

Boring Completed: 14/07/2016

Drilled by: T. Tindall

Rig Type: Dando 150

Logged by: M. Kaliski

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: grey slightly sandy slightly gravelly silty clay with low cobble content and trace of concrete fragments (5%). Gravel is subangular to subrounded, fine to coarse of varied lithologies. Cobbles are subangular of varied lithologies (20-80mm).	0.00		9.91	B	0.50	TT01			
Obstruction - borehole terminated and moved 2m (BH01A).	1.10		8.81	SPT(C)	1.00	N=50/0mm- (50/0mm)	1.10	14/07/2016	Dry(E)
	2.0								
	3.0								
	4.0								
	5.0								
	6.0								
	7.0								
	8.0								
	9.0								
	10.0								

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
Chiselling: at 1.1m: 1hr
Borehole backfilled - no installation.

Key to Symbols	
B Bulk Disturbed Sample	SPT(S) Standard Penetration Test (Split Spoon)
D Small disturbed sample	SPT(C) Standard Penetration Test (Cone)
W Water sample	▼ 3.50 Waterstrike depth
U(9) Undisturbed sample (drive blows)	▽ 1.50(20) Water level depth 20mins after strike
	5.00(E) Depth to water (E)nd of shift
	5.00(S) Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL BH GINT GPJ COREHOLE_GDT 24/08/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Grange Lodge

HOLE ID: BH01A

Client: Gannon Homes Ltd

Co-ordinates: E:722695.570

Consultant: Waterman Moylan

N:740705.550

Site Address: Clongriffin, Dublin 13

Elevation: 9.92 m.O.D.

Boring Started: 14/07/2016

Hole Diameter: 200 mm

Boring Completed: 14/07/2016

Drilled by: T. Tindall

Rig Type: Dando 150

Logged by: M. Kaliski

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: grey slightly sandy slightly gravelly silty clay with low cobble content and trace of concrete fragments (5%). Gravel is subangular to subrounded, fine to coarse of varied lithologies. Cobbles are subangular of varied lithologies (20-80mm).	0.00		9.92						
Medium dense light brown silty gravelly medium SAND. Gravel is subangular to subrounded, fine to medium of varied lithologies.	0.90		9.02	B	1.50	TT02			
	2.00			SPT(C)	2.00	N=24-(7,7,5,5)			
	2.50			B	2.50	TT03			
	3.00			SPT(C)	3.00	N=41-(11,9,13,8)			
Very stiff grey brown slightly sandy slightly gravelly silty CLAY. Gravel is subangular to subrounded, fine to coarse of varied lithologies.	3.30		6.62	B	3.50	TT04			
	4.00			SPT(C)	4.00	N=41-(7,11,13,10)			
	4.50			W	4.50	TT05			
	5.00			SPT(C)	5.00	N=36-(8,8,11,9)			
Borehole terminated at scheduled depth.	6.00		3.92				6.00	14/07/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Borehole terminated at scheduled depth
 Borehole backfilled - no installation.

<p>B Bulk Disturbed Sample</p> <p>D Small disturbed sample</p> <p>W Water sample</p> <p>U(9) Undisturbed sample (drive blows)</p>	<p>Key to Symbols</p> <p>SPT(S) Standard Penetration Test (Split Spoon)</p> <p>SPT(C) Standard Penetration Test (Cone)</p> <p>∇ 3.50 Waterstrike depth</p> <p>∇ 1.50(20) Water level depth 20mins after strike</p> <p>5.00(E) Depth to water (E)nd of shift</p> <p>5.00(S) Depth to water (S)tart of shift</p>
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BOREHOLE SL BH GINT GPJ COREHOLE_GDT 24/08/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Grange Lodge

HOLE ID: BH02

Client: Gannon Homes Ltd

Co-ordinates: E:722697.799

Consultant: Waterman Moylan

N:740686.782

Site Address: Clongriffin, Dublin 13

Elevation: 10.28 m.O.D.

Boring Started: 18/07/2016

Hole Diameter: 200 mm

Boring Completed: 18/07/2016

Drilled by: T. Tindall

Rig Type: Dando 150

Logged by: M. Kaliski

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
TOPSOIL. Medium dense light brown silty very gravelly medium SAND. Gravel is subangular to subrounded, fine to medium of varied lithologies.	0.00 0.10		10.28 10.18	B	0.50	TT07			
				SPT(C)	1.00	N=17-(4,5,4,4)			
				B	1.50	TT08			
				SPT(C)	2.00	N=18-(5,4,5,4)			
Medium dense light brown slightly silty sandy subrounded to subangular, fine GRAVEL of varied lithologies interbedded with very silty medium sand.	2.40		7.88	B	2.50	TT09			
				SPT(C)	3.00	N=21-(5,5,6,5)			
				B	3.50	TT10			
				SPT(C)	4.00	N=23-(4,6,7,6)			
				B	4.50	TT11			
Very stiff grey brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Gravel is subangular to subrounded, fine to coarse of varied lithologies. Cobbles are subrounded of varied lithologies (20-100mm).	4.70		5.58	SPT(C)	5.00	N=46-(13,9,10,14)			
				B	5.50	TT12			
Borehole terminated at scheduled depth.	6.00		4.28				6.00	18/07/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
Borehole terminated at scheduled depth
Borehole backfilled - no installation.

Key to Symbols	
B	Bulk Disturbed Sample
D	Small disturbed sample
W	Water sample
U(9)	Undisturbed sample (drive blows)
SPT(S)	Standard Penetration Test (Split Spoon)
SPT(C)	Standard Penetration Test (Cone)
	Waterstrike depth
	Water level depth 20mins after strike
5.00(E)	Depth to water (E)nd of shift
5.00(S)	Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL BH GINT GPJ COREHOLE_GDT 24/08/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Grange Lodge

HOLE ID: **BH03**

Client: Gannon Homes Ltd

Co-ordinates: E:722688.578

Consultant: Waterman Moylan

N:740680.561

Site Address: Clongriffin, Dublin 13

Elevation: 10.10 m.O.D.

Boring Started: 15/07/2016

Hole Diameter: 200 mm

Boring Completed: 15/07/2016

Drilled by: T. Tindall

Rig Type: Dando 150

Logged by: M. Kaliski

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
TOPSOIL.	0.00		10.10						
MADE GROUND: brown slightly sandy slightly gravelly silty clay.	0.10		10.00						
MADE GROUND: brown and grey mottled silty gravelly sand with medium cobble content and trace of concrete and glass fragments (1%). Gravel is subangular, fine to coarse of varied lithologies. Cobbles are subangular of varied lithologies.	0.30	[Cross-hatched pattern]		B	0.50	TT13			
				SPT(C)	1.00	N=17-(5,4,4,4)			
				B	1.50	TT14			
				SPT(C)	2.00	N=18-(4,4,5,5)			
Medium dense grey brown silty very gravelly medium SAND with low cobble content and occasional clay bands. Gravel is subangular, fine to coarse of varied lithologies. Cobbles are subangular of varied lithologies (20-100mm).	1.80	[Sand with cobbles pattern]		B	2.50	TT15			
				SPT(C)	3.00	N=20-(5,4,5,6)			
				B	3.50	TT16			
				SPT(C)	4.00	N=23-(4,6,6,7)			
Stiff grey brown slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular, fine to coarse of varied lithologies. Cobbles are subangular to subrounded of varied lithologies.	3.50	[Clay with cobbles pattern]		B	4.50	TT17			
				SPT(C)	5.00	N=32-(8,8,9,7)			
				B	5.50	TT18			
				SPT(C)	6.00				
Borehole terminated at scheduled depth.	6.00		4.10				6.00	15/07/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Borehole terminated at scheduled depth
 Borehole backfilled - no installation.

B Bulk Disturbed Sample	SPT(S) Standard Penetration Test (Split Spoon)
D Small disturbed sample	SPT(C) Standard Penetration Test (Cone)
W Water sample	▽ Waterstrike depth
U(9) Undisturbed sample (drive blows)	▽ Water level depth 20mins after strike
	5.00(E) Depth to water (E)nd of shift
	5.00(S) Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL_BH_GINT_GPJ_COREHOLE_GDT_24/08/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Grange Lodge

HOLE ID: BH04

Client: Gannon Homes Ltd

Co-ordinates: E:722687.714

Consultant: Waterman Moylan

N:740665.240

Site Address: Clongriffin, Dublin 13

Elevation: 10.44 m.O.D.

Boring Started: 15/07/2016

Hole Diameter: 200 mm

Boring Completed: 15/07/2016

Drilled by: T. Tindall

Rig Type: Dando 151

Logged by: M. Kaliski

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
TOPSOIL.	0.00		10.44						
MADE GROUND: grey slightly sandy slightly gravelly silty clay with low cobble content and trace of concrete fragments (5%). Gravel is subangular to subrounded, fine to coarse of varied lithologies. Cobbles are subangular of varied lithologies (20-80mm).	0.10		10.34	B	0.50	TT19			
Medium dense light brown very silty sandy subangular, fine to medium GRAVEL of varied lithologies with low content of clay bands.	0.60		9.84	SPT(C)	1.00	N=20-(4,5,6,5)			
Stiff brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Gravel is subangular to subrounded, fine to coarse of varied lithologies. Cobbles are subrounded of varied lithologies (20-80mm).	1.50		8.94	B	1.50	TT20			
	2.00			SPT(C)	2.00	N=25-(5,7,6,7)			
				B	2.50	TT21			
				SPT(C)	3.00	N=25-(6,6,6,7)			
				B	3.50	TT22			
Dense brown slightly silty slightly sandy subangular to subrounded, fine to medium GRAVEL of varied lithologies.	3.90		6.54	SPT(C)	4.00	N=36-(6,11,9,10)			
Very stiff grey brown slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular, fine to coarse of varied lithologies. Cobbles are subangular to subrounded of varied lithologies.	4.50		5.94	B	4.50	TT23			
	5.00			SPT(C)	5.00	N=50-(9,11,14,12)			
				B	5.50	TT24			
Borehole terminated at scheduled depth.	6.00		4.44				6.00	15/07/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Borehole terminated at scheduled depth
 Borehole backfilled - no installation.

Key to Symbols	
B	Bulk Disturbed Sample
D	Small disturbed sample
W	Water sample
U(9)	Undisturbed sample (drive blows)
SPT(S)	Standard Penetration Test (Split Spoon)
SPT(C)	Standard Penetration Test (Cone)
	Waterstrike depth
	Water level depth 20mins after strike
5.00(E)	Depth to water (E)nd of shift
5.00(S)	Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL_BH_GINT_GPJ_COREHOLE_GDT_24/08/16

Appendix 2
Trial Pit Logs and Photographs

TRIAL PIT RECORD

Contract: Grange Lodge

Hole ID:

TP01

Client: Gannon Homes Ltd

Co-ordinates: E:722684.871

Consultant: Waterman Moylan

N:740691.150

Site Address: Clongriffin, Dublin 13

Elevation: 10.11 m.O.D.

Date Completed: 25/07/2016

Logged by: M.Kaliski

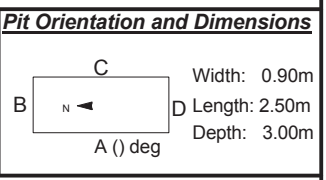
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
TOPSOIL.	0.0 0.00	— τ —	10.11					
MADE GROUND: light brown slightly sandy clay mottled with grey clayey gravelly medium to coarse sand with medium cobble content and occasional small red brick fragments (less than 1%). Cobbles are subrounded of varied lithologies (20-100mm) .	0.10	[Cross-hatch pattern]	10.01	B	0.50	MK05		
Grey brown silty slightly gravelly medium SAND with clayey fine sand bands.	1.20	[Dotted pattern]	8.91	B	1.50	MK06		
Light grey very silty slightly gravelly fine SAND.	2.20	[Dotted pattern]	7.91	B	2.20	MK07		
Stiff light grey slightly sandy slightly gravelly silty CLAY. Gravel is subangular, fine to medium of varied lithologies.	2.40	[Horizontal line pattern]	7.71				▼ 2.40	25/06/2106
Pit terminated at scheduled depth.	3.0 3.00	Hole End	7.11	B	3.00	MK08		

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Seepages at 2.40m.
 Pit walls stable.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼ 3.00 Waterstrike depth
 - ▽ 1.50(20) Water level depth 20mins after strike



TRIAL PIT TP GINT.GPJ COREHOLE.GDT 23/08/16

TRIAL PIT RECORD

Contract: Grange Lodge

Hole ID:

TP02

Client: Gannon Homes Ltd

Co-ordinates: E:722683.801

Consultant: Waterman Moylan

N:740674.770

Site Address: Clongriffin, Dublin 13

Elevation: 10.30 m.O.D.

Date Completed: 25/07/2016

Logged by: M.Kaliski

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
TOPSOIL.	0.0	0.00	10.30					
MADE GROUND: grey brown slightly silty gravelly medium sand with high cobble content and with some plastic bags and red brick fragments. Cobbles are subangular of limestone (20-100mm).	0.10		10.20					
Firm grey brown slightly sandy slightly gravelly silty CLAY. Gravel is subangular to subrounded, fine of varied lithologies.	0.40		9.90					
Grey slightly sandy slightly gravelly organic silty CLAY with high cobble content. Cobbles are subrounded of varied lithologies (20-150mm).	1.60		8.70	B	1.00	MK14		
Grey slightly silty gravelly fine to coarse SAND. Gravel is subrounded, fine to medium of varied lithologies.	1.90		8.40	B	2.00	MK16		
Light brown medium SAND with thin laminas of coarse sand	2.10		8.20				▼ 2.50	25/06/2106
Pit terminated at scheduled depth.	3.0	3.00	7.30	B	3.00	MK17		
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet. Strata descriptions refer to all faces unless otherwise specified.

Remarks:

Pit terminated at scheduled depth.

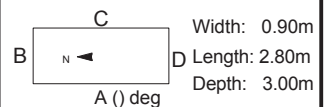
Seepages at 2.50m.

Pit walls stable.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▼ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Grange Lodge

Hole ID: **TP03**

Client: Gannon Homes Ltd

Co-ordinates: E:722699.373

Consultant: Waterman Moylan

N:740695.007

Site Address: Clongriffin, Dublin 13

Elevation: 10.18 m.O.D.

Date Completed: 25/07/2016

Logged by: M.Kaliski

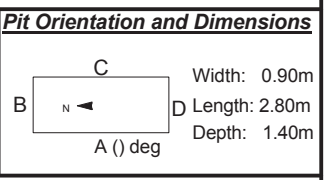
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
TOPSOIL.	0.0 0.00	— T —	10.18					
MADE GROUND: grey brown silty medium sand with high cobble content and trace of small red brick fragments and plastic bottles (less than 1%). Cobbles are subangular of limestone (20-100mm).	0.10		10.08					
Brown very gravelly medium SAND with bands of clay. Gravel is subrounded, fine to medium of varied lithologies.	0.50		9.68					
	1.0			B	1.00	MK09		
Pit terminated at scheduled depth.	1.40	Hole End	8.78					
	2.0							
	3.0							
	4.0							
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 No groundwater encountered.
 Pit walls stable.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼ 3.00 Waterstrike depth
 - ▽ 1.50(20) Water level depth 20mins after strike



TRIAL PIT TP GINT.GPJ COREHOLE.GDT 23/08/16

TRIAL PIT RECORD

Contract: Grange Lodge

Hole ID:

TP04

Client: Gannon Homes Ltd

Co-ordinates: E:722693.103

Consultant: Waterman Moylan

N:740676.603

Site Address: Clongriffin, Dublin 13

Elevation: 10.27 m.O.D.

Date Completed: 25/07/2016

Logged by: M.Kaliski

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
TOPSOIL.	0.00	— τ —	10.27					
MADE GROUND: grey brown very silty gravelly sand with medium cobble content and trace of small fragments of red brick, concrete and glass (less than 1%). Cobbles are subangular of limestone (20-100mm).	0.10	[Cross-hatch pattern]	10.17					
MADE GROUND: grey brown very sandy subrounded, fine to coarse gravel with trace of very small (2-3mm) red brick fragments.	0.60	[Cross-hatch pattern]	9.67					
	1.00			B	1.00	MK10		
Light brown silty slightly gravelly fine SAND.	1.80	[Dotted pattern]	8.47					
	2.00			B	2.00	MK11		
Grey coarse SAND.	2.40	[Dotted pattern]	7.87				▼ 2.40	25/06/2106
	2.50			B	2.50	MK12		
Light brown slightly silty fine SAND with bands of slightly sandy slightly gravelly silty clay.	2.70	[Dotted pattern]	7.57					
	3.00			B	3.00	MK13		
Pit terminated at scheduled depth.	3.30	Hole End	6.97					
	4.00							
	5.00							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:

Pit terminated at scheduled depth.

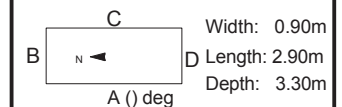
Seepages at 2.40m.

Pit walls stable.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▼ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Grange Lodge

Hole ID: TP05

Client: Gannon Homes Ltd

Co-ordinates: E:722691.507

Consultant: Waterman Moylan

N:740665.399

Site Address: Clongriffin, Dublin 13

Elevation: 10.48 m.O.D.

Date Completed: 25/07/2016

Logged by: M.Kaliski

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
TOPSOIL.	0.0 0.00	— T —	10.48					
MADE GROUND: grey brown silty gravelly medium sand with high cobble content and trace of fragments of plastic, red brick and timber. Cobbles are subangular to subrounded of varied lithologies (20-100mm).	0.10	[Cross-hatch pattern]	10.38					
Light brown slightly sandy gravelly silty CLAY. Gravel is subangular, fine of varied lithologies.	0.40	[Small circles]	10.08	B	0.50	MK18		
Dark grey brown slightly silty sandy subangular, fine to coarse GRAVEL of varied lithologies with medium cobble content. Cobbles are subrounded of varied lithologies (20-200mm).	0.60	[Large circles]	9.88	B	1.50	MK19		
Grey slightly silty slightly gravelly medium to coarse SAND. Gravel is subangular to subrounded, fine of varied lithologies.	1.70	[Small dots]	8.78	B	2.50	MK20	▼ 2.60	25/06/2106
Pit terminated at scheduled depth.	3.0 3.00	Hole End	7.48					

Note: If deemed necessary, pit face sketches are given on the last sheet. Strata descriptions refer to all faces unless otherwise specified.

Remarks:

Pit terminated at scheduled depth.

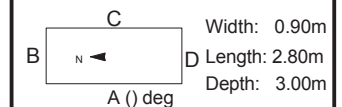
Seepages at 2.50m.

Pit walls stable.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▽ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TP01 Pit



TP01 Sidewall



TP01 Spoil



TP02 Pit



TP02 Sidewall



TP02 Spoil



TP03 Pit



TP03 Sidewall



TP03 Spoil



TP04 Pit



TP04 Sidewall



TP04 Spoil



TP05 Pit



TP05 Sidewall



TP05 Spoil

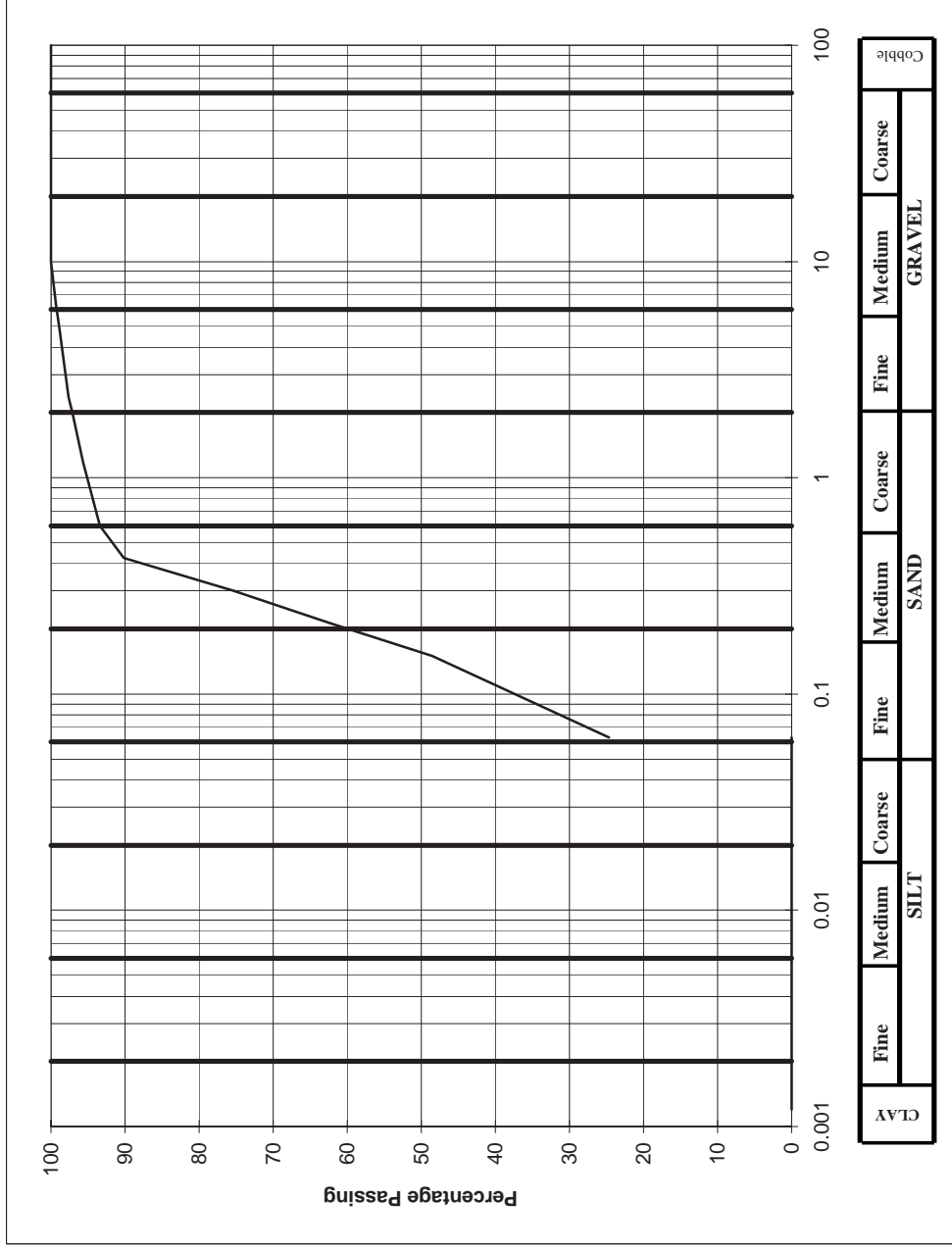


Appendix 3
Laboratory Test Results

BS 1377 Particle Size Analysis

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	0.0630	
90	100	0.0200	
75	100	0.0060	
63	100	0.0020	
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99.3		
5.0	98.9		
2.36	97.6		
2.00	97.1		
1.18	95.7		
0.600	93.4		
0.425	90.2		
0.300	75.4		
0.212	62.3		
0.150	48.6		
0.063	25		

Cobbles, %	0
Gravel, %	3
Sand, %	72
Clay / Silt, %	25



Client :	Gannon Homes Ltd
Project :	Grange Lodge

Lab. No. :	16/685
Sample No. :	MK07

Hole ID :	TP 01
Depth, m :	2.20

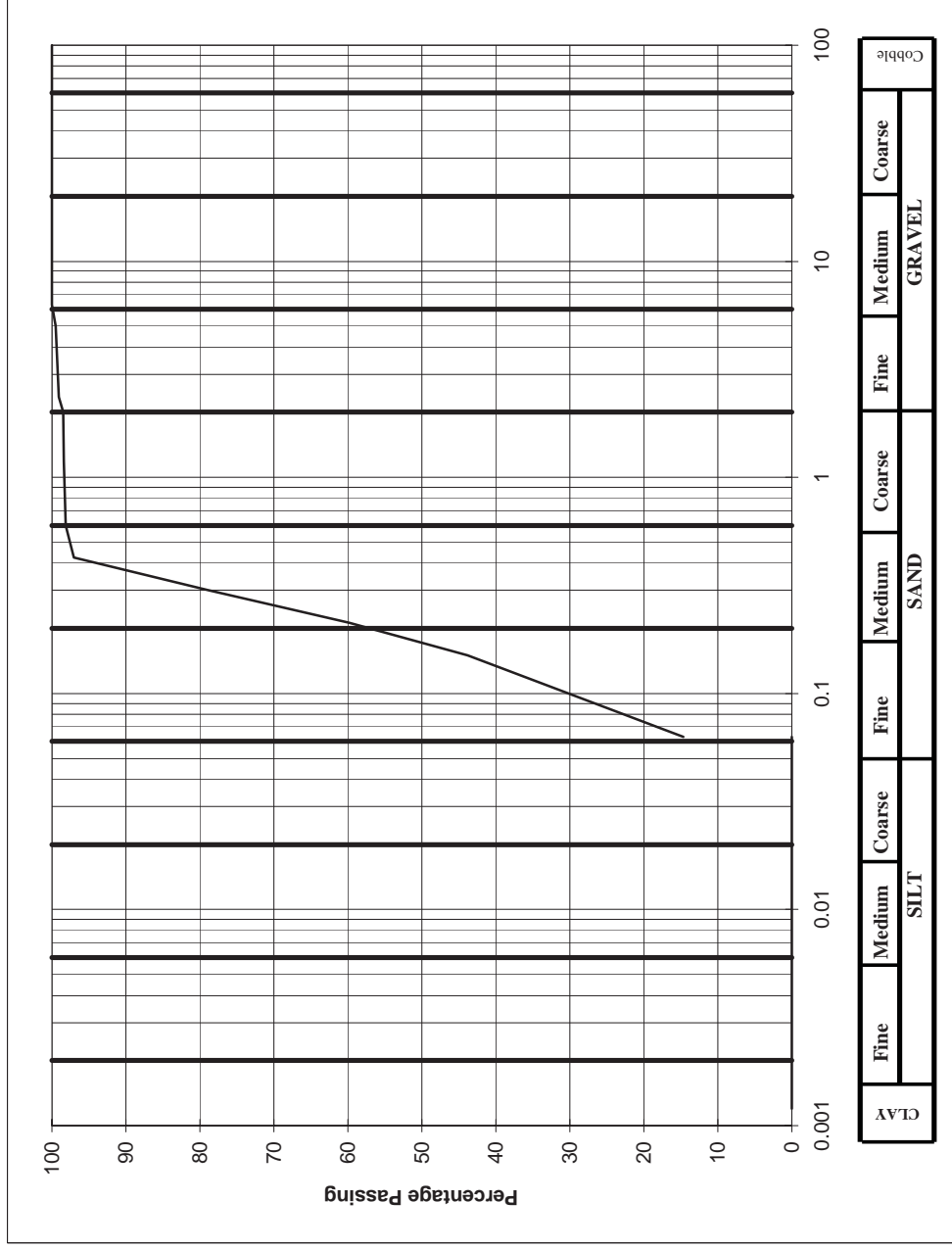
Material description : slightly gravelly very silty SAND

Remarks : Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

BS 1377 Particle Size Analysis

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	0.0630	
90	100	0.0200	
75	100	0.0060	
63	100	0.0020	
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5.0	99.5		
2.36	99.1		
2.00	98.5		
1.18	98.4		
0.600	98.1		
0.425	97		
0.300	78.9		
0.212	59.8		
0.150	43.8		
0.063	15		

Cobbles, %	0
Gravel, %	2
Sand, %	84
Clay / Silt, %	15



Client :	Gannon Homes Ltd	
Project :	Grange Lodge	

Lab. No. :	16/688
Sample No. :	MK11

Hole ID :	TP 04
Depth, m :	2.00

Material description : slightly gravely silty SAND
 Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour.
 Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

California Bearing Ratio (CBR) In accordance with BS1377: Part 4: Method 7

Client	Gannon Homes Ltd
Site	Grange Lodge
S.I. File No	5309 / 16
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email siltd@indigo.ie
Report Date	12th August 2016

Hole ID	Depth (mBGL)	Sample No	Sample Type	Lab Ref	Moisture Content (%)	CBR Value (%)	Remarks / Material Type
CBR01	1.00	MK01	B	16/689	8.0	6.1	
CBR01	1.50	MK02	B	16/690	10.5	7.4	
CBR02	1.00	MK03	B	16/691	7.6	8.3	
CBR02	1.50	MK04	B	16/692	9.3	6.6	

Chemical Testing
In accordance with BS 1377: Part 3

Client	Gannon Homes Ltd
Site	Grange Lodge
S.I. File No	5309 / 16
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email siltd@indigo.ie
Report Date	15th August 2016

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Sulphate Content Acid Soluble (SO ₃) g/L	Sulphate Content Acid Soluble (SO ₃) %	Organic Content %	Chloride ion Content (soil:water ratio 2:1) %	% passing 2mm	Remarks
TP01	2.20	MK07	16/685	7.67	0.112	0.109	1.74	0.23	97.1	
TP02	1.00	MK09	16/686	7.94	0.105	0.074	1.24	0.21	70.8	
TP03	1.00	MK14	16/687	7.77	0.105	0.098	1.33	0.18	93.6	
TP04	2.00	MK11	16/688	7.71	0.106	0.105	1.58	0.25	98.5	



Site Investigations Ltd
The Grange
Carhugar
12th Lock Road
Lucan
Co. Dublin

Attention: Stephen Letch

CERTIFICATE OF ANALYSIS

Date: 18 August 2016
Customer: D_SITEINV_NCS
Sample Delivery Group (SDG): 160811-53
Your Reference:
Location: 5309 GRANGE LODGE
Report No: 374201

This report has been revised and directly supersedes 374170 in its entirety.

We received 2 samples on Wednesday August 10, 2016 and 2 of these samples were scheduled for analysis which was completed on Thursday August 18, 2016. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager



SDG: 160811-53	Location: 5309 GRANGE LODGE	Order Number: 92/A/16
Job: D_SITEINV_NCS-92	Customer: Site Investigations Ltd	Report Number: 374201
Client Reference:	Attention: Stephen Letch	Superseded Report: 374170

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
13945580	GRANGE LODGE TP1		0.50	08/08/2016
13945581	GRANGE LODGE TP4		1.00	08/08/2016

Only received samples which have had analysis scheduled will be shown on the following pages.



SDG: 160811-53
 Job: D_SITEINV_NCS-92
 Client Reference:

Location: 5309 GRANGE LODGE
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 92/A/16
 Report Number: 374201
 Superseded Report: 374170

SOLID Results Legend <input checked="" type="checkbox"/> Test <input checked="" type="checkbox"/> No Determination Possible	Lab Sample No(s)	13945580	13945581
	Customer Sample Reference	GRANGE LODGE TP1	GRANGE LODGE TP4
	AGS Reference		
	Depth (m)	0.50	1.00
	Container	250g VOC (ALE215) 1kg Amber Jar (AL 1kg TUB	60g VOC (ALE215) 1kg TUB 250g Amber Jar (AL
ANC at pH4 and ANC at pH 6	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Anions by Kone (w)	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
CEN Readings	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fluoride	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
GRO by GC-FID (S)	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Loss on Ignition in soils	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Mercury Dissolved	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Mineral Oil	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
PAH Value of soil	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
PCBs by GCMS	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
pH	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Phenols by HPLC (W)	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Sample description	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>



SDG: 160811-53
 Job: D_SITEINV_NCS-92
 Client Reference:

Location: 5309 GRANGE LODGE
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 92/A/16
 Report Number: 374201
 Superseded Report: 374170

SOLID					
Results Legend		Lab Sample No(s)			
<input checked="" type="checkbox"/>	Test	13945580	13945581		
<input checked="" type="checkbox"/>	No Determination Possible	GRANGE LODGE TP1	GRANGE LODGE TP4		
		Customer Sample Reference			
		AGS Reference			
		Depth (m)			
		Container			
Total Dissolved Solids	All	NDPs: 0 Tests: 2			
			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Total Organic Carbon	All	NDPs: 0 Tests: 2			
			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

SDG: 160811-53	Location: 5309 GRANGE LODGE	Order Number: 92/A/16
Job: D_SITEINV_NCS-92	Customer: Site Investigations Ltd	Report Number: 374201
Client Reference:	Attention: Stephen Letch	Superseded Report: 374170

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
------------------	--------------------	-------------	------------------------	---------------	--------------------	---------------	-------------------	--------------------	-----------------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
13945580	GRANGE LODGE TP1	0.50	Dark Brown	Sandy Clay Loam	0.063 - 2.00 mm	Stones	None
13945581	GRANGE LODGE TP4	1.00	Dark Brown	Sandy Loam	0.063 - 2.00 mm	Stones	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



CERTIFICATE OF ANALYSIS

Validated

SDG: 160811-53
Job: D_SITEINV_NCS-92
Client Reference:

Location: 5309 GRANGE LODGE
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 92/A/16
Report Number: 374201
Superseded Report: 374170

Table with columns: Results Legend, Customer Sample R, GRANGE LODGE TP 1, GRANGE LODGE TP 4, Component, LOD/Units, Method, and numerical data for various chemical tests like Moisture Content Ratio, Loss on ignition, Mineral oil, etc.



SDG: 160811-53
Job: D_SITEINV_NCS-92
Client Reference:

Location: 5309 GRANGE LODGE
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 92/A/16
Report Number: 374201
Superseded Report: 374170

GRO by GC-FID (S)

Table with columns: Results Legend, Customer Sample R, GRANGE LODGE TP 1, GRANGE LODGE TP 4, Component, LOD/Units, Method, and detection results for various compounds like MTBE, Benzene, Toluene, etc.

SDG: 160811-53
 Job: D_SITEINV_NCS-92
 Client Reference:

Location: 5309 GRANGE LODGE
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 92/A/16
 Report Number: 374201
 Superseded Report: 374170

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference
 Mass Sample taken (kg) 0.101
 Mass of dry sample (kg) 0.090
 Particle Size <4mm >95%

Site Location 5309 GRANGE LODGE
 Natural Moisture Content (%) 12.3
 Dry Matter Content (%) 89

Case
 SDG 160811-53
 Lab Sample Number(s) 13945580
 Sampled Date 08-Aug-2016
 Customer Sample Ref. GRANGE LODGE TP1
 Depth (m) 0.50

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	>6	-
-	-	-
-	-	-

Solid Waste Analysis	Result
Total Organic Carbon (%)	0.28
Loss on Ignition (%)	1.15
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	19.1
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	9.06
ANC to pH 6 (mol/kg)	0.577
ANC to pH 4 (mol/kg)	4.66

Eluate Analysis	C2 Conc ⁿ in 10:1 eluate (mg/l)		A2 10:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.00135	<0.00051	0.0135	<0.0051	0.5	2	25
Barium	0.00537	<0.0002	0.0537	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.0012	<0.0012	<0.012	<0.012	0.5	10	70
Copper	<0.00085	<0.00085	<0.0085	<0.0085	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.003	<0.00062	0.03	<0.0062	0.5	10	30
Nickel	<0.00044	<0.00044	<0.0044	<0.0044	0.4	10	40
Lead	<0.0001	<0.0001	<0.001	<0.001	0.5	10	50
Antimony	0.00036	<0.00016	0.0036	<0.0016	0.06	0.7	5
Selenium	<0.00081	<0.00081	<0.0081	<0.0081	0.1	0.5	7
Zinc	<0.0013	<0.0013	<0.013	<0.013	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	38.8	<5	388	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared 15-Aug-2016
 pH (pH Units) 9.28
 Conductivity (µS/cm) 7.80
 Temperature (°C) 20.60
 Volume Leachant (Litres) 0.889

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

18/08/2016 17:50:34
 17:50:23 18/08/2016

SDG: 160811-53	Location: 5309 GRANGE LODGE	Order Number: 92/A/16
Job: D_SITEINV_NCS-92	Customer: Site Investigations Ltd	Report Number: 374201
Client Reference:	Attention: Stephen Letch	Superseded Report: 374170

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		Site Location	5309 GRANGE LODGE
Mass Sample taken (kg)	0.095	Natural Moisture Content (%)	5.78
Mass of dry sample (kg)	0.090	Dry Matter Content (%)	94.5
Particle Size <4mm	>95%		

Case	
SDG	160811-53
Lab Sample Number(s)	13945581
Sampled Date	08-Aug-2016
Customer Sample Ref.	GRANGE LODGE TP4
Depth (m)	1.00

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	>6	-
-	-	-
-	-	-

Solid Waste Analysis	Result
Total Organic Carbon (%)	<0.2
Loss on Ignition (%)	0.975
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	10.3
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	8.97
ANC to pH 6 (mol/kg)	0.415
ANC to pH 4 (mol/kg)	2.28

Eluate Analysis	C2 Conc ⁿ in 10:1 eluate (mg/l)		A2 10:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.00155	<0.00051	0.0155	<0.0051	0.5	2	25
Barium	0.00257	<0.0002	0.0257	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.0012	<0.0012	<0.012	<0.012	0.5	10	70
Copper	<0.00085	<0.00085	<0.0085	<0.0085	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00717	<0.00062	0.0717	<0.0062	0.5	10	30
Nickel	<0.00044	<0.00044	<0.0044	<0.0044	0.4	10	40
Lead	0.000126	<0.0001	0.00126	<0.001	0.5	10	50
Antimony	0.000353	<0.00016	0.00353	<0.0016	0.06	0.7	5
Selenium	<0.00081	<0.00081	<0.0081	<0.0081	0.1	0.5	7
Zinc	<0.0013	<0.0013	<0.013	<0.013	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	39.4	<5	394	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	15-Aug-2016
pH (pH Units)	9.29
Conductivity (µS/cm)	49.50
Temperature (°C)	20.70
Volume Leachant (Litres)	0.895

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

18/08/2016 17:50:34
 17:50:23 18/08/2016



SDG: 160811-53
Job: D_SITEINV_NCS-92
Client Reference:

Location: 5309 GRANGE LODGE
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 92/A/16
Report Number: 374201
Superseded Report: 374170

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step		
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition		
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water		
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser		
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils		
TM182	CEN/TC 292 - WI 292046-characterization of waste-leaching Behaviour Tests- Acid and Base Neutralization Capacity Test	Determination of Acid Neutralisation Capacity (ANC) Using Autotitration in Soils		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM213	In-house Method	Rapid Determination of PAHs by GC-FID		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



SDG: 160811-53
 Job: D_SITEINV_NCS-92
 Client Reference:

Location: 5309 GRANGE LODGE
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 92/A/16
 Report Number: 374201
 Superseded Report: 374170

Test Completion Dates

Lab Sample No(s)	13945580	13945581
Customer Sample Ref.	GRANGE LODGE TP 1	GRANGE LODGE TP 4
AGS Ref.		
Depth	0.50	1.00
Type	SOLID	SOLID
ANC at pH4 and ANC at pH 6	17-Aug-2016	17-Aug-2016
Anions by Kone (w)	17-Aug-2016	17-Aug-2016
CEN 10:1 Leachate (1 Stage)	15-Aug-2016	15-Aug-2016
CEN Readings	17-Aug-2016	17-Aug-2016
Dissolved Metals by ICP-MS	18-Aug-2016	18-Aug-2016
Dissolved Organic/Inorganic Carbon	18-Aug-2016	18-Aug-2016
Fluoride	18-Aug-2016	18-Aug-2016
GRO by GC-FID (S)	17-Aug-2016	17-Aug-2016
Loss on Ignition in soils	17-Aug-2016	18-Aug-2016
Mercury Dissolved	18-Aug-2016	18-Aug-2016
Mineral Oil	17-Aug-2016	17-Aug-2016
PAH Value of soil	16-Aug-2016	16-Aug-2016
PCBs by GCMS	18-Aug-2016	18-Aug-2016
pH	16-Aug-2016	16-Aug-2016
Phenols by HPLC (W)	18-Aug-2016	18-Aug-2016
Sample description	13-Aug-2016	13-Aug-2016
Total Dissolved Solids	17-Aug-2016	17-Aug-2016
Total Organic Carbon	17-Aug-2016	17-Aug-2016



SDG: 160811-53
Job: D_SITEINV_NCS-92
Client Reference:

Location: 5309 GRANGE LODGE
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 92/A/16
Report Number: 374201
Superseded Report: 374170

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

General

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
\$	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anorthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

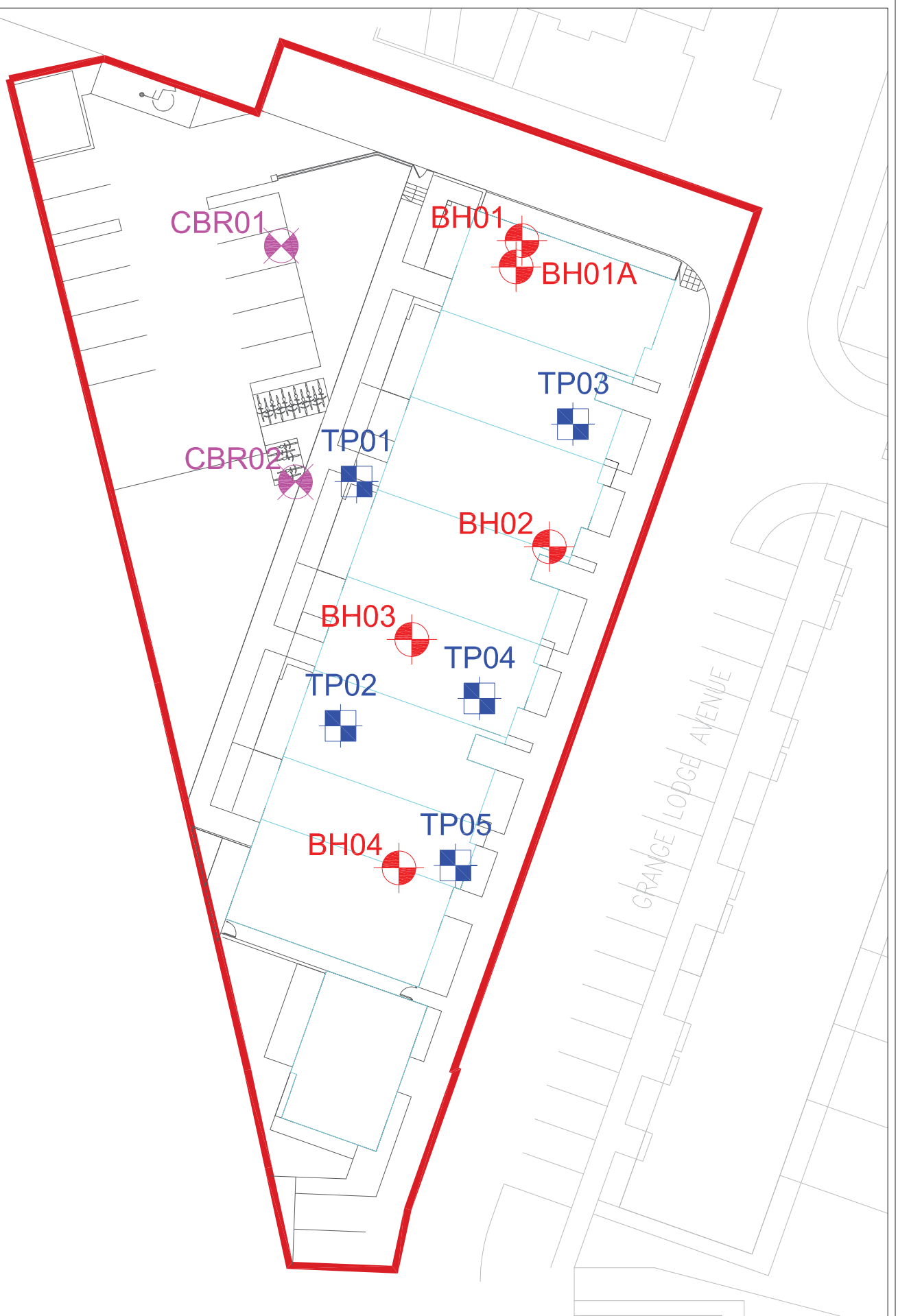
Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Appendix 4
Survey Data

Site Survey

Location	Irish National Grid		Level	Irish Transverse Mercator	
	Easting	Northing		Easting	Northing
Boreholes					
BH01	322771.745	240682.504	9.91	722695.966	740707.311
BH01A	322771.349	240680.743	9.92	722695.570	740705.550
BH02	322773.578	240661.971	10.28	722697.799	740686.782
BH03	322764.356	240655.748	10.10	722688.578	740680.561
BH04	322763.491	240640.424	10.44	722687.714	740665.24
Trial Pits					
TP01	322760.648	240666.34	10.11	722684.871	740691.15
TP02	322759.578	240649.956	10.30	722683.801	740674.77
TP03	322775.153	240670.198	10.18	722699.373	740695.007
TP04	322768.882	240651.79	10.27	722693.103	740676.603
TP05	322767.285	240640.583	10.48	722691.507	740665.399
California Bearing Ratio Tests					
CBR01	322755.603	240682.157	9.79	722679.828	740706.964
CBR02	322756.554	240666.317	10.13	722680.778	740691.127



Site Investigations Ltd
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 The Grange
 12th Lock Road
 Lucan
 Co. Dublin

 T: 01 6108768
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Client :	Gannon Homes		
Engineer :	Waterman Moylan		
Project :	Grange Lodge		
Date :	24-08-2016	Scale :	Not to Scale
Description :	Site Investigation Plan	Rev :	1
Drawing Number :	SIL5309:01	Drawn by :	SL

Legend:

	Cable Percussion Borehole
	Trial Pit
	California Bearing Ratio



S.I. Ltd Contract No: 5269

Client: Gannon Homes Ltd
Engineer: Waterman Moylan
Contractor: Site Investigations Ltd

Block 17, Clongriffin, Dublin 13
Site Investigation Report

Prepared by:

.....

Stephen Letch

Issue Date:	14/07/2016
Status	Final
Revision	1

Contents:

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1. Introduction	1
2. Fieldwork	1
3. Laboratory Testing	2
4. Ground Conditions	3
5. Recommendations and Conclusions	4

Appendices:

1. Cable Percussive Borehole Logs
2. Rotary Corehole Logs
3. Trial Pit Logs and Photographs
4. Laboratory Test Results
5. Survey Data

1. Introduction

On the instructions of Waterman Moylan, Site Investigations Ltd (SIL) were appointed to complete a ground investigation at Block 17, Clongriffin, Dublin 13. The investigation was completed for the residential development of the site and was completed on behalf of the Client, Gannon Homes Ltd.

The fieldworks comprised a programme of cable percussive boreholes, rotary coreholes and trial pits. All fieldwork was carried out in accordance with Eurocode 7: Geotechnical Design and the IEI Specification & Related Documents for Ground Investigation in Ireland (2006). Laboratory testing has been performed on representative soil samples recovered from the boreholes and trial pits and these were completed in accordance of BS1377: 1990.

This report presents the factual geotechnical data obtained from the field and laboratory testing with interpretation of the ground conditions discussed.

2. Fieldwork

The geotechnical fieldworks were completed in March 2016 and comprised the following:

- 6 No. cable percussive boreholes
- 3 No. rotary coreholes
- 6 No. trial pits

2.1. Cable Percussive Boreholes

Cable percussion boring was undertaken at 6 No. locations using a Dando 150 rig and constructed a 200mm diameter borehole. Due to shallow obstructions at BH05 and BH06 then the boreholes had to be moved and reattempt to advance the borehole below the MADE GROUND. The boreholes were terminated at various depths from 4.20mbgl (BH02) to 13.70mbgl (BH01). It was not possible to collect undisturbed samples due to the gravel and cobble content of the strata so bulk disturbed samples were recovered at regular intervals.

In order to test the strength of the stratum, Standard Penetration Tests (SPT's) were performed at 1.00m intervals in accordance with BS 1377 (1990). In soils with high gravel and cobble content it is appropriate to use a solid cone (60°) (CPT) instead of the split spoon and this was used throughout the testing. The test is completed over 450mm and the cone is driven 150mm into the stratum to ensure that the test is conducted over an undisturbed zone. The cone is then driven the remaining 300mm and the blows recorded to report the N-Value. The report shows the N-Value with the 75mm incremental blows listed in brackets (e.g. BH01 at 1.00mbgl where N=46-(21,9,9,7)). Where refusal of 50 blows across the test zone was

encountered was achieved during testing, the penetration depth is also reported (e.g. BH01 at 13.00mbgl where N=50/80mm-(32,18/5mm)).

The logs are presented in Appendix 1.

2.2. Rotary Coreholes

3 No. rotary coreholes were completed at the same locations as BH02, BH04 and BH05B in order to confirm if the borehole terminated on a boulder obstruction or to recover bedrock for strength testing. The coreholes were advanced to 15mbgl and no rock was encountered so the boreholes terminated in boulder obstructions. The drilling crew undertook SPT tests at 1.50m intervals below the termination depth of the boreholes and the coreholes were backfilled upon completion.

The logs are presented in Appendix 2.

2.3. Trial Pits

6 No. trial pits were completed using a wheeled excavator and were logged by SIL geotechnical engineer. Representative disturbed bulk samples were recovered as the pits were excavated and they were returned to the laboratory for geotechnical testing.

The trial pit logs and photographs are presented in Appendix 3.

2.4. Surveying

Following the completion of all the fieldworks works, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log and the locations are shown on the site plan in Appendix 5.

3. Laboratory Testing

Geotechnical laboratory testing has been carried out on representative soil samples in accordance with BS 1377 (1990). Testing included:

- Moisture content
- Atterberg limits
- Particle size gradings
- pH and sulphate
- Chloride content
- Organic content

Environmental testing was completed by Alcontrol Laboratories Ltd. and consisted of the following:

- WAC Analysis

The laboratory test results are presented in Appendix 4.

4. Ground Conditions

4.1. Overburden

A summary of the ground profile from the deepest borehole, BH01, is shown overleaf. Reference should be made to the individual borehole and trial pit records in Appendices 1 and 2 for the full strata information at specific locations.

- MADE GROUND: dark brown sandy clay with much brick, timber and concrete.
- MADE GROUND: black sandy gravelly silty clay with some timber.
- Stiff brown slightly sandy slightly gravelly silty CLAY.
- Stiff becoming very stiff black slightly sandy slightly gravelly silty CLAY.
- Very stiff black slightly sandy slightly gravelly silty CLAY with low cobble content.

The overburden deposits are of glacial origin and the particle size gradings of the cohesive soils display characteristic well-graded 'straight-line' profiles for the glacial material. Fines contents (i.e. silt & clay) from the gradings show the cohesive soils with 32% and 42% silt/clay and the Atterberg Limits tests show silty CLAY samples were tested.

The coreholes were advanced to 15mbgl and confirm that bedrock is deeper than this depth as no rock was encountered. The rotary driller did report returns of sand overlying gravel from 10mbgl.

4.2. Groundwater

Groundwater details in the boreholes and trial pits during the fieldworks are noted on the logs in Appendices 1 and 2. Groundwater was not encountered during the drilling of the boreholes, however, water did ingress into BH01 and BH06A when the borehole was left overnight. The groundwater was then removed from the boreholes as the drilling continued and the boreholes finished dry.

Water ingressed in four (TP01, TP03, TP04 and TP05) of the six boreholes. The depth of water strike varied from 1.00mbgl in TP04 and the 3.00mbgl to 3.10mbgl in the other three trial pits. All the ingresses were slow and were recorded as seepages.

5.0. Recommendations and Conclusions

Please note the following caveats:

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 the exploratory hole locations or below the final level of excavation, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for adjacent unexpected conditions that have not been revealed by the exploratory holes. It is further recommended that all bearing surfaces when excavated should be inspected by a suitably qualified Engineer to verify the information given in this report.

Excavated surfaces in clay strata should be kept dry to avoid softening prior to foundation placement. Foundations should always be taken to a minimum depth of 0.50mBGL to avoid the effects of frost action and possible seasonal shrinkage/swelling.

If it is intended that on-site materials are to be used as fill, then the necessary laboratory testing should be specified by the Client to confirm the suitability. Also, relevant lab testing should be specified where stability of side slopes to excavations is a concern, or where contamination may be an issue.

5.1. Foundations

The planned development is a sixteen-storey structure and therefore it would be anticipated that the loadings from this size of structure would be too high for conventional shallow foundations and piled foundations will be required. Therefore no shallow foundation analysis has been completed as part of this report.

5.1.1. Pile Foundations

No loadings of any structures have been provided for this report and therefore all the information provided is to be used for guidance purposes only and a piling contractor or Temporary Works Designer (TWD) should be consulted to provide the most cost effective pile design.

5.1.1.1. Applicable Pile Types

This section discusses a number of possible piling solutions frequently used in Ireland to support heavily loaded structures. The pile designer or TWD should satisfy themselves that the piling platform is adequate to support the piling rigs to be used on the site. All concreted piles (and open boreholes) should be protected to prevent operatives and others from falling into the hole.

5.1.1.2. Driven Pre-Cast or Steel Piles

The boreholes undertaken in all phases of this project have indicated the presence of significant proportions of cobbles and boulders within the glacial strata.

Pile breakage, false set, non-vertical piles and short piles may result when driving piles in these strata, requiring additional piles to be installed. The relocation of these additional piles may require redesign of pile caps that might affect the project programme. Further, integrity testing cannot always verify the structural integrity of piles, leaving a level of uncertainty with the installed piles.

For these reasons driven piles are not considered appropriate for the ground conditions encountered.

5.1.1.3. Bored (drilled) Cast-in-Place Concrete Piles

Bored piles are frequently used in ground conditions similar to those encountered on site. Due to the nature of this boring (drilling) equipment, cobbles, boulders, granular and cohesive soil strata can be penetrated successfully. However, advancing piles using this method is relatively slow.

Piling Contractors using this method frequently advance a number of pile holes prior to concreting for efficiency purposes. If this approach is adopted it is recommended that all un-concreted bores be protected from collapse by leaving the casings in place until the concrete is poured and reinforcing in place.

The pile designer should consider the hazard of an open bore as part of the piling risk assessment and the possibility of an operative falling into the open hole.

Pile lengths and therefore pile capacities are limited by the torque of each particular piling machine. We would recommend that a requirement be made that the selected rig can successfully bore well beyond the final pile design length.

5.1.1.4. Continuous Flight Auger (CFA) Cast-in-Place Concrete Piles

CFA, along with bored piles, are the two most common methods of installing heavily loaded piles in Ireland. The CFA method most commonly used is the Hollow-Stem Auger, which allows concrete to be pumped under pressure to the bottom of the drilled hole while the annulus of the hole is stabilised by the auger.

The depth that CFA rigs can bore is generally limited by two items:

1. The capacity (torque) of the rig
2. The mast height. (Sometimes using a longer Kelly Bar can extend this.)

The piling contractor should give confirmation that their equipment is capable of advancing through the hard strata, potentially laden with cobbles and boulders, encountered on the site.

We would also recommend that a requirement be made that the selected rig can successfully bore well below the final pile design length. This makes allowance for some unforeseen ground conditions requiring deeper piles.

5.1.1.5. Pile Testing

Piles should be tested in order to determine their actual constructed capacity and to verify their structural integrity. Integrity testing should also be undertaken on selected piles. Consideration should be given to dynamic testing of selected piles.

5.1.1.5.1 Static Load Testing

The actual pile lengths determined by the pile designer should be verified as adequate prior to the installation of contract piles by the use of sacrificial (preliminary) piles. Therefore sacrificial piles should be installed and tested to destruction and their performance evaluated to allow changes in pile design, usually changes in length, if required.

A minimum of one sacrificial pile should be installed in each of the dominant layers where piles are to be supported, namely the stiff to very stiff glacial till.

Along with sacrificial piles it is good practice to test 1 + 1% of contract piles to be installed across the site where conditions are uniform across the site. The number of piles tested should be increased to take account of the variation on ground conditions across this site.

5.1.1.5.2. Dynamic Load Testing

Consideration should be given to the use of dynamic testing of contract and sacrificial piles. CASE testing and CAPWAP analysis should be considered with a minimum of 5% contract piles being CASE tested and 20% of the CASE tested piles having a CAPWAP analysis.

5.1.1.5.3 Integrity Testing of Piles

Consideration should be given to integrity testing of all contract and sacrificial piles – 100% of piles to be tested. Any of the following could be considered:

- Impulse method
- Sonic Echo, transient dynamic steady state vibration method
- Transient dynamic response (frequency response) method, with simulations and impedance profiles carried out on piles having anomalous results
- Sonic coring (logging) method
- Statmamic method

5.2. Groundwater

The caveats overleaf relating to interpretation of groundwater levels should be noted:

There is always considerable uncertainty as to the likely rates of water ingress into excavations in clayey soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water.

Furthermore, water levels noted on the borehole and trial pit logs do not generally give an accurate indication of the actual groundwater conditions as the borehole or trial pit is rarely left open for sufficient time for the water level to reach equilibrium.

Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period of groundwater monitoring using any constructed standpipes is required to provide more accurate information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.

Pumping tests would be required to determine likely seepage rates and persistence into excavations taken below the groundwater level. Deep trial pits also aid estimation of seepage rates.

As discussed previously there were no water strikes in the boreholes but water did enter the holes when left overnight. This suggests that the soil does have water present within the pores but the permeability of the soil is very low and therefore takes time to enter any void. Water did enter four of the trial pits and these were also recorded as seepages rather than faster ingresses.

There is always considerable uncertainty as to the likely rates of water ingress into excavations in cohesive soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water. However, based on this information at the exploratory hole locations to date, it is considered likely that any seepages into excavations of the CLAY will be at depth and generally will be slow.

If groundwater is encountered during shallow excavations then mechanical pumps will be required to remove the groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

5.3. Contamination

Environmental testing was carried out on two samples from the investigation and the results are shown in Appendix 4. For material to be removed from site, landfill acceptability testing (WAC) was carried out to determine whether the material on the site could be accepted as

'inert material' by an Irish landfill. The results were compared with the published waste acceptance limits of BS EN 12457-2.

The disposal suite results indicate that the material mostly falls within the Inert Waste category. However, the sulphate result from the sample taken at BH01 did slightly exceed the Inert level. Therefore it is important that discussions about the acceptance of the material must be undertaken with individual landfills before removal of any material from site.

Only two samples were tested for analysis and although no contamination was noted at the fieldwork locations, any localised contamination may have been missed. Therefore, a testing regime designed by an environmental engineer should be designed on any material that is to be removed from site to ensure that the material stays within the landfill acceptance criteria.

5.4. Aggressive Ground Conditions

The chemical tests results in Appendix 4 indicate a general pH value between 8.61 and 8.96, which is close to neutral and below the level of 9, which could cause possible concern, therefore no special precautions are required.

The maximum value obtained for acid soluble sulphate was 115mg/l as SO_3 . The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground*' guidelines require SO_4 values and after conversion ($SO_4 = SO_3 \times 1.2$), the maximum value of 138mg/l shows Class 1 conditions and no special precautions are required.

Appendix 1
Cable Percussive Borehole Logs

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Block 17

HOLE ID: **BH01**

Client: Gannon Homes

Co-ordinates: E:723042.270

Consultant: Waterman Moylan

N:740663.454

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 8.76 m.O.D.

Boring Commenced: 08/03/2016

Hole Diameter: 200 mm

Boring Completed: 10/03/2016

Drilled by: T. Tindall

Rig Type: Dando 150

Logged by: S. Letch

Sheet 1 of 2

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: dark brown sandy clay with much brick, timber and concrete.	0.00		8.76						
MADE GROUND: black sandy gravelly silty clay with some timber.	0.60		8.16	B	0.50	TT01			
	1.00			SPT(C)	1.00	N=46-(21,9,9,7)			
	1.50			B	1.50	TT02			
	2.00			SPT(C)	2.00	N=37-(11,8,9,9)			
	2.50			B	2.50	TT03			
	2.70			SPT(C)	2.70	N=15-(4,3,3,5)			
Stiff brown slightly sandy slightly gravelly silty CLAY.	3.00		6.06	B	3.50	TT04			
	4.00			SPT(C)	4.00	N=21-(4,6,5,6)			
	4.50			B	4.50	TT05			
	5.00			SPT(C)	5.00	N=21-(5,6,4,6)			
	5.40			B	5.50	TT06			
	6.00			SPT(C)	6.00	N=24-(6,6,7,5)	6.00	08/03/2016	Dry(E)
Stiff becoming very stiff black slightly sandy slightly gravelly silty CLAY.	6.50		3.36	B	6.50	TT07	6.00	09/03/2016	5.40(S)
	7.00			SPT(C)	7.00	N=30-(8,7,7,8)			
	7.50			B	7.50	TT08			
	8.00			SPT(C)	8.00	N=26-(5,7,7,7)			
	8.50			B	8.50	TT09			
	9.00			SPT(C)	9.00	N=26-(7,6,6,7)			
	10.00			B	9.50	TT10			

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Water ingressed into borehole overnight.
 Chiselling: 13.60m to 13.70m: 1hr
 Borehole backfilled - no installation.

<p>B Bulk Disturbed Sample</p> <p>D Small disturbed sample</p> <p>W Water sample</p> <p>U(9) Undisturbed sample (drive blows)</p>	<p>Key to Symbols</p> <p>SPT(S) Standard Penetration Test (Split Spoon)</p> <p>SPT(C) Standard Penetration Test (Cone)</p> <p>▽ 3.50 Waterstrike depth</p> <p>▽ 1.50(20) Water level depth 20mins after strike</p> <p>5.00(E) Depth to water (E)nd of shift</p> <p>5.00(S) Depth to water (S)tart of shift</p>
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Site Investigations Ltd

BOREHOLE SL 5269 BH GINT.GPJ COREHOLE.GDT 19/04/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Block 17

HOLE ID: **BH01**

Client: Gannon Homes

Co-ordinates: E:723042.270

Consultant: Waterman Moylan

N:740663.454

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 8.76 m.O.D.

Boring Commenced: 08/03/2016

Hole Diameter: 200 mm

Boring Completed: 10/03/2016

Drilled by: T. Tindall

Rig Type: Dando 150

Logged by: S. Letch

Sheet 2 of 2

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
Stiff becoming very stiff black slightly sandy slightly gravelly silty CLAY.	10.0			SPT(C)	10.00	N=33-(6,9,11,7)			
				B	10.50	TT11			
	11.0			SPT(C)	11.00	N=31-(7,8,7,9)			
				B	11.50	TT12			
	12.0			SPT(C)	12.00	N=36-(13,7,7,9)			
				B	12.50	TT13			
Very stiff black slightly sandy slightly gravelly silty CLAY with low cobble content.	12.90		-4.14	SPT(C)	13.00	N=50/80mm-(32,18/5mm)			
				B	13.50	TT14			
Obstruction - possible boulder. Borehole terminated due to obstruction.	13.60 13.70		-4.84 -4.94	SPT(C)	13.70	N=50/5mm-(50/5mm)	13.70	10/03/2016	9.20(E)
	14.0								
	15.0								
	16.0								
	17.0								
	18.0								
	19.0								
	20.0								

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
Water ingressed into borehole overnight.
Chiselling: 13.60m to 13.70m: 1hr
Borehole backfilled - no installation.

<p>B Bulk Disturbed Sample</p> <p>D Small disturbed sample</p> <p>W Water sample</p> <p>U(9) Undisturbed sample (drive blows)</p>	<p>Key to Symbols</p> <p>SPT(S) Standard Penetration Test (Split Spoon)</p> <p>SPT(C) Standard Penetration Test (Cone)</p> <p>▼ 3.50 Waterstrike depth</p> <p>▽ 1.50(20) Water level depth 20mins after strike</p> <p>5.00(E) Depth to water (E)nd of shift</p> <p>5.00(S) Depth to water (S)tart of shift</p>
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Site Investigations Ltd

BOREHOLE SL 5269 BH GINT.GPJ COREHOLE.GDT 19/04/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Block 17

HOLE ID: **BH02**

Client: Gannon Homes	Co-ordinates: E:723021.376
Consultant: Waterman Moylan	N:740697.051
Site Address: Railway Road, Clongriffin, Dublin 13	Elevation: 8.27 m.O.D.
Boring Commenced: 16/03/2016	Hole Diameter: 200 mm
Boring Completed: 16/03/2016	Drilled by: T. Tindall
Rig Type: Dando 150	Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: dark brown sandy clay with much brick, timber and concrete.	0.0	[Cross-hatch pattern]	8.27	B	0.50	TT41			
	1.0			SPT(C)	1.00	N=21-(5,4,6,6)			
	1.50			B	1.50	TT42			
Stiff brown slightly sandy slightly gravelly silty CLAY.	1.80	[X pattern]	6.47	SPT(C)	2.00	N=17-(4,4,5,4)			
	2.0			B	2.50	TT43			
	3.0			SPT(C)	3.00	N=23-(5,7,6,5)			
	3.50			B	3.50	TT44			
Obstruction - possible boulder. Borehole terminated due to obstruction.	4.10 4.20	[Triangle symbol]	4.17 4.07	SPT(C)	4.00	N=50/10mm-(50/10mm)	4.20	16/03/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
Chiselling: 4.10m to 4.20m: 1hr
Borehole backfilled - no installation.

<p>Key to Symbols</p> <p>B Bulk Disturbed Sample</p> <p>D Small disturbed sample</p> <p>W Water sample</p> <p>U(9) Undisturbed sample (drive blows)</p>	<p>SPT(S) Standard Penetration Test (Split Spoon)</p> <p>SPT(C) Standard Penetration Test (Cone)</p> <p>▼ 3.50 Waterstrike depth</p> <p>▽ 1.50(20) Water level depth 20mins after strike</p> <p>5.00(E) Depth to water (E)nd of shift</p> <p>5.00(S) Depth to water (S)tart of shift</p>
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Site Investigations Ltd

BOREHOLE SL 5269 BH GINT.GPJ COREHOLE.GDT 19/04/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Block 17

HOLE ID: **BH03**

Client: Gannon Homes

Co-ordinates: E:723040.296

Consultant: Waterman Moylan

N:740720.263

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 7.73 m.O.D.

Boring Commenced: 14/03/2016

Hole Diameter: 200 mm

Boring Completed: 14/03/2016

Drilled by: T. Tindall

Rig Type: Dando 150

Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: dark brown sandy clay with much brick, timber and concrete.	0.00		7.73	B	0.50	TT27			
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY.	0.90		6.83	SPT(C)	1.00	N=15-(4,3,4,4)			
				B	1.50	TT28			
	2.00			SPT(C)	2.00	N=17-(3,4,5,5)			
				B	2.50	TT29			
Very stiff black slightly sandy gravelly silty CLAY with low cobble content.	2.80		4.93	SPT(C)	3.00	N=36-(6,6,11,13)			
				B	3.50	TT30			
	4.00			SPT(C)	4.00	N=41-(10,9,9,13)			
				B	4.50	TT31			
	5.00			SPT(C)	5.00	N=40-(9,8,11,12)			
				B	5.50	TT32			
	6.00			SPT(C)	6.00	N=32-(6,8,9,9)			
				B	6.50	TT33			
7.00		SPT(C)	7.00	N=41-(9,10,13,9)					
		B	7.50	TT34					
Obstruction - possible boulder.	7.60		0.13						
Borehole terminated due to obstruction.	7.80		-0.07	SPT(C)	7.80	N=50/5mm-(50/5mm)	7.80	14/03/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Chiselling: 4.70m to 4.80m: 0.75hr
 7.60m to 7.80m: 1hr
 Borehole backfilled - no installation.

Key to Symbols	
B Bulk Disturbed Sample	SPT(S) Standard Penetration Test (Split Spoon)
D Small disturbed sample	SPT(C) Standard Penetration Test (Cone)
W Water sample	Waterstrike depth
U(9) Undisturbed sample (drive blows)	Water level depth 20mins after strike
	5.00(E) Depth to water (E)nd of shift
	5.00(S) Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL_52269 BH GINT.GPJ COREHOLE.GDT_19/04/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Block 17

HOLE ID: **BH04**

Client: Gannon Homes	Co-ordinates: E:723023.240
Consultant: Waterman Moylan	N:740688.569
Site Address: Railway Road, Clongriffin, Dublin 13	Elevation: 8.31 m.O.D.
Boring Commenced: 22/03/2016	Hole Diameter: 200 mm
Boring Completed: 22/03/2016	Drilled by: T. Tindall
Rig Type: Dando 150	Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: dark brown sandy clay with much brick, timber and concrete.	0.00		8.31	B	0.50	TT45			
Stiff brown slightly sandy slightly gravelly silty CLAY.	0.90		7.41	SPT(C)	1.00	N=17-(4,4,5,4)			
	1.50			B	1.50	TT46			
	2.00			SPT(C)	2.00	N=22-(5,5,5,7)			
	2.50			B	2.50	TT47			
	3.00			SPT(C)	3.00	N=27-(8,6,6,7)			
	3.50			B	3.50	TT48			
	4.00			SPT(C)	4.00	N=26-(6,6,7,7)			
	4.50			B	4.50	TT49			
Obstruction - possible boulder. Borehole terminated due to obstruction.	4.80 4.90		3.51 3.41	SPT(C)	4.90	N=50/5mm-(50/5mm)	4.90	22/03/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)

Chiselling: 4.80m to 4.90m: 1hr
Borehole backfilled - no installation.

Key to Symbols

- | | |
|---------------------------------------|--|
| B Bulk Disturbed Sample | SPT(S) Standard Penetration Test (Split Spoon) |
| D Small disturbed sample | SPT(C) Standard Penetration Test (Cone) |
| W Water sample | Waterstrike depth |
| U(9) Undisturbed sample (drive blows) | Water level depth 20mins after strike |
| | 5.00(E) Depth to water (E)nd of shift |
| | 5.00(S) Depth to water (S)tart of shift |

Site Investigations Ltd

BOREHOLE SL 5269 BH GINT.GPJ COREHOLE.GDT 19/04/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Block 17

HOLE ID: **BH05**

Client: Gannon Homes	Co-ordinates: E:723026.934
Consultant: Waterman Moylan	N:740711.943
Site Address: Railway Road, Clongriffin, Dublin 13	Elevation: 8.05 m.O.D.
Boring Commenced: 15/03/2016	Hole Diameter: 200 mm
Boring Completed: 15/03/2016	Drilled by: T. Tindall
Rig Type: Dando 150	Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: dark brown sandy clay with much brick, timber and concrete.	0.00		8.05						
Pushing boulder - moved 2m and made reattempt - BH05A.	0.70		7.35				0.70	15/03/2016	Dry(E)
	1.0								
	2.0								
	3.0								
	4.0								
	5.0								
	6.0								
	7.0								
	8.0								
	9.0								
	10.0								

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Chiselling: 0.70m to 0.70m: 1hr
 Pushing boulder - moved 2m and made reattempt - BH05A

<p>B Bulk Disturbed Sample</p> <p>D Small disturbed sample</p> <p>W Water sample</p> <p>U(9) Undisturbed sample (drive blows)</p>	<p>Key to Symbols</p> <p>SPT(S) Standard Penetration Test (Split Spoon)</p> <p>SPT(C) Standard Penetration Test (Cone)</p> <p>∇ 3.50 Waterstrike depth</p> <p>∇ 1.50(20) Water level depth 20mins after strike</p> <p>5.00(E) Depth to water (E)nd of shift</p> <p>5.00(S) Depth to water (S)tart of shift</p>
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Site Investigations Ltd

BOREHOLE SL 5269 BH GINT.GPJ COREHOLE.GDT 19/04/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Block 17

HOLE ID: **BH05A**

Client: Gannon Homes

Co-ordinates: E:723026.771

Consultant: Waterman Moylan

N:740710.646

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 8.00 m.O.D.

Boring Commenced: 15/03/2016

Hole Diameter: 200 mm

Boring Completed: 15/03/2016

Drilled by: T. Tindall

Rig Type: Dando 150

Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: dark brown sandy clay with much brick, timber and concrete.	0.00		8.00	B	0.50	TT35			
Pushing boulder - moved 2m and made reattempt - BH05B.	0.90		7.10				0.90	15/03/2016	Dry(E)
	1.0								
	2.0								
	3.0								
	4.0								
	5.0								
	6.0								
	7.0								
	8.0								
	9.0								
	10.0								

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Chiselling: 0.80m to 0.90m: 1hr
 Pushing boulder - moved 2m and made reattempt - BH05B

Key to Symbols	
B Bulk Disturbed Sample	SPT(S) Standard Penetration Test (Split Spoon)
D Small disturbed sample	SPT(C) Standard Penetration Test (Cone)
W Water sample	Waterstrike depth
U(9) Undisturbed sample (drive blows)	Water level depth 20mins after strike
	5.00(E) Depth to water (E)nd of shift
	5.00(S) Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL 5269 BH GINT.GPJ COREHOLE.GDT 19/04/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Block 17

HOLE ID: BH05B

Client: Gannon Homes

Co-ordinates: E:723026.616

Consultant: Waterman Moylan

N:740708.987

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 7.98 m.O.D.

Boring Commenced: 15/03/2016

Hole Diameter: 200 mm

Boring Completed: 16/03/2016

Drilled by: T. Tindall

Rig Type: Dando 150

Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: dark brown sandy clay with much brick, timber and concrete.	0.00		7.98						
Stiff brown slightly sandy slightly gravelly silty CLAY.	1.40		6.58	SPT(C)	1.00	N=50/180mm-(14,22,14/30mm)			
	2.00			B	1.50	TT36			
	2.50			SPT(C)	2.00	N=19-(5,4,5,5)			
	3.00			B	2.50	TT37			
	3.50			SPT(C)	3.00	N=22-(5,5,6,6)			
	4.00			B	3.50	TT38	3.50	15/03/2016	Dry(E)
	4.50			SPT(C)	4.00	N=23-(5,5,6,7)	3.50	15/03/2016	Dry(S)
	5.00			B	4.50	TT39			
	5.50			SPT(C)	5.00	N=28-(9,6,6,7)			
	5.80			B	5.50	TT40			
Obstruction - possible boulder. Borehole terminated due to obstruction.	5.70 5.80		2.28 2.18	SPT(C)	5.80	N=50/5mm-(50/5mm)	5.80	16/03/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Chiselling: 1.30m to 1.50m: 0.75hr
 5.70m to 5.80m: 1hr
 Borehole backfilled - no installation.

<p>B Bulk Disturbed Sample</p> <p>D Small disturbed sample</p> <p>W Water sample</p> <p>U(9) Undisturbed sample (drive blows)</p>	<p>Key to Symbols</p> <p>SPT(S) Standard Penetration Test (Split Spoon)</p> <p>SPT(C) Standard Penetration Test (Cone)</p> <p>▼ 3.50 Waterstrike depth</p> <p>▽ 1.50(20) Water level depth 20mins after strike</p> <p>5.00(E) Depth to water (E)nd of shift</p> <p>5.00(S) Depth to water (S)tart of shift</p>
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Site Investigations Ltd

BOREHOLE SL_5269BH GINT.GPJ COREHOLE.GDT_19/04/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Block 17

HOLE ID: **BH06**

Client: Gannon Homes	Co-ordinates: E:723019.549
Consultant: Waterman Moylan	N:740726.787
Site Address: Railway Road, Clongriffin, Dublin 13	Elevation: 8.03 m.O.D.
Boring Commenced: 10/03/2016	Hole Diameter: 200 mm
Boring Completed: 10/03/2016	Drilled by: T. Tindall
Rig Type: Dando 150	Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: dark brown sandy clay with much brick, timber and concrete.	0.00		8.03	B	0.50	TT15			
Pushing boulder - moved 2m and made reattempt - BH06A.	0.80		7.23				0.80	10/03/2016	Dry(E)
	1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0								

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
Chiselling: 0.70m to 0.80m: 1hr

Pushing boulder - moved 2m and made reattempt - BH06A

Key to Symbols

- | | |
|---------------------------------------|--|
| B Bulk Disturbed Sample | SPT(S) Standard Penetration Test (Split Spoon) |
| D Small disturbed sample | SPT(C) Standard Penetration Test (Cone) |
| W Water sample | Waterstrike depth |
| U(9) Undisturbed sample (drive blows) | Water level depth 20mins after strike |
| | 5.00(E) Depth to water (E)nd of shift |
| | 5.00(S) Depth to water (S)tart of shift |

Site Investigations Ltd

BOREHOLE SL 5269 BH GINT.GPJ COREHOLE.GDT 19/04/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Block 17

HOLE ID: BH06A

Client: Gannon Homes

Co-ordinates: E:723020.764

Consultant: Waterman Moylan

N:740724.976

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 8.12 m.O.D.

Boring Commenced: 10/03/2016

Hole Diameter: 200 mm

Boring Completed: 14/03/2016

Drilled by: T. Tindall

Rig Type: Dando 150

Logged by: S. Letch

Sheet 1 of 2

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: dark brown sandy clay with much brick, timber and concrete.	0.00		8.12						
Stiff brown slightly sandy slightly gravelly silty CLAY.	1.10		7.02	SPT(C)	1.00	N=16-(3,5,4,4)			
				B	1.50	TT16			
				SPT(C)	2.00	N=17-(4,4,4,5)			
				B	2.50	TT17			
				SPT(C)	3.00	N=19-(3,4,7,5)	3.00	10/03/2016	Dry(E)
				B	3.50	TT18	3.00	11/03/2016	Dry(S)
				SPT(C)	4.00	N=21-(4,5,6,6)			
				B	4.50	TT19			
				SPT(C)	5.00	N=17-(4,4,4,5)			
				B	5.50	TT20			
Stiff black slightly sandy slightly gravelly silty CLAY.	3.40		4.72	SPT(C)	6.00	N=21-(5,6,5,5)			
				B	6.50	TT21			
				SPT(C)	7.00	N=25-(6,6,7,6)			
				B	7.50	TT22			
				SPT(C)	8.00	N=25-(6,6,6,7)			
				B	8.50	TT23			
				SPT(C)	9.00	N=50/225mm-(12,14,19,6/0mm)			
				B	9.50	TT24			
Very stiff black slightly sandy slightly gravelly silty CLAY with low cobble content.	9.40		-1.28	B	9.50	TT24			

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Water ingressed into borehole over weekend.
 Chiselling: 0.60m to 0.80m: 0.75hr
 11.80m to 11.90m: 1hr
 Borehole backfilled - no installation.

Key to Symbols	
B Bulk Disturbed Sample	SPT(S) Standard Penetration Test (Split Spoon)
D Small disturbed sample	SPT(C) Standard Penetration Test (Cone)
W Water sample	Waterstrike depth
U(9) Undisturbed sample (drive blows)	Water level depth 20mins after strike
	5.00(E) Depth to water (E)nd of shift
	5.00(S) Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL_5269 BH GINT.GPJ COREHOLE.GDT_19/04/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Block 17

HOLE ID: BH06A

Client: Gannon Homes	Co-ordinates: E:723020.764
Consultant: Waterman Moylan	N:740724.976
Site Address: Railway Road, Clongriffin, Dublin 13	Elevation: 8.12 m.O.D.
Boring Commenced: 10/03/2016	Hole Diameter: 200 mm
Boring Completed: 14/03/2016	Drilled by: T. Tindall
Rig Type: Dando 150	Logged by: S. Letch

Sheet 2 of 2

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
Very stiff black slightly sandy slightly gravelly silty CLAY with low cobble content.	10.0			SPT(C)	10.00	N=50/190mm-(14,17,19/40mm)			
				B	10.50	TT25			
	11.0			SPT(C)	11.00	N=50/190mm-(14,23,13/40mm)			
				B	11.50	TT26			
Obstruction - possible boulder.	11.70		-3.58						
Borehole terminated due to obstruction.	11.90		-3.78	SPT(C)	11.90	N=50/5mm-(50/5mm)	11.90	14/03/2016	Dry(E)
	12.0								
	13.0								
	14.0								
	15.0								
	16.0								
	17.0								
	18.0								
	19.0								
	20.0								

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
Water ingressed into borehole over weekend.

Chiselling: 0.60m to 0.80m: 0.75hr
11.80m to 11.90m: 1hr

Borehole backfilled - no installation.

Key to Symbols

- | | |
|---------------------------------------|--|
| B Bulk Disturbed Sample | SPT(S) Standard Penetration Test (Split Spoon) |
| D Small disturbed sample | SPT(C) Standard Penetration Test (Cone) |
| W Water sample | Waterstrike depth |
| U(9) Undisturbed sample (drive blows) | Water level depth 20mins after strike |
| | 5.00(E) Depth to water (E)nd of shift |
| | 5.00(S) Depth to water (S)tart of shift |

Site Investigations Ltd

BOREHOLE SL_5269 BH GINT.GPJ COREHOLE.GDT_19/04/16

Appendix 2
Rotary Corehole Logs

Rotary Corehole Log

CONTRACT: Block 17

HOLE ID: **RC02**

Client: Gannon Homes

Co-ordinates: E:723021.376

Consultant: Waterman Moylan

N:740697.051

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 8.27 m.O.D.

Date Commenced: 01/07/2016

Drilled by: J. Campbell

Date Completed: 01/07/2016

Logged by: S. Letch

Corehole Diameter: 156mm

Sheet 1 of 2

Downhole Depth (m)	Core Run Depth (m)	Total Core Recovery%	Solid Core Recovery%	Rock Quality Designation%	Fracture Index (Fractures per m)	DISCONTINUITIES	Unit Depth (m)	Legend	Elevation (M.O.D.)	GEOLOGICAL DESCRIPTION
0.0							0.00	X	8.27	Cable percussion borehole completed - see log.
1.0										
2.0										
3.0										
4.0										
4.20							4.20	X	4.07	Open hole drilling - driller reports returns of dark grey gravelly sandy silty CLAY with cobbles and boulders.
5.0						SPT(C)-N=43-(9,9,11,14)		X		
6.0								X		
7.0						SPT(C)-N=38-(9,10,9,10)		X		
8.0								X		
9.0						SPT(C)-N=50/250mm-(12,14,15,9/25mm)		X		
10.0								X		

Remarks:
 (Note: Stratum bands <100mm are not indicated pictorially;
 NA = not applicable; NR = not recordable; NI = non-intact)
 Corehole terminated at scheduled depth.

Site Investigations Ltd

COREHOLE 5269 BH GINT.GPJ COREHOLE.GDT 14/07/16

Rotary Corehole Log

CONTRACT: Block 17

HOLE ID: RC02

Client: Gannon Homes

Co-ordinates: E:723021.376

Consultant: Waterman Moylan

N:740697.051

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 8.27 m.O.D.

Date Commenced: 01/07/2016

Drilled by: J. Campbell

Date Completed: 01/07/2016

Logged by: S. Letch

Corehole Diameter: 156mm

Sheet 2 of 2

Downhole Depth (m)	Core Run Depth (m)	Total Core Recovery%	Solid Core Recovery%	Rock Quality Designation%	Fracture Index (Fractures per m)	DISCONTINUITIES	Unit Depth (m)	Legend	Elevation (M.O.D.)	GEOLOGICAL DESCRIPTION
10.0						SPT(C)-N=50/200mm-(15,16,19/50mm)	10.00		-1.73	Open hole drilling - driller reports returns of gravelly fine to medium SAND with low cobble content.
11.0						SPT(C)-N=50/175mm-(18,22,10/25mm)	11.20		-2.93	Open hole drilling - driller reports returns of slightly sandy fine to medium GRAVEL.
12.0						SPT(C)-N=50/135mm-(28,22/60mm)	12.50		-4.23	Open hole drilling - driller reports returns of GRAVEL with high cobble content.
13.0						SPT(C)-N=50/95mm-(32,18/20mm)				
14.0										
15.0							15.00	Hole End	-6.73	Corehole terminated at scheduled depth.
16.0										
17.0										
18.0										
19.0										
20.0										

Remarks:
 (Note: Stratum bands <100mm are not indicated pictorially;
 NA = not applicable; NR = not recordable; NI = non-intact)
 Corehole terminated at scheduled depth.

Site Investigations Ltd

COREHOLE 5269 BH GINT.GPJ COREHOLE.GDT 14/07/16

Rotary Corehole Log

CONTRACT: Block 17

HOLE ID: **RC04**

Client: Gannon Homes

Co-ordinates: E:723023.240

Consultant: Waterman Moylan

N:740688.569

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 8.31 m.O.D.

Date Commenced: 05/07/2016

Drilled by: J. Campbell

Date Completed: 05/07/2016

Logged by: S. Letch

Corehole Diameter: 156mm

Sheet 1 of 2

Downhole Depth (m)	Core Run Depth (m)	Total Core Recovery%	Solid Core Recovery%	Rock Quality Designation%	Fracture Index (Fractures per m)	DISCONTINUITIES	Unit Depth (m)	Legend	Elevation (M.O.D.)	GEOLOGICAL DESCRIPTION
0.0							0.00		8.31	Cable percussion borehole completed - see log.
1.0										
2.0										
3.0										
4.0										
5.0							4.90		3.41	Open hole drilling - driller reports returns of dark grey gravelly sandy silty CLAY with cobbles and boulders.
6.0						SPT(C)-N=38-(9,10,10,9)				
7.0						SPT(C)-N=39-(9,10,10,10)				
8.0										
9.0						SPT(C)-N=42-(9,10,11,12)				
10.0										

Remarks:
 (Note: Stratum bands <100mm are not indicated pictorially;
 NA = not applicable; NR = not recordable; NI = non-intact)
 Corehole terminated at scheduled depth.

Site Investigations Ltd

COREHOLE 5269 BH GINT.GPJ COREHOLE.GDT 14/07/16

Rotary Corehole Log

CONTRACT: Block 17

HOLE ID: RC04

Client: Gannon Homes

Co-ordinates: E:723023.240

Consultant: Waterman Moylan

N:740688.569

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 8.31 m.O.D.

Date Commenced: 05/07/2016

Drilled by: J. Campbell

Date Completed: 05/07/2016

Logged by: S. Letch

Corehole Diameter: 156mm

Sheet 2 of 2

Downhole Depth (m)	Core Run Depth (m)	Total Core Recovery%	Solid Core Recovery%	Rock Quality Designation%	Fracture Index (Fractures per m)	DISCONTINUITIES	Unit Depth (m)	Legend	Elevation (M.O.D.)	GEOLOGICAL DESCRIPTION
10.0						SPT(C)-N=46-(11,11,12,12)	10.00		-1.69	Open hole drilling - driller reports returns of gravelly fine to medium SAND with low cobble content.
11.0					SPT(C)-N=45-(11,11,12,11)	11.50	-3.19		Open hole drilling - driller reports returns of slightly sandy fine to medium GRAVEL.	
12.0					SPT(C)-N=50/250mm-(10,13,14,13/25mm)					
13.0					SPT(C)-N=50/175mm-(20,21,9/25mm)					
14.0										
15.0							15.00	Hole End	-6.69	Corehole terminated at scheduled depth.
16.0										
17.0										
18.0										
19.0										
20.0										

Remarks:
 (Note: Stratum bands <100mm are not indicated pictorially;
 NA = not applicable; NR = not recordable; NI = non-intact)
 Corehole terminated at scheduled depth.

Site Investigations Ltd

COREHOLE 5269 BH GINT.GPJ COREHOLE.GDT 14/07/16

Rotary Corehole Log

CONTRACT: Block 17

HOLE ID: **RC05B**

Client: Gannon Homes

Co-ordinates: E:723026.616

Consultant: Waterman Moylan

N:740708.987

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 7.98 m.O.D.

Date Commenced: 04/07/2016

Drilled by: J. Campbell

Date Completed: 04/07/2016

Logged by: S. Letch

Corehole Diameter: 156mm

Sheet 1 of 2

Downhole Depth (m)	Core Run Depth (m)	Total Core Recovery%	Solid Core Recovery%	Rock Quality Designation%	Fracture Index (Fractures per m)	DISCONTINUITIES	Unit Depth (m)	Legend	Elevation (M.O.D.)	GEOLOGICAL DESCRIPTION
0.0							0.00	X	7.98	Cable percussion borehole completed - see log.
1.0										
2.0										
3.0										
4.0										
5.0										
6.0							5.80	X	2.18	Open hole drilling - driller reports returns of dark grey gravelly sandy silty CLAY with cobbles and boulders.
7.0						SPT(C)-N=50/275mm-(7,9,15,19/50mm)		X		
8.0								X		
9.0						SPT(C)-N=50/250mm-(11,11,15,13/25mm)		X		
10.0							9.50	X	-1.52	Open hole drilling - driller reports returns of gravelly fine to medium SAND with low cobble content.

Remarks:
 (Note: Stratum bands <100mm are not indicated pictorially;
 NA = not applicable; NR = not recordable; NI = non-intact)
 Corehole terminated at scheduled depth.

Site Investigations Ltd

COREHOLE 5269 BH GINT.GPJ COREHOLE.GDT 14/07/16

Rotary Corehole Log

CONTRACT: Block 17

HOLE ID: RC05B

Client: Gannon Homes

Co-ordinates: E:723026.616

Consultant: Waterman Moylan

N:740708.987

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 7.98 m.O.D.

Date Commenced: 04/07/2016

Drilled by: J. Campbell

Date Completed: 04/07/2016

Logged by: S. Letch

Corehole Diameter: 156mm

Sheet 2 of 2

Downhole Depth (m)	Core Run Depth (m)	Total Core Recovery%	Solid Core Recovery%	Rock Quality Designation%	Fracture Index (Fractures per m)	DISCONTINUITIES	Unit Depth (m)	Legend	Elevation (M.O.D.)	GEOLOGICAL DESCRIPTION
10.0						SPT(C)-N=48-(11,12,13,12)				
10.30									-2.32	Open hole drilling - driller reports returns of slightly sandy fine to medium GRAVEL.
11.0						SPT(C)-N=50/180mm-(18,20,12/30mm)				
12.0										
13.0						SPT(C)-N=50/125mm-(30,20/50mm)				
13.00									-5.02	Open hole drilling - driller reports returns of GRAVEL with high cobble content.
14.0										
15.0						SPT(C)-N=50/100mm-(35/15/25mm)				
15.00									-7.02	Corehole terminated at scheduled depth.
16.0										
17.0										
18.0										
19.0										
20.0										

Remarks:
 (Note: Stratum bands <100mm are not indicated pictorially;
 NA = not applicable; NR = not recordable; NI = non-intact)
 Corehole terminated at scheduled depth.

Site Investigations Ltd

COREHOLE 5269 BH GINT.GPJ COREHOLE.GDT 14/07/16

Appendix 3
Trial Pit Logs and Photographs

TRIAL PIT RECORD

Contract: Block 17

Hole ID:

TP01

Client: Gannon Homes

Co-ordinates: E:723014.901

Consultant: Waterman Moylan

N:740678.516

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 9.09 m.O.D.

Date Completed: 09/03/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: grey silty sandy gravel.	0.0	0.00	9.09					
MADE GROUND: black slightly sandy slightly gravelly silty clay with low cobble and boulder content.	0.60	8.49						
Firm brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subrounded, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	1.80	7.29		B	1.00	PM01		
	2.0			B	2.50	PM02		
Pit terminated at scheduled depth.	3.30	Hole End	5.79				▼ 3.10	09/03/2016

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:

Pit terminated at scheduled depth.

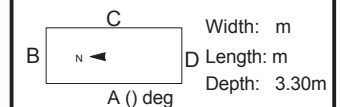
Pit walls stable.

Seepage at 3.10m

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.10 Waterstrike depth
- ▽ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Block 17

Hole ID:

TP02

Client: Gannon Homes

Co-ordinates: E:723018.738

Consultant: Waterman Moylan

N:740715.035

Site Address: Railway Road, Clongriffin, Dublin 13


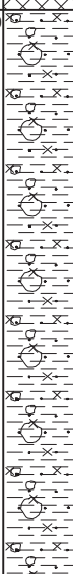
Elevation: 8.92 m.O.D.

Date Completed: 09/03/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: grey silty sandy gravel with some concrete blocks.	0.0 0.00		8.92					
Firm brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subrounded, fine to coarse of limestone. Cobbles and boulders are subrounded to rounded of limestone.	1.0 1.00		7.92	B	1.50	PM04		
	2.0			B	2.50	PM05		
Pit terminated at scheduled depth.	3.0 3.10	Hole End	5.82					
	4.0							
	5.0							

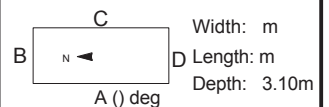
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 1.50 Waterstrike depth
- ▽ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Block 17

Hole ID:

TP03

Client: Gannon Homes

Co-ordinates: E:723029.397

Consultant: Waterman Moylan

N:740666.195

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 9.13 m.O.D.

Date Completed: 09/03/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: grey silty sandy gravel with some concrete blocks, timber and steel.	0.0 0.00		9.13					
Firm brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subrounded, fine to coarse of limestone. Cobbles and boulders are subrounded to rounded of limestone.	1.80 2.0 3.0		7.33	B	2.00	PM06		
Pit terminated at scheduled depth.	3.30	Hole End	5.83	B	3.00	PM07	▼ 3.10	09/03/2016

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:

Pit terminated at scheduled depth.

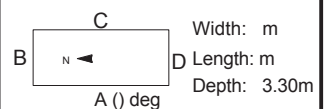
Pit walls stable.

Seepage at 3.10m

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.10 Waterstrike depth
- ▽ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Block 17

Hole ID:

TP04

Client: Gannon Homes

Co-ordinates: E:723031.683

Consultant: Waterman Moylan

N:740705.000

Site Address: Railway Road, Clongriffin, Dublin 13


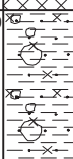

Elevation: 7.96 m.O.D.

Date Completed: 09/03/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: grey silty sandy gravel with some red brick and concrete blocks.	0.0 0.00		7.96					
Firm brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subrounded, fine to coarse of limestone. Cobbles and boulders are subrounded to rounded of limestone.	0.30		7.66	B	0.80	PM08		
Firm brown sandy gravelly silty CLAY with medium cobble and boulder content. Gravel is angular to subrounded, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	0.90 1.0		7.06	B	2.00	PM09	▼ 1.00	09/03/2016
Pit terminated due to pit wall collapse.	2.50	Hole End	5.46					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

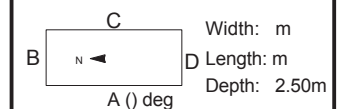
Remarks:

Pit terminated due to pit wall collapse.
Pit wall collapse forcing termination of pit.
Seepage at 1.00m.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 1.00 Waterstrike depth
- ▼ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



Site Investigations Ltd

TRIAL PIT TP GINT.GPJ COREHOLE.GDT 19/04/16

TRIAL PIT RECORD

Contract: Block 17

Hole ID:

TP05

Client: Gannon Homes

Co-ordinates: E:723044.710

Consultant: Waterman Moylan

N:740688.831

Site Address: Railway Road, Clongriffin, Dublin 13



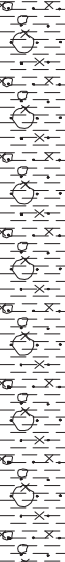
Elevation: 8.40 m.O.D.

Date Completed: 09/03/2016

Logged by: P. McGonagle

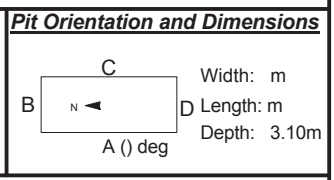
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: grey silty sandy gravel.	0.0 0.00		8.40					
MADE GROUND: brown slightly sandy slightly gravelly silty clay with low cobble and boulder content and some concrete.	0.30		8.10					
Firm brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subrounded, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	1.0 1.00		7.40	B	1.50	PM10		
	2.0			B	2.50	PM11		
	3.0						▼ 3.00	09/03/2016
Pit terminated at scheduled depth.	3.10	Hole End	5.30					
	4.0							
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated due to boulder obstructions and strength of soil.
 Pit walls stable.
 Seepage at 3.00m

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼ 3.00 Waterstrike depth
 - ▼ 1.50(20) Water level depth 20mins after strike



TRIAL PIT TP GINT.GPJ COREHOLE.GDT 19/04/16

TRIAL PIT RECORD

Contract: Block 17

Hole ID:

TP06

Client: Gannon Homes

Co-ordinates: E:723046.404

Consultant: Waterman Moylan

N:740708.052

Site Address: Railway Road, Clongriffin, Dublin 13

Elevation: 7.91 m.O.D.

Date Completed: 09/03/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: grey silty sandy gravel.	0.00	0.00	7.91					
MADE GROUND: black slightly sandy slightly gravelly silty clay with low cobble and boulder content and some red brick.	0.20	0.20	7.71					
Firm brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subrounded, fine to coarse of limestone. Cobbles and boulders are subrounded to rounded of limestone.	0.90 1.0	0.90	7.01	B	1.50	PM12		
Stiff black slightly sandy slightly gravelly silty CLAY with medium cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	2.70 3.0	2.70	5.21	B	2.80	PM13		
Pit terminated at scheduled depth.	3.10	Hole End	4.81					
	5.0							

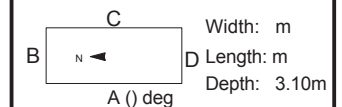
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼^{3.50} Waterstrike depth
- ▽^{1.50(20)} Water level depth 20mins after strike

Pit Orientation and Dimensions



TP01 Pit



TP01 Sidewall



TP01 Spoil



TP02 Pit



TP02 Sidewall



TP02 Spoil



TP03 Pit



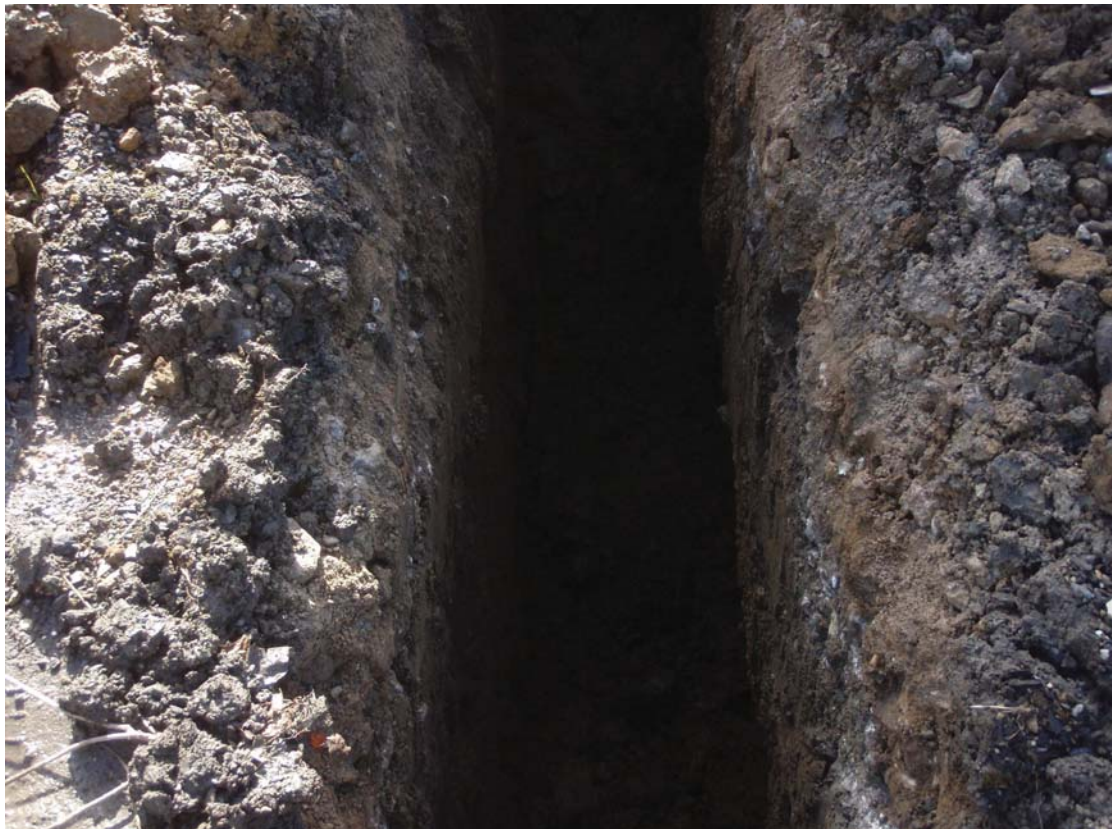
TP03 Sidewall



TP03 Spoil



TP04 Pit



TP04 Sidewall



TP04 Spoil



TP05 Pit



TP05 Sidewall



TP05 Spoil



TP06 Pit



TP06 Sidewall



TP06 Spoil



Appendix 4
Laboratory Test Results

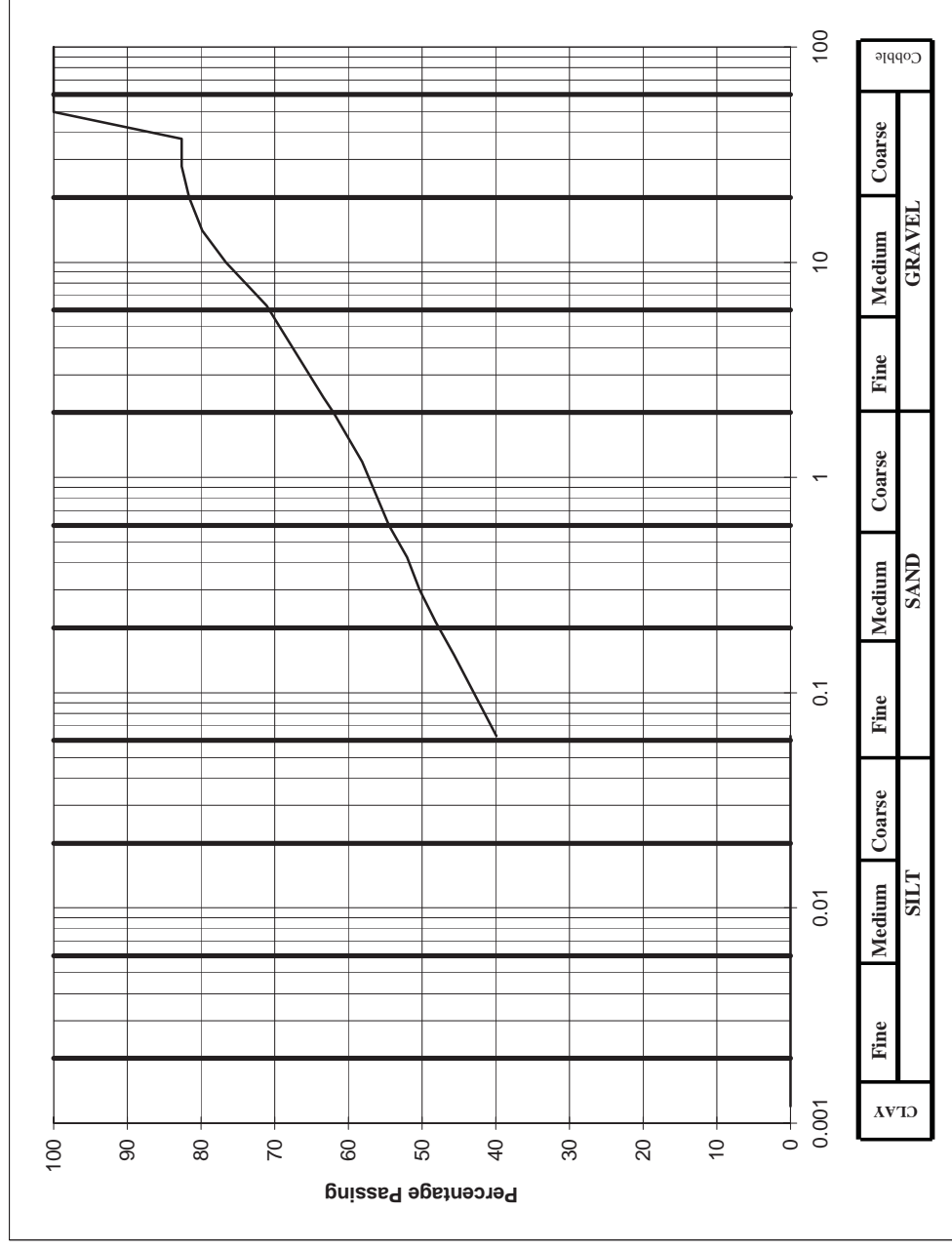
Classification Tests

Client	Gannon Homes		
Site	Clongriffin - Block 17		
S.I. File No	5269 / 16		
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email siltd@indigo.ie		
Report Date	18th April 2016		

Hole ID	Depth	Sample No	Lab Ref No.	Sample Type	Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Max. Dry Density Mg/m ³	Min. Dry Density Mg/m ³	Particle Density Mg/m ³	% passing 425um	Comments	Remarks
BH03	3.50	TT30	16/375	B	9.3	37	22				52.0		C=Clay; M=Silt Plasticity: L=Low; I=Intermediate; H=High; V=Very High; E=Extremely High
BH06A	3.50	TT321	16/376	B	9.3	34	21				59.6		CI CL

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	0.0630	
90	100	0.0200	
75	100	0.0060	
63	100	0.0020	
50	100		
37.5	82.6		
28	82.6		
20	81.6		
14	79.8		
10	76.6		
6.3	71.1		
5.0	69.3		
2.36	63.4		
2.00	62		
1.18	58.1		
0.600	54.5		
0.425	52		
0.300	50.3		
0.212	48.1		
0.150	45.7		
0.063	40		

Cobbles, %	0
Gravel, %	38
Sand, %	22
Clay / Silt, %	40



Client :	Gannon Homes Ltd.
Project :	Clongriffin - Block 17

Lab. No. :	16/375
Sample No. :	TT30

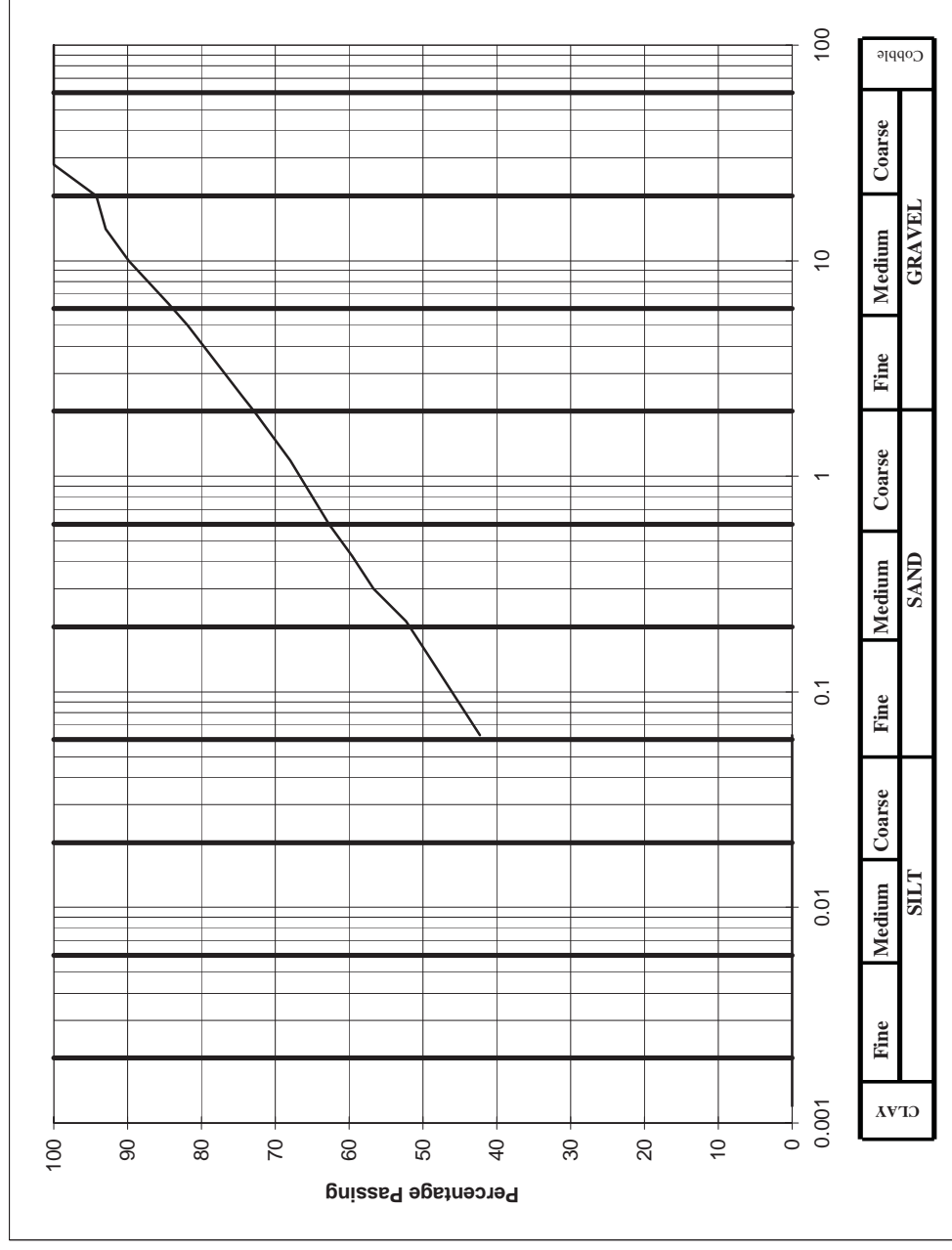
Hole ID :	BH 03
Depth, m :	3.50

Material description :	slightly sandy gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

BS 1377 Particle Size Analysis

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	0.0630	
90	100	0.0200	
75	100	0.0060	
63	100	0.0020	
50	100		
37.5	100		
28	100		
20	94.2		
14	93		
10	89.8		
6.3	84.4		
5.0	81.9		
2.36	74.5		
2.00	72.9		
1.18	68		
0.600	62.7		
0.425	59.6		
0.300	56.7		
0.212	52.3		
0.150	49.4		
0.063	42		

Cobbles, %	0
Gravel, %	27
Sand, %	31
Clay / Silt, %	42



Client :	Gannon Homes Ltd.	
Project :	Clongriffin - Block 17	

Lab. No. :	16/376
Sample No. :	TT21

Hole ID :	BH 06A
Depth, m :	3.50

Material description :	slightly gravelly slightly sandy silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

Chemical Testing
In accordance with BS 1377: Part 3

Client	Gannon Homes Ltd.		
Site	Clongriffin - Block 17		
S.I. File No	5269 / 16		
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email siltd@indigo.ie		
Report Date	18th April 2016		

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Sulphate Content Acid Soluble (SO ₃) g/L	Sulphate Content Acid Soluble (SO ₃) %	Organic Content %	Chloride ion Content (soil:water ratio 2:1) %	% passing 2mm	Remarks
TP02	1.50	PM04	16/377	8.96	0.115	0.067	2.10	0.33	57.7	
TP04	0.80	PM08	16/378	8.61	0.114	0.068	2.35	0.44	59.5	



Site Investigations Ltd
The Grange
Carhugar
12th Lock Road
Lucan
Co. Dublin

Attention: Stephen Letch

CERTIFICATE OF ANALYSIS

Date: 22 March 2016
Customer: D_SITEINV_NCS
Sample Delivery Group (SDG): 160312-101
Your Reference: Block 17
Location: Clongriffin
Report No: 354287

We received 2 samples on Saturday March 12, 2016 and 2 of these samples were scheduled for analysis which was completed on Tuesday March 22, 2016. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager



SDG: 160312-101	Location: Clongriffin	Order Number: 27/A/16
Job: D_SITEINV_NCS-66	Customer: Site Investigations Ltd	Report Number: 354287
Client Reference: Block 17	Attention: Stephen Letch	Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
13082950	BH01		0.50	09/03/2016
13082951	BH06		0.50	11/03/2016



Only received samples which have had analysis scheduled will be shown on the following pages.



SDG: 160312-101
 Job: D_SITEINV_NCS-66
 Client Reference: Block 17

Location: Clongriffin
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 27/A/16
 Report Number: 354287
 Superseded Report:

SOLID Results Legend  Test  No Determination Possible	Lab Sample No(s)	13082950	13082951	
	Customer Sample Reference	BH01	BH06	
	AGS Reference			
	Depth (m)	0.50	0.50	
	Container	60g VOC (ALE215) 250g Amber Jar (AL 1kg TUB	60g VOC (ALE215) 1kg TUB	60g VOC (ALE215) 250g Amber Jar (AL
ANC at pH4 and ANC at pH 6	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Anions by Kone (w)	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CEN Readings	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Fluoride	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GRO by GC-FID (S)	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Loss on Ignition in soils	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Mercury Dissolved	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Mineral Oil	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PAH Value of soil	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PCBs by GCMS	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
pH	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Phenols by HPLC (W)	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sample description	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



SDG: 160312-101
 Job: D_SITEINV_NCS-66
 Client Reference: Block 17

Location: Clongriffin
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 27/A/16
 Report Number: 354287
 Superseded Report:

SOLID		Lab Sample No(s)		13082950		13082951			
Results Legend Test No Determination Possible		Customer Sample Reference		BH01		BH06			
		AGS Reference							
		Depth (m)		0.50		0.50			
		Container		250g Amber Jar (AL 1kg TUB)		60g VOC (ALE215) 1kg TUB		60g VOC (ALE215) 250g Amber Jar (AL 1kg TUB)	
		Total Dissolved Solids		All		NDPs: 0 Tests: 2			
Total Organic Carbon		All		NDPs: 0 Tests: 2					

SDG: 160312-101
Job: D_SITEINV_NCS-66
Client Reference: Block 17

Location: Clongriffin
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 27/A/16
Report Number: 354287
Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<input type="checkbox"/> <0.063mm	fine	<input type="checkbox"/> 0.063mm - 0.1mm	medium	<input type="checkbox"/> 0.1mm - 2mm	coarse	<input type="checkbox"/> 2mm - 10mm	very coarse	<input type="checkbox"/> >10mm
-----------	-----------------------------------	------	--	--------	--------------------------------------	--------	-------------------------------------	-------------	--------------------------------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
13082950	BH01	0.50	Dark Brown	Sandy Clay	0.063 - 2.00 mm	Stones	Vegetation
13082951	BH06	0.50	Dark Brown	Sandy Clay	0.063 - 2.00 mm	Stones	Vegetation

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



SDG: 160312-101	Location: Clongriffin	Order Number: 27/A/16
Job: D_SITEINV_NCS-66	Customer: Site Investigations Ltd	Report Number: 354287
Client Reference: Block 17	Attention: Stephen Letch	Superseded Report:

Results Legend		Customer Sample R	BH01	BH06				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
M	mCERTS accredited.		0.50	0.50				
aq	Aqueous / settled sample.		Soil/Solid	Soil/Solid				
diss.filt	Dissolved / filtered sample.		09/03/2016	11/03/2016				
tot.unfilt	Total / unfiltered sample.		00:00:00	.				
*	Subcontracted test.		12/03/2016	12/03/2016				
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery		160312-101	160312-101				
(F)	Trigger breach confirmed		13082950	13082951				
1-5&*&@	Sample deviation (see appendix)							
Component	LOD/Units		Method					
Moisture Content Ratio (% of as received sample)	%	PM024	11	12				
Loss on ignition	<0.7 %	TM018	2.1	2.35				
			M	M				
Mineral oil >C10-C40	<1 mg/kg	TM061	33.2	34.1				
Mineral Oil Surrogate % recovery**	%	TM061	85.6	82.7				
Organic Carbon, Total	<0.2 %	TM132	0.423	0.693				
			M	M				
pH	1 pH Units	TM133	8.26	10.8				
			M	M				
PCB congener 28	<3 µg/kg	TM168	<3	<3				
			M	M				
PCB congener 52	<3 µg/kg	TM168	<3	<3				
			M	M				
PCB congener 101	<3 µg/kg	TM168	<3	<3				
			M	M				
PCB congener 118	<3 µg/kg	TM168	<3	<3				
			M	M				
PCB congener 138	<3 µg/kg	TM168	<3	<3				
			M	M				
PCB congener 153	<3 µg/kg	TM168	<3	<3				
			M	M				
PCB congener 180	<3 µg/kg	TM168	<3	<3				
			M	M				
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21	<21				
ANC @ pH 4	<0.03 mol/kg	TM182	5.36	4.53				
ANC @ pH 6	<0.03 mol/kg	TM182	0.592	0.773				
Polyaromatic hydrocarbons, Total 17	<10 mg/kg	TM213	<10	<10				



SDG: 160312-101
Job: D_SITEINV_NCS-66
Client Reference: Block 17

Location: Clongriffin
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 27/A/16
Report Number: 354287
Superseded Report:

GRO by GC-FID (S)

Table with columns: Results Legend, Customer Sample R, BH01, BH06, Component, LOD/Units, Method. Rows include Methyl tertiary butyl ether (MTBE), Benzene, Toluene, Ethylbenzene, m,p-Xylene, o-Xylene, and sum of detected mpo xylene by GC.

SDG: 160312-101
 Job: D_SITEINV_NCS-66
 Client Reference: Block 17

Location: Clongriffin
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 27/A/16
 Report Number: 354287
 Superseded Report:

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.101
Mass of dry sample (kg)	0.175
Particle Size <4mm	>95%

Site Location	Clongriffin
Natural Moisture Content (%)	12.4
Dry Matter Content (%)	89

Case	
SDG	160312-101
Lab Sample Number(s)	13082950
Sampled Date	09-Mar-2016
Customer Sample Ref.	BH01
Depth (m)	0.50

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	<6	-
-	-	-
-	-	-

Solid Waste Analysis	Result
Total Organic Carbon (%)	0.423
Loss on Ignition (%)	2.1
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	33.2
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	8.26
ANC to pH 6 (mol/kg)	0.592
ANC to pH 4 (mol/kg)	5.36

Eluate Analysis	C2 Conc ⁿ in 10:1 eluate (mg/l)		A2 10:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.0019	<0.00012	0.019	<0.0012	0.5	2	25
Barium	0.0214	<0.00003	0.214	<0.0003	20	100	300
Cadmium	<0.0001	<0.0001	<0.001	<0.001	0.04	1	5
Chromium	0.000732	<0.00022	0.00732	<0.0022	0.5	10	70
Copper	0.00192	<0.00085	0.0192	<0.0085	2	50	100
Mercury Dissolved (CVAf)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00453	<0.00024	0.0453	<0.0024	0.5	10	30
Nickel	0.00122	<0.00015	0.0122	<0.0015	0.4	10	40
Lead	0.000058	<0.00002	0.00058	<0.0002	0.5	10	50
Antimony	0.0009	<0.00016	0.009	<0.0016	0.06	0.7	5
Selenium	0.00518	<0.00039	0.0518	<0.0039	0.1	0.5	7
Zinc	<0.00041	<0.00041	<0.0041	<0.0041	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	115	<2	1150	<20	1000	20000	50000
Total Dissolved Solids	212	<5	2120	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	18-Mar-2016
pH (pH Units)	8.71
Conductivity (µS/cm)	272.00
Temperature (°C)	20.40
Volume Leachant (Litres)	0.889

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

22/03/2016 16:42:48

16:42:43 22/03/2016

SDG: 160312-101
 Job: D_SITEINV_NCS-66
 Client Reference: Block 17

Location: Clongriffin
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 27/A/16
 Report Number: 354287
 Superseded Report:

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.102
Mass of dry sample (kg)	0.175
Particle Size <4mm	>95%

Site Location	Clongriffin
Natural Moisture Content (%)	13.6
Dry Matter Content (%)	88

Case	
SDG	160312-101
Lab Sample Number(s)	13082951
Sampled Date	11-Mar-2016
Customer Sample Ref.	BH06
Depth (m)	0.50

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	<6	-
-	-	-
-	-	-

Solid Waste Analysis	Result
Total Organic Carbon (%)	0.693
Loss on Ignition (%)	2.35
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	34.1
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	10.8
ANC to pH 6 (mol/kg)	0.773
ANC to pH 4 (mol/kg)	4.53

Eluate Analysis	C2 Conc ⁿ in 10:1 eluate (mg/l)		A2 10:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.0028	<0.00012	0.028	<0.0012	0.5	2	25
Barium	0.0165	<0.00003	0.165	<0.0003	20	100	300
Cadmium	<0.0001	<0.0001	<0.001	<0.001	0.04	1	5
Chromium	0.00421	<0.00022	0.0421	<0.0022	0.5	10	70
Copper	0.00483	<0.00085	0.0483	<0.0085	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00352	<0.00024	0.0352	<0.0024	0.5	10	30
Nickel	0.00147	<0.00015	0.0147	<0.0015	0.4	10	40
Lead	<0.00002	<0.00002	<0.0002	<0.0002	0.5	10	50
Antimony	0.00376	<0.00016	0.0376	<0.0016	0.06	0.7	5
Selenium	0.00144	<0.00039	0.0144	<0.0039	0.1	0.5	7
Zinc	<0.00041	<0.00041	<0.0041	<0.0041	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	77.7	<2	777	<20	1000	20000	50000
Total Dissolved Solids	219	<5	2190	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	18-Mar-2016
pH (pH Units)	10.79
Conductivity (µS/cm)	370.00
Temperature (°C)	20.20
Volume Leachant (Litres)	0.888

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates



SDG: 160312-101
Job: D_SITEINV_NCS-66
Client Reference: Block 17

Location: Clongriffin
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 27/A/16
Report Number: 354287
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step		
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition		
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water		
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser		
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils		
TM182	CEN/TC 292 - WI 292046-characterization of waste-leaching Behaviour Tests- Acid and Base Neutralization Capacity Test	Determination of Acid Neutralisation Capacity (ANC) Using Autotitration in Soils		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM213	In-house Method	Rapid Determination of PAHs by GC-FID		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



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Superseded Report:

Test Completion Dates

Lab Sample No(s)	13082950	13082951
Customer Sample Ref.	BH01	BH06
AGS Ref.		
Depth	0.50	0.50
Type	SOLID	SOLID
ANC at pH4 and ANC at pH 6	22-Mar-2016	22-Mar-2016
Anions by Kone (w)	21-Mar-2016	21-Mar-2016
CEN 10:1 Leachate (1 Stage)	18-Mar-2016	18-Mar-2016
CEN Readings	22-Mar-2016	22-Mar-2016
Dissolved Metals by ICP-MS	22-Mar-2016	22-Mar-2016
Dissolved Organic/Inorganic Carbon	22-Mar-2016	22-Mar-2016
Fluoride	22-Mar-2016	22-Mar-2016
GRO by GC-FID (S)	18-Mar-2016	18-Mar-2016
Loss on Ignition in soils	18-Mar-2016	18-Mar-2016
Mercury Dissolved	22-Mar-2016	22-Mar-2016
Mineral Oil	22-Mar-2016	22-Mar-2016
PAH Value of soil	22-Mar-2016	22-Mar-2016
PCBs by GCMS	20-Mar-2016	20-Mar-2016
pH	18-Mar-2016	18-Mar-2016
Phenols by HPLC (W)	22-Mar-2016	22-Mar-2016
Sample description	16-Mar-2016	16-Mar-2016
Total Dissolved Solids	22-Mar-2016	22-Mar-2016
Total Organic Carbon	18-Mar-2016	18-Mar-2016



SDG: 160312-101
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Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

General

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

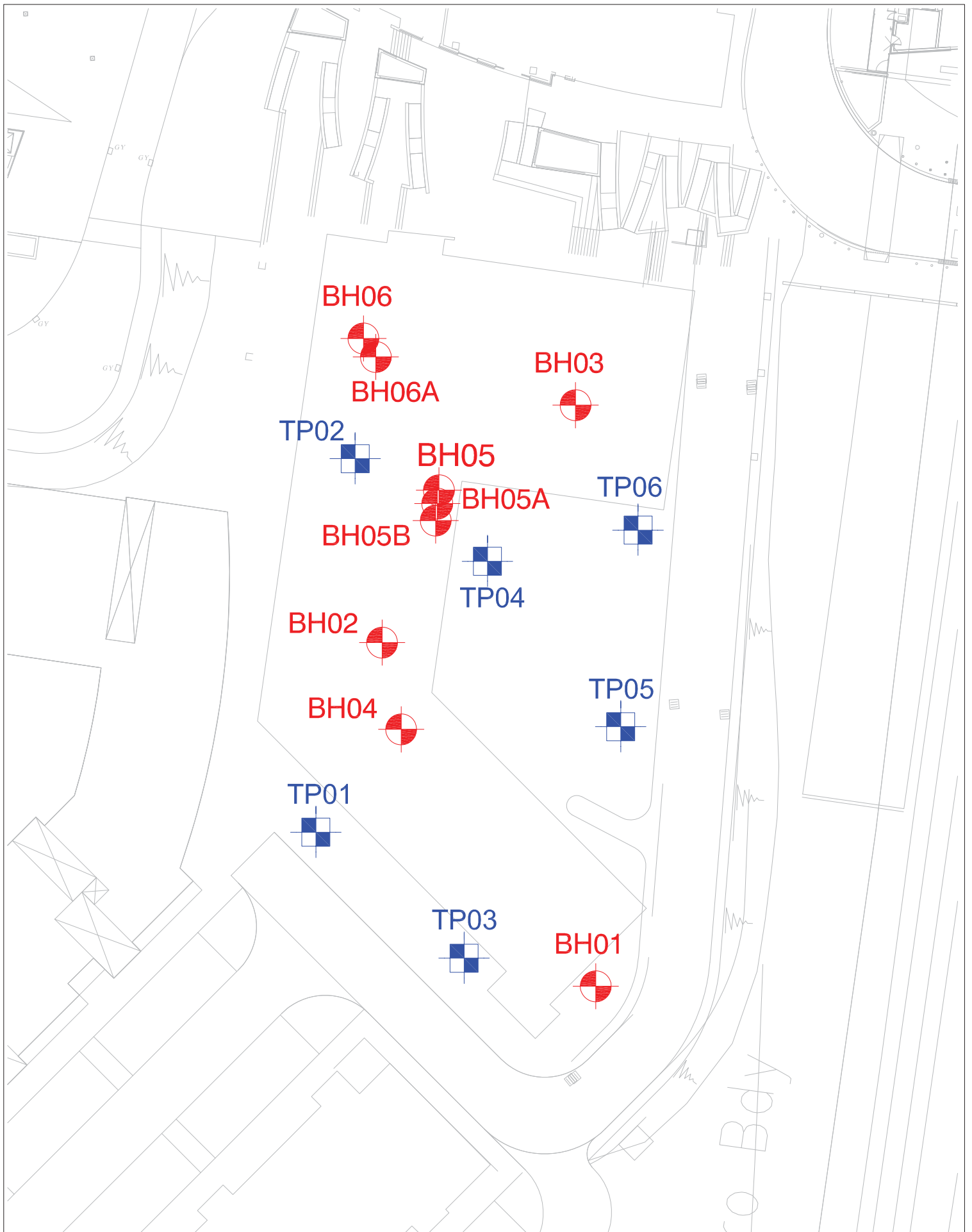
Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Appendix 5
Survey Data

Site Survey

Location	Irish National Grid		Level	Irish Transverse Mercator	
	Easting	Northing		Easting	Northing
Boreholes					
BH01	323118.123	240638.640	8.76	723042.270	740663.454
BH02	323097.224	240672.244	8.27	723021.376	740697.051
BH03	323116.148	240695.461	7.73	723040.296	740720.263
BH04	323099.089	240663.760	8.31	723023.240	740688.569
BH05	323102.783	240687.139	8.05	723026.934	740711.943
BH05A	323102.62	240685.842	8.00	723026.771	740710.646
BH05B	323102.465	240684.183	7.98	723026.616	740708.987
BH06	323095.397	240701.987	8.03	723019.549	740726.787
BH06A	323096.612	240700.175	8.12	723020.764	740724.976
Trial Pits					
TP01	323090.748	240653.705	9.09	723014.901	740678.516
TP02	323094.586	240690.232	8.92	723018.738	740715.035
TP03	323105.247	240641.381	9.13	723029.397	740666.195
TP04	323107.533	240680.195	7.96	723031.683	740705.000
TP05	323120.563	240664.023	8.40	723044.710	740688.831
TP06	323122.257	240683.248	7.91	723046.404	740708.052



Site Investigations Ltd
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 The Grange
 12th Lock Road
 Lucan
 Co. Dublin

T: 01 6108768
 E: siltd@indigo.ie

Client :	Gannon Homes		
Engineer :	Waterman Moylan		
Project :	Block 17, Clongriffin		
Date :	18-04-2016	Scale :	Not to Scale
Description :	Site Investigation Plan	Rev :	1
Drawing Number :	SIL5269:01	Drawn by :	SL

Legend:



Cable Percussion Borehole



Trial Pit



S.I. Ltd Contract No: 5274

Client: Gannon Homes Ltd
Engineer: Waterman Moylan
Contractor: Site Investigations Ltd

Plot E, Clongriffin, Dublin 13
Site Investigation Report

Prepared by:

.....

Stephen Letch

Issue Date:	12/05/2016
Status	Final
Revision	0

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3. Laboratory Testing	3
4. Ground Conditions	3
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Appendices:

1. Cable Percussive Borehole Logs
2. Trial Pit Logs and Photographs
3. Dynamic Probe Logs
4. Soakaway Test Results
5. Laboratory Test Results
6. Survey Data

1. Introduction

On the instructions of Waterman Moylan, Site Investigations Ltd (SIL) were appointed to complete a ground investigation at Plot E, Clongriffin, Dublin 13. The investigation was completed for the residential development of the site and was completed on behalf of the Client, Gannon Homes Ltd.

The fieldworks comprised a programme of cable percussive boreholes, trial pits, dynamic probes and soakaways. All fieldwork was carried out in accordance with Eurocode 7: Geotechnical Design and the IEI Specification & Related Documents for Ground Investigation in Ireland (2006). Laboratory testing has been performed on representative soil samples recovered from the boreholes and trial pits and these were completed in accordance of BS1377: 1990.

This report presents the factual geotechnical data obtained from the field and laboratory testing with interpretation of the ground conditions discussed.

2. Fieldwork

The geotechnical fieldworks were started and completed in April 2016 and comprised the following:

- 4 No. cable percussive boreholes
- 11 No. trial pits
- 11 No. dynamic probes
- 3 No. soakaways

2.1. Cable Percussive Boreholes

Cable percussion boring was undertaken at 4 No. locations using a Dando 150 rig and constructed a 200mm diameter borehole. The boreholes terminated at the scheduled depth of 9.00mbgl at each location. It was not possible to collect undisturbed samples due to the gravel and cobble content of the strata so bulk disturbed samples were recovered at regular intervals.

In order to test the strength of the stratum, Standard Penetration Tests (SPT's) were performed at 1.00m intervals in accordance with BS 1377 (1990). In soils with high gravel and cobble content it is appropriate to use a solid cone (60°) (CPT) instead of the split spoon and this was used throughout the testing. The test is completed over 450mm and the cone is driven 150mm into the stratum to ensure that the test is conducted over an undisturbed zone. The cone is then driven the remaining 300mm and the blows recorded to report the N-Value. The report shows the N-Value with the 75mm incremental blows listed in brackets (e.g. BH01

at 1.00mbgl where N=15-(3,4,4,4)). Where refusal of 50 blows across the test zone was encountered was achieved during testing, the penetration depth is also reported (e.g. BH01 at 7.50mbgl where N=50/260mm-(12,12,14,12/35mm)).

The logs are presented in Appendix 1.

2.2. Trial Pits

11 No. trial pits were completed using a wheeled excavator and were logged by SIL geotechnical engineer. Representative disturbed bulk samples were recovered as the pits were excavated and they were returned to the laboratory for geotechnical testing.

The trial pit logs and photographs are presented in Appendix 2.

2.3. Dynamic Probes

Dynamic probes were carried out at 11 No. locations, adjacent to the trial pits, using a track mounted Competitor 130 machine. The testing complies with the requirements of BS1377: Part 9 (1990) and Eurocode 7: Part 3. The configuration utilised standard DPH (Heavy) probing method comprising a 50kg weight, 500mm drop height and a 43.7mm diameter (90°) cone. The number of blows required to drive the cone each 100mm increment into the sub soil is recorded in accordance with the standards. The dynamic probe provides no information regarding soil type or groundwater conditions.

The dynamic probe results can be used to analyse the strength of the soil strata encountered by the probe. 'Proceedings of the Trinity College Dublin Symposium of Field and Laboratory Testing of Soils for Foundations and Embankments' presents a paper by Foirbart that is most relevant to Irish soil conditions and within this paper the following equations were included:

$$\text{DPH } N_{100} \times 2.5 = \text{SPT } N \text{ value (Granular Soils)}$$

$$C_u = 15 \times \text{DPH } N_{100} + 30 \text{ kPa (Cohesive Soils)}$$

These equations present a relationship between the probe N_{100} value and the SPT N value for granular soils and the shear strength of cohesive soils.

The probe results are presented in Appendix 3 and present the data both numerically and graphically.

2.4. Soakaway Tests

3 No. soakaway test were completed using a wheeled excavator and were logged by SIL geotechnical engineer. The soakaway test is used to identify possible areas for storm water drainage. The pit was filled with water and the level of the groundwater was recorded over

time. As stipulated by BRE Special Digest 365, the pit should be filled three times and the final cycle is used to provide the infiltration rate. The time taken for the water level to fall from 75% volume to 25% volume is required to calculate the rate of infiltration. However, if the water level does not fall then the test is deemed to have failed and the area is unsuitable as a drainage area

The soakaway logs are presented in Appendix 4.

2.5. Surveying

Following the completion of all the fieldworks works, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log and the locations are shown on the site plan in Appendix 6.

3. Laboratory Testing

Geotechnical laboratory testing has been carried out on representative soil samples in accordance with BS 1377 (1990). Testing included:

- Moisture content
- Atterberg limits
- Particle size gradings
- pH and sulphate
- Chloride content
- Organic content

Environmental testing was completed by Alcontrol Laboratories Ltd. and consisted of the following:

- WAC Analysis

The laboratory test results are presented in Appendix 3.

4. Ground Conditions

4.1. Overburden

A generalised summary of the ground profile at BH04 is shown overleaf. Reference should be made to the individual borehole and trial pit records in Appendices 1 and 2 for the full strata information at specific locations.

- TOPSOIL.
- MADE GROUND: brown slightly sandy slightly gravelly silty clay with low cobble content.
- Firm brown grey sandy slightly gravelly silty CLAY.
- Medium dense grey brown slightly silty sandy GRAVEL.
- Very stiff grey slightly sandy slightly gravelly silty CLAY with low cobble content.

The overburden deposits are of glacial origin and the particle size gradings of the cohesive soils display characteristic well-graded 'straight-line' profiles for the glacial material. Fines contents (i.e. silt & clay) from the gradings show the cohesive soils with 40% and 64% silt/clay and the Atterberg Limits tests show that silty CLAY dominates the site.

The boreholes and trial pits did record MADE GROUND in each location to a maximum depth of 2.60mbgl at TP04 and TP08. This was described by the SIL Engineer as engineered fill with only a small amount of red brick and timber within the fill.

4.2. Groundwater

Groundwater details in the boreholes and trial pits during the fieldworks are noted on the logs in Appendices 1 and 2. Groundwater was encountered in all the boreholes and this entered the holes close to when the GRAVEL stratum was encountered. The depth of strike varied from 3.00mbgl at BH04 to 5.00mbgl at BH02. The water level rose during the drilling process and was standing between 1.00mbgl and 2.00mbgl when the boreholes were completed.

Groundwater was encountered in 2 of the 11 trial pits at depths ranging from 2.40mbgl (TP05) to 2.60mbgl (TP02). Both ingresses were recorded as a seepage into the pit.

5.0. Recommendations and Conclusions

Please note the following caveats:

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 the exploratory hole locations or below the final level of excavation, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for adjacent unexpected conditions that have not been revealed by the exploratory holes. It is further recommended that all bearing surfaces when excavated should be inspected by a suitably qualified Engineer to verify the information given in this report.

Excavated surfaces in clay strata should be kept dry to avoid softening prior to foundation placement. Foundations should always be taken to a minimum depth of 0.50mBGL to avoid the effects of frost action and possible seasonal shrinkage/swelling.

If it is intended that on-site materials are to be used as fill, then the necessary laboratory testing should be specified by the Client to confirm the suitability. Also, relevant lab testing should be specified where stability of side slopes to excavations is a concern, or where contamination may be an issue.

5.1. Foundations

Due to the unknown depth of foundation and no longer term groundwater information, this analysis assumes the groundwater will not have an effect on the construction or performance of these foundations.

From the boreholes, MADE GROUND was encountered to a depth of 2.00mbgl. This was described as engineered fill on site but it would be recommended that all foundations are placed on natural ground. This is to eliminate the possibility of differential settlement if foundations are placed on the MADE GROUND.

Below the MADE GROUND, the boreholes encountered firm/stiff grey brown slightly sandy slightly gravelly CLAY with low cobble content. Therefore, the SPT N-values at 2.00mbgl vary from 13 (BH01) to 16 (BH02). For the analysis an N-value of 15 was chosen for the purposes of design in this stratum, in accordance with Eurocode 7 (EC 7).

Using an equation proposed by Stroud and Butler, the SPT N-value can be used to calculate the shear strength and this is $C_u=5N$. Therefore, using the value of 15, this indicates that the shear strength of the CLAY is 75kN/m^2 . This can be used to calculate the allowable bearing capacity (ABC) and using a factor of safety of 3 an ABC of 140kN/m^2 would be anticipated.

The trial pits on the site recorded MADE GROUND to a maximum depth of 2.60mbgl and therefore it is important that any foundations are placed on natural ground.

The following assumptions were made as part of these analyses. If any of these assumptions are not in accordance with detailed design or observations made during construction these recommendations should be re-evaluated.

- The foundation is to be 1m wide.
- Foundations are to be constructed on a level formation of uniform material type (described above).
- All man-made or filled material is to be removed prior to construction.
- The bulk unit weight of the material in this stratum has a minimum density of 19kN/m^3 .

- Based on groundwater observations this analysis assumes the groundwater will not have an effect on the construction or performance of these foundations.
- Foundation formations should be inspected by a competent geotechnical engineer prior to construction so as to verify that the observations made during the ground investigation are consistent with the actual ground conditions at the time of construction.

The trial pits indicate that excavations in the cohesive soils should be stable for a short while at least. However as the upper soil is MADE GROUND then regular inspection of temporary excavations should be completed during construction to ensure that all slopes are stable. Temporary support should be used on any excavation that will be left open for an extended period of time.

5.2. Groundwater

The caveats overleaf relating to interpretation of groundwater levels should be noted:

There is always considerable uncertainty as to the likely rates of water ingress into excavations in clayey soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water.

Furthermore, water levels noted on the borehole and trial pit logs do not generally give an accurate indication of the actual groundwater conditions as the borehole or trial pit is rarely left open for sufficient time for the water level to reach equilibrium.

Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period of groundwater monitoring using any constructed standpipes is required to provide more accurate information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.

Pumping tests would be required to determine likely seepage rates and persistence into excavations taken below the groundwater level. Deep trial pits also aid estimation of seepage rates.

As discussed previously there were 4 No. water strikes in the boreholes. These were between 3.00mbgl (BH04) and 5.00mbgl (BH02) and were encountered when the granular soils were encountered or just above the boundary. It would be anticipated that water ingresses into any excavation of the cohesive soil would be slight (as seen in TP02 and TP05) and only if the granular soils are encountered will the ingress rate increase.

There is always considerable uncertainty as to the likely rates of water ingress into excavations in cohesive soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water. However, based

on this information at the exploratory hole locations to date, it is considered likely that any seepages into excavations of the CLAY will be at depth and generally will be slow (as per TP02 and TP05). If the granular soils are encountered then the probability of water ingressing into the excavation increases, as does the likely rate of ingress.

If groundwater is encountered during excavations then mechanical pumps will be required to remove the groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

5.3. Soakaway Tests

The graphs in Appendix 4 show that the areas where the soakaways were completed are unsuitable for soakaway design. The BRE Digest stipulates that the pit should half empty within 24hrs, and extrapolation indicates this condition would not be satisfied. The test was terminated at the end of the first (of a possible three) fill/empty cycle since further testing would give even slower fall rates due to increased soil saturation.

The unsuitability of the site for soakaways is further suggested by the soil descriptions of the materials in the area of the site where the soakaway was completed, i.e. clay and silt soils.

5.4. Contamination

Environmental testing was carried out on two samples from the investigation and the results are shown in Appendix 5. For material to be removed from site, landfill acceptability testing (WAC) was carried out to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill. The results were compared with the published waste acceptance limits of BS EN 12457-2.

The disposal suite results indicate that the material would generally be able to be treated as Inert Waste. However, the sulphate result did exceed the Inert threshold and therefore discussions about the acceptance of the material must be undertaken with individual landfills before removal of any material from site.

Only two samples were tested for analysis and although no major contamination was noted at the fieldwork locations, any localised contamination may have been missed. Therefore, a testing regime designed by an environmental engineer should be designed on any material that is to be removed from site to ensure that the material stays within the landfill acceptance criteria.

5.5. Aggressive Ground Conditions

The chemical tests results in Appendix 5 indicate a general pH value between 8.70 and 8.95, which is close to neutral and below the level of 9, which could cause possible concern, therefore no special precautions are required.

The maximum value obtained for acid soluble sulphate was 117mg/l as SO₃. The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground*' guidelines require SO₄ values and after conversion ($SO_4 = SO_3 \times 1.2$), the maximum value of 140mg/l shows Class 1 conditions and no special precautions are required.

Appendix 1
Cable Percussive Borehole Logs

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Plot E

HOLE ID: BH01

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Commenced: 13/04/2016
Boring Completed: 13/04/2016
Rig Type: Dando 150

Co-ordinates: E:722553.522
 N:741040.599
Elevation: 9.40 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
TOPSOIL.	0.00	- T -	9.40						
MADE GROUND: brown slightly sandy slightly gravelly silty clay with low cobble content.	0.50	X X X X	8.90	SPT(C)	1.00	N=15-(3,4,4,4)			
	1.00	X X X X		B	1.50	PM08			
Firm brown grey slightly sandy slightly gravelly silty CLAY with low cobble content.	1.80	X X X X	7.60	SPT(C)	2.00	N=13-(3,3,3,4)			
	2.00	X X X X		B	2.50	PM09			
Firm brown grey slightly sandy slightly gravelly silty CLAY.	2.50	X X X X	6.90	SPT(C)	3.00	N=12-(3,3,3,3)			
	3.00	X X X X		B	3.50	PM10			
	4.00	X X X X		B	4.50	PM11			
	4.50	X X X X	4.90	SPT(C)	4.50	N=28-(6,6,7,9)		13/04/2016	4.50
Dense becoming very dense grey brown slightly silty sandy GRAVEL.	5.00	X X X X		B	5.50	PM12			
	6.00	X X X X		SPT(C)	6.00	N=36-(8,9,9,10)			
	6.50	X X X X	2.90	B	6.50	PM13			
Very stiff grey slightly sandy slightly gravelly silty CLAY with low cobble content.	7.00	X X X X		SPT(C)	7.50	N=50/260mm-(12,12,14,12/35mm)			
	8.00	X X X X		B	8.50	PM14			
Borehole terminated at scheduled depth.	9.00	X X X X	0.40	SPT(C)	9.00	N=50/5mm-(50/5mm)	9.00	13/04/2016	2.00(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Chiselling: 5.20m to 5.60m: 1.5hrs
 Borehole backfilled - no installation.

Key to Symbols	
B Bulk Disturbed Sample	SPT(S) Standard Penetration Test (Split Spoon)
D Small disturbed sample	SPT(C) Standard Penetration Test (Cone)
W Water sample	▼ 3.50 Waterstrike depth
U(9) Undisturbed sample (drive blows)	▽ 1.50(20) Water level depth 20mins after strike
	5.00(E) Depth to water (E)nd of shift
	5.00(S) Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL 5274 BH GINT.GPJ COREHOLE.GDT 10/05/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Plot E

HOLE ID: BH02

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Commenced: 12/04/2016
Boring Completed: 12/04/2016
Rig Type: Dando 150

Co-ordinates: E:722591.299
 N:741018.384
Elevation: 8.90 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
TOPSOIL.	0.00	- T -	8.90						
MADE GROUND: brown slightly sandy slightly gravelly silty clay with low cobble content.	0.50	[Cross-hatch pattern]	8.40	B	0.50	PM01			
	1.00		SPT(C)	1.00	N=17-(4,4,5,4)				
	1.50		B	1.50	PM02				
	2.00		SPT(C)	2.00	N=16-(4,4,4,4)				
Stiff grey brown slightly sandy slightly gravelly silty CLAY with low cobble content.	2.00	[X pattern]	6.90	SPT(C)	2.00	N=16-(4,4,4,4)			
Stiff brown slightly sandy slightly gravelly silty CLAY with low cobble content.	3.00	[X pattern]	5.90	B	3.00	PM03			
	3.00		SPT(C)	3.00	N=18-(4,5,5,4)				
Firm grey sandy silty CLAY.	3.50	[X pattern]	5.40						
	4.00								
	4.50		B	4.50	PM04				
	4.50		SPT(C)	4.50	N=9-(2,2,2,3)				
Dense grey brown slightly silty sandy GRAVEL.	5.50	[X pattern]	3.40						
	6.00		B	6.00	PM05				
	6.00	SPT(C)	6.00	N=33-(7,8,8,10)					
Very stiff grey slightly sandy slightly gravelly silty CLAY with low cobble content.	7.00	[X pattern]	1.90	B	7.00	PM06			
	7.50		SPT(C)	7.50	N=50/275mm-(12,13,13,12/50mm)				
Very dense grey brown slightly silty sandy GRAVEL.	7.80	[X pattern]	1.10						
	8.50		B	8.50	PM07				
Borehole terminated at scheduled depth.	9.00	[X pattern]	-0.10	SPT(C)	9.00	N=50/250mm-(10,15,15,10/25mm)	9.00	12/04/2016	1.60(E)
	9.00								

12/04/2016 5.00

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Chiselling: 6.50m to 6.70m: 0.5hr
 8.40m to 8.60m: 0.75hr
 Borehole backfilled - no installation.

<p>B Bulk Disturbed Sample D Small disturbed sample W Water sample U(9) Undisturbed sample (drive blows)</p>	<p>Key to Symbols SPT(S) Standard Penetration Test (Split Spoon) SPT(C) Standard Penetration Test (Cone) Waterstrike depth Water level depth 20mins after strike 5.00(E) Depth to water (E)nd of shift 5.00(S) Depth to water (S)tart of shift</p>
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Site Investigations Ltd

BOREHOLE SL_5274 BH GINT.GPJ COREHOLE.GDT_10/05/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Plot E

HOLE ID: **BH03**

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Commenced: 14/04/2016
Boring Completed: 14/04/2016
Rig Type: Dando 150

Co-ordinates: E:722553.776
 N:741011.527
Elevation: 8.73 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
TOPSOIL.	0.00	— T —	8.73						
MADE GROUND: brown slightly sandy slightly gravelly silty clay with low cobble content.	0.50	[Cross-hatch pattern]	8.23	SPT(C)	0.50	N=12-(3,3,3,3)			
	1.50			B SPT(C)	1.50	PM15 N=14-(4,3,3,4)			
Stiff brown slightly sandy slightly gravelly silty CLAY with low cobble content.	2.00	[Circles and crosses]	6.73	B	2.50	PM16			
	3.00			SPT(C)	3.00	N=20-(5,5,5,5)			
Brown silty SAND.	3.50	[Dotted]	5.23	B	3.50	PM17		14/04/2016	3.50
Medium dense grey brown slightly silty sandy GRAVEL.	4.00	[Circles and crosses]	4.73	B SPT(C)	4.50	PM18 N=25-(6,7,6,6)			
	5.00								
Very stiff grey slightly sandy slightly gravelly silty CLAY with low cobble content.	5.20	[Circles and crosses]	3.53	B	5.50	PM19			
	6.00			SPT(C)	6.00	N=38-(9,9,9,11)			
	6.50			B	6.50	PM20			
	7.50			SPT(C)	7.50	N=50/275mm- (13,13,15,9/50mm)			
Borehole terminated at scheduled depth.	8.00	[Circles and crosses]		B	8.00	PM21			
	9.00			SPT(C)	9.00	N=50/195mm- (17,17,16/45mm)	9.00	14/04/2016	1.00(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Chiselling: 4.00m to 4.30m: 1hr

Borehole backfilled - no installation.

Key to Symbols

- B Bulk Disturbed Sample
- D Small disturbed sample
- W Water sample
- U(9) Undisturbed sample (drive blows)
- SPT(S) Standard Penetration Test (Split Spoon)
- SPT(C) Standard Penetration Test (Cone)
- ▽ 3.50 Waterstrike depth
- ▽ 1.50(20) Water level depth 20mins after strike
- 5.00(E) Depth to water (E)nd of shift
- 5.00(S) Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL 5274 BH GINT.GPJ COREHOLE.GDT 10/05/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Plot E

HOLE ID: **BH04**

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Commenced: 15/04/2016
Boring Completed: 15/04/2016
Rig Type: Dando 150

Co-ordinates: E:722573.013
 N:740988.590
Elevation: 8.41 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
TOPSOIL.	0.00	- T -	8.41						
MADE GROUND: brown slightly sandy slightly gravelly silty clay with low cobble content.	0.50	[Cross-hatch pattern]	7.91	B SPT(C)	1.00 1.00	PM22 N=15-(4,3,3,5)			
Firm brown grey sandy slightly gravelly silty CLAY.	1.50	[X pattern]	6.91	B SPT(C)	2.00 2.00	PM23 N=15-(3,4,4,4)			
Medium dense grey brown slightly silty sandy GRAVEL.	3.00	[Circles and X's]	5.41	B SPT(C)	3.00 3.00	PM24 N=23-(5,5,6,7)		15/04/2016	3.00
Very stiff grey slightly sandy slightly gravelly silty CLAY with low cobble content.	4.00			B	4.00	PM25			
	4.50			SPT(C)	4.50	N=25-(6,6,6,7)			
	5.00			B	5.00	PM26			
	6.00			SPT(C)	6.00	N=47-(10,10,12,15)			
	6.50			B	6.50	PM27			
	7.50			SPT(C)	7.50	N=50/235mm-(12,15,15,8/10mm)			
	8.00			B	8.00	PM28			
	9.00			SPT(C)	9.00	N=50/200mm-(17,20,13/50mm)		15/04/2016	1.00(E)
Borehole terminated at scheduled depth.	9.00		-0.59						

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Chiselling: 5.10m to 5.20m: 1hr
 Borehole backfilled - no installation.

<p>B Bulk Disturbed Sample D Small disturbed sample W Water sample U(9) Undisturbed sample (drive blows)</p>	<p>Key to Symbols SPT(S) Standard Penetration Test (Split Spoon) SPT(C) Standard Penetration Test (Cone) Waterstrike depth Water level depth 20mins after strike 5.00(E) Depth to water (E)nd of shift 5.00(S) Depth to water (S)tart of shift</p>
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BOREHOLE SL_5274 BH GINT.GPJ COREHOLE.GDT_10/05/16

Appendix 2
Trial Pit Logs and Photographs

TRIAL PIT RECORD

Contract: Plot E

Hole ID:

TP01

Client: Gannon Homes

Co-ordinates: E:722550.486

Consultant: Waterman Moylan

N:741051.573

Site Address: Clongriffin, Dublin 13


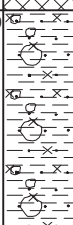
Elevation: 9.61 m.O.D.

Date Completed: 19/04/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown grey black slightly sandy slightly gravelly silty clay with low cobble and boulder content with some red brick and timber.	0.0 0.00		9.61					
	1.0			ENV	0.50	PM01		
	2.0			B	1.00	PM02		
	2.20			B	2.00	PM03		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles and boulders are subangular to subrounded of limestone.	2.20		7.41	B	2.50	PM04		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	6.61					
	4.0							
	5.0							

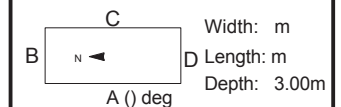
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▽ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Plot E

Hole ID:

TP02

Client: Gannon Homes

Co-ordinates: E:722540.593

Consultant: Waterman Moylan

N:741036.926

Site Address: Clongriffin, Dublin 13


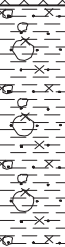
Elevation: 9.21 m.O.D.

Date Completed: 19/04/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown grey black slightly sandy slightly gravelly silty clay with low cobble and boulder content with some red brick and timber.	0.0 0.00		9.21					
	1.0			B	1.00	PM05		
	2.0			B	2.00	PM06		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles and boulders are subangular to subrounded of limestone.	2.10		7.11					
	2.50			B	2.50	PM07	▼ 2.60	19/04/2016
Pit terminated at scheduled depth.	3.0 3.00	Hole End	6.21					
	4.0							
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:

Pit terminated at scheduled depth.

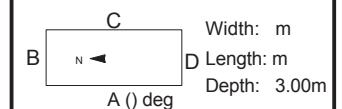
Pit walls stable.

Seepage at 2.60m.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▼ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



Site Investigations Ltd

TRIAL PIT 5274 TP GINT GPJ COREHOLE.GDT 10/05/16

TRIAL PIT RECORD

Contract: Plot E

Hole ID: **TP03**

Client: Gannon Homes

Co-ordinates: E:722564.061

Consultant: Waterman Moylan

N:741027.713

Site Address: Clongriffin, Dublin 13



Elevation: 9.01 m.O.D.

Date Completed: 19/04/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown grey black slightly sandy slightly gravelly silty clay with low cobble and boulder content with some red brick and timber.	0.0 0.00		9.01	ENV	0.50	PM08		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles and boulders are subangular to subrounded of limestone.	1.90 2.0		7.11	B	2.20	PM10		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	6.01					
	5.0							

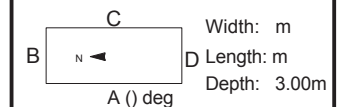
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼^{3.50} Waterstrike depth
- ▽^{1.50(20)} Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Plot E

Hole ID: **TP04**

Client: Gannon Homes

Co-ordinates: E:722577.216

Consultant: Waterman Moylan

N:741037.651

Site Address: Clongriffin, Dublin 13

Elevation: 9.29 m.O.D.

Date Completed: 19/04/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown grey black slightly sandy slightly gravelly silty clay with low cobble and boulder content with some red brick and timber.	0.0 0.00		9.29					
	1.0			B	1.00	PM11		
	2.0			B	2.00	PM12		
Stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles and boulders are subangular to subrounded of limestone.	2.60		6.69	B	2.80	PM13		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	6.29					
	4.0							
	5.0							

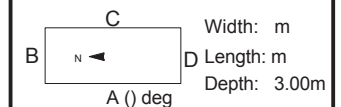
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼^{3.00} Waterstrike depth
- ▽^{1.50(20)} Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Plot E

Hole ID: **TP05**

Client: Gannon Homes

Co-ordinates: E:722528.614

Consultant: Waterman Moylan

N:741014.984

Site Address: Clongriffin, Dublin 13


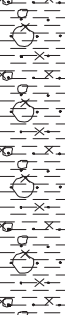
Elevation: 8.85 m.O.D.

Date Completed: 20/04/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown grey black slightly sandy slightly gravelly silty clay with low cobble and boulder content with some red brick and timber.	0.0 0.00		8.85	ENV	0.50	PM14		
Stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles and boulders are subangular to subrounded of limestone.	1.80 2.0		7.05	B	2.20	PM16	▼ 2.40	20/04/2016
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.85					

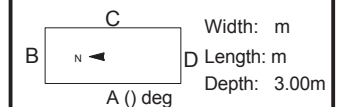
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
Seepage at 2.40m.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▽ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Plot E

Hole ID: **TP06**

Client: Gannon Homes

Co-ordinates: E:722558.524

Consultant: Waterman Moylan

N:741018.012

Site Address: Clongriffin, Dublin 13



Elevation: 8.83 m.O.D.

Date Completed: 20/04/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown grey black slightly sandy slightly gravelly silty clay with low cobble and boulder content with some red brick and timber.	0.0 0.00		8.83					
Stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles and boulders are subangular to subrounded of limestone.	1.90 2.0		6.93	B	1.00 2.10	PM17 PM18		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.83					

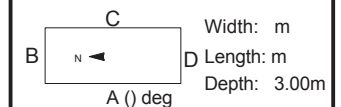
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼^{3.50} Waterstrike depth
- ▽^{1.50(20)} Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Plot E

Hole ID: **TP07**

Client: Gannon Homes

Co-ordinates: E:722582.519

Consultant: Waterman Moylan

N:741013.651

Site Address: Clongriffin, Dublin 13


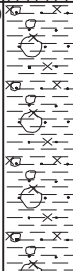
Elevation: 8.81 m.O.D.

Date Completed: 20/04/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown grey black slightly sandy slightly gravelly silty clay with low cobble and boulder content with some red brick and timber.	0.0 0.00		8.81					
Stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles and boulders are subangular to subrounded of limestone.	2.0 2.00		6.81	B	1.00	PM19		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.81					
	5.0							

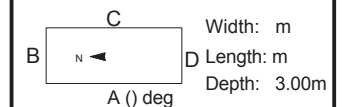
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼^{3.50} Waterstrike depth
- ▽^{1.50(20)} Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Plot E

Hole ID:

TP08

Client: Gannon Homes

Co-ordinates: E:722610.268

Consultant: Waterman Moylan

N:741012.291

Site Address: Clongriffin, Dublin 13


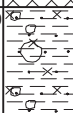
Elevation: 8.93 m.O.D.

Date Completed: 20/04/2016

Logged by: P. McGonagle

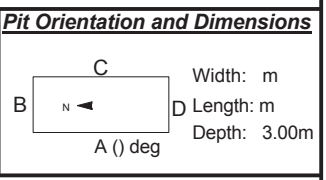
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown grey black slightly sandy slightly gravelly silty clay with low cobble and boulder content with some red brick and timber.	0.0 0.00		8.93					
			ENV	0.50	PM21			
	1.0		B	1.00	PM22			
	2.0	B	2.00	PM23				
Stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles and boulders are subangular to subrounded of limestone.	2.60		6.33	B	2.80	PM24		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.93					
	4.0							
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼^{3.00} Waterstrike depth
 - ▽^{1.50(20)} Water level depth 20mins after strike



TRIAL PIT 5274 TP GINT GPJ COREHOLE.GDT 10/05/16

TRIAL PIT RECORD

Contract: Plot E

Hole ID: **TP09**

Client: Gannon Homes

Co-ordinates: E:722579.141

Consultant: Waterman Moylan

N:741003.507

Site Address: Clongriffin, Dublin 13


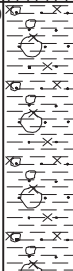
Elevation: 8.75 m.O.D.

Date Completed: 20/04/2016

Logged by: P. McGonagle

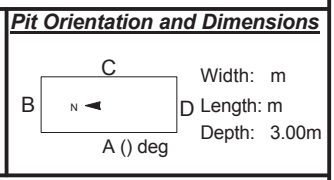
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown grey black slightly sandy slightly gravelly silty clay with low cobble and boulder content with some red brick and timber.	0.0 0.00		8.75	B	1.00	PM25		
Stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles and boulders are subangular to subrounded of limestone.	2.0 2.00		6.75					
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.75					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼^{3.50} Waterstrike depth
 - ▽^{1.50(20)} Water level depth 20mins after strike



TRIAL PIT RECORD

Contract: Plot E

Hole ID: **TP10**

Client: Gannon Homes

Co-ordinates: E:722556.329

Consultant: Waterman Moylan

N:740995.516

Site Address: Clongriffin, Dublin 13

Elevation: 8.57 m.O.D.

Date Completed: 20/04/2016

Logged by: P. McGonagle

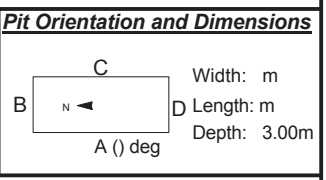
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown grey black slightly sandy slightly gravelly silty clay with low cobble and boulder content with some red brick and timber.	0.0 0.00		8.57	ENV	0.50	PM27		
Stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles and boulders are subangular to subrounded of limestone.	1.90 2.0		6.67	B	2.20	PM29		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.57					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼^{3.50} Waterstrike depth
 - ▽^{1.50(20)} Water level depth 20mins after strike



TRIAL PIT 5274 TP GINT GPJ COREHOLE.GDT 10/05/16

TRIAL PIT RECORD

Contract: Plot E

Hole ID:

TP11

Client: Gannon Homes

Co-ordinates: E:722589.590

Consultant: Waterman Moylan

N:740979.415

Site Address: Clongriffin, Dublin 13

Elevation: 8.17 m.O.D.

Date Completed: 20/04/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

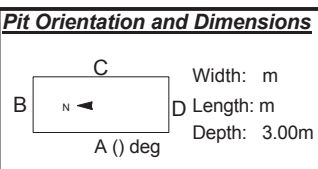
DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown grey black slightly sandy slightly gravelly silty clay with low cobble and boulder content with some red brick and timber.	0.0 0.00 1.0		8.17	ENV B	0.50 1.00	PM30 PM31		
Stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles and boulders are subangular to subrounded of limestone.	1.40 2.0		6.77	B	2.00	PM32		
Pit terminated at scheduled depth.	3.0 3.00 4.0	Hole End	5.17					

TRIAL PIT 5274 TP GINT GPJ COREHOLE.GDT 10/05/16

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

Key to Symbols

B	Bulk disturbed sample
D	Small disturbed sample
U	Undisturbed sample
V(60)	In-situ hand shear vane test(kPa)
P	Hand Penetrometer Test(N value)
▼ 3.00	Waterstrike depth
▽ 1.50(20)	Water level depth 20mins after strike



TP01 Sidewall



TP01 Spoil



TP02 Pit



TP02 Sidewall



TP02 Spoil



TP03 Pit



TP03 Sidewall



TP03 Spoil



TP04 Pit



TP04 Sidewall



TP04 Spoil



TP05 Pit



TP05 Sidewall



TP05 Spoil



TP06 Pit



TP06 Sidewall



TP06 Spoil



TP07 Pit



TP07 Sidewall



TP07 Spoil



TP08 Pit



TP08 Sidewall



TP08 Spoil



TP09 Pit



TP09 Sidewall



TP09 Spoil



TP10 Pit



TP10 Sidewall



TP10 Spoil



TP11 Pit



TP11 Sidewall



TP11 Spoil



Appendix 3
Dynamic Probe Logs

PENNINE DYNAMIC PROBING

SITE : Plot E, Clongriffin	P.C. No : 5274
CLIENT : Gannon Homes	PROBE No : DP01
SHEET No : 1 OF 1	DATE : 18-04-16

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	5 6 7 8 8	
1.0	8 6 7 4 4	
1.5	4 4 4 3 4	
2.0	3 3 4 3 3	
2.5	2 3 3 4 3	
3.0	2 2 3 2 4	
3.5	4 6 10 12 12	
4.0	14 20 26 35 -	
4.5	- - - -	
5.0	- - - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 3.90m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Plot E, Clongriffin	P.C. No : 5274
CLIENT : Gannon Homes	PROBE No : DP02
SHEET No : 1 OF 1	DATE : 18-04-16

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	7 11 8 8 8 6 4 4 4 3	
1.0	3 5 6 3 3 4 4 4 2	
1.5	2 2 1 2 3 4 4 4 3	
2.0	2 2 1 2 3 4 4 4 3	
2.5	4 4 4 3 3 4 7 7 12 11	
3.0	14 14 14 19 35	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90°
2.0		
3.0		
4.0		Refusal at 4.00m
5.0		

PENNINE DYNAMIC PROBING

SITE : Plot E, Clongriffin	P.C. No : 5274
CLIENT : Gannon Homes	PROBE No : DP03
SHEET No : 1 OF 1	DATE : 18-04-16

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 3 7 9 7 8 6 4 4 2	
1.0	2 3 4 2 2 2 2	
1.5	2 2 2 2	
2.0	2 4 4 7 12 8	
2.5	8 8 5 5 6	
3.0	5 7 12 17 20	
3.5	35	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 3.60m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Plot E, Clongriffin	P.C. No : 5274
CLIENT : Gannon Homes	PROBE No : DP04
SHEET No : 1 OF 1	DATE : 18-04-16

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	8 25 30 8 9 6 5 5 5 6 5 4 3 3 5 3 4 4 2 2 3 7 6 7 7 7 12 10 12 15 15 18 35 - - - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90°
2.0		
3.0		
4.0		Refusal at 3.70m
5.0		

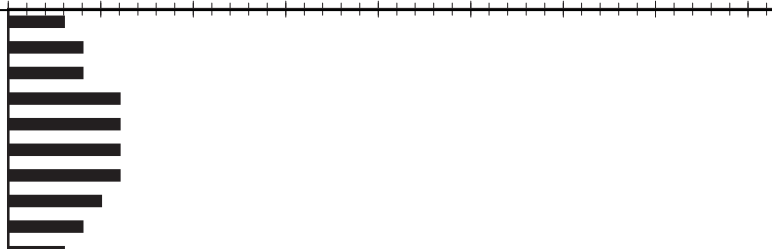






PENNINE DYNAMIC PROBING

SITE : Plot E, Clongriffin	P.C. No : 5274
CLIENT : Gannon Homes	PROBE No : DP05
SHEET No : 1 OF 1	DATE : 18-04-16

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	4 5 9 20 10 6 5 3 2 2 3 4 7 4 9 6 5 4 5 4 5 13 17 20 26 35	
1.0	-	
2.0	-	
3.0	-	
4.0	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.60m
2.0		
3.0		
4.0		
5.0		










PENNINE DYNAMIC PROBING

SITE : Plot E, Clongriffin	P.C. No : 5274
CLIENT : Gannon Homes	PROBE No : DP06
SHEET No : 1 OF 1	DATE : 18-04-16

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	3 4 4 6 6 6 5 4 3	
1.0	2 2 2 3 3	
1.5	2 3 2 4 6	
2.0	3 5 8 9 9	
2.5	10 6 6 6 6	
3.0	6 6 9 14 14	
3.5	18 26 35	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 3.80m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Plot E, Clongriffin	P.C. No : 5274
CLIENT : Gannon Homes	PROBE No : DP07
SHEET No : 1 OF 1	DATE : 18-04-16

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0	0	
0.5	6 6 6	
1.0	5 6 5 5	
1.5	6 3 3 2 3	
2.0	2 2 3 5 7	
2.5	12 14 14 9	
3.0	7 7 5 4 3	
3.5	5 7 6 6 6	
4.0	7 6 6 4 4	
4.5	5 6 14 15 20 35	
5.0	- - -	

DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 4.60m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Plot E, Clongriffin	P.C. No : 5274
CLIENT : Gannon Homes	PROBE No : DP08
SHEET No : 1 OF 1	DATE : 18-04-16

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	7 15 15 11 7 5 4 3 2 2 3 4 2 2 6 4 3 4 3 2 2 3 3 9 8 5 5 8 6 5 5 6 6 10 12 13 15 22 35	
1.0		
1.5		
2.0		
2.5		
3.0		
3.5		
4.0		
4.5		
5.0		
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 4.00m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Plot E, Clongriffin	P.C. No : 5274
CLIENT : Gannon Homes	PROBE No : DP09
SHEET No : 1 OF 1	DATE : 18-04-16

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
2 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0	2 2 4 5 5 6 6 6 5 5 4 4 3 3 3 3 4 4 5 6 6 7 7 7 6 7 4 5 5 6 6 7 9 10 5 5 6 4 4 5 8 10 17 24 35 - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 4.70m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Plot E, Clongriffin	P.C. No : 5274
CLIENT : Gannon Homes	PROBE No : DP10
SHEET No : 1 OF 1	DATE : 18-04-16

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	3 3 10 14 16	
1.0	10 8 7 6 7	
1.5	7 5 4 4 4	
2.0	3 2 5 5 5	
2.5	5 3 4 5 4	
3.0	4 7 11 12 15	
3.5	19 21 26 35	
4.0	-	-
4.5	-	-
5.0	-	-

DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 3.40m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Plot E, Clongriffin	P.C. No : 5274
CLIENT : Gannon Homes	PROBE No : DP11
SHEET No : 1 OF 1	DATE : 18-04-16

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 4 9 7 7 6 5 5 2 4 5 4 3 2 3 8 12 9 9 12 13 12 10 11 15 16 16 19 21 28 35	
1.0		
1.5		
2.0		
2.5		
3.0		
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 3.20m
2.0		
3.0		
4.0		
5.0		

Appendix 4
Soakaway Test Results

SOAKAWAY TEST f-Value Calculations

SIL

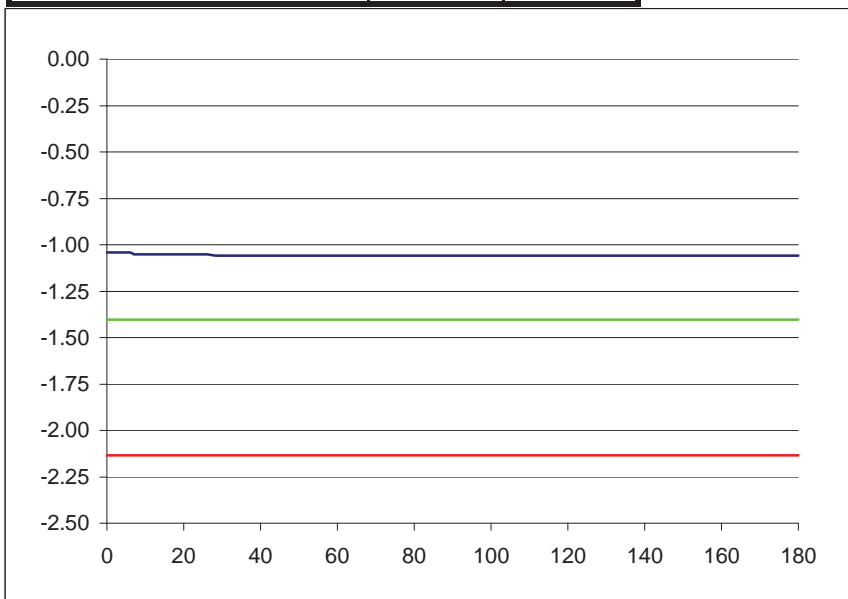
Project Reference:	5274
Contract name:	Plot E
Location:	Clongriffin, Dublin 13
Test No:	SA01
Date:	20-04-16

Ground Conditions		
From	To	
0.00	2.30	MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content and some timber and brick.
2.30	2.50	Firm brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content.

Comments:
Pit walls stable.

Elapsed Time (mins)	Fall of Water (m)
0	-1.04
0.5	-1.04
1	-1.04
1.5	-1.04
2	-1.04
2.5	-1.04
3	-1.04
3.5	-1.04
4	-1.04
4.5	-1.04
5	-1.04
6	-1.04
7	-1.05
8	-1.05
9	-1.05
10	-1.05
12	-1.05
14	-1.05
16	-1.05
18	-1.05
20	-1.05
25	-1.05
30	-1.06
40	-1.06
50	-1.06
60	-1.06
90	-1.06
120	-1.06
180	-1.06

Pit Dimensions (m)		
Length (m)	2.10	m
Width (m)	0.35	m
Depth	2.50	m
Water		
Start Depth of Water	1.04	m
Depth of Water	1.46	m
75% Full	1.405	m
25% Full	2.135	m
75%-25%	0.73	m
Volume of water (75%-25%)	0.53655	m ³
Area of Drainage	12.25	m ²
Area of Drainage (75%-25%)	4.312	m ²
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	N/A	min
Time 75% to 25% (sec)	N/A	sec



f = N/A or N/A
m/min m/s

SOAKAWAY TEST f-Value Calculations

SIL

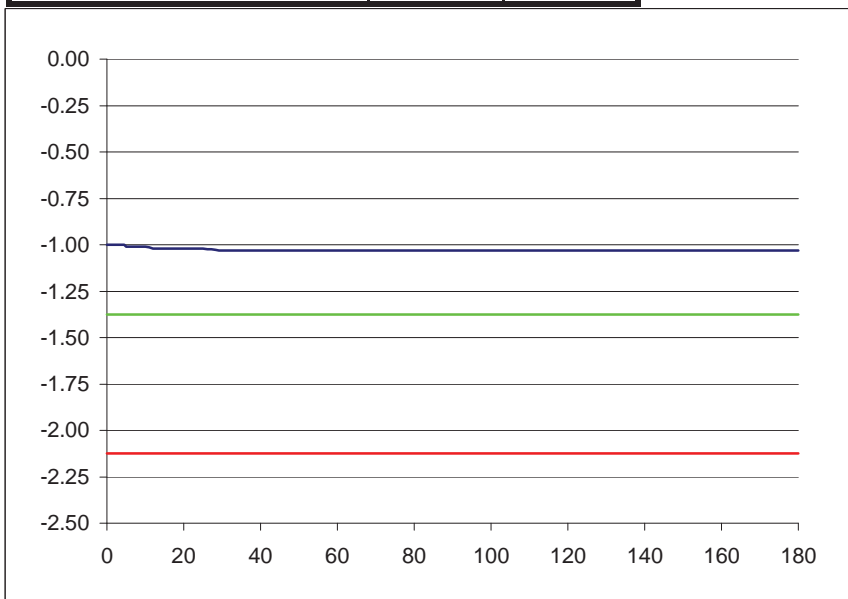
Project Reference:	5274
Contract name:	Plot E
Location:	Clongriffin, Dublin 13
Test No:	SA02
Date:	20-04-16

Ground Conditions		
From	To	
0.00	1.70	MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content and some timber and brick.
1.70	2.50	Firm brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content.

Comments:
Pit walls stable.

Elapsed Time (mins)	Fall of Water (m)
0	-1.00
0.5	-1.00
1	-1.00
1.5	-1.00
2	-1.00
2.5	-1.00
3	-1.00
3.5	-1.00
4	-1.00
4.5	-1.00
5	-1.01
6	-1.01
7	-1.01
8	-1.01
9	-1.01
10	-1.01
12	-1.02
14	-1.02
16	-1.02
18	-1.02
20	-1.02
25	-1.02
30	-1.03
40	-1.03
50	-1.03
60	-1.03
90	-1.03
120	-1.03
180	-1.03

Pit Dimensions (m)		
Length (m)	2.20	m
Width (m)	0.35	m
Depth	2.50	m
Water		
Start Depth of Water	1.00	m
Depth of Water	1.50	m
75% Full	1.375	m
25% Full	2.125	m
75%-25%	0.75	m
Volume of water (75%-25%)	0.5775	m ³
Area of Drainage	12.75	m ²
Area of Drainage (75%-25%)	4.595	m ²
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	N/A	min
Time 75% to 25% (sec)	N/A	sec



$f = \frac{N/A}{m/min}$ or $\frac{N/A}{m/s}$

SOAKAWAY TEST f-Value Calculations

SIL

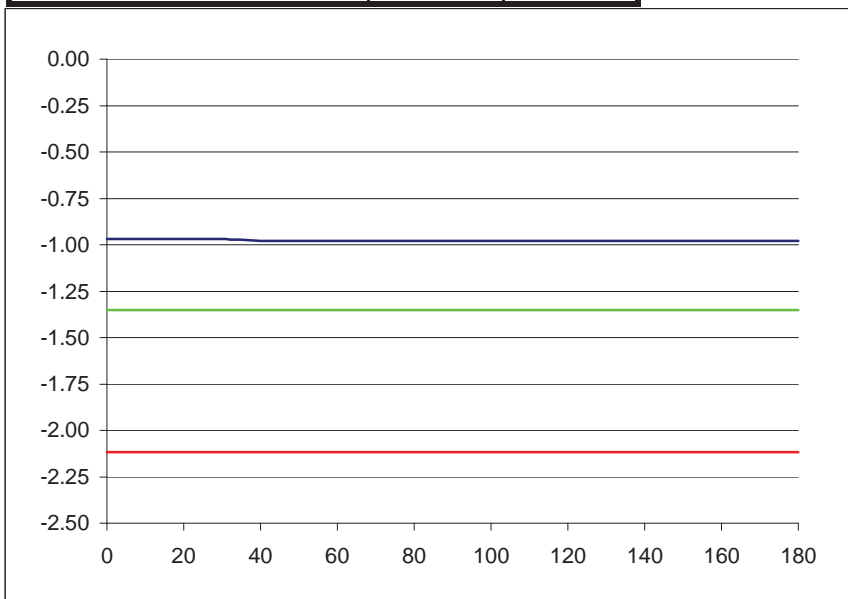
Project Reference:	5274
Contract name:	Plot E
Location:	Clongriffin, Dublin 13
Test No:	SA03
Date:	20-04-16

Ground Conditions		
From	To	
0.00	1.80	MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content.
1.70	2.50	Firm brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content.

Comments:
Pit walls stable.

Elapsed Time (mins)	Fall of Water (m)
0	-0.97
0.5	-0.97
1	-0.97
1.5	-0.97
2	-0.97
2.5	-0.97
3	-0.97
3.5	-0.97
4	-0.97
4.5	-0.97
5	-0.97
6	-0.97
7	-0.97
8	-0.97
9	-0.97
10	-0.97
12	-0.97
14	-0.97
16	-0.97
18	-0.97
20	-0.97
25	-0.97
30	-0.97
40	-0.98
50	-0.98
60	-0.98
90	-0.98
120	-0.98
180	-0.98

Pit Dimensions (m)		
Length (m)	2.00	m
Width (m)	0.35	m
Depth	2.50	m
Water		
Start Depth of Water	0.97	m
Depth of Water	1.53	m
75% Full	1.3525	m
25% Full	2.1175	m
75%-25%	0.765	m
Volume of water (75%-25%)	0.5355	m ³
Area of Drainage	11.75	m ²
Area of Drainage (75%-25%)	4.2955	m ²
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	N/A	min
Time 75% to 25% (sec)	N/A	sec



$f = \frac{N/A}{m/min}$ or $\frac{N/A}{m/s}$

Appendix 5
Laboratory Test Results

Classification Tests

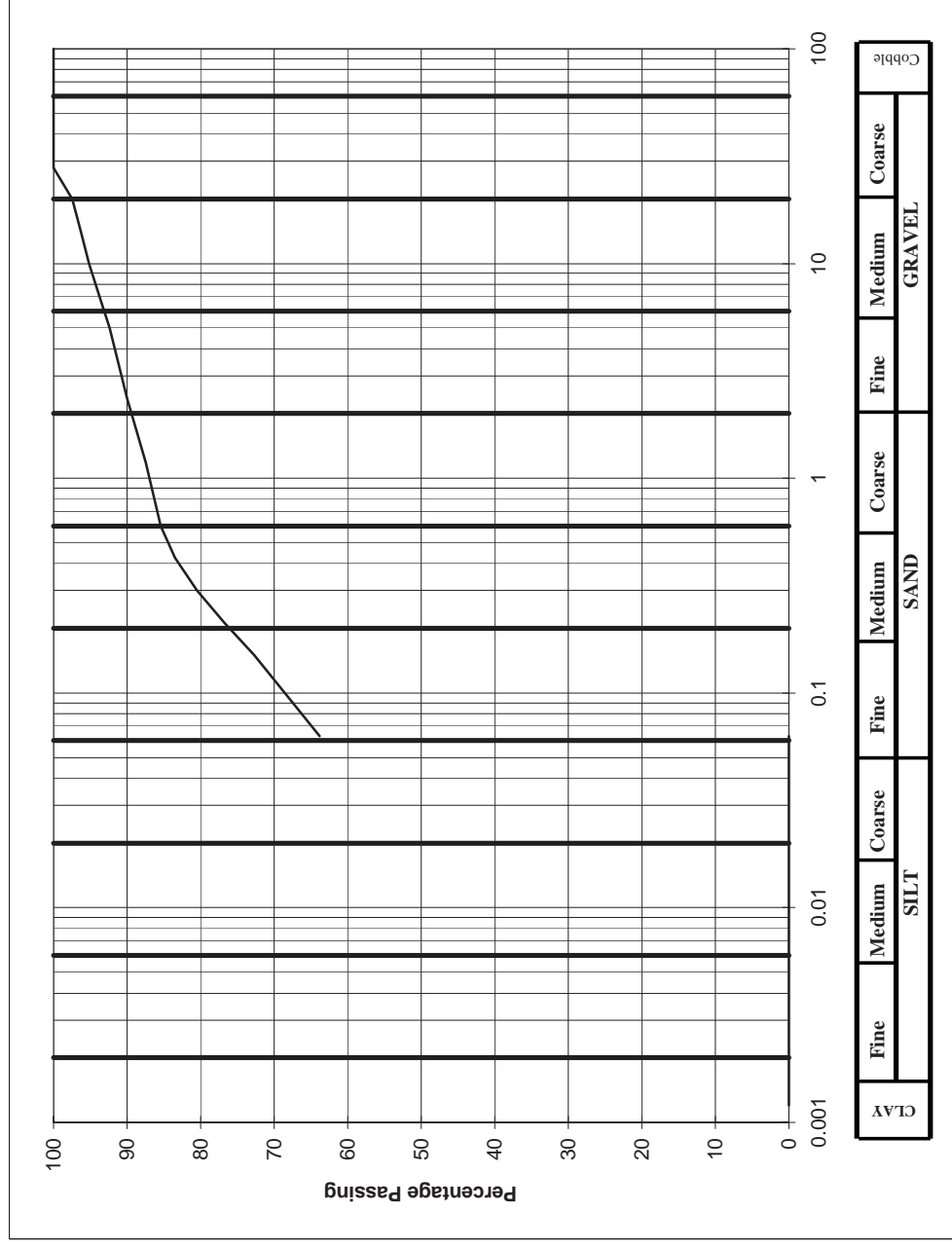
Client	Gannon Homes		
Site	Clongriffin - Block 17		
S.I. File No	5274 / 16		
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email siltd@indigo.ie		
Report Date	28th April 2016		

Hole ID	Depth	Sample No	Lab Ref No.	Sample Type	Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Max. Dry Density Mg/m ³	Min. Dry Density Mg/m ³	Particle Density Mg/m ³	% passing 425um	Comments	Remarks C=Clay; M=Silt Plasticity: L=Low; I=Intermediate; H=High; V=Very High; E=Extremely High
BH01	3.50	JM10	16/408	B	11.6	37	23				83.5		CI
BH04	2.00	JM23	16/411	B	15.4	31	22				65.4		CL

BS 1377 Particle Size Analysis

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	0.0630	
90	100	0.0200	
75	100	0.0060	
63	100	0.0020	
50	100		
37.5	100		
28	100		
20	97.5		
14	96.3		
10	95.2		
6.3	93.3		
5.0	92.4		
2.36	90		
2.00	89.4		
1.18	87.5		
0.600	85.4		
0.425	83.5		
0.300	80.5		
0.212	76.8		
0.150	72.7		
0.063	64		

Cobbles, %	0
Gravel, %	11
Sand, %	25
Clay / Silt, %	64



Client : Gannon Homes Ltd.
 Project : Clongriffin - Plot E

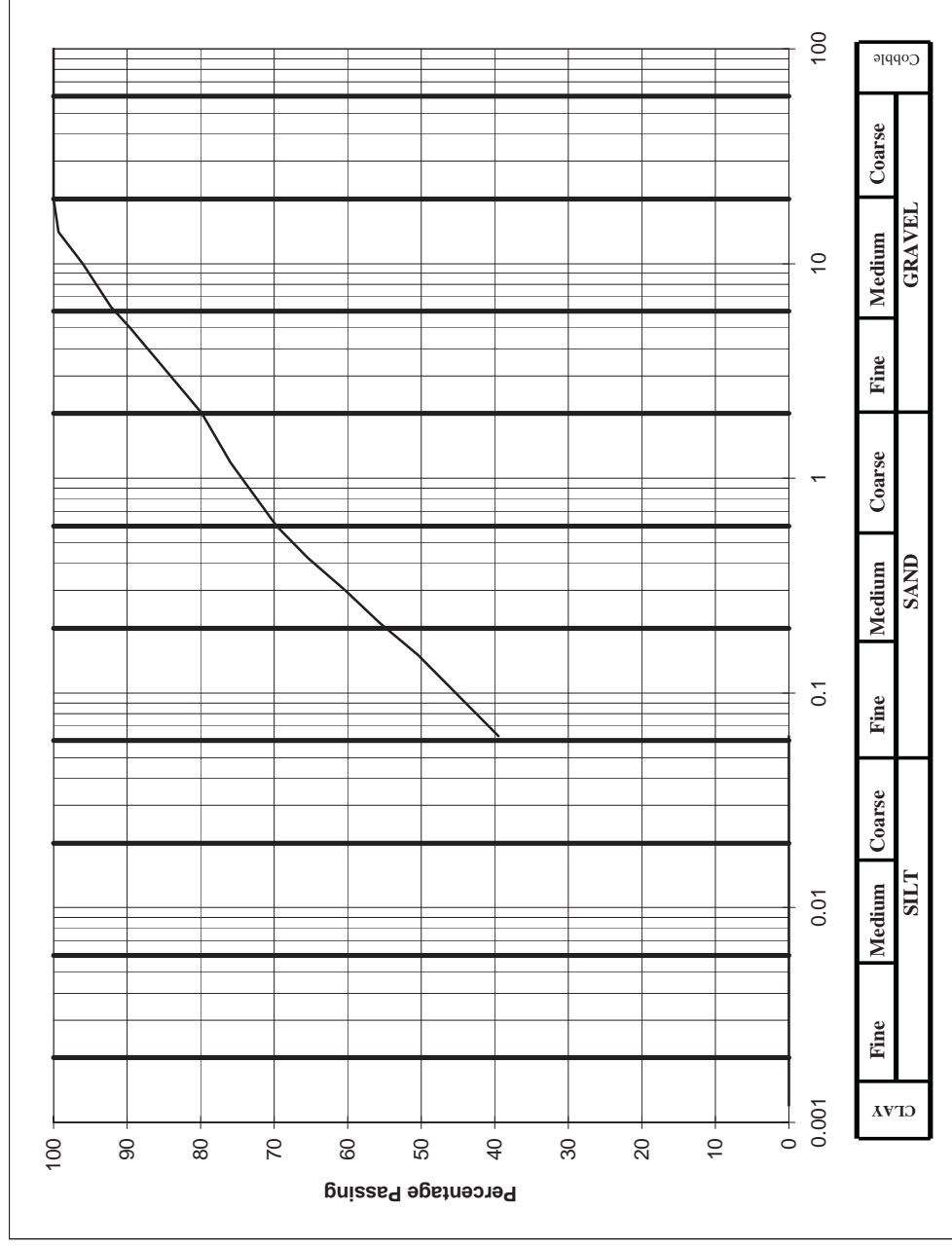
Lab. No : 16/408
 Sample No : JM10

Hole ID : BH 01
 Depth, m : 3.50

Material description : slightly gravely slightly sandy silty CLAY
 Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour.
 Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	0.0630	
90	100	0.0200	
75	100	0.0060	
63	100	0.0020	
50	100		
37.5	100		
28	100		
20	100		
14	99.3		
10	96		
6.3	92.2		
5.0	89.6		
2.36	81.5		
2.00	79.8		
1.18	75.9		
0.600	69.7		
0.425	65.4		
0.300	60.3		
0.212	55.7		
0.150	50.4		
0.063	40		

Cobbles, %	0
Gravel, %	20
Sand, %	40
Clay / Silt, %	40



Client :	Gannon Homes Ltd.
Project :	Clongriffin - Plot E

Lab. No. :	16/411
Sample No. :	JM23

Hole ID :	BH 04
Depth, m :	2.00

Material description :	slightly gravelly sandy silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

Chemical Testing
In accordance with BS 1377: Part 3

Client	Gannon Homes Ltd.		
Site	Clongriffin - Plot E		
S.I. File No	5274 / 16		
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email siltd@indigo.ie		
Report Date	28th April 2016		

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Sulphate Content Acid Soluble (SO ₃) g/L	Sulphate Content Acid Soluble (SO ₃) %	Organic Content %	Chloride ion Content (soil:water ratio 2:1) %	% passing 2mm	Remarks
BH01	1.50	JM08	16/407	8.91	0.117	0.046	2.05	0.38	39.2	
BH02	0.80	JM01	16/409	8.70	0.117	0.067	1.58	0.42	57.3	
BH04	1.50	JM22	16/410	8.95	0.110	0.051	2.53	0.51	46.4	



Site Investigations Ltd
The Grange
Carhugar
12th Lock Road
Lucan
Co. Dublin

Attention: Stephen Letch

CERTIFICATE OF ANALYSIS

Date: 04 May 2016
Customer: D_SITEINV_NCS
Sample Delivery Group (SDG): 160423-83
Your Reference:
Location: Plot E, Clongriffin
Report No: 359485

We received 5 samples on Saturday April 23, 2016 and 5 of these samples were scheduled for analysis which was completed on Wednesday May 04, 2016. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager





SDG: 160423-83
Job: D_SITEINV_NCS-68
Client Reference:

Location: Plot E, Clongriffin
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 39/A/16
Report Number: 359485
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
13312248	BH01		1.50	21/04/2016
13312249	BH02		0.50	21/04/2016
13312250	BH04		1.00	21/04/2016
13312246	TP01		0.50	21/04/2016
13312247	TP11		0.50	21/04/2016

Only received samples which have had analysis scheduled will be shown on the following pages.



SDG: 160423-83
 Job: D_SITEINV_NCS-68
 Client Reference:

Location: Plot E, Clongriffin
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 39/A/16
 Report Number: 359485
 Superseded Report:

SOLID Results Legend X Test N No Determination Possible	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	
		13312248	BH01		1.50	1kg TUB
		13312249	BH02		0.50	1kg TUB
		13312250	BH04		1.00	1kg TUB
		13312246	TP01		0.50	60g VOC (AL/E215) 250g Amber Jar (AL)
	13312247	TP11		0.50	60g VOC (AL/E215) 250g Amber Jar (AL)	
ANC at pH4 and ANC at pH 6	All	NDPs: 0 Tests: 2				
Anions by Kone (w)	All	NDPs: 0 Tests: 2				
CEN Readings	All	NDPs: 0 Tests: 2				
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 2				
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 2				
Fluoride	All	NDPs: 0 Tests: 2				
GRO by GC-FID (S)	All	NDPs: 0 Tests: 2				
Loss on Ignition in soils	All	NDPs: 0 Tests: 5				
Mercury Dissolved	All	NDPs: 0 Tests: 2				
Mineral Oil	All	NDPs: 0 Tests: 2				
PAH Value of soil	All	NDPs: 0 Tests: 2				
PCBs by GCMS	All	NDPs: 0 Tests: 2				
pH	All	NDPs: 0 Tests: 2				
Phenols by HPLC (W)	All	NDPs: 0 Tests: 2				
Sample description	All	NDPs: 0 Tests: 5				



SDG: 160423-83
 Job: D_SITEINV_NCS-68
 Client Reference:

Location: Plot E, Clongriffin
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 39/A/16
 Report Number: 359485
 Superseded Report:

SOLID Results Legend <input checked="" type="checkbox"/> Test <input checked="" type="checkbox"/> No Determination Possible	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	
		13312248	BH01		1.50	1kg TUB
		13312250	BH04		1.00	1kg TUB
		13312249	BH02		0.50	1kg TUB
		13312246	TP01		0.50	250g Amber Jar (AL) 60g VOC (ALE215) 1kg TUB
	13312247	TP11		0.50	60g VOC (ALE215) 250g Amber Jar (AL) 1kg TUB	
Total Dissolved Solids	All	NDPs: 0 Tests: 2			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
Total Organic Carbon	All	NDPs: 0 Tests: 2			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	

SDG: 160423-83
 Job: D_SITEINV_NCS-68
 Client Reference:

Location: Plot E, Clongriffin
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 39/A/16
 Report Number: 359485
 Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
-----------	----------	------	-----------------	--------	-------------	--------	------------	-------------	-------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
13312248	BH01	1.50	Dark Brown	Sandy Clay	0.063 - 2.00 mm	Stones	None
13312249	BH02	0.50	Dark Brown	Sandy Clay	0.063 - 2.00 mm	Stones	None
13312250	BH04	1.00	Dark Brown	Sandy Clay	0.063 - 2.00 mm	Stones	None
13312246	TP01	0.50	Dark Brown	Clay	0.002 - 0.063 mm	Stones	N/A
13312247	TP11	0.50	Dark Brown	Clay	0.002 - 0.063 mm	Stones	N/A

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



SDG: 160423-83
Job: D_SITEINV_NCS-68
Client Reference:

Location: Plot E, Clongriffin
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 39/A/16
Report Number: 359485
Superseded Report:

Results Legend		Customer Sample R	BH01	BH02	BH04	TP01	TP11
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	BH01	BH02	BH04	TP01	TP11
M	mCERTS accredited.		1.50	0.50	1.00	0.50	0.50
aq	Aqueous / settled sample.		Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
diss.filt	Dissolved / filtered sample.		21/04/2016	21/04/2016	21/04/2016	21/04/2016	21/04/2016
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery						
(F)	Trigger breach confirmed		23/04/2016	23/04/2016	23/04/2016	23/04/2016	23/04/2016
1-5&*&@	Sample deviation (see appendix)		160423-83	160423-83	160423-83	160423-83	160423-83
			13312248	13312249	13312250	13312246	13312247
Component	LOD/Units	Method					
Moisture Content Ratio (% of as received sample)	%	PM024	11	9	13	7.5	13
Loss on ignition	<0.7 %	TM018	2.05	1.58	2.53	1.44	2.73
			M	M	M	M	M
Mineral oil >C10-C40	<1 mg/kg	TM061				10.1	3.35
Mineral Oil Surrogate % recovery**	%	TM061				96	97.4
Organic Carbon, Total	<0.2 %	TM132				0.544	0.751
						M	M
pH	1 pH Units	TM133				8.43	8.52
						M	M
PCB congener 28	<3 µg/kg	TM168				<3	<3
						M	M
PCB congener 52	<3 µg/kg	TM168				<3	<3
						M	M
PCB congener 101	<3 µg/kg	TM168				<3	<3
						M	M
PCB congener 118	<3 µg/kg	TM168				<3	<3
						M	M
PCB congener 138	<3 µg/kg	TM168				<3	<3
						M	M
PCB congener 153	<3 µg/kg	TM168				<3	<3
						M	M
PCB congener 180	<3 µg/kg	TM168				<3	<3
						M	M
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168				<21	<21
ANC @ pH 4	<0.03 mol/kg	TM182				3.36	0.749
ANC @ pH 6	<0.03 mol/kg	TM182				0.63	0.584
Polyaromatic hydrocarbons, Total 17	<10 mg/kg	TM213				<10	<10



SDG: 160423-83
Job: D_SITEINV_NCS-68
Client Reference:

Location: Plot E, Clongriffin
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 39/A/16
Report Number: 359485
Superseded Report:

GRO by GC-FID (S)

Table with columns for Component, LOD/Units, Method, TP01, and TP11. Rows include Methyl tertiary butyl ether (MTBE), Benzene, Toluene, Ethylbenzene, m,p-Xylene, o-Xylene, and sum of detected mpo xylene by GC.

SDG: 160423-83
 Job: D_SITEINV_NCS-68
 Client Reference:

Location: Plot E, Clongriffin
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 39/A/16
 Report Number: 359485
 Superseded Report:

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.098
Mass of dry sample (kg)	0.175
Particle Size <4mm	>95%

Site Location	Plot E, Clongriffin
Natural Moisture Content (%)	8.11
Dry Matter Content (%)	92.5

Case	
SDG	160423-83
Lab Sample Number(s)	13312246
Sampled Date	21-Apr-2016
Customer Sample Ref.	TP01
Depth (m)	0.50

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	>6	-
-	-	-
-	-	-

Solid Waste Analysis	Result
Total Organic Carbon (%)	0.544
Loss on Ignition (%)	1.44
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	10.1
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	8.43
ANC to pH 6 (mol/kg)	0.63
ANC to pH 4 (mol/kg)	3.36

Eluate Analysis	C2 Conc ⁿ in 10:1 eluate (mg/l)		A2 10:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.000661	<0.00012	0.00661	<0.0012	0.5	2	25
Barium	0.0307	<0.00003	0.307	<0.0003	20	100	300
Cadmium	<0.0001	<0.0001	<0.001	<0.001	0.04	1	5
Chromium	0.000683	<0.00022	0.00683	<0.0022	0.5	10	70
Copper	<0.00085	<0.00085	<0.0085	<0.0085	2	50	100
Mercury Dissolved (CVAf)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.0191	<0.00024	0.191	<0.0024	0.5	10	30
Nickel	0.000664	<0.00015	0.00664	<0.0015	0.4	10	40
Lead	0.000212	<0.00002	0.00212	<0.0002	0.5	10	50
Antimony	0.000407	<0.00016	0.00407	<0.0016	0.06	0.7	5
Selenium	0.00555	<0.00039	0.0555	<0.0039	0.1	0.5	7
Zinc	0.00241	<0.00041	0.0241	<0.0041	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	113	<2	1130	<20	1000	20000	50000
Total Dissolved Solids	201	<5	2010	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	28-Apr-2016
pH (pH Units)	8.38
Conductivity (µS/cm)	250.00
Temperature (°C)	17.10
Volume Leachant (Litres)	0.893

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

04/05/2016 15:50:15
 15:50:08 04/05/2016

SDG: 160423-83
 Job: D_SITEINV_NCS-68
 Client Reference:

Location: Plot E, Clongriffin
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 39/A/16
 Report Number: 359485
 Superseded Report:

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.103
Mass of dry sample (kg)	0.175
Particle Size <4mm	>95%

Site Location	Plot E, Clongriffin
Natural Moisture Content (%)	14.9
Dry Matter Content (%)	87

Case	
SDG	160423-83
Lab Sample Number(s)	13312247
Sampled Date	21-Apr-2016
Customer Sample Ref.	TP11
Depth (m)	0.50

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	>6	-
-	-	-
-	-	-

Solid Waste Analysis	Result
Total Organic Carbon (%)	0.751
Loss on Ignition (%)	2.73
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	3.35
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	8.52
ANC to pH 6 (mol/kg)	0.584
ANC to pH 4 (mol/kg)	0.749

Eluate Analysis	C2 Conc ⁿ in 10:1 eluate (mg/l)		A2 10:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.000863	<0.00012	0.00863	<0.0012	0.5	2	25
Barium	0.0139	<0.00003	0.139	<0.0003	20	100	300
Cadmium	<0.0001	<0.0001	<0.001	<0.001	0.04	1	5
Chromium	0.00166	<0.00022	0.0166	<0.0022	0.5	10	70
Copper	0.00228	<0.00085	0.0228	<0.0085	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.0107	<0.00024	0.107	<0.0024	0.5	10	30
Nickel	0.00121	<0.00015	0.0121	<0.0015	0.4	10	40
Lead	0.000275	<0.00002	0.00275	<0.0002	0.5	10	50
Antimony	0.0011	<0.00016	0.011	<0.0016	0.06	0.7	5
Selenium	0.00154	<0.00039	0.0154	<0.0039	0.1	0.5	7
Zinc	0.00163	<0.00041	0.0163	<0.0041	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	77.7	<5	777	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	5.46	<3	54.6	<30	500	800	1000

Leach Test Information

Date Prepared	28-Apr-2016
pH (pH Units)	8.39
Conductivity (µS/cm)	101.00
Temperature (°C)	19.00
Volume Leachant (Litres)	0.887

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

04/05/2016 15:50:15
 15:50:08 04/05/2016

SDG: 160423-83
Job: D_SITEINV_NCS-68
Client Reference:

Location: Plot E, Clongriffin
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 39/A/16
Report Number: 359485
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step		
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition		
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water		
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser		
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils		
TM182	CEN/TC 292 - WI 292046-characterization of waste-leaching Behaviour Tests- Acid and Base Neutralization Capacity Test	Determination of Acid Neutralisation Capacity (ANC) Using Autotitration in Soils		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM213	In-house Method	Rapid Determination of PAHs by GC-FID		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



SDG: 160423-83
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 Superseded Report:

Test Completion Dates

Lab Sample No(s)	13312248	13312249	13312250	13312246	13312247
Customer Sample Ref.	BH01	BH02	BH04	TP01	TP11
AGS Ref.					
Depth	1.50	0.50	1.00	0.50	0.50
Type	SOLID	SOLID	SOLID	SOLID	SOLID
ANC at pH4 and ANC at pH 6				28-Apr-2016	28-Apr-2016
Anions by Kone (w)				29-Apr-2016	29-Apr-2016
CEN 10:1 Leachate (1 Stage)				28-Apr-2016	28-Apr-2016
CEN Readings				29-Apr-2016	29-Apr-2016
Dissolved Metals by ICP-MS				04-May-2016	04-May-2016
Dissolved Organic/Inorganic Carbon				03-May-2016	03-May-2016
Fluoride				29-Apr-2016	29-Apr-2016
GRO by GC-FID (S)				28-Apr-2016	28-Apr-2016
Loss on Ignition in soils	04-May-2016	04-May-2016	04-May-2016	28-Apr-2016	28-Apr-2016
Mercury Dissolved				03-May-2016	03-May-2016
Mineral Oil				29-Apr-2016	29-Apr-2016
PAH Value of soil				27-Apr-2016	27-Apr-2016
PCBs by GCMS				28-Apr-2016	28-Apr-2016
pH				29-Apr-2016	29-Apr-2016
Phenols by HPLC (W)				03-May-2016	03-May-2016
Sample description	28-Apr-2016	28-Apr-2016	28-Apr-2016	25-Apr-2016	25-Apr-2016
Total Dissolved Solids				04-May-2016	04-May-2016
Total Organic Carbon				29-Apr-2016	29-Apr-2016



SDG: 160423-83
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Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

General

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
\$	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Appendix 6
Survey Data

Site Survey

Location	Irish National Grid		Level	Irish Transverse Mercator	
	Easting	Northing		Easting	Northing
Boreholes					
BH01	322629.267	241015.863	9.40	722553.522	741040.599
BH02	322667.052	240993.644	8.90	722591.299	741018.384
BH03	322629.521	240986.785	8.73	722553.776	741011.527
BH04	322648.763	240963.843	8.41	722573.013	740988.590
Trial Pits					
TP01	322626.230	241026.840	9.61	722550.486	741051.573
TP02	322616.335	241012.190	9.21	722540.593	741036.926
TP03	322639.808	241002.975	9.01	722564.061	741027.713
TP04	322652.966	241012.915	9.29	722577.216	741037.651
TP05	322604.354	240990.243	8.85	722528.614	741014.984
TP06	322634.270	240993.272	8.83	722558.524	741018.012
TP07	322658.270	240988.910	8.81	722582.519	741013.651
TP08	322686.025	240987.550	8.93	722610.268	741012.291
TP09	322654.892	240978.764	8.75	722579.141	741003.507
TP10	322632.075	240970.771	8.57	722556.329	740995.516
TP11	322665.343	240954.666	8.17	722589.590	740979.415
Soakaways					
SA01	322640.726	241018.861	9.53	722564.979	741043.596
SA02	322617.069	240982.307	8.72	722541.326	741007.050
SA03	322677.051	240972.623	8.37	722601.295	740997.368

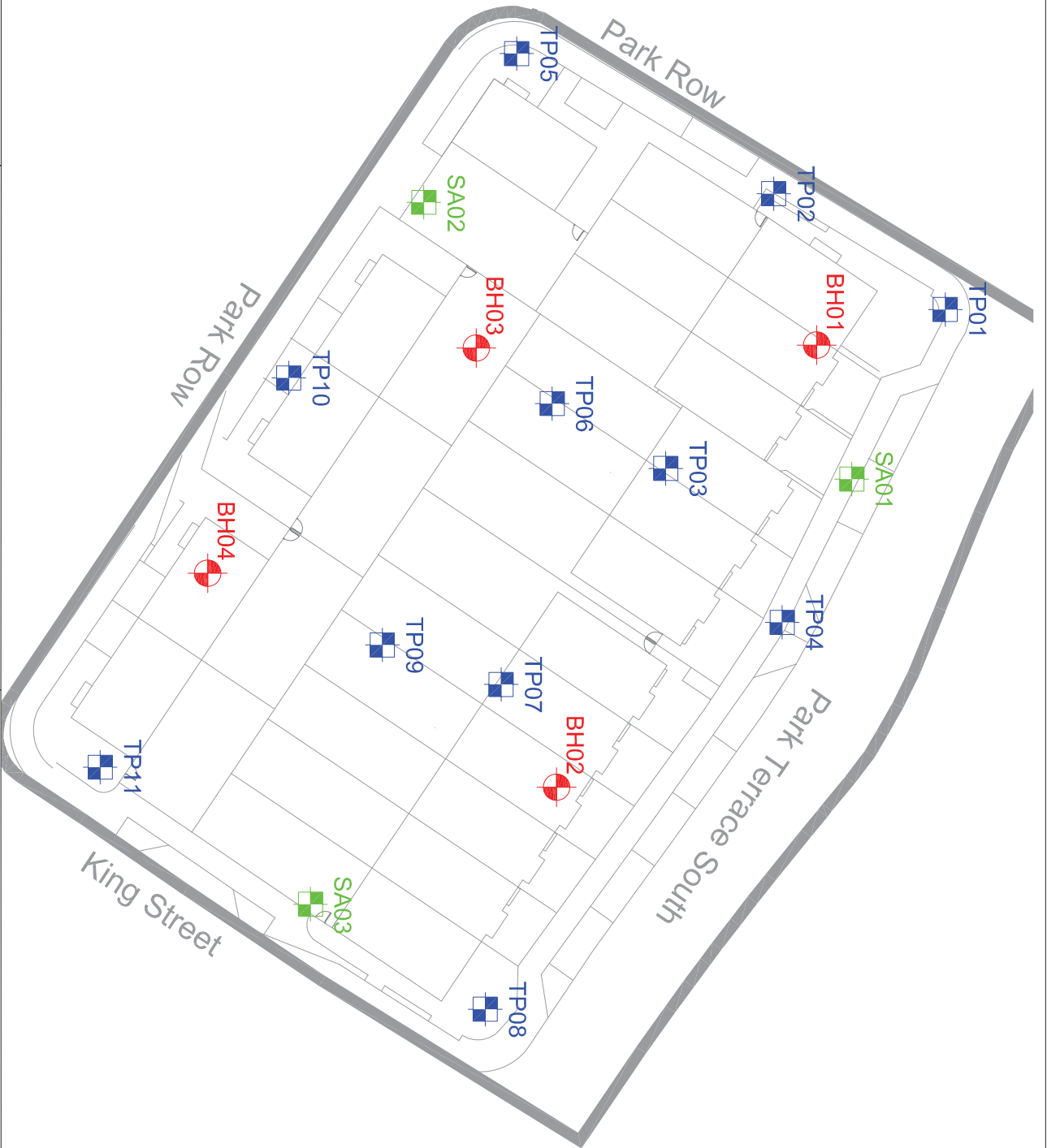


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Project 1 Gannon Homes Ltd
Engineer 1 Waterman Moylan
Project 1 Plot E, Clongriffin
Date 1 29-04-2016
Description 1 Site Investigation Plan
Drawing Number 1 SIL527401

Scale 1 Not To Scale
Rev 1 1
Drawn by 1 SL

-  Borehole
-  Trial Pit
-  Soakaway Test



S.I. Ltd Contract No: 5294

Client: Gannon Homes Ltd
Engineer: Waterman Moylan
Contractor: Site Investigations Ltd

Belltree Park, Clongriffin, Dublin 13
Site Investigation Report

Prepared by:

.....

Stephen Letch

Issue Date:	19/07/2016
Status	Final
Revision	0

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3. Laboratory Testing	3
4. Ground Conditions	3
5. Recommendations and Conclusions	4

Appendices:

1. Cable Percussive Borehole Logs
2. Trial Pit Logs and Photographs
3. Dynamic Probe Logs
4. Soakaway Test Results
5. Laboratory Test Results
6. Survey Data

1. Introduction

On the instructions of Waterman Moylan, Site Investigations Ltd (SIL) were appointed to complete a ground investigation at Belltree Park, Clongriffin, Dublin 13. The investigation was completed for the residential development of the site and was completed on behalf of the Client, Gannon Homes Ltd.

The fieldworks comprised a programme of cable percussive boreholes, trial pits, dynamic probes, soakaways and California Bearing Ratio tests. All fieldwork was carried out in accordance with Eurocode 7: Geotechnical Design and the IEI Specification & Related Documents for Ground Investigation in Ireland (2006). Laboratory testing has been performed on representative soil samples and these were completed in accordance of BS1377: 1990.

This report presents the factual geotechnical data obtained from the field and laboratory testing with interpretation of the ground conditions discussed.

2. Fieldwork

The geotechnical fieldworks were started and completed in June 2016 and comprised the following:

- 10 No. cable percussive boreholes
- 28 No. trial pits
- 28 No. dynamic probes
- 2 No. soakaways
- 8 No. California Bearing Ratio tests

2.1. Cable Percussive Boreholes

Cable percussion boring was undertaken at 10 No. locations using a Dando 150 rig and constructed a 200mm diameter borehole. The boreholes terminated at the scheduled depth of 6.00mbgl at each location. It was not possible to collect undisturbed samples due to the gravel and cobble content of the strata so bulk disturbed samples were recovered at regular intervals.

In order to test the strength of the stratum, Standard Penetration Tests (SPT's) were performed at 1.00m intervals in accordance with BS 1377 (1990). In soils with high gravel and cobble content it is appropriate to use a solid cone (60°) (CPT) instead of the split spoon and this was used throughout the testing. The test is completed over 450mm and the cone is driven 150mm into the stratum to ensure that the test is conducted over an undisturbed zone. The cone is then driven the remaining 300mm and the blows recorded to report the N-Value. The report shows the N-Value with the 75mm incremental blows listed in brackets (e.g. BH01

at 1.00mbgl where N=13-(3,3,3,4)). Where refusal of 50 blows across the test zone was encountered was achieved during testing, the penetration depth is also reported (e.g. BH03 at 5.00mbgl where N=50/5mm-(50/5mm)).

The logs are presented in Appendix 1.

2.2. Trial Pits

28 No. trial pits were completed using a wheeled excavator and were logged by SIL geotechnical engineer. Representative disturbed bulk samples were recovered as the pits were excavated and they were returned to the laboratory for geotechnical testing.

The trial pit logs and photographs are presented in Appendix 2.

2.3. Dynamic Probes

Dynamic probes were carried out at 28 No. locations, adjacent to the trial pits, using a track mounted Competitor 130 machine. The testing complies with the requirements of BS1377: Part 9 (1990) and Eurocode 7: Part 3. The configuration utilised standard DPH (Heavy) probing method comprising a 50kg weight, 500mm drop height and a 43.7mm diameter (90°) cone. The number of blows required to drive the cone each 100mm increment into the sub soil is recorded in accordance with the standards. The dynamic probe provides no information regarding soil type or groundwater conditions.

The dynamic probe results can be used to analyse the strength of the soil strata encountered by the probe. 'Proceedings of the Trinity College Dublin Symposium of Field and Laboratory Testing of Soils for Foundations and Embankments' presents a paper by Foirbart that is most relevant to Irish soil conditions and within this paper the following equations were included:

$$\text{DPH } N_{100} \times 2.5 = \text{SPT } N \text{ value (Granular Soils)}$$

$$C_u = 15 \times \text{DPH } N_{100} + 30 \text{ kPa (Cohesive Soils)}$$

These equations present a relationship between the probe N_{100} value and the SPT N value for granular soils and the shear strength of cohesive soils.

The probe results are presented in Appendix 3 and present the data both numerically and graphically.

2.4. Soakaway Tests

2 No. soakaway tests were completed using a wheeled excavator and were logged by SIL geotechnical engineer. The soakaway test is used to identify possible areas for storm water drainage. The pit was filled with water and the level of the groundwater was recorded over

time. As stipulated by BRE Special Digest 365, the pit should be filled three times and the final cycle is used to provide the infiltration rate. The time taken for the water level to fall from 75% volume to 25% volume is required to calculate the rate of infiltration. However, if the water level does not fall then the test is deemed to have failed and the area is unsuitable as a drainage area

The soakaway logs are presented in Appendix 4.

2.5. California Bearing Ratio tests

At 8 No. locations, undisturbed cylindrical mould samples were taken to complete California Bearing Ratio tests in the laboratory. The results facilitate the designing of the access roads and associated areas. These tests were completed to BS1377: 1990: Part 4, Clause 7 'Determination of California Bearing Ratio'. The results are presented as part of Appendix 5 with the laboratory test data.

2.6. Surveying

Following the completion of all the fieldworks works, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log and the locations are shown on the site plan in Appendix 6.

3. Laboratory Testing

Geotechnical laboratory testing has been carried out on representative soil samples in accordance with BS 1377 (1990). Testing included:

- 2 No. Moisture content
- 2 No. Atterberg limits
- 2 No. Particle size gradings
- 3 No. pH and sulphate
- 3 No. Chloride content
- 3 No. Organic content

Environmental testing was completed by Alcontrol Laboratories Ltd. and consisted of the following:

- 2 No. WAC Analysis

The laboratory test results are presented in Appendix 5.

4. Ground Conditions

4.1. Overburden

A generalised summary of the ground profile at BH06 is shown below. Reference should be made to the individual borehole and trial pit records in Appendices 1 and 2 for the full strata information at specific locations.

- MADE GROUND: brown sandy slightly gravelly silty clay.
- Firm becoming stiff grey slightly sandy silty CLAY.
- Stiff brown sandy slightly gravelly silty CLAY with low cobble content.
- Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content.

MADE GROUND was encountered in 10 No. boreholes to a maximum depth of 2.00mbgl at BH04 and BH10 and 22 No. trial pits to 1.80mbgl at TP28. TP10 did encounter MADE GROUND to 2.50mbgl and this was over a possible land drain so would be the trench for the drain.

The overburden deposits are of glacial origin and the particle size gradings of the cohesive soils display characteristic poorly-graded profiles for the glacial material. Fines contents (i.e. silt & clay) from the gradings show the cohesive soils with 40% and 64% silt/clay and the Atterberg Limits tests show that silty CLAY dominates the site.

The dynamic probes did show that the areas tested at DP14, DP15, DP18, DP19, DP24, DP25, DP26 and DP27 showed very low blow counts of 1 or less to deeper depths than the rest of the probes. The blow counts do not increase until between 2.10m (DP15) to 2.90m (DP14 and DP24).

4.2. Groundwater

Groundwater details in the boreholes and trial pits during the fieldworks are noted on the logs in Appendices 1 and 2. Groundwater was encountered in four of the boreholes at depths ranging from 2.00m (BH02 and BH08) to 4.50m (BH07). Groundwater was encountered in 12 of the 28 trial pits with the depth ranging from 1.60m (TP27) to 3.00m (TP25) and the rate of ingress was generally slow although a medium ingress was recorded at TP06 and a rapid ingress at TP10.

5.0. Recommendations and Conclusions

Please note the following caveats:

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 the exploratory hole locations or below the final level of excavation, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for adjacent unexpected conditions that have not been revealed by the exploratory holes. It is further recommended that all bearing surfaces when excavated should be inspected by a suitably qualified Engineer to verify the information given in this report.

Excavated surfaces in clay strata should be kept dry to avoid softening prior to foundation placement. Foundations should always be taken to a minimum depth of 0.50mBGL to avoid the effects of frost action and possible seasonal shrinkage/swelling.

If it is intended that on-site materials are to be used as fill, then the necessary laboratory testing should be specified by the Client to confirm the suitability. Also, relevant lab testing should be specified where stability of side slopes to excavations is a concern, or where contamination may be an issue.

5.1. Foundations

5.1.1. Shallow Foundations

Due to the unknown depth of foundation and no longer term groundwater information, this analysis assumes the groundwater will not have an effect on the construction or performance of these foundations. Also, MADE GROUND was encountered up to 2.00mbgl and it would be recommended that the foundations be placed on the natural stratum. Therefore all bearing capacities shown below are for natural ground.

The boreholes encountered firm/stiff brown slightly sandy slightly gravelly CLAY with low cobble content. The SPT N-values at 1.00mbgl vary from 11 (at 4 No. Boreholes) to 19 (BH03). For the analysis an N-value of 11 was chosen for the purposes of design in this stratum, in accordance with Eurocode 7 (EC 7).

Using an equation proposed by Stroud and Butler, the SPT N-value can be used to calculate the shear strength and this is $C_u=5N$. Therefore, using the value of 11, this indicates that the shear strength of the CLAY is 55kN/m^2 . This can be used to calculate the allowable bearing capacity (ABC) and using a factor of safety of 3 an ABC of 100kN/m^2 would be anticipated.

If higher capacities are required then using the SPT N-values at 2.00mbgl, an ABC of 140kN/m^2 would be anticipated at this depth. Alternatively foundations could be placed on the stiff black slightly sandy slightly gravelly silty CLAY. This was encountered at various depths from 2.50mbgl (BH01 and BH02) to 4.00mbgl (BH05 and BH07) and showed an increase in SPT N-values from 23 (BH02, BH04 and BH06 at 3.00mbgl) to 27 (BH05 at 4.00mbgl). Using an SPT value of 23 at 3.00mbgl, the shear strength of 115kN/m^2 would suggest that an allowable bearing capacity of 215kN/m^2 could be used when this strata is encountered.

It should be noted that although the boreholes showed no noticeable soft spots across the site the dynamic probes did record lower blow counts at 8 No. locations. It would therefore be imperative that foundation formations are inspected by a competent geotechnical engineer prior to construction so as to verify that the observations made during the ground investigation are consistent with the actual ground conditions at the time of construction.

The following assumptions were made as part of these analyses. If any of these assumptions are not in accordance with detailed design or observations made during construction these recommendations should be re-evaluated.

- The foundation is to be 1m wide.
- Foundations are to be constructed on a level formation of uniform material type (described above).
- All man-made or filled material is to be removed prior to construction.
- The bulk unit weight of the material in this stratum has a minimum density of 19kN/m³.
- Based on groundwater observations this analysis assumes the groundwater will not have an effect on the construction or performance of these foundations.

The trial pits indicate that excavations in the cohesive soils should be stable for a short while at least. However regular inspection of temporary excavations should be completed during construction to ensure that all slopes are stable especially in MADE GROUND. Temporary support should be used on any excavation that will be left open for an extended period of time.

5.1.2. Piled Foundations

Due to the lower than anticipated bearing capacities and the possibility of soft spots in the South East part of the site then deeper foundations may be required. The following information is for guidance for a pile designer.

No loadings of any structures have been provided for this report and therefore all the information provided is to be used for guidance purposes only and a piling contractor or Temporary Works Designer (TWD) should be consulted to provide the most cost effective pile design.

5.1.2.1. Applicable Pile Types

This section discusses a number of possible piling solutions frequently used in Ireland to support heavily loaded structures. The pile designer or TWD should satisfy themselves that the piling platform is adequate to support the piling rigs to be used on the site. All concreted

piles (and open boreholes) should be protected to prevent operatives and others from falling into the hole.

5.1.2.2. Driven Pre-Cast or Steel Piles

The boreholes undertaken in all phases of this project have indicated the presence of significant proportions of cobbles and boulders within the glacial strata.

Pile breakage, false set, non-vertical piles and short piles may result when driving piles in these strata, requiring additional piles to be installed. The relocation of these additional piles may require redesign of pile caps that might affect the project programme. Further, integrity testing cannot always verify the structural integrity of piles, leaving a level of uncertainty with the installed piles.

For these reasons driven piles are not considered appropriate for the ground conditions encountered.

5.1.2.3. Bored (drilled) Cast-in-Place Concrete Piles

Bored piles are frequently used in ground conditions similar to those encountered on site. Due to the nature of this boring (drilling) equipment, cobbles, boulders, granular and cohesive soil strata can be penetrated successfully. However, advancing piles using this method is relatively slow.

Piling Contractors using this method frequently advance a number of pile holes prior to concreting for efficiency purposes. If this approach is adopted it is recommended that all un-concreted bores be protected from collapse by leaving the casings in place until the concrete is poured and reinforcing in place.

The pile designer should consider the hazard of an open bore as part of the piling risk assessment and the possibility of an operative falling into the open hole.

Pile lengths and therefore pile capacities are limited by the torque of each particular piling machine. We would recommend that a requirement be made that the selected rig can successfully bore well beyond the final pile design length.

5.1.2.4. Continuous Flight Auger (CFA) Cast-in-Place Concrete Piles

CFA, along with bored piles, are the two most common methods of installing heavily loaded piles in Ireland. The CFA method most commonly used is the Hollow-Stem Auger, which allows concrete to be pumped under pressure to the bottom of the drilled hole while the annulus of the hole is stabilised by the auger.

The depth that CFA rigs can bore is generally limited by two items:

1. The capacity (torque) of the rig
2. The mast height. (Sometimes using a longer Kelly Bar can extend this.)

The piling contractor should give confirmation that their equipment is capable of advancing through the hard strata, potentially laden with cobbles and boulders, encountered on the site.

We would also recommend that a requirement be made that the selected rig can successfully bore well below the final pile design length. This makes allowance for some unforeseen ground conditions requiring deeper piles.

5.1.2.5. Pile Testing

Piles should be tested in order to determine their actual constructed capacity and to verify their structural integrity. Integrity testing should also be undertaken on selected piles. Consideration should be given to dynamic testing of selected piles.

5.1.2.5.1 Static Load Testing

The actual pile lengths determined by the pile designer should be verified as adequate prior to the installation of contract piles by the use of sacrificial (preliminary) piles. Therefore sacrificial piles should be installed and tested to destruction and their performance evaluated to allow changes in pile design, usually changes in length, if required.

A minimum of one sacrificial pile should be installed in each of the dominant layers where piles are to be supported namely the stiff to very stiff glacial till.

Along with sacrificial piles it is good practice to test 1 + 1% of contract piles to be installed across the site where conditions are uniform across the site. The number of piles tested should be increased to take account of the variation on ground conditions across this site.

5.1.2.5.2. Dynamic Load Testing

Consideration should be given to the use of dynamic testing of contract and sacrificial piles. CASE testing and CAPWAP analysis should be considered with a minimum of 5% contract piles being CASE tested and 20% of the CASE tested piles having a CAPWAP analysis.

5.1.2.5.3 Integrity Testing of Piles

Consideration should be given to integrity testing of all contract and sacrificial piles – 100% of piles to be tested. Any of the following could be considered:

- Impulse method
- Sonic Echo, transient dynamic steady state vibration method
- Transient dynamic response (frequency response) method, with simulations and impedance profiles carried out on piles having anomalous results
- Sonic coring (logging) method
- Statmamic method

5.2. Groundwater

The caveats overleaf relating to interpretation of groundwater levels should be noted:

There is always considerable uncertainty as to the likely rates of water ingress into excavations in clayey soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water.

Furthermore, water levels noted on the borehole and trial pit logs do not generally give an accurate indication of the actual groundwater conditions as the borehole or trial pit is rarely left open for sufficient time for the water level to reach equilibrium.

Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period of groundwater monitoring using any constructed standpipes is required to provide more accurate information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.

Pumping tests would be required to determine likely seepage rates and persistence into excavations taken below the groundwater level. Deep trial pits also aid estimation of seepage rates.

As discussed previously there were 4 No. water strikes in the boreholes and 12 No. strikes in the trial pits. There is always considerable uncertainty as to the likely rates of water ingress into excavations in cohesive soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water. However, based on this information at the exploratory hole locations to date, it is considered likely that any seepages into excavations will generally be slow.

If groundwater is encountered during excavations then mechanical pumps will be required to remove the groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

5.3. Soakaway Tests

The graphs in Appendix 4 show that the areas where the soakaways were completed are unsuitable for soakaway design. The BRE Digest stipulates that the pit should half empty within 24hrs, and extrapolation indicates this condition would not be satisfied. The test was

terminated at the end of the first (of a possible three) fill/empty cycle since further testing would give even slower fall rates due to increased soil saturation.

The unsuitability of the site for soakaways is further suggested by the soil descriptions of the materials in the area of the site where the soakaway was completed, i.e. clay and silt soils.

5.4. Pavement Design

The summary of the CBR test results in Appendix 5 indicates values generally of 3.7% or more. The CBR tests samples were collected at 0.50mbgl and inspection of the formation strata should be completed prior to construction of the pavement. Once the exact formation levels are finalised then additional in-situ testing could be completed to assist with the detailed pavement design.

5.5. Contamination

Environmental testing was carried out on two samples from the investigation and the results are shown in Appendix 5. For material to be removed from site, landfill acceptability testing (WAC) was carried out to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill. The results were compared with the published waste acceptance limits of BS EN 12457-2.

The disposal suite results indicate that the material would generally be able to be treated as Inert Waste. However discussions about the acceptance of the material must be undertaken with individual landfills before removal of any material from site.

Only two samples were tested for analysis and although no major contamination was noted at the fieldwork locations, any localised contamination may have been missed. Therefore, a testing regime designed by an environmental engineer should be designed on any material that is to be removed from site to ensure that the material stays within the landfill acceptance criteria.

5.6. Aggressive Ground Conditions

The chemical tests results in Appendix 5 indicate a general pH value between 8.42 and 8.95, which is close to neutral and below the level of 9, which could cause possible concern, therefore no special precautions are required.

The maximum value obtained for acid soluble sulphate was 112mg/l as SO₃. The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground*' guidelines require SO₄ values and after conversion (SO₄ = SO₃ x 1.2), the maximum value of 134mg/l shows Class 1 conditions and no special precautions are required.

Appendix 1
Cable Percussive Borehole Logs

CABLE PERCUSSIVE BOREHOLE RECORD














CONTRACT: Belltree Park

HOLE ID: **BH01**



Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Started: 10/06/2016
Boring Completed: 10/06/2016
Rig Type: Dando 150

Co-ordinates: E:722606.291
 N:741141.412
Elevation: 9.09 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: brown sandy slightly gravelly silty clay.	0.00		9.09						
Firm becoming stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	0.50		8.59	B	1.00	JM19 N=13-(3,3,3,4)			
	1.00			SPT(C)	1.00				
	2.00			B	2.00	JM20 N=17-(4,4,4,5)			
	2.50			SPT(C)	2.00				
Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	2.50		6.59	B	3.00	JM21 N=26-(5,7,7,7)			
	3.00			SPT(C)	3.00				
	4.00			B	4.00	JM22 N=38-(8,10,10,10)			
	4.50			SPT(C)	4.00				
Borehole terminated at scheduled depth.	5.00			B	5.00	JM23 N=43-(9,10,12,12)			
	5.50			SPT(C)	5.00				
	6.00			B	6.00	JM24 N=46-(8,10,14,14)	6.00	10/06/2016	Dry(E)
	6.00		3.09	SPT(C)	6.00				

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Borehole terminated at scheduled depth.
 Borehole backfilled - no installation.

B Bulk Disturbed Sample D Small disturbed sample W Water sample U(9) Undisturbed sample (drive blows)	SPT(S) Standard Penetration Test (Split Spoon) SPT(C) Standard Penetration Test (Cone)  Waterstrike depth  Water level depth 20mins after strike 5.00(E) Depth to water (E)nd of shift 5.00(S) Depth to water (S)tart of shift	Key to Symbols
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Site Investigations Ltd

BOREHOLE SL_5294 BH GINT.GPJ COREHOLE.GDT_15/07/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Park

HOLE ID: BH02

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Started: 10/06/2016
Boring Completed: 10/06/2016
Rig Type: Dando 150

Co-ordinates: E:722647.929
 N:741126.446
Elevation: 8.78 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: brown sandy slightly gravelly silty clay.	0.00		8.78						
Firm becoming stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	0.50		8.28	B	1.00	JM13 N=12-(3,3,3,3)			
	1.00			SPT(C)	1.00				
	2.00			B	2.00	JM14 N=17-(4,5,4,4)		10/06/2016	2.00
	2.50			SPT(C)	2.00				
Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	2.50		6.28	B	3.00	JM15 N=23-(5,6,6,6)			
	3.00			SPT(C)	3.00				
	4.00			B	4.00	JM16 N=30-(7,7,7,9)			
	5.00			SPT(C)	4.00				
Borehole terminated at scheduled depth.	6.00		2.78	B	6.00	JM18 N=44-(8,11,11,14)	6.00	10/06/2016	1.50(E)
	7.00			SPT(C)	6.00				
	8.00								
	9.00								
	10.00								

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Water strike at 2.00mbgl sealed at 4.50mbgl and re-entered hole when casings removed.
 Borehole terminated at scheduled depth.
 Borehole backfilled - no installation.

B Bulk Disturbed Sample D Small disturbed sample W Water sample U(9) Undisturbed sample (drive blows)	SPT(S) Standard Penetration Test (Split Spoon) SPT(C) Standard Penetration Test (Cone) ▾ 3.50 Waterstrike depth ▽ 1.50(20) Water level depth 20mins after strike 5.00(E) Depth to water (E)nd of shift 5.00(S) Depth to water (S)tart of shift	Key to Symbols
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BOREHOLE SL_5294 BH GINT.GPJ COREHOLE.GDT_15/07/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Park

HOLE ID: **BH03**

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Started: 09/06/2016
Boring Completed: 09/06/2016
Rig Type: Dando 150

Co-ordinates: E:722582.735
 N:741092.941
Elevation: 9.18 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: brown sandy slightly gravelly silty clay.	0.00		9.18	B SPT(C)	1.00	JM01 N=19-(4,5,5,5)			
MADE GROUND: brown black sandy slightly gravelly silty clay with low cobble content.	0.50		8.68		1.00				
Stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	1.40		7.78	B SPT(C)	2.00	JM02 N=21-(5,5,5,6)			
	2.00				2.00				
Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	3.00		6.18	B SPT(C)	3.00	JM03 N=26-(6,6,7,7)			
	4.00				4.00				
	5.00				5.00				
	6.00				6.00				
Borehole terminated at scheduled depth.	6.00		3.18	B SPT(C)	6.00	JM06 N=41-(8,10,11,12)	6.00	09/06/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Borehole terminated at scheduled depth.
 Borehole backfilled - no installation.

B Bulk Disturbed Sample	SPT(S) Standard Penetration Test (Split Spoon)
D Small disturbed sample	SPT(C) Standard Penetration Test (Cone)
W Water sample	Waterstrike depth
U(9) Undisturbed sample (drive blows)	Water level depth 20mins after strike
	5.00(E) Depth to water (E)nd of shift
	5.00(S) Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL_5294 BH GINT.GPJ COREHOLE.GDT_15/07/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Park

HOLE ID: **BH04**

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Started: 09/06/2016
Boring Completed: 09/06/2016
Rig Type: Dando 150

Co-ordinates: E:722628.444
 N:741063.608
Elevation: 8.69 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: brown sandy slightly gravelly silty clay.	0.00		8.69						
MADE GROUND: brown black sandy slightly gravelly silty clay with low cobble content.	0.50		8.19	B SPT(C)	1.00 1.00	JM07 N=14-(3,3,4,4)			
Stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	2.00		6.69	B SPT(C)	2.00 2.00	JM08 N=15-(3,4,4,4)			
Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	3.00		5.69	B SPT(C)	3.00 3.00	JM09 N=23-(5,6,6,6)			
	4.00			B SPT(C)	4.00 4.00	JM10 N=28-(6,7,7,8)			
	5.00			B SPT(C)	5.00 5.00	JM11 N=32-(7,7,9,9)			
Borehole terminated at scheduled depth.	6.00		2.69	B SPT(C)	6.00 6.00	JM12 N=34-(8,8,8,10)	6.00	09/06/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Borehole terminated at scheduled depth.
 Borehole backfilled - no installation.

Key to Symbols	
B Bulk Disturbed Sample	SPT(S) Standard Penetration Test (Split Spoon)
D Small disturbed sample	SPT(C) Standard Penetration Test (Cone)
W Water sample	∇ Waterstrike depth
U(9) Undisturbed sample (drive blows)	∇ ^{1.50(20)} Water level depth 20mins after strike
	5.00(E) Depth to water (E)nd of shift
	5.00(S) Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL_5294 BH GINT.GPJ COREHOLE.GDT 15/07/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Park

HOLE ID: **BH05**

Client: Gannon Homes

Co-ordinates: E:722706.539

Consultant: Waterman Moylan

N:741111.149

Site Address: Clongriffin, Dublin 13

Elevation: 8.81 m.O.D.

Boring Started: 14/06/2016

Hole Diameter: 200 mm

Boring Completed: 14/06/2016

Drilled by: J. Moriarty

Rig Type: Dando 150

Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: brown sandy slightly gravelly silty clay.	0.00		8.81						
Firm grey slightly sandy silty CLAY.	1.20		7.61	B SPT(C)	1.00 1.00	JM37 N=11-(2,3,3,3)			
Firm becoming stiff brown grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	1.80		7.01	B SPT(C)	2.00 2.00	JM38 N=14-(4,3,3,4)			
Brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	3.50		5.31	B SPT(C)	3.00 3.00	JM39 N=17-(4,4,4,5)			
Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	4.00		4.81	B SPT(C)	4.00 4.00	JM40 N=27-(6,6,7,8)			
	5.00			B SPT(C)	5.00 5.00	JM41 N=31-(8,7,8,8)			
Borehole terminated at scheduled depth.	6.00		2.81	B SPT(C)	6.00 6.00	JM42 N=34-(7,8,9,10)	6.00	14/06/2016	Dry(E)

BOREHOLE SL 5294 BH GINT.GPJ COREHOLE.GDT 15/07/16

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
Borehole terminated at scheduled depth.
Borehole backfilled - no installation.

B Bulk Disturbed Sample	SPT(S) Standard Penetration Test (Split Spoon)
D Small disturbed sample	SPT(C) Standard Penetration Test (Cone)
W Water sample	Waterstrike depth
U(9) Undisturbed sample (drive blows)	Water level depth 20mins after strike
	5.00(E) Depth to water (E)nd of shift
	5.00(S) Depth to water (S)tart of shift

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Park

HOLE ID: BH06

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Started: 13/06/2016
Boring Completed: 13/06/2016
Rig Type: Dando 150

Co-ordinates: E:722695.453
 N:741082.519
Elevation: 8.08 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: brown sandy slightly gravelly silty clay.	0.00		8.08						
Firm becoming stiff grey slightly sandy silty CLAY.	0.50		7.58	B	1.00	JM25 N=12-(3,3,3,3)			
	1.00			SPT(C)	1.00				
Stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	2.00			B	2.00	JM26 N=18-(4,4,5,5)			
	2.30		5.78	SPT(C)	2.00				
Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	3.00		5.08	B	3.00	JM27 N=23-(5,6,6,6)			
	3.00			SPT(C)	3.00				
	4.00			B	4.00	JM28 N=31-(7,7,7,10)			
	4.00			SPT(C)	4.00				
	5.00			B	5.00	JM29 N=33-(8,8,8,9)			
5.00			SPT(C)	5.00					
Borehole terminated at scheduled depth.	6.00		2.08	B	6.00	JM30 N=40-(8,8,10,14)	6.00	13/06/2016	3.50(E)
	6.00			SPT(C)	6.00				

13/06/2016 3.50

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Water strike at 3.50mbgl sealed at 4.00mbgl and re-entered hole when casings removed.
 Chiselling: 3.50m to 3.70m: 0.75hr
 Borehole terminated at scheduled depth.
 Borehole backfilled - no installation.

B Bulk Disturbed Sample D Small disturbed sample W Water sample U(9) Undisturbed sample (drive blows)	SPT(S) Standard Penetration Test (Split Spoon) SPT(C) Standard Penetration Test (Cone) ▾ 3.50 Waterstrike depth ▽ 1.50(20) Water level depth 20mins after strike 5.00(E) Depth to water (E)nd of shift 5.00(S) Depth to water (S)tart of shift	Key to Symbols
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BOREHOLE SL_5294 BH GINT.GPJ COREHOLE.GDT_15/07/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Park

HOLE ID: **BH07**

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Started: 13/06/2016
Boring Completed: 13/06/2016
Rig Type: Dando 150

Co-ordinates: E:722704.389
 N:741052.484
Elevation: 8.87 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: brown sandy slightly gravelly silty clay.	0.00		8.87						
Firm grey slightly sandy silty CLAY.	1.20		7.67	B SPT(C)	1.00	JM31 N=11-(3,2,2,4)			
Stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	2.20		6.67	B SPT(C)	2.00	JM32 N=16-(4,4,4,4)			
Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	4.00		4.87	B SPT(C)	4.00	JM34 N=25-(6,6,7,6)			
Borehole terminated at scheduled depth.	5.00			B SPT(C)	5.00	JM35 N=30-(7,6,7,10)		13/06/2016	4.50
	6.00		2.87	B SPT(C)	6.00	JM36 N=44-(10,10,11,13)	6.00	13/06/2016	4.50(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Water strike at 4.50mbgl sealed at 5.00mbgl and re-entered hole when casings removed.
 Borehole terminated at scheduled depth.
 Borehole backfilled - no installation.

<p>B Bulk Disturbed Sample D Small disturbed sample W Water sample U(9) Undisturbed sample (drive blows)</p>	<p>Key to Symbols SPT(S) Standard Penetration Test (Split Spoon) SPT(C) Standard Penetration Test (Cone) 3.50 Waterstrike depth 1.50(20) Water level depth 20mins after strike 5.00(E) Depth to water (E)nd of shift 5.00(S) Depth to water (S)tart of shift</p>
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BOREHOLE SL_5294 BH GINT.GPJ COREHOLE.GDT_15/07/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Park

HOLE ID: **BH08**

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Started: 15/06/2016
Boring Completed: 15/06/2016
Rig Type: Dando 150

Co-ordinates: E:722767.115
 N:741093.390
Elevation: 8.04 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: brown sandy slightly gravelly silty clay.	0.00		8.04						
Firm grey slightly sandy silty CLAY.	1.00		7.04	B SPT(C)	1.00	JM55 N=11-(2,3,3,3)			
	2.00			B SPT(C)	2.00	JM56 N=14-(3,3,4,4)	15/06/2016	2.00	
Firm brown grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	2.50		5.54	B SPT(C)	3.00	JM57 N=16-(4,4,4,4)			
	3.00			B SPT(C)	3.00	JM57 N=16-(4,4,4,4)			
Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	3.80		4.24	B SPT(C)	4.00	JM58 N=25-(6,6,7,6)			
	4.00			B SPT(C)	4.00	JM58 N=25-(6,6,7,6)			
	5.00			B SPT(C)	5.00	JM59 N=32-(7,7,9,9)			
Borehole terminated at scheduled depth.	6.00		2.04	B SPT(C)	6.00	JM60 N=37-(7,8,10,12)	6.00	15/06/2016	Dry(E)
	7.00								
	8.00								
	9.00								
	10.00								

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Water strike at 2.00mbgl sealed at 4.50mbgl and re-entered hole when casings removed.
 Borehole terminated at scheduled depth.
 Borehole backfilled - no installation.

Key to Symbols	
B	Bulk Disturbed Sample
D	Small disturbed sample
W	Water sample
U(9)	Undisturbed sample (drive blows)
SPT(S)	Standard Penetration Test (Split Spoon)
SPT(C)	Standard Penetration Test (Cone)
▼ 3.50	Waterstrike depth
▽ 1.50(20)	Water level depth 20mins after strike
5.00(E)	Depth to water (E)nd of shift
5.00(S)	Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL_5294 BH GINT.GPJ COREHOLE.GDT_15/07/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Park

HOLE ID: BH09

Client: Gannon Homes

Co-ordinates: E:722740.554

Consultant: Waterman Moylan

N:741029.463

Site Address: Clongriffin, Dublin 13

Elevation: 8.50 m.O.D.

Boring Started: 14/06/2016

Hole Diameter: 200 mm

Boring Completed: 14/06/2016

Drilled by: J. Moriarty

Rig Type: Dando 150

Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: brown sandy slightly gravelly silty clay.	0.00		8.50						
Firm grey slightly sandy silty CLAY.	1.20		7.30	B SPT(C)	1.00 1.00	JM43 N=11-(2,3,3,3)			
Firm brown grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	2.00		6.50	B SPT(C)	2.00 2.00	JM44 N=12-(4,2,3,3)			
Stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	3.20		5.30	B SPT(C)	3.00 3.00	JM45 N=22-(5,5,6,6)			
Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	3.80		4.70	B SPT(C)	4.00 4.00	JM46 N=50/10mm-(50/10mm)			
	5.00			B SPT(C)	5.00 5.00	JM47 N=31-(7,8,8,8)			
Borehole terminated at scheduled depth.	6.00		2.50	B SPT(C)	6.00 6.00	JM48 N=41-(9,9,10,13)	6.00	14/06/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Chiselling: 4.10m to 4.30m: 0.75hr
 Borehole terminated at scheduled depth.
 Borehole backfilled - no installation.

B Bulk Disturbed Sample	SPT(S) Standard Penetration Test (Split Spoon)
D Small disturbed sample	SPT(C) Standard Penetration Test (Cone)
W Water sample	Waterstrike depth
U(9) Undisturbed sample (drive blows)	Water level depth 20mins after strike
	5.00(E) Depth to water (E)nd of shift
	5.00(S) Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL 5294 BH GINT.GPJ COREHOLE.GDT 15/07/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Park

HOLE ID: **BH10**

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Started: 15/06/2016
Boring Completed: 15/06/2016
Rig Type: Dando 150

Co-ordinates: E:722760.222
 N:740998.247
Elevation: 7.72 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
MADE GROUND: brown sandy slightly gravelly silty clay.	0.00	[Symbol]	7.72						
MADE GROUND: brown black sandy slightly gravelly silty clay with low cobble content.	0.20	[Symbol]	7.52						
Stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	1.00	[Symbol]	5.72	B SPT(C)	1.00	JM49 N=50/50mm-(50/50mm)			
	2.00	[Symbol]		B SPT(C)	2.00	JM50 N=15-(3,4,4,4)			
Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	3.00	[Symbol]	4.72	B SPT(C)	3.00	JM51 N=25-(5,6,7,7)			
	4.00	[Symbol]		B SPT(C)	4.00	JM52 N=28-(6,7,7,8)			
	5.00	[Symbol]		B SPT(C)	5.00	JM53 N=42-(8,9,10,15)			
	6.00	[Symbol]		B SPT(C)	6.00	JM54 N=48-(10,12,12,14)			
Borehole terminated at scheduled depth.	6.00		1.72	B SPT(C)	6.00		6.00	15/06/2016	2.00(E)

BOREHOLE SL 5294 BH GINT.GPJ COREHOLE.GDT 15/07/16

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Chiselling: 0.50m to 2.00m: 1hr
 Borehole terminated at scheduled depth.
 Borehole backfilled - no installation.

B Bulk Disturbed Sample	SPT(S) Standard Penetration Test (Split Spoon)
D Small disturbed sample	SPT(C) Standard Penetration Test (Cone)
W Water sample	▽ 3.50 Waterstrike depth
U(9) Undisturbed sample (drive blows)	▽ 1.50(20) Water level depth 20mins after strike
	5.00(E) Depth to water (E)nd of shift
	5.00(S) Depth to water (S)tart of shift

Appendix 2
Trial Pit Logs and Photographs

TRIAL PIT RECORD

Contract: **Beltree Park, Clongriffin**

Hole ID: **TP01**

Client: **Gannon Homes Ltd.**

Co-ordinates: **E:722610.177**

Consultant: **Waterman Moylan**

N:741166.215

Site Address: **Clongriffin, Dublin 13**

Elevation: **9.30 m.O.D.**

Date Completed: **21/06/2016**

Logged by: **P. McGonagle**

Excavator: **JCB 3CX**

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date					
				Type	Depth (m)	Ref No.							
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		9.30	B	1.00	PM01							
Stiff black slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone. Pit terminated at scheduled depth.	2.80		6.50						B	2.80	PM02		
	3.0 3.00		6.30										

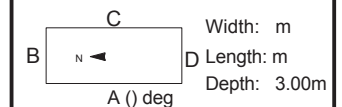
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- Waterstrike depth
- Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP02**

Client: Gannon Homes Ltd.

Co-ordinates: E:722645.034

Consultant: Waterman Moylan

N:741154.072

Site Address: Clongriffin, Dublin 13

Elevation: 9.06 m.O.D.

Date Completed: 21/06/2016

Logged by: P. McGonagle

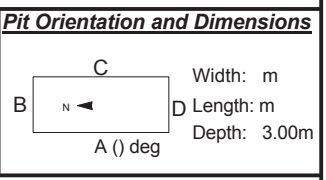
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		9.06	B	1.00	PM03		
Stiff black slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	2.20		6.86					
Pit terminated at scheduled depth.	3.0 3.00	Hole End	6.06					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Minor pit wall collapse.
 Slow water ingress at 2.5m.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - Waterstrike depth
 - Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP04**

Client: Gannon Homes Ltd.

Co-ordinates: E:722630.403

Consultant: Waterman Moylan

N:741134.316

Site Address: Clongriffin, Dublin 13

Elevation: 9.14 m.O.D.

Date Completed: 21/06/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content (engineered fill). Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		9.14					
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY. Gravel is angular to subangular, fine to coarse of limestone.	1.0 1.00		8.14	B	1.00	PM07		
	1.50			B	1.50	PM08		
Firm brown sandy gravelly clayey SILT. Gravel is angular to subangular, fine to coarse of limestone.	1.60		7.54					
	2.0			B	2.50	PM09	▼ 2.50	21/06/2016
Stiff black slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	2.70		6.44					
Pit terminated at scheduled depth.	3.0 3.00	Hole End	6.14					
	4.0							
	5.0							

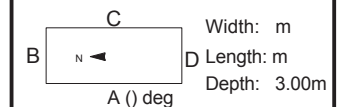
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▼ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: **Beltree Park, Clongriffin**

Hole ID: **TP05**

Client: **Gannon Homes Ltd.**

Co-ordinates: **E:722595.616**

Consultant: **Waterman Moylan**

N:741128.690

Site Address: **Clongriffin, Dublin 13**


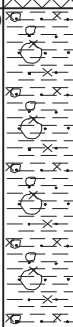

Elevation: **8.95 m.O.D.**

Date Completed: **21/06/2016**



Logged by: **P. McGonagle**

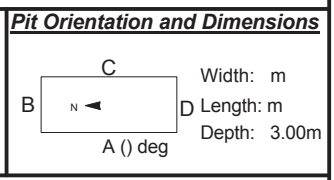
Excavator: **JCB 3CX**

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content (engineered fill). Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		8.95	B	1.00	PM10		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	1.20		7.75	B	2.00	PM11		
Stiff black slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	2.40		6.55	B	2.50	PM12		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.95					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

Key to Symbols
 B Bulk disturbed sample
 D Small disturbed sample
 U Undisturbed sample
 V(60) In-situ hand shear vane test(kPa)
 P Hand Penetrometer Test(N value)
 Waterstrike depth
 Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP06**

Client: Gannon Homes Ltd.

Co-ordinates: E:722616.664

Consultant: Waterman Moylan

N:741117.690

Site Address: Clongriffin, Dublin 13

Elevation: 8.93 m.O.D.

Date Completed: 21/06/2016

Logged by: P. McGonagle

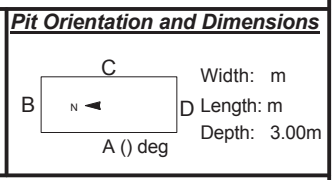
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content (engineered fill). Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		8.93	ENV	0.50	PM13		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	0.90 1.0		8.03	B	1.50	PM14		
Firm brown sandy gravelly clayey SILT. Gravel is angular to subangular, fine to coarse of limestone.	1.60 2.0		7.33	B	2.00	PM15	▼ 2.50	21/06/2016
Stiff black slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone. Pit terminated at scheduled depth.	2.90 3.0 3.00	 Hole End	6.03 5.93					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Minor pit wall collapse in SILT layer.
 Medium water ingress at 2.5m.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼ 3.00 Waterstrike depth
 - ▼ 1.50(20) Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: **Beltree Park, Clongriffin**

Hole ID: **TP07**

Client: **Gannon Homes Ltd.**

Co-ordinates: **E:722642.123**

Consultant: **Waterman Moylan**

N:741097.614

Site Address: **Clongriffin, Dublin 13**


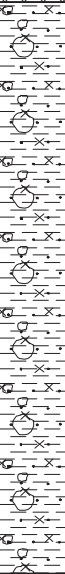

Elevation: **8.72 m.O.D.**

Date Completed: **21/06/2016**

Logged by: **P. McGonagle**

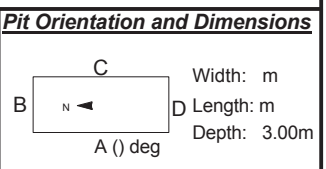
Excavator: **JCB 3CX**

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content (engineered fill). Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		8.72					
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	0.60 1.0 2.0		8.12	B	1.00	PM16		
Stiff black slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	2.70		6.02	B	2.70	PM17		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.72					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼_{3.50} Waterstrike depth
 - ▽_{1.50(20)} Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: **Beltree Park, Clongriffin**

Hole ID: **TP08**

Client: **Gannon Homes Ltd.**

Co-ordinates: **E:722595.130**

Consultant: **Waterman Moylan**

N:741085.413

Site Address: **Clongriffin, Dublin 13**

Elevation: **9.15 m.O.D.**

Date Completed: **21/06/2016**

Logged by: **P. McGonagle**

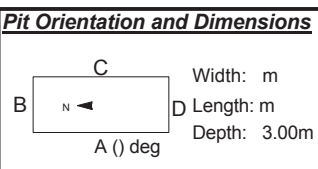
Excavator: **JCB 3CX**

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content (engineered fill). Cobbles and boulders are angular to subangular of limestone.	0.0 0.00	[Cross-hatch pattern]	9.15	B	1.00	PM18		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	1.20	[Pattern with circles and crosses]	7.95	B	2.00	PM19		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	6.15					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▽^{3.50} Waterstrike depth
 - ▽^{1.50(20)} Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP09**

Client: Gannon Homes Ltd.

Co-ordinates: E:722572.025

Consultant: Waterman Moylan

N:741083.776

Site Address: Clongriffin, Dublin 13


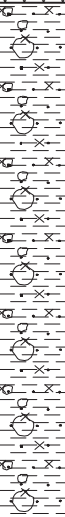
Elevation: 9.39 m.O.D.

Date Completed: 21/06/2016

Logged by: P. McGonagle

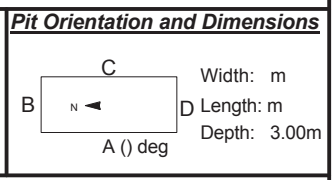
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content (engineered fill). Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		9.39					
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	1.10		8.29	B	1.00	PM20		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	6.39					
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼^{3.50} Waterstrike depth
 - ▽^{1.50(20)} Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP10**

Client: Gannon Homes Ltd.

Co-ordinates: E:722595.339

Consultant: Waterman Moylan

N:741069.193

Site Address: Clongriffin, Dublin 13

Elevation: 9.32 m.O.D.

Date Completed: 21/06/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content (engineered fill). Cobbles and boulders are angular to subangular of limestone.	0.0 0.00	[Cross-hatch pattern]	9.32					
	1.0			B	1.00	PM22		
MADE GROUND: brown slightly sandy slightly gravelly silty clay with low cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	1.50	[Cross-hatch pattern]	7.82					
	2.0			B	2.00	PM23		
MADE GROUND: gravel (Cl. 505 Drainage Stone)	2.40	[Cross-hatch pattern]	6.92				▼ 2.40	21/06/2016
Pit terminated due to heavy seepage & possible drain pipe with medium drainage stone surround	2.50	Hole End	6.82					
	3.0							
	4.0							
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:

Pit terminated due to Rapid ingress.

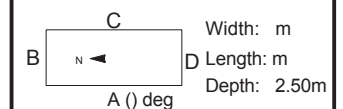
Pit walls stable.

Rapid ingress at 2.4m.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▼ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP11**

Client: Gannon Homes Ltd.

Co-ordinates: E:722629.769

Consultant: Waterman Moylan

N:741048.613

Site Address: Clongriffin, Dublin 13

Elevation: 8.71 m.O.D.

Date Completed: 21/06/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content (engineered fill). Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		8.71					
	1.0			B	1.00	PM24		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	1.50 2.0		7.21					
	2.20			B	2.00	PM25		
Stiff brown sandy gravelly clayey SILT with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	2.20 3.0		6.51				▼ 2.50	21/06/2016
	3.0 3.00	Hole End	5.71					
Pit terminated at scheduled depth.	3.0 4.0 5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

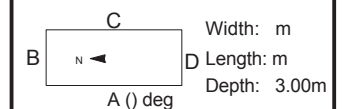
Remarks:

- Pit terminated at scheduled depth.
- Minor pit wall collapse in SILT layer.
- Slow water ingress at 2.5m.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▼ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP12**

Client: Gannon Homes Ltd.

Co-ordinates: E:722718.991

Consultant: Waterman Moylan

N:741127.841

Site Address: Clongriffin, Dublin 13




Elevation: 8.60 m.O.D.

Date Completed: 21/06/2016

Logged by: P. McGonagle

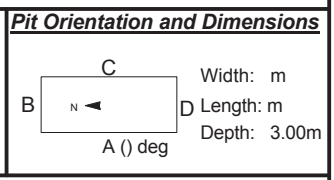
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content (engineered fill). Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		8.60					
Firm brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	1.70 2.0		6.90	B	1.00 2.00	PM27 PM28		
Stiff black slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	2.70		5.90					
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.60					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼_{3.50} Waterstrike depth
 - ▽_{1.50(20)} Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ_COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP13**

Client: Gannon Homes Ltd.

Co-ordinates: E:722685.259

Consultant: Waterman Moylan

N:741113.094

Site Address: Clongriffin, Dublin 13

Elevation: 8.61 m.O.D.

Date Completed: 21/06/2016

Logged by: P. McGonagle

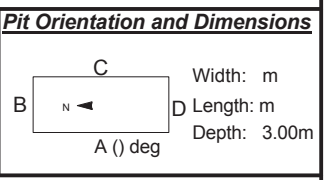
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content (engineered fill). Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		8.61	ENV	0.50	PM29		
Firm brown sandy gravelly clayey SILT. Gravel is angular to subangular, fine to coarse of limestone.	1.0 1.00		7.61	B	2.00	PM30		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.61					
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼^{3.00} Waterstrike depth
 - ▽^{1.50(20)} Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP14**

Client: Gannon Homes Ltd.

Co-ordinates: E:722726.631

Consultant: Waterman Moylan

N:741103.321

Site Address: Clongriffin, Dublin 13

Elevation: 8.87 m.O.D.

Date Completed: 23.06.2016

Logged by: M.Kaliski

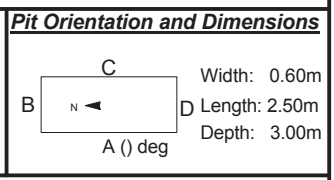
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
TOPSOIL	0.0 0.00	- T -	8.87					
Firm brown slightly sandy slightly gravelly silty CLAY. Gravel is subangular, fine to medium of limestone.	0.20		8.67	B	0.50	MK03		
Firm grey silty CLAY with low cobble content. Cobbles are subangular to subrounded of varied lithologies.	0.80		8.07	B	1.80	MK04		
Firm grey brown slightly sandy gravelly silty CLAY with medium cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular of varied lithologies.	1.90		6.97					
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.87					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼^{3.50} Waterstrike depth
 - ▽^{1.50(20)} Water level depth 20mins after strike



TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP15**

Client: Gannon Homes Ltd.

Co-ordinates: E:722724.923

Consultant: Waterman Moylan

N:741090.980

Site Address: Clongriffin, Dublin 13

Elevation: 8.88 m.O.D.

Date Completed: 23.06.2016

Logged by: M.Kaliski

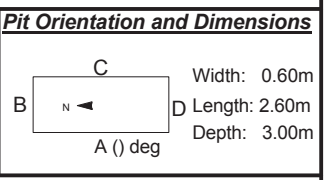
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
TOPSOIL	0.0 0.00	— T —	8.88					
Firm brown slightly sandy slightly gravelly silty CLAY. Gravel is subangular, fine of varied lithologies.	0.10	(Symbol: small circles and dashes)	8.78	B	0.50	MK05		
Firm dark grey silty CLAY.	0.90	(Symbol: horizontal dashes)	7.98	B	1.50	MK06		
Firm grey brown slightly sandy gravelly silty CLAY with medium cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular of varied lithologies.	2.20	(Symbol: circles with crosses)	6.68	B	2.50	MK07		
				B	2.90	MK08	▼ 2.80	23.06.2016
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.88					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit walls stable.
 Slow water ingress at 2.80m.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼ 3.00 Waterstrike depth
 - ▼ 1.50(20) Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP16**

Client: Gannon Homes Ltd.

Co-ordinates: E:722689.811

Consultant: Waterman Moylan

N:741076.362

Site Address: Clongriffin, Dublin 13


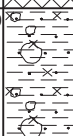

Elevation: 8.10 m.O.D.

Date Completed: 23.06.2016

Logged by: M.Kaliski

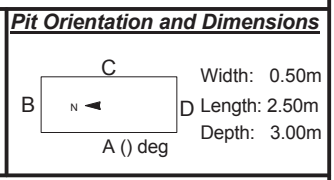
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown slightly sandy slightly gravelly silty clay with trace of red brick fragments. Gravel is subangular, fine to medium of varied lithologies.	0.0 0.00		8.10	B	0.50	MK01		
Firm grey slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular, medium of varied lithologies. Cobbles are subrounded of varied lithologies.	1.20		6.90	B	1.50	MK02		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	1.70		6.40					
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.10					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼^{3.50} Waterstrike depth
 - ▽^{1.50(20)} Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: **Beltree Park, Clongriffin**

Hole ID: **TP17**

Client: **Gannon Homes Ltd.**

Co-ordinates: **E:722646.023**

Consultant: **Waterman Moylan**

N:741077.376

Site Address: **Clongriffin, Dublin 13**


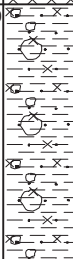
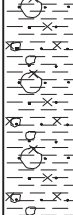

Elevation: **8.29 m.O.D.**

Date Completed: **21/06/2016**

Logged by: **P. McGonagle**

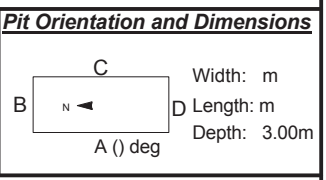
Excavator: **JCB 3CX**

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content (engineered fill). Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		8.29					
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	0.90 1.0		7.39	B	1.00	PM31		
	2.0			B	2.00	PM32		
Stiff black slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone.	2.70		5.59	B	2.70	PM33		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.29					
	4.0							
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼^{1.50} Waterstrike depth
 - ▽^{1.50(20)} Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP18**

Client: Gannon Homes Ltd.

Co-ordinates: E:722707.304

Consultant: Waterman Moylan

N:741039.133

Site Address: Clongriffin, Dublin 13

Elevation: 8.62 m.O.D.

Date Completed: 23.06.2016

Logged by: M.Kaliski

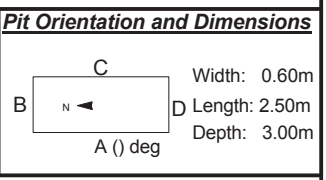
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
TOPSOIL	0.0 0.00	— T —	8.62					
MADE GROUND: light brown sandy clay with some plastic bags, rags and plastic pipe fragments.	0.10	[Cross-hatch pattern]	8.52	B	0.50	MK09		
Firm grey slightly sandy slightly gravelly silty CLAY. Gravel is subangular, fine to medium of varied lithologies.	1.20	[Gravel symbol]	7.42	B	1.50	MK10		
Firm grey slightly sandy gravelly CLAY with high cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	2.10	[Cobble symbol]	6.52	B	2.50	MK11		
Stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	2.70	[Cobble symbol]	5.92					
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.62					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼^{3.50} Waterstrike depth
 - ▽^{1.50(20)} Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP19**

Client: Gannon Homes Ltd.

Co-ordinates: E:722706.864

Consultant: Waterman Moylan

N:741029.077

Site Address: Clongriffin, Dublin 13





Elevation: 8.84 m.O.D.

Date Completed: 23.06.2016

Logged by: M.Kaliski

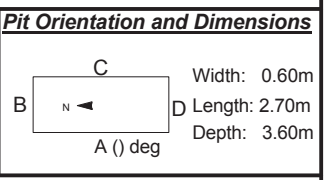
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown and grey mottled slightly sandy slightly gravelly clay with medium cobble content and trace of red brick and china fragments. Gravel is subangular, fine to medium of limestone. Cobbles are subangular to subrounded of varied lithologies.	0.0 0.00		8.84	B	0.50	MK25		
Firm grey slightly sandy gravelly CLAY with low cobble content. Gravel is angular to subangular, fine to coarse of limestone. Cobbles are angular to subangular of limestone.	0.90 1.0		7.94	B	1.00	MK26		
Firm grey brown mottled slightly sandy gravelly silty CLAY with medium cobble content. Gravel is subangular, fine to medium of limestone. Cobbles are subangular of limestone.	1.40 2.0 3.0		7.44	B	2.00	MK27		
Stiff black slightly sandy slightly gravelly silty CLAY with medium cobble content. Gravel is subangular, fine to medium of limestone. Cobbles are subangular of limestone.	3.50 3.60		5.34	B	3.50	MK28		
Pit terminated at below scheduled depth.	3.60 4.0 5.0	Hole End	5.24					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼ 3.00 Waterstrike depth
 - ▽ 1.50(20) Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP20**

Client: Gannon Homes Ltd.

Co-ordinates: E:722754.795

Consultant: Waterman Moylan

N:741120.897

Site Address: Clongriffin, Dublin 13




Elevation: 7.96 m.O.D.

Date Completed: 23.06.2016

Logged by: M.Kaliski

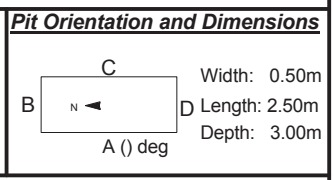
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown slightly sandy slightly gravelly silty clay with medium cobble content and trace of timber, rags and plastic fragments. Gravel is subangular, fine to medium of varied lithologies. Cobbles are subangular to subrounded of varied lithologies.	0.0 0.00		7.96	B	0.50	MK36		
Firm brown grey mottled slightly sandy slightly gravelly silty CLAY with medium cobble content and thin grey medium to coarse sand laminas. Gravel is subangular, fine to medium of limestone. Cobbles are angular to subangular of limestone.	0.70 1.0 2.0		7.26	B	1.50	MK37	▼ 2.00	23.06.2016
Firm grey brown firm slightly sandy gravelly silty CLAY with medium cobble content. Gravel is subangular, fine to medium of limestone. Cobbles are subangular to subrounded of limestone.	2.10		5.86					
Pit terminated at scheduled depth.	3.0 3.00 4.0 5.0	Hole End	4.96	B	3.00	MK38		

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit walls stable.
 Slow water ingress at 2.00m.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼ 3.00 Waterstrike depth
 - ▼ 1.50(20) Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP21**

Client: Gannon Homes Ltd.

Co-ordinates: E:722790.556

Consultant: Waterman Moylan

N:741107.609

Site Address: Clongriffin, Dublin 13

Elevation: 7.27 m.O.D.

Date Completed: 23.06.2016

Logged by: M.Kaliski

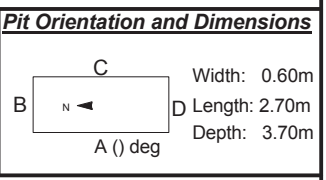
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: black grey and brown mottled slightly sandy gravelly silty clay with high cobble content and trace of plastic bags, steel rods and red bricks fragments. Cobbles are subangular of varied lithologies.	0.00		7.27	B	0.50	MK32		
Firm black slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular, fine to medium of limestone. Cobbles are subangular of limestone.	0.75		6.52	B	1.00	MK33		
Firm light brown slightly sandy slightly gravelly silty CLAY. Gravel is subangular, fine to medium of varied lithologies.	1.60		5.67	B	1.80	MK34	▼ 1.90	
Stiff grey brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Gravel is subangular to subrounded, fine to medium of limestone. Cobbles are subangular of limestone.	1.90		5.37	B	3.00	MK35		23.06.2016
Pit terminated at below scheduled depth.	3.70	Hole End	3.57					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit walls unstable below 1.90m.
 Slow water ingress at 1.90m.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼^{3.50} Waterstrike depth
 - ▼^{1.90(20)} Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP22**

Client: Gannon Homes Ltd.

Co-ordinates: E:722750.583

Consultant: Waterman Moylan

N:741077.663

Site Address: Clongriffin, Dublin 13

Elevation: 8.63 m.O.D.

Date Completed: 23.06.2016

Logged by: M.Kaliski

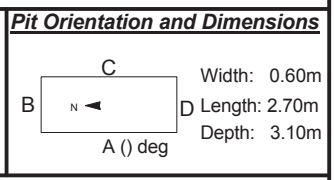
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
TOPSOIL	0.0	— T —	8.63					
MADE GROUND: brown slightly sandy slightly gravelly silty clay with low cobble content and trace of red brick fragments. Gravel is subangular, fine to medium of varied lithologies. Cobbles are subangular to subrounded of varied lithologies.	0.20	— T —	8.43	B	0.50	MK29		
Firm dark grey silty CLAY.	1.20	X X X X	7.43	B	1.50	MK30		
Stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble content. Gravel is subangular, fine to medium of limestone. Cobbles are subangular to subrounded of limestone.	2.60	X X X X	6.03	B	3.00	MK31		
Pit terminated at below scheduled depth.	3.10	Hole End	5.53					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼^{3.50} Waterstrike depth
 - ▽^{1.50(20)} Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID:

TP23

Client: Gannon Homes Ltd.

Co-ordinates: E:722784.670

Consultant: Waterman Moylan

N:741083.475

Site Address: Clongriffin, Dublin 13

Elevation: 7.59 m.O.D.

Date Completed: 23.06.2016

Logged by: M.Kaliski

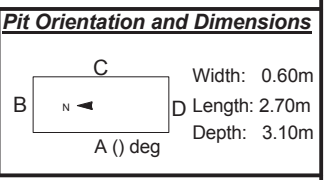
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
TOPSOIL	0.00	— T —	7.59					
MADE GROUND: brown sandy slightly gravelly silty clay with medium cobble content and trace of steel wires, red brick and plastic fragments. Cobbles are subangular to subrounded of varied lithologies.	0.10		7.49	B	0.50	MK39		
Firm dark grey slightly sandy slightly gravelly silty CLAY with medium cobble content. Gravel is subangular, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	1.10		6.49	B	1.50	MK40		
Stiff grey slightly sandy slightly gravelly silty CLAY with medium cobble content. Gravel is subangular, medium to coarse of limestone. Cobbles are subangular to subrounded of limestone.	2.50		5.09	B	3.00	MK41	▼ 2.90	23.06.2016
Pit terminated at below scheduled depth.	3.10	Hole End	4.49					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit walls stable.
 Slow water ingress at 2.90m.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼ 3.00 Waterstrike depth
 - ▼ 1.50(20) Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: **Beltree Park, Clongriffin**

Hole ID: **TP24**

Client: **Gannon Homes Ltd.**

Co-ordinates: **E:722740.984**

Consultant: **Waterman Moylan**

N:741050.121

Site Address: **Clongriffin, Dublin 13**

Elevation: **8.84 m.O.D.**

Date Completed: **23.06.2016**

Logged by: **M.Kaliski**

Excavator: **JCB 3CX**

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown very sandy slightly gravelly silty clay with trace of vegetation and red brick fragments.	0.0	0.00	8.84	B	0.50	MK18		
Firm dark grey silty CLAY with traces of vegetation.	1.40	7.44	7.44	B	1.50	MK19		
Firm becoming stiff light grey slightly sandy gravelly silty CLAY. Gravel is subangular, fine to medium of limestone.	2.80	6.04	6.04	B	3.00	MK20	▼ 3.00	23.06.2016
Pit terminated at below scheduled depth.	3.10	Hole End	5.74					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

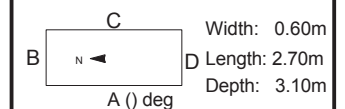
Remarks:
 Pit walls stable.

Slow water ingress at 3.00m.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▼ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP25**

Client: Gannon Homes Ltd.

Co-ordinates: E:722774.270

Consultant: Waterman Moylan

N:741044.946

Site Address: Clongriffin, Dublin 13

Elevation: 7.82 m.O.D.

Date Completed: 23.06.2016

Logged by: M.Kaliski

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown very sandy silty clay with trace of red brick fragments.	0.0	[Cross-hatch pattern]	7.82					
TOPSOIL	0.30	[Horizontal dashes]	7.52					
Soft light brown sandy silty CLAY.	0.40	[Vertical dashes]	7.42					
	1.0	[Vertical dashes]		B	1.00	MK42		
Firm grey slightly sandy slightly gravelly silty CLAY with traces of vegetation. Gravel is subangular, fine to medium of limestone.	1.40	[Vertical dashes]	6.42					
	2.0	[Vertical dashes]						
Firm light grey silty CLAY.	2.40	[Vertical dashes]	5.42	B	2.50	MK43		
Firm grey brown slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular, fine to medium of limestone. Cobbles are subangular of limestone.	2.90	[Vertical dashes]	4.92					
Pit terminated at below scheduled depth.	3.0	[Vertical dashes]		B	3.00	MK44	▼ 3.00	23.06.2016
	3.10	[Vertical dashes]	4.72					
	4.0	[Vertical dashes]						
	5.0	[Vertical dashes]						

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

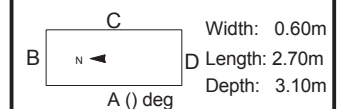
Remarks:

Pit walls stable.
Slow water ingress at 3.00m.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼^{3.00} Waterstrike depth
- ▽^{1.50(20)} Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: **Beltree Park, Clongriffin**

Hole ID: **TP26**

Client: **Gannon Homes Ltd.**

Co-ordinates: **E:722725.699**

Consultant: **Waterman Moylan**

N:741037.096

Site Address: **Clongriffin, Dublin 13**

Elevation: **8.71 m.O.D.**

Date Completed: **23.06.2016**

Logged by: **M.Kaliski**

Excavator: **JCB 3CX**

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
TOPSOIL	0.0	0.00	8.71					
MADE GROUND: brown very sandy silty clay with trace of glass fragments.	0.10	8.61		B	0.50	MK12		
Soft becoming firm grey slightly sandy slightly gravelly CLAY with traces of vegetation. Gravel is subangular, fine of varied lithologies.	0.80	7.91		B	1.50	MK13		
Firm grey brown slightly sandy gravelly silty CLAY with high cobble content. Gravel is subangular, medium to coarse of limestone. Cobbles are subangular of limestone.	2.20	6.51		B	2.80	MK14	▼ 2.90	23.06.2016
Pit terminated at scheduled depth.	3.0	3.00	5.71					
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

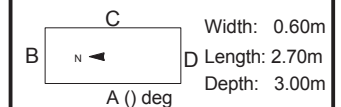
Remarks:

Pit walls stable.
Slow water ingress at 2.90m.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▼ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



Site Investigations Ltd

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP27**

Client: Gannon Homes Ltd.

Co-ordinates: E:722768.462

Consultant: Waterman Moylan

N:741018.722

Site Address: Clongriffin, Dublin 13

Elevation: 7.17 m.O.D.

Date Completed: 23.06.2016

Logged by: M.Kaliski

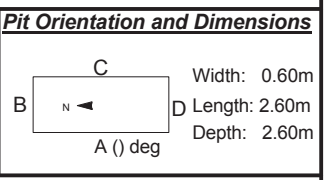
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
TOPSOIL	0.00	— T —	7.17					
Soft grey slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular, fine to medium of varied lithologies. Cobbles are subrounded of varied lithologies.	0.20		6.97	B	0.50	MK21		
Soft becoming firm grey slightly sandy gravelly silty CLAY with medium cobble content. Gravel is subangular, fine to medium of limestone. Cobbles are subangular to subrounded of limestone.	0.60		6.57	B	1.00	MK22		
Firm light brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Gravel is subangular, fine to medium of limestone. Cobbles are subangular of limestone.	1.30		5.87	B	1.50	MK23	▼ 1.60	23.06.2016
Stiff black slightly sandy gravelly silty CLAY with medium cobble content. Gravel is subangular, fine to medium of limestone. Cobbles are subangular of limestone.	2.40	 Hole End	4.77	B	2.50	MK24		
Pit terminated at scheduled depth.	3.00		4.17					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit walls stable.
 Slow water ingress at 1.60m.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼ 1.50 Waterstrike depth
 - ▼ 1.50(20) Water level depth 20mins after strike



TRIAL PIT 5294.TP.GINT.GPJ.COREHOLE.GDT 15/07/16

TRIAL PIT RECORD

Contract: Beltree Park, Clongriffin

Hole ID: **TP28**

Client: Gannon Homes Ltd.

Co-ordinates: E:722725.645

Consultant: Waterman Moylan

N:741015.594

Site Address: Clongriffin, Dublin 13

Elevation: 8.80 m.O.D.

Date Completed: 23.06.2016

Logged by: M.Kaliski

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
MADE GROUND: brown slightly sandy gravelly silty clay with medium cobble content with trace of small tarmacadam fragments. Gravel is subangular to subrounded, fine to medium of varied lithologies. Cobbles are subangular to subrounded of varied lithologies.	0.0 0.00		8.80	B	0.50	MK15		
MADE GROUND: dark grey silty clay with low cobble content and trace of red brick fragments. Cobbles are subangular to subrounded of varied lithologies.	0.80 1.0		8.00	B	1.50	MK16		
Firm grey brown slightly sandy gravelly silty CLAY with medium cobble content. Gravel is subangular, fine to medium of limestone. Cobbles are subangular to subrounded of limestone.	1.80 2.0		7.00	B	2.50	MK17		
Pit terminated at scheduled depth.	3.0 3.00 4.0 5.0		5.80					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

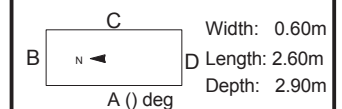
Remarks:
Pit walls stable.

No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼_{3.50} Waterstrike depth
- ▽_{1.50(20)} Water level depth 20mins after strike

Pit Orientation and Dimensions



TP01 Pit



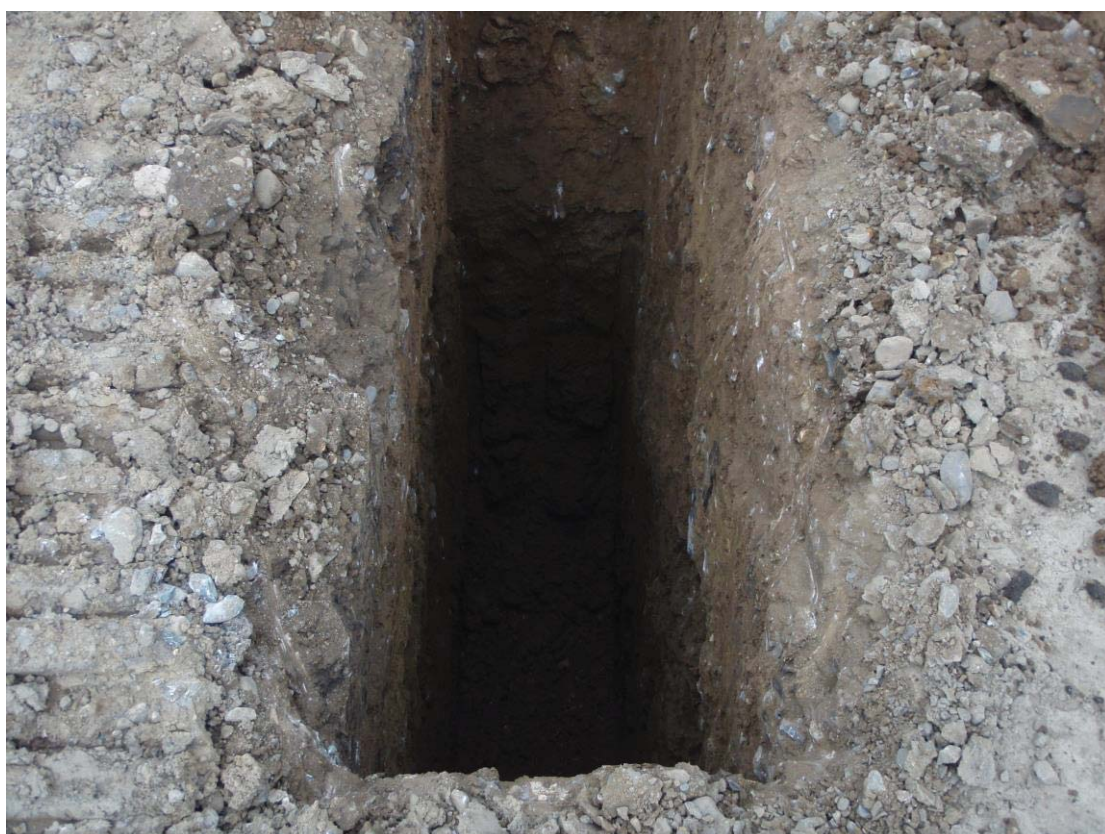
TP01 Sidewall



TP01 Spoil



TP02 Pit



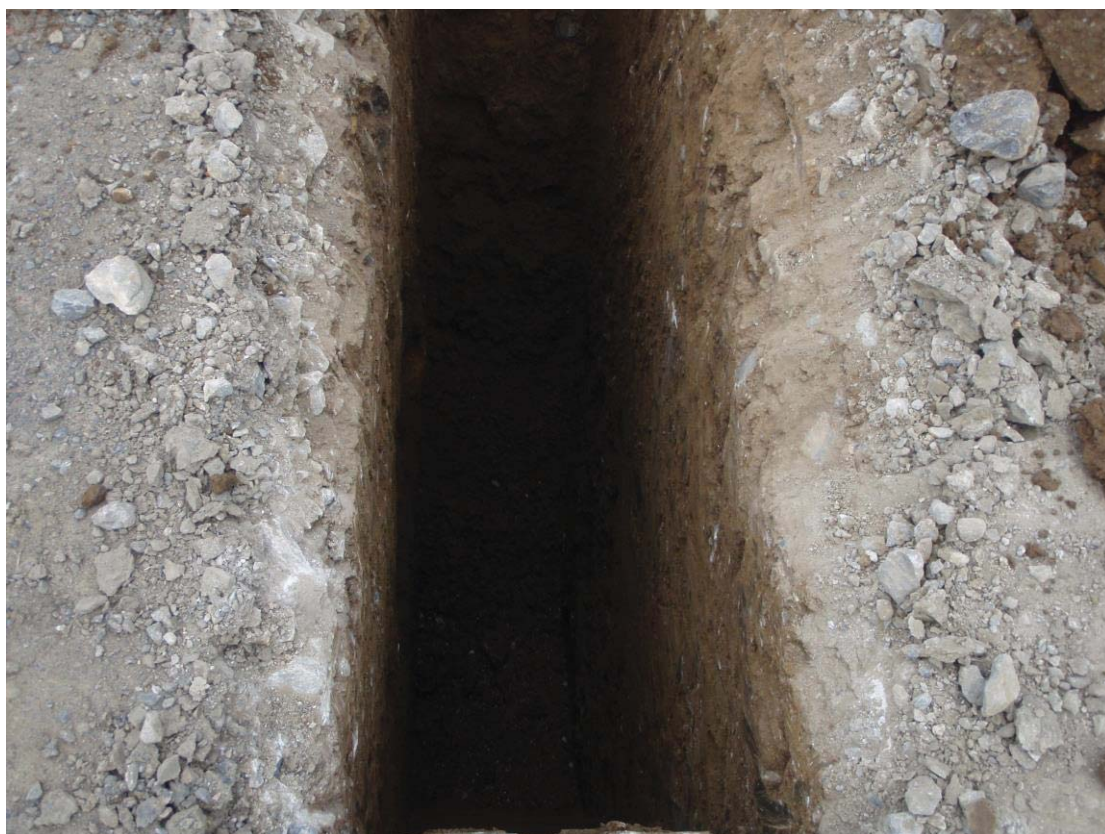
TP02 Sidewall



TP02 Spoil



TP03 Pit



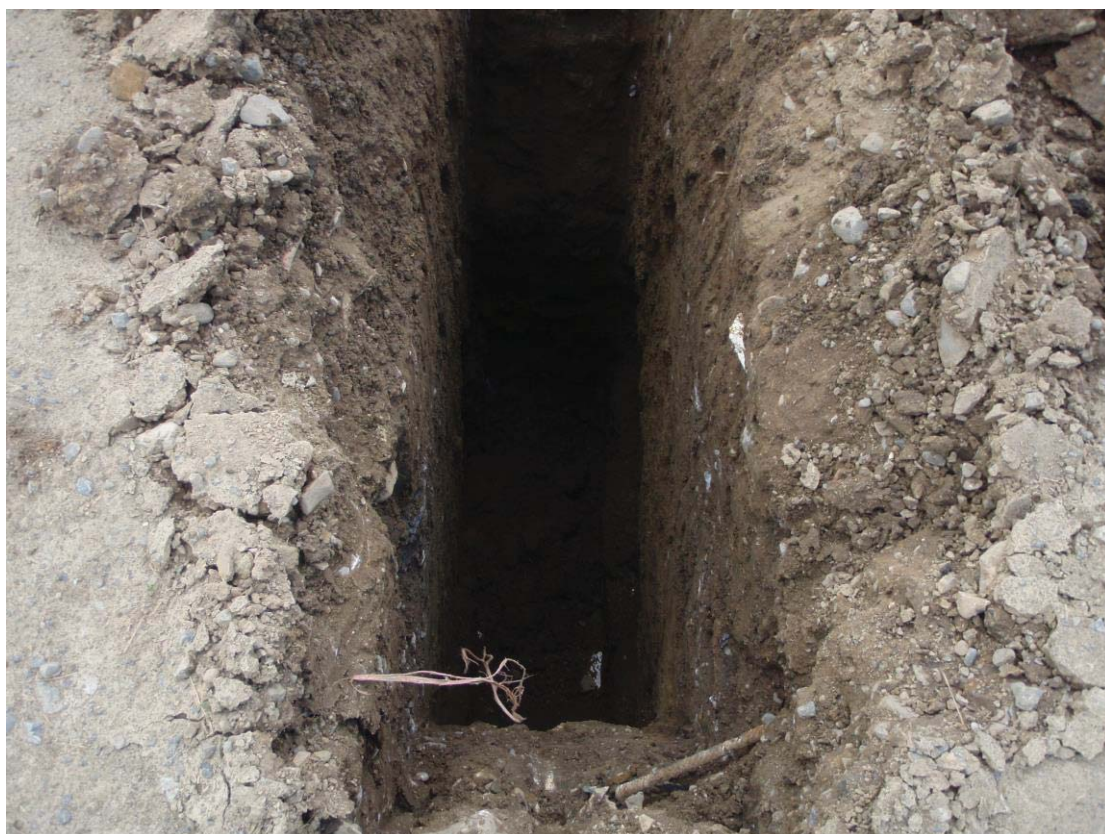
TP03 Sidewall



TP03 Spoil



TP04 Pit



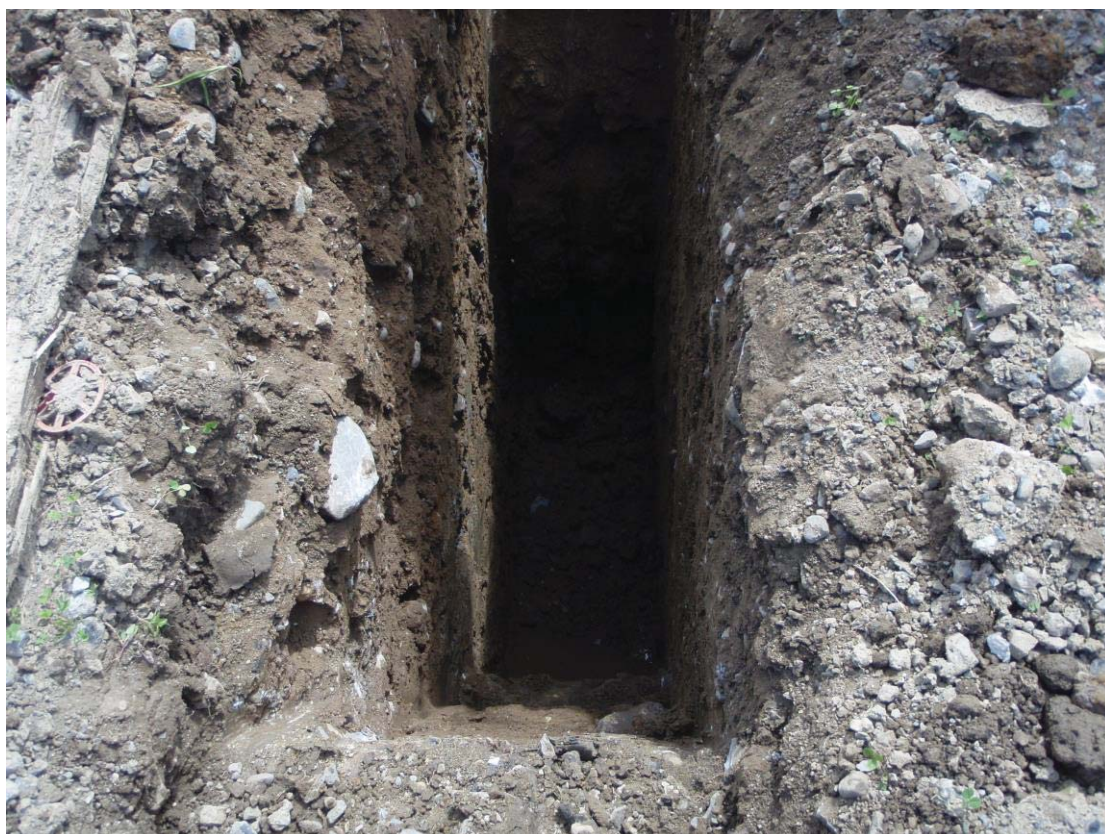
TP04 Sidewall



TP04 Spoil



TP05 Pit



TP05 Sidewall



TP05 Spoil



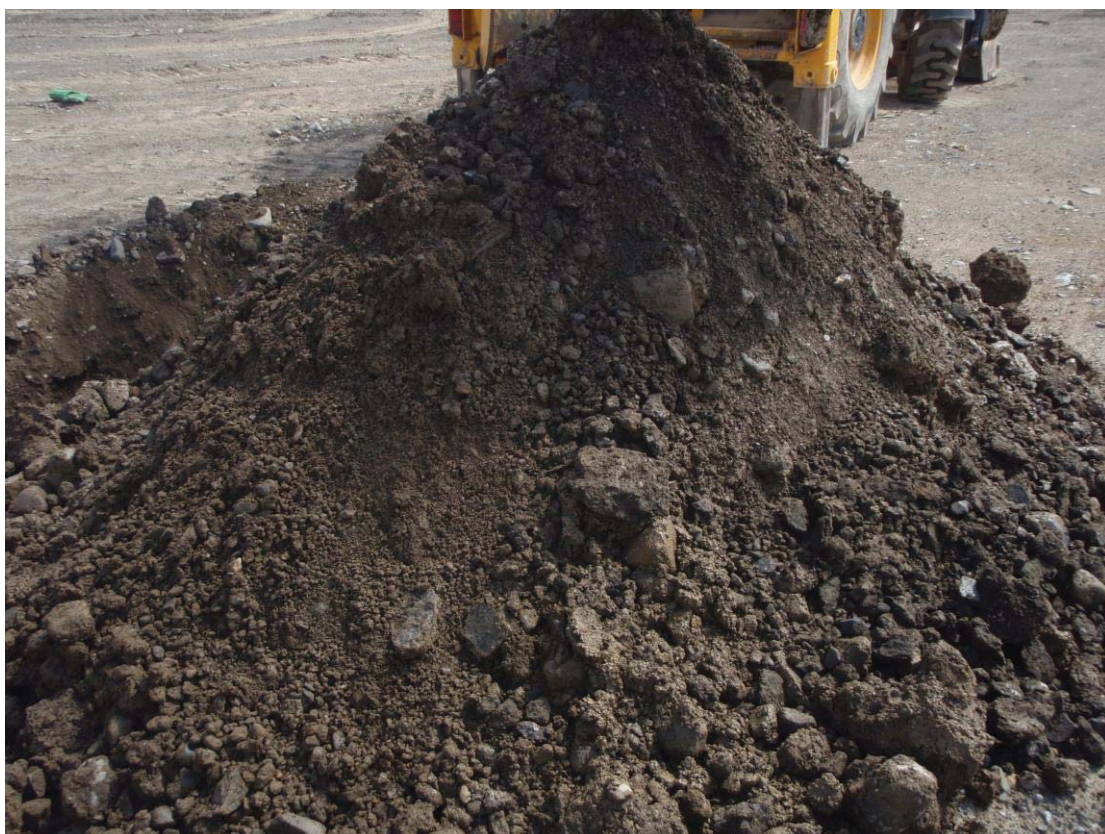
TP06 Pit



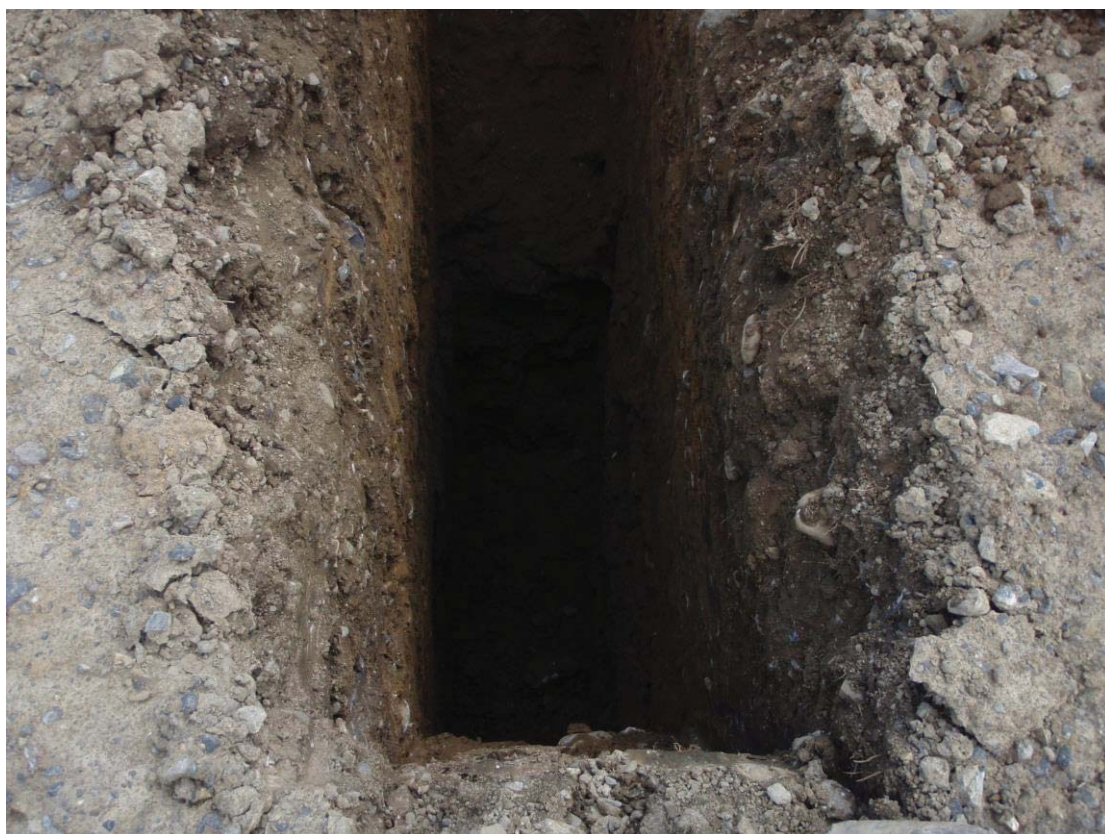
TP06 Sidewall



TP06 Spoil



TP07 Pit



TP07 Sidewall



TP07 Spoil



TP08 Pit



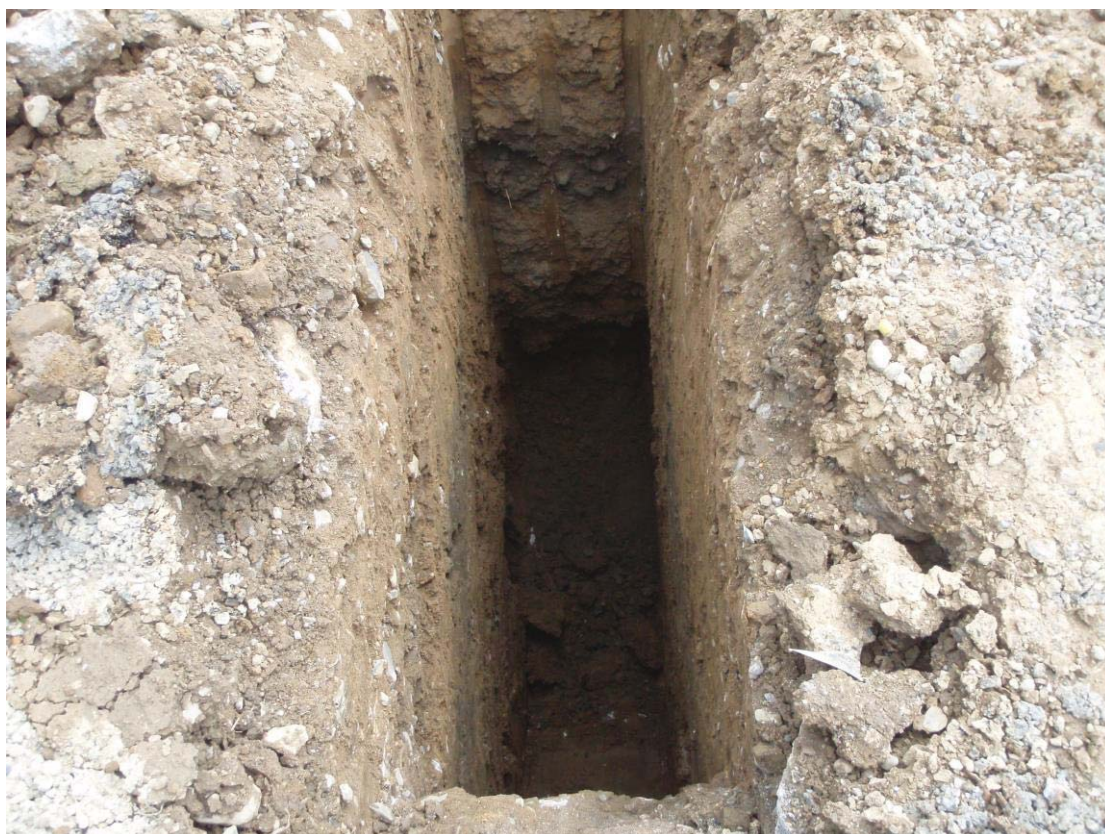
TP08 Sidewall



TP08 Spoil



TP09 Pit



TP09 Sidewall



TP09 Spoil



TP10 Pit



TP10 Sidewall



TP10 Spoil



TP11 Pit



TP11 Sidewall



TP11 Spoil



TP12 Pit



TP12 Sidewall



TP12 Spoil



TP13 Pit



TP13 Sidewall



TP13 Spoil



TP14 Pit



TP14 Sidewall



TP14 Spoil



TP15 Pit



TP15 Sidewall



TP15 Spoil



TP16 Pit



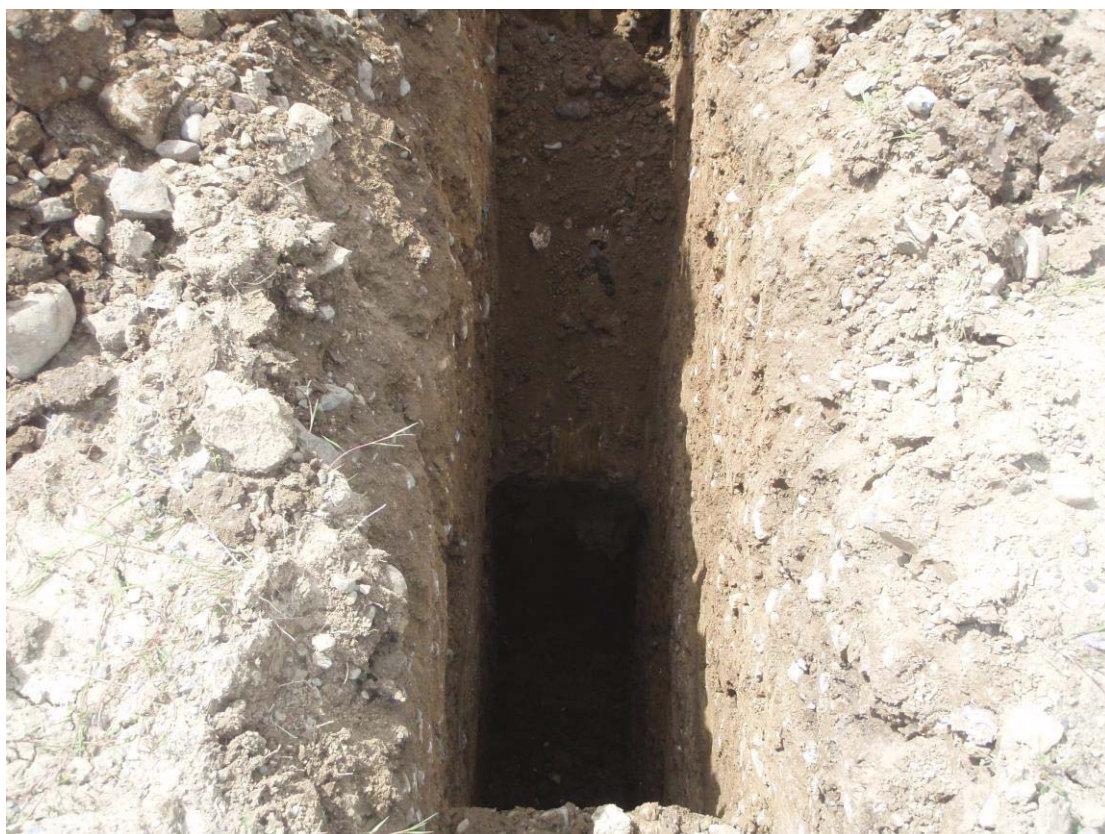
TP16 Sidewall



TP16 Spoil



TP17 Pit



TP17 Sidewall



TP17 Spoil



TP18 Pit



TP18 Sidewall



TP18 Spoil



TP19 Pit



TP19 Sidewall



TP19 Spoil



TP20 Pit



TP20 Sidewall



TP20 Spoil



TP21 Pit



TP21 Sidewall



TP21 Spoil



TP22 Pit



TP22 Sidewall



TP22 Spoil



TP23 Pit



TP23 Sidewall



TP23 Spoil



TP24 Pit



TP24 Sidewall



TP24 Spoil



TP25 Pit



TP25 Sidewall



TP25 Spoil



TP26 Pit



TP26 Sidewall



TP26 Spoil



TP27 Pit



TP27 Sidewall



TP27 Spoil



TP28 Pit



TP28 Sidewall



TP28 Spoil



Appendix 3
Dynamic Probe Logs

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP01
SHEET No : 1 OF 1	DATE : 22/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	3 17 18 15 9	
1.0	7 7 8 14 23 15	
1.5	19 17 20 15	
2.0	12 8 8 7 8	
2.5	3 3 3 6 6	
3.0	6 9 12 17 23 29	
3.5	29 29 35	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 3.30m
2.0		
3.0		
4.0		
5.0		

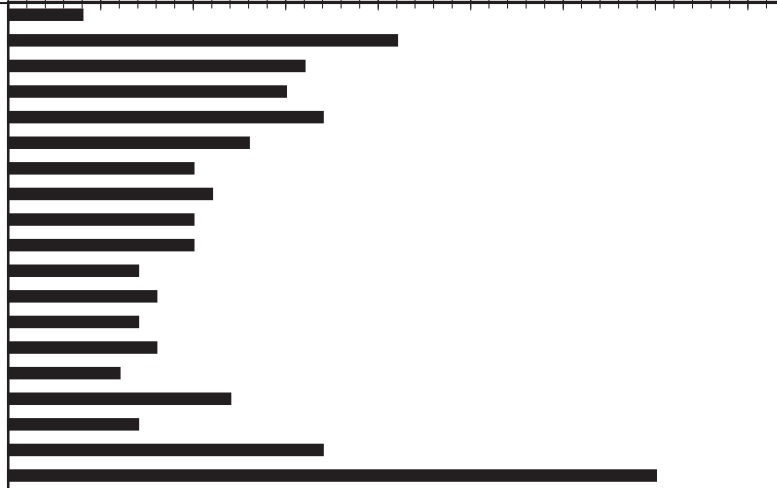



PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP02
SHEET No : 1 OF 1	DATE : 22/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	4 30 33 16 13	
1.0	13 13 19 14 15	
1.5	16 27 31 35	
2.0	- - - -	
2.5	- - - -	
3.0	- - - -	
3.5	- - - -	
4.0	- - - -	
4.5	- - - -	
5.0	- - - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 1.40m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP03
SHEET No : 1 OF 1	DATE : 22/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	4 21 16 15 17 13	
1.0	10 11 10 10 7	
1.5	8 7 8 6 12	
2.0	7 17 35 -	
2.5	- - - -	
3.0	- - - -	
3.5	- - - -	
4.0	- - - -	
4.5	- - - -	
5.0	- - - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 1.90m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP04
SHEET No : 1 OF 1	DATE : 22/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 11 12 7 5	
1.0	5 12 7 5 10	
1.5	11 12 11 17 17	
2.0	12 10 9 10 9	
2.5	6 8 9 9 9	
3.0	8 4 4 4 4	
3.5	4 5 5 13 15	
4.0	12 16 14 22 27 35	
4.5	- - - -	
5.0	- - - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 4.10m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP05
SHEET No : 1 OF 1	DATE : 22/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	4 8 11 16 12	
1.0	7 5 7 7	
1.5	8 14 35 -	
2.0	- - - -	
2.5	- - - -	
3.0	- - - -	
3.5	- - - -	
4.0	- - - -	
4.5	- - - -	
5.0	- - - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 1.40m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP06
SHEET No : 1 OF 1	DATE : 22/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	3 4 5 4 11 14 11	
1.0	8 6 5 16 17	
1.5	18 16 12 5 5	
2.0	19 13 10 9 6	
2.5	5 8 8 14 19	
3.0	27 35 -	
3.5	- - -	
4.0	- - -	
4.5	- - -	
5.0	- -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.90m
2.0		
3.0		
4.0		
5.0		


PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP07
SHEET No : 1 OF 1	DATE : 22/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	3 4 6 8 6	
1.0	4 8 17 13 12	
1.5	9 13 17 14 21	
2.0	7 5 4 7 7 35	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.10m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP08
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	1 3 6 8 35	
1.0	-	
1.5	-	
2.0	-	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 0.50m Reattempt made 2m away - DP08A
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP08A
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	0 4 9 11 14 26 35	
1.0	-	
1.5	-	
2.0	-	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 0.70m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP09
SHEET No : 1 OF 1	DATE : 22/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	3 4 24 27 21 12	
1.0	13 10 10 5 4	
1.5	5 8 6 6 5	
2.0	4 4 4 12 7	
2.5	13 19 23 27 35	
3.0	- - -	
3.5	- -	
4.0	- -	
4.5	- -	
5.0	- -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.60m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP10
SHEET No : 1 OF 1	DATE : 22/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	3 10 28 23 12	
1.0	10 15 10 4 4	
1.5	3 4 5 5 4	
2.0	2 3 7 10	
2.5	7 6 8 7 6	
3.0	13 14 15 14 15	
3.5	6 4 5 3 6	
4.0	6 8 8 9 11	
4.5	17 23 27 35	
5.0	- - - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 4.40m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP11
SHEET No : 1 OF 1	DATE : 22/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	3 11 17 26 23	
1.0	11 10 7 7 7	
1.5	12 5 5 27 35	
2.0	- - - -	
2.5	- - - -	
3.0	- - - -	
3.5	- - - -	
4.0	- - - -	
4.5	- - - -	
5.0	- - - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 1.50m
2.0		
3.0		
4.0		
5.0		

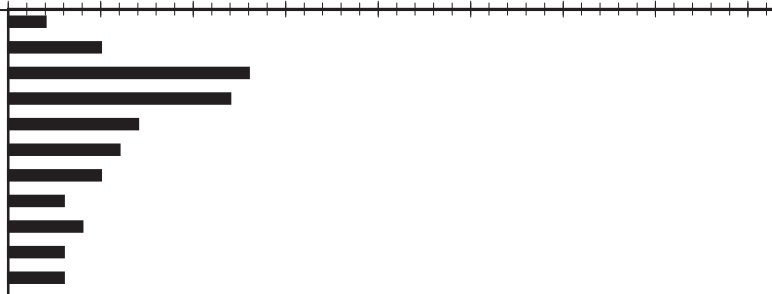


PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP12
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 3 3 7 11 9	
1.0	5 7 14 18 21	
1.5	13 9 9 6 6	
2.0	7 13 17 21 18	
2.5	27 35 -	
3.0	- - -	
3.5	- -	
4.0	- -	
4.5	- -	
5.0	- -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.30m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP13
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 5 13 12 7 6 5 3 4 3	
1.0	4 14 19 25 18 15 11 8 6 5 3 4 3 4 5 5 6 8 9	
1.5	9 14 35	
2.0	-	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 3.30m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP14
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
2 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0	2 6 7 7 8 13 17 7 6 5 1 2 0 0 1 1 3 3 2 3 3 2 1 0 1 1 1 4 5 7 5 5 11 14 7 8 7 7 7 5 17 23 29 35 - -	

DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 4.60m
2.0		
3.0		
4.0		
5.0	0	

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP15
SHEET No : 1 OF 2	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	1 7 6 3 3	
1.0	2 1 1 0 0	
1.5	1 1 0 0 1	
2.0	0 0 0 1 0	
2.5	4 4 6 3	
3.0	2 4 5 4 5	
3.5	7 9 23 16 15	
4.0	8 5 6 8 7	
4.5	8 10 7 6 4	
5.0	6 8 8 22 15	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 6.00m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP15
SHEET No : 2 OF 2	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
5.5	15 15 21 20 16	
6.0	16 21 23 27 35	
6.5	- - - -	
7.0	- - - -	
7.5	- - - -	
8.0	- - - -	
8.5	- - - -	
9.0	- - - -	
9.5	- - - -	
10.0	- - - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
6.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 6.00m
7.0		
8.0		
9.0		
10.0		




PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP16
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 4 8 13 29 35	
1.0	-	
1.5	-	
2.0	-	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 0.60m Reattempt made 2m away - DP16A
2.0		
3.0		
4.0		
5.0		

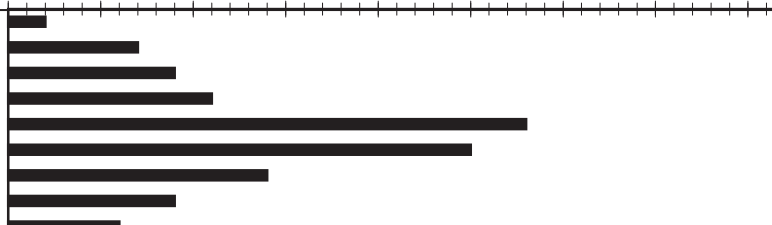


PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP16A
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	3 8 13 17 11	
1.0	9 6 6 9 11	
1.5	7 14 35 -	
2.0	- - - -	
2.5	- - - -	
3.0	- - - -	
3.5	- - - -	
4.0	- - - -	
4.5	- - - -	
5.0	- - - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 1.30m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP17
SHEET No : 1 OF 1	DATE : 22/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 7 9 11 28 25 14	
1.0	9 6 3 3 2	
1.5	17 35 -	
2.0	- - -	
2.5	- - -	
3.0	- - -	
3.5	- - -	
4.0	- - -	
4.5	- - -	
5.0	- - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 1.40m
2.0		
3.0		
4.0		
5.0		











PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP18
SHEET No : 1 OF 2	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 3 3 4 3 6	
1.0	8 11 9 13 7 6	
1.5	3 3 0 1 0	
2.0	1 0 1 2	
2.5	4 4 5 4 3	
3.0	5 7 9 5 6	
3.5	11 21 17 14 5	
4.0	4 11 9 8 13	
4.5	17 21 14 14 22	
5.0	17 13 10	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Terminated at 6.00m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP18
SHEET No : 2 OF 2	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
	11	
	21	
	19	
	16	
5.5	17	
	23	
	18	
	19	
6.0	19	
	17	
6.5	-	
7.0	-	
7.5	-	
8.0	-	
8.5	-	
9.0	-	
9.5	-	
10.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
6.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90°
7.0		
8.0		
9.0		Terminated at 6.00m
10.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP19
SHEET No : 1 OF 2	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 2 7 11 17 23	
1.0	11 5 5 5	
1.5	7 9 4 8 5	
2.0	3 3 3 3 1	
2.5	0 1 1 0 0	
3.0	2 4 2 2 2	
3.5	3 8 11 7 7	
4.0	9 14 8 15 20 22	
4.5	19 11 13 10	
5.0	7 7 9 14 21	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 6.00m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP19
SHEET No : 2 OF 2	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)																				
		0 5 10 15 20 25 30 35 40																				
	15	<table border="1" style="display: none;"> <caption>N100 Values from Diagram</caption> <thead> <tr><th>Depth (m)</th><th>Reading (Blows/100mm)</th></tr> </thead> <tbody> <tr><td>5.5</td><td>12</td></tr> <tr><td>5.5</td><td>12</td></tr> <tr><td>5.5</td><td>18</td></tr> <tr><td>5.5</td><td>22</td></tr> <tr><td>5.5</td><td>19</td></tr> <tr><td>5.5</td><td>23</td></tr> <tr><td>5.5</td><td>14</td></tr> <tr><td>5.5</td><td>21</td></tr> <tr><td>6.0</td><td>35</td></tr> </tbody> </table>	Depth (m)	Reading (Blows/100mm)	5.5	12	5.5	12	5.5	18	5.5	22	5.5	19	5.5	23	5.5	14	5.5	21	6.0	35
Depth (m)	Reading (Blows/100mm)																					
5.5	12																					
5.5	12																					
5.5	18																					
5.5	22																					
5.5	19																					
5.5	23																					
5.5	14																					
5.5	21																					
6.0	35																					
5.5	12																					
	12																					
	18																					
5.5	22																					
	19																					
	23																					
	14																					
6.0	21																					
6.0	35																					
6.5	-																					
7.0	-																					
7.5	-																					
8.0	-																					
8.5	-																					
9.0	-																					
9.5	-																					
10.0	-																					
DEPTH (m)	TORQUE (Nm)	COMMENTS:																				
6.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90°																				
7.0																						
8.0																						
9.0		Refusal at 5.20m																				
10.0																						

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP20
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	1 3 4 5 3	
1.0	3 4 8 9 11 7	
1.5	7 7 9 5 5	
2.0	6 7 3 3 4	
2.5	3 4 4 7 11	
3.0	9 13 17 23 27 35	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 3.10m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP21
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 2 11 7 6 4 5 6 16 5 4 8 5 3 4 3 5 27 21 17 9 5 5 6 4 4 4 5 7 12 17 22 35	
1.0		
1.5		
2.0		
2.5		
3.0		
3.5		
4.0		
4.5		
5.0		
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 3.40m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP22
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	1 2 4 9 7 6	
1.0	5 7 11 9 13	
1.5	8 7 4 5 4	
2.0	4 4 5 7 11 17	
2.5	19 11 10 5 5	
3.0	4 7 5 4 5 5	
3.5	7 11 8 13	
4.0	21 29 35 -	
4.5	- - -	
5.0	- - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 3.90m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP23
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 3 4 5	
1.0	8 6 8 10 6	
1.5	7 6 7 5	
2.0	6 6 7 8	
2.5	9 9 7 6 8	
3.0	10 11 12	
3.5	12 17 28 35	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 3.40m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP24
SHEET No : 1 OF 2	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	1 2 2 3 4 4	
1.0	7 11 5 6 4 4	
1.5	5 4 3 2 2 1	
2.0	0 0 1 0 1 2 1	
2.5	0 1 0 1 0 4 6 11 13	
3.0	9 8 12 17 23 9 5 5 6 11 19	
3.5	8 12 17 23 9 5 5 6 11 19	
4.0	9 5 5 6 11 19	
4.5	10 13 14 17 21	
5.0		
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Terminated at 6.00m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP24
SHEET No : 2 OF 2	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
5.5	19 17 17 14 22	
6.0	26 21 19 23 27	
6.5	- - - -	
7.0	- - - -	
7.5	- - - -	
8.0	- - - -	
8.5	- - - -	
9.0	- - - -	
9.5	- - - -	
10.0	- - - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
6.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Terminated at 6.00m
7.0		
8.0		
9.0		
10.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP25
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)	
		0 5 10 15 20 25 30 35 40	
0.5	0 1 2 2 4		
1.0	3 2 3 2 1		
1.5	1 1 2 3 1		
2.0	1 1 2 2 2		
2.5	2 1 1 6 7		
3.0	7 5 5 3 4		
3.5	3 4 4 5 4		
4.0	6 8 11 9 11		
4.5	15 13 27 35 -		
5.0	-		
DEPTH (m)	TORQUE (Nm)		COMMENTS:
1.0			TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 4.90m
2.0			
3.0			
4.0			
5.0			

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP26
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 3 3 3 3	
1.0	3 2 2 2 1	
1.5	4 2 2 3 4	
2.0	3 3 2 2 4	
2.5	3 3 3 4 2	
3.0	3 7 10 10 14	
3.5	19 11 10 10 13	
4.0	16 13 13 15 8	
4.5	9 7 6 6 5	
5.0	8 1 13 21 35	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 5.00m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP27
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	1 2 2 3	
1.0	2 2 4 5 7	
1.5	8 11 5 5 6	
2.0	4 2 1 0 1	
2.5	1 0 0 1 2	
3.0	3 3 2 5 4	
3.5	7 11 19 27 35	
4.0	-	
4.5	-	
5.0	-	

DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 3.50m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Park	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP28
SHEET No : 1 OF 1	DATE : 23/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 6 11 13 9 5	
1.0	5 5 7 5 3	
1.5	3 8 11 10 8 7	
2.0	6 7 5 7 8	
2.5	8 8 7 6 6 6	
3.0	7 13 13 10 11	
3.5	12 12 15 14 13 11	
4.0	10 15 -	
4.5	- - -	
5.0	- - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 3.90m
2.0		
3.0		
4.0		
5.0		

Appendix 4
Soakaway Test Results

SOAKAWAY TEST f-Value Calculations

SIL

Project Reference:	5294
Contract:	Belltree Park
Location:	Clongriffin, Dublin 13
Test No:	SA01
Date:	20/06/2016

Ground Conditions

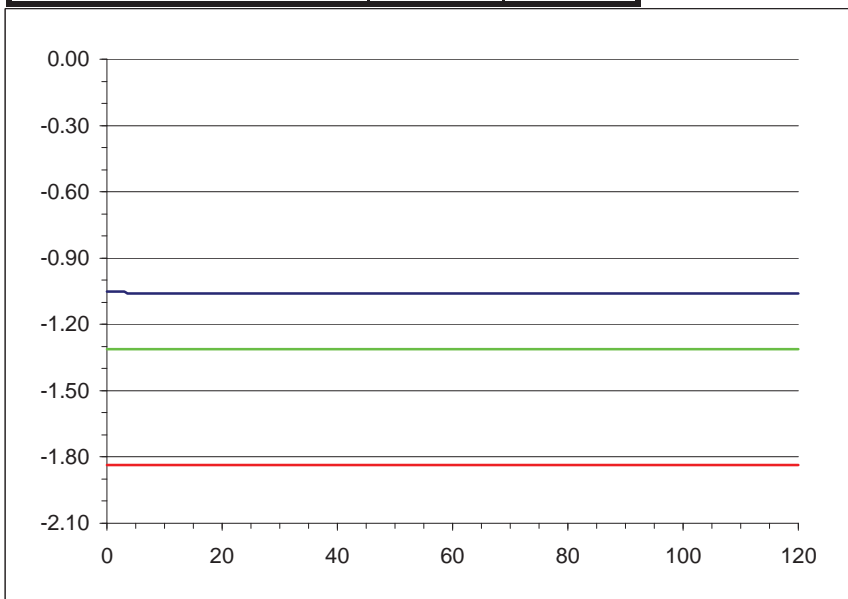
From	To	
0.00	1.40	MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content (engineered fill).
1.40	2.10	Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content.

Comments:

Pit walls stable.

Elapsed Time (mins)	Fall of Water (m)
0	-1.05
0.5	-1.05
1	-1.05
1.5	-1.05
2	-1.05
2.5	-1.05
3	-1.05
3.5	-1.06
4	-1.06
4.5	-1.06
5	-1.06
6	-1.06
7	-1.06
8	-1.06
9	-1.06
10	-1.06
12	-1.06
14	-1.06
16	-1.06
18	-1.06
20	-1.06
25	-1.06
30	-1.06
40	-1.06
50	-1.06
60	-1.06
75	-1.06
90	-1.06
120	-1.06

Pit Dimensions (m)		
Length (m)	2.30	m
Width (m)	0.60	m
Depth	2.10	m
Water		
Start Depth of Water	1.05	m
Depth of Water	1.05	m
75% Full	1.3125	m
25% Full	1.8375	m
75%-25%	0.525	m
Volume of water (75%-25%)	0.7245	m ³
Area of Drainage	12.18	m ²
Area of Drainage (75%-25%)	4.425	m ²
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	N/A	min
Time 75% to 25% (sec)	N/A	sec



$f = \frac{N/A}{m/min}$ or $\frac{N/A}{m/s}$

SOAKAWAY TEST f-Value Calculations

SIL

Project Reference:	5294
Contract:	Belltree Park
Location:	Clongriffin, Dublin 13
Test No:	SA02
Date:	20/06/2016

Ground Conditions

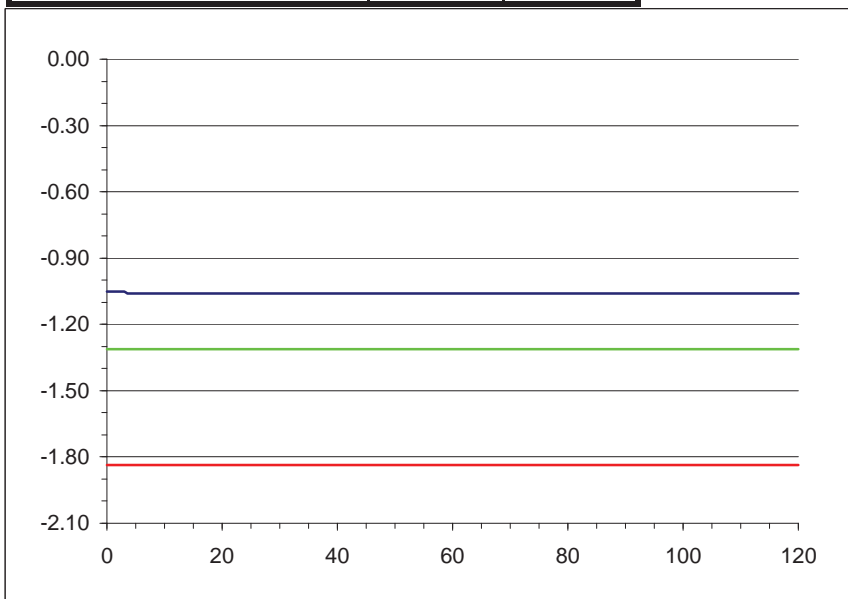
From	To	
0.00	1.40	MADE GROUND: brown black slightly sandy slightly gravelly silty clay with low cobble and boulder content (engineered fill).
1.40	2.10	Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content.

Comments:

Pit walls stable.

Elapsed Time (mins)	Fall of Water (m)
0	-1.05
0.5	-1.05
1	-1.05
1.5	-1.05
2	-1.05
2.5	-1.05
3	-1.05
3.5	-1.06
4	-1.06
4.5	-1.06
5	-1.06
6	-1.06
7	-1.06
8	-1.06
9	-1.06
10	-1.06
12	-1.06
14	-1.06
16	-1.06
18	-1.06
20	-1.06
25	-1.06
30	-1.06
40	-1.06
50	-1.06
60	-1.06
75	-1.06
90	-1.06
120	-1.06

Pit Dimensions (m)		
Length (m)	2.30	m
Width (m)	0.60	m
Depth	2.10	m
Water		
Start Depth of Water	1.05	m
Depth of Water	1.05	m
75% Full	1.3125	m
25% Full	1.8375	m
75%-25%	0.525	m
Volume of water (75%-25%)	0.7245	m ³
Area of Drainage	12.18	m ²
Area of Drainage (75%-25%)	4.425	m ²
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	N/A	min
Time 75% to 25% (sec)	N/A	sec



$f = \frac{N/A}{m/min}$ or $\frac{N/A}{m/s}$

Appendix 5
Laboratory Test Results

Classification Tests

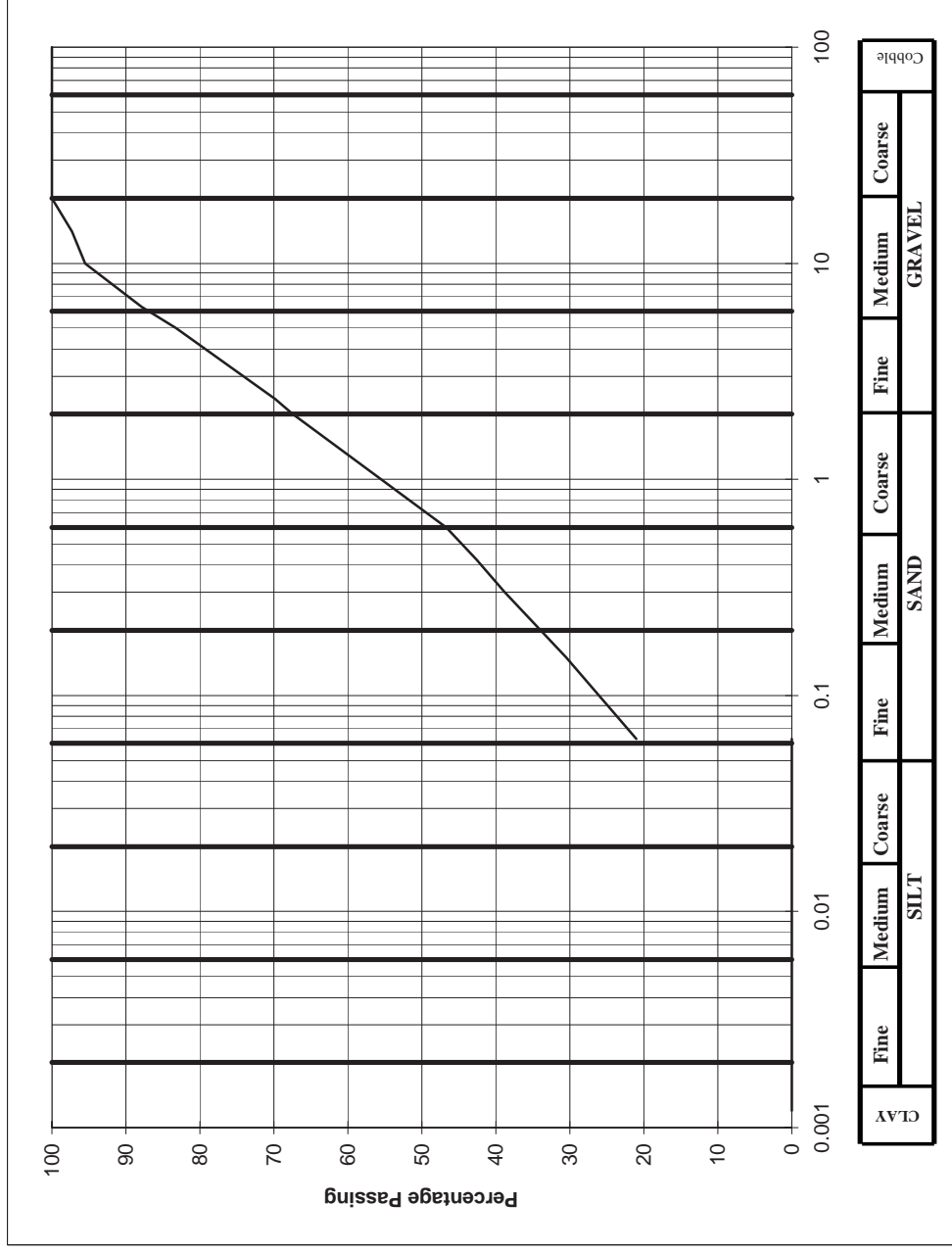
Client	Gannon Homes		
Site	Belltree Park, Clongriffin		
S.I. File No	5294 / 16		
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email siltd@indigo.ie		
Report Date	14th July 2016		

Hole ID	Depth	Sample No	Lab Ref No.	Sample Type	Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Max. Dry Density Mg/m ³	Min. Dry Density Mg/m ³	Particle Density Mg/m ³	% passing 425um	Comments	Remarks
BH02	1.00	JM04	16/576	B	12.4	34	24				42.6		C=Clay; M=Silt Plasticity: L=Low; I=Intermediate; H=High; V=Very High; E=Extremely High
BH09	2.50	JM16	16/578	B	13.6	33	22				65.4		CL/ML CL

BS 1377 Particle Size Analysis

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	0.0630	
90	100	0.0200	
75	100	0.0060	
63	100	0.0020	
50	100		
37.5	100		
28	100		
20	100		
14	97.3		
10	95.5		
6.3	87.9		
5.0	83.2		
2.36	69.8		
2.00	67.5		
1.18	58.4		
0.600	46.7		
0.425	42.6		
0.300	38.8		
0.212	34.7		
0.150	30.5		
0.063	21		

Cobbles, %	0
Gravel, %	33
Sand, %	47
Clay / Silt, %	21



Client :	Gannon Homes Ltd.
Project :	Belltree Park, Clongriffin

Lab. No. :	16/576
Sample No. :	JM04

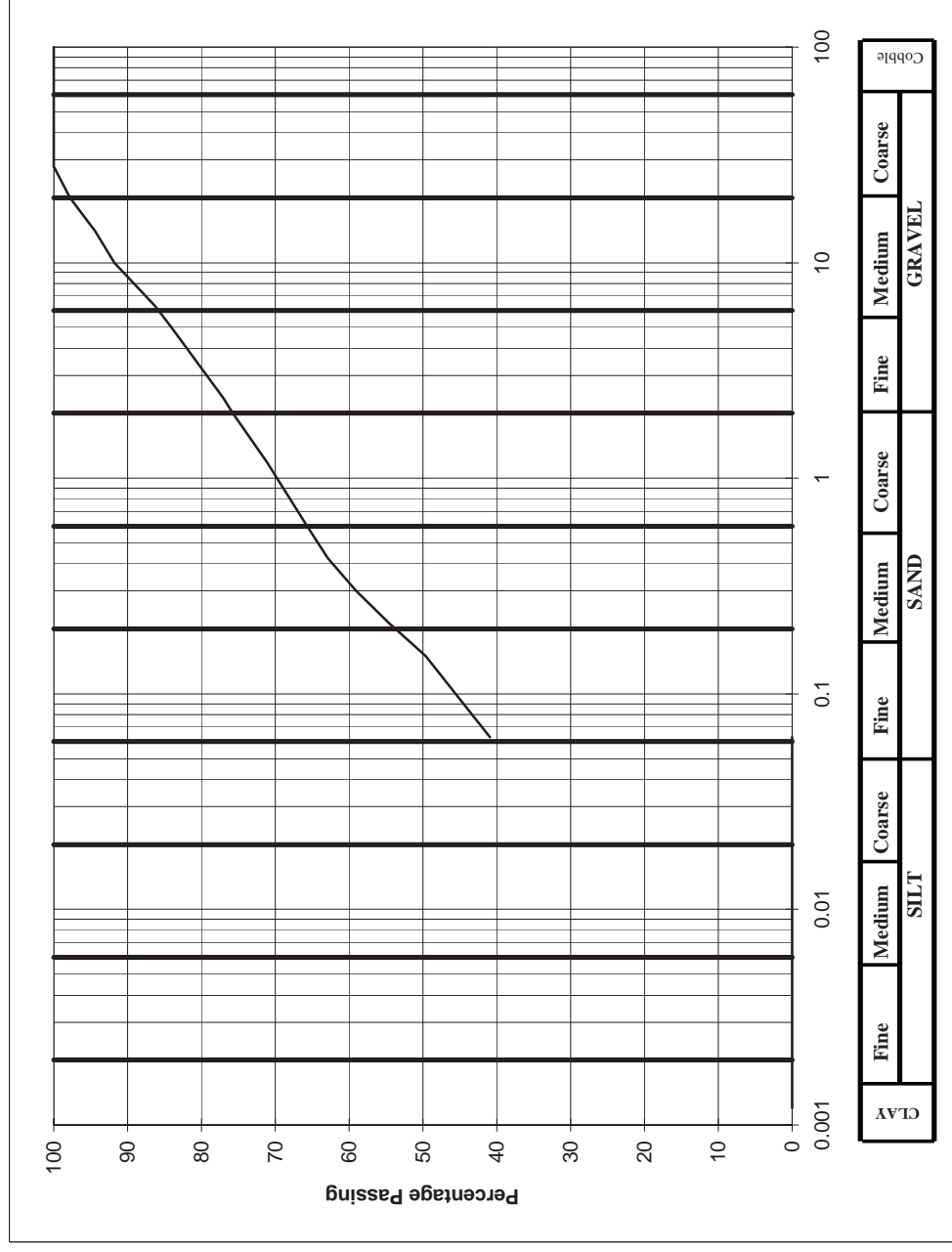
Hole ID :	BH 02
Depth, m :	1.00

Material description :	slightly gravely sandy SILT/CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

BS 1377 Particle Size Analysis

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	0.0630	
90	100	0.0200	
75	100	0.0060	
63	100	0.0020	
50	100		
37.5	100		
28	100		
20	97.8		
14	94.4		
10	91.8		
6.3	86.3		
5.0	84.1		
2.36	77		
2.00	75.8		
1.18	71.1		
0.600	65.7		
0.425	62.9		
0.300	59.1		
0.212	54.6		
0.150	49.7		
0.063	41		

Cobbles, %	0
Gravel, %	24
Sand, %	35
Clay / Silt, %	41



Client :	Gannon Homes Ltd.
Project :	Belltree Park, Clongriffin

Lab. No. :	16/578
Sample No. :	JM16

Hole ID :	BH 09
Depth, m :	2.50

Material description :	slightly gravely sandy silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

California Bearing Ratio (CBR) In accordance with BS1377: Part 4: Method 7

Client	Gannon Homes
Site	Belltree Park, Clongriffin
S.I. File No	5294 / 16
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email siltld@indigo.ie
Report Date	14th July 2016

Hole ID	Depth (mBGL)	Sample No	Sample Type	Lab Ref	Moisture Content (%)	CBR Value (%)	Remarks / Material Type
CBR01	0.60	PM06	B	16/584	7.9	5.4	
CBR02	0.60	PM07	B	16/585	8.4	6.3	
CBR03	0.60	PM08	B	16/586	9.2	5.4	
CBR04	0.60	PM09	B	16/587	9.7	4.8	
CBR05	0.60	PM10	B	16/588	9.3	3.9	
CBR06	0.60	PM11	B	16/589	8.8	4.1	
CBR07	0.60	PM12	B	16/590	7.7	3.7	
CBR08	0.60	PM13	B	16/591	8.2	3.8	

Chemical Testing
In accordance with BS 1377: Part 3

Client	Gannon Homes Ltd.
Site	Belltree Park, Clongriffin
S.I. File No	5294 / 16
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email siltd@indigo.ie
Report Date	14th July 2016

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Sulphate Content Acid Soluble (SO ₃) g/L	Sulphate Content Acid Soluble (SO ₃) %	Organic Content %	Chloride ion Content (soil:water ratio 2:1) %	% passing 2mm	Remarks
BH02	1.00	JM04	16/576	8.95	0.112	0.048	3.45	0.29	42.6	
BH06	1.00	JM09	16/577	8.84	0.103	0.073	3.28	0.36	70.6	
BH09	2.50	JM16	16/578	8.42	0.106	0.081	2.95	0.38	75.8	



Site Investigations Ltd
The Grange
Carhugar
12th Lock Road
Lucan
Co. Dublin

Attention: Stephen Letch

CERTIFICATE OF ANALYSIS

Date: 09 July 2016
Customer: D_SITEINV_NCS
Sample Delivery Group (SDG): 160630-18
Your Reference:
Location: Beltree Park
Report No: 368315

We received 2 samples on Wednesday June 29, 2016 and 2 of these samples were scheduled for analysis which was completed on Saturday July 09, 2016. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager



SDG: 160630-18	Location: Beltree Park	Order Number: 66/A/16
Job: D_SITEINV_NCS-80	Customer: Site Investigations Ltd	Report Number: 368315
Client Reference:	Attention: Stephen Letch	Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
13681360	TP06		0.50	27/06/2016
13681361	TP13		0.50	27/06/2016



Only received samples which have had analysis scheduled will be shown on the following pages.



SDG: 160630-18
 Job: D_SITEINV_NCS-80
 Client Reference:

Location: Beltree Park
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 66/A/16
 Report Number: 368315
 Superseded Report:

SOLID Results Legend  Test  No Determination Possible	Lab Sample No(s)	13681360	13681361	
	Customer Sample Reference	TP06	TP13	
	AGS Reference			
	Depth (m)	0.50	0.50	
	Container	250g Amber Jar (AL 1kg TUB 60g VOC (ALEZ15))	250g Amber Jar (AL 1kg TUB 60g VOC (ALEZ15))	
ANC at pH4 and ANC at pH 6	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Anions by Kone (w)	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CEN Readings	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Fluoride	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GRO by GC-FID (S)	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Loss on Ignition in soils	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Mercury Dissolved	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Mineral Oil	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PAH Value of soil	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PCBs by GCMS	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
pH	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Phenols by HPLC (W)	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sample description	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



SDG: 160630-18
Job: D_SITEINV_NCS-80
Client Reference:

Location: Beltree Park
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 66/A/16
Report Number: 368315
Superseded Report:

SOLID Results Legend <input checked="" type="checkbox"/> Test <input type="checkbox"/> No Determination Possible	Lab Sample No(s)		13681360	13681361
	Customer Sample Reference		TP06	TP13
	AGS Reference			
	Depth (m)		0.50	0.50
	Container		250g Amber Jar (AL 1kg TUB)	60g VOC (ALEZ15) 1kg TUB 250g Amber Jar (AL)
Total Dissolved Solids	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Total Organic Carbon	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

SDG: 160630-18
Job: D_SITEINV_NCS-80
Client Reference:
Location: Beltree Park
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 66/A/16
Report Number: 368315
Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
------------------	--------------------	-------------	------------------------	---------------	--------------------	---------------	-------------------	--------------------	-----------------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
13681360	TP06	0.50	Dark Brown	Silt Loam	0.002 - 0.063 mm	Stones	Vegetation
13681361	TP13	0.50	Dark Brown	Silt Loam	0.002 - 0.063 mm	Stones	Vegetation

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



CERTIFICATE OF ANALYSIS

Validated

SDG: 160630-18
Job: D_SITEINV_NCS-80
Client Reference:

Location: Beltree Park
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 66/A/16
Report Number: 368315
Superseded Report:

Table with columns: Results Legend, Customer Sample R, TP06, TP13, Component, LOD/Units, Method, and numerical data for various tests like Moisture Content Ratio, Loss on ignition, Mineral oil, etc.



SDG: 160630-18
Job: D_SITEINV_NCS-80
Client Reference:

Location: Beltree Park
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 66/A/16
Report Number: 368315
Superseded Report:

GRO by GC-FID (S)

Table with columns for Component, LOD/Units, Method, and results for samples TP06 and TP13. Includes a Results Legend and Customer Sample R details.

SDG: 160630-18
 Job: D_SITEINV_NCS-80
 Client Reference:

Location: Beltree Park
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 66/A/16
 Report Number: 368315
 Superseded Report:

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.100
Mass of dry sample (kg)	0.175
Particle Size <4mm	>95%

Site Location	Beltree Park
Natural Moisture Content (%)	10.8
Dry Matter Content (%)	90.3

Case	
SDG	160630-18
Lab Sample Number(s)	13681360
Sampled Date	27-Jun-2016
Customer Sample Ref.	TP06
Depth (m)	0.50

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	>6	-
-	-	-
-	-	-

Solid Waste Analysis	Result
Total Organic Carbon (%)	0.86
Loss on Ignition (%)	2.83
Sum of BTEX (mg/kg)	0.0771
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	88.2
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	8.56
ANC to pH 6 (mol/kg)	0.611
ANC to pH 4 (mol/kg)	4.13

Eluate Analysis	C2 Conc ⁿ in 10:1 eluate (mg/l)		A2 10:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.000652	<0.00012	0.00652	<0.0012	0.5	2	25
Barium	0.0262	<0.00003	0.262	<0.0003	20	100	300
Cadmium	<0.0001	<0.0001	<0.001	<0.001	0.04	1	5
Chromium	0.00151	<0.00022	0.0151	<0.0022	0.5	10	70
Copper	0.00149	<0.00085	0.0149	<0.0085	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.0106	<0.00024	0.106	<0.0024	0.5	10	30
Nickel	0.00131	<0.00015	0.0131	<0.0015	0.4	10	40
Lead	0.000069	<0.00002	0.00069	<0.0002	0.5	10	50
Antimony	0.00106	<0.00016	0.0106	<0.0016	0.06	0.7	5
Selenium	0.00268	<0.00039	0.0268	<0.0039	0.1	0.5	7
Zinc	0.000468	<0.00041	0.00468	<0.0041	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	29.7	<2	297	<20	1000	20000	50000
Total Dissolved Solids	107	<5	1070	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	06-Jul-2016
pH (pH Units)	8.62
Conductivity (µS/cm)	133.00
Temperature (°C)	12.50
Volume Leachant (Litres)	0.890

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

SDG: 160630-18
 Job: D_SITEINV_NCS-80
 Client Reference:

Location: Beltree Park
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 66/A/16
 Report Number: 368315
 Superseded Report:

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.100
Mass of dry sample (kg)	0.175
Particle Size <4mm	>95%

Site Location	Beltree Park
Natural Moisture Content (%)	10.9
Dry Matter Content (%)	90.2

Case	
SDG	160630-18
Lab Sample Number(s)	13681361
Sampled Date	27-Jun-2016
Customer Sample Ref.	TP13
Depth (m)	0.50

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	>6	-
-	-	-
-	-	-

Solid Waste Analysis	Result
Total Organic Carbon (%)	0.575
Loss on Ignition (%)	2.02
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	23
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	8.59
ANC to pH 6 (mol/kg)	0.565
ANC to pH 4 (mol/kg)	4.86

Eluate Analysis	C2 Conc ⁿ in 10:1 eluate (mg/l)		A2 10:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.000719	<0.00012	0.00719	<0.0012	0.5	2	25
Barium	0.0196	<0.00003	0.196	<0.0003	20	100	300
Cadmium	<0.0001	<0.0001	<0.001	<0.001	0.04	1	5
Chromium	0.00154	<0.00022	0.0154	<0.0022	0.5	10	70
Copper	0.00124	<0.00085	0.0124	<0.0085	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.0101	<0.00024	0.101	<0.0024	0.5	10	30
Nickel	0.00118	<0.00015	0.0118	<0.0015	0.4	10	40
Lead	0.000036	<0.00002	0.00036	<0.0002	0.5	10	50
Antimony	0.00125	<0.00016	0.0125	<0.0016	0.06	0.7	5
Selenium	0.00254	<0.00039	0.0254	<0.0039	0.1	0.5	7
Zinc	<0.00041	<0.00041	<0.0041	<0.0041	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	26.4	<2	264	<20	1000	20000	50000
Total Dissolved Solids	98.4	<5	984	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	06-Jul-2016
pH (pH Units)	8.64
Conductivity (µS/cm)	126.00
Temperature (°C)	16.00
Volume Leachant (Litres)	0.890

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates



SDG: 160630-18
Job: D_SITEINV_NCS-80
Client Reference:

Location: Beltree Park
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 66/A/16
Report Number: 368315
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step		
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition		
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water		
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser		
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils		
TM182	CEN/TC 292 - WI 292046-characterization of waste-leaching Behaviour Tests- Acid and Base Neutralization Capacity Test	Determination of Acid Neutralisation Capacity (ANC) Using Autotitration in Soils		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM213	In-house Method	Rapid Determination of PAHs by GC-FID		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



SDG: 160630-18
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Client Reference:

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Attention: Stephen Letch

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Report Number: 368315
Superseded Report:

Test Completion Dates

Lab Sample No(s)	13681360	13681361
Customer Sample Ref.	TP06	TP13
AGS Ref.		
Depth	0.50	0.50
Type	SOLID	SOLID
ANC at pH4 and ANC at pH 6	08-Jul-2016	08-Jul-2016
Anions by Kone (w)	08-Jul-2016	08-Jul-2016
CEN 10:1 Leachate (1 Stage)	06-Jul-2016	06-Jul-2016
CEN Readings	07-Jul-2016	07-Jul-2016
Dissolved Metals by ICP-MS	08-Jul-2016	08-Jul-2016
Dissolved Organic/Inorganic Carbon	08-Jul-2016	08-Jul-2016
Fluoride	08-Jul-2016	08-Jul-2016
GRO by GC-FID (S)	08-Jul-2016	08-Jul-2016
Loss on Ignition in soils	08-Jul-2016	08-Jul-2016
Mercury Dissolved	08-Jul-2016	08-Jul-2016
Mineral Oil	09-Jul-2016	09-Jul-2016
PAH Value of soil	07-Jul-2016	07-Jul-2016
PCBs by GCMS	08-Jul-2016	08-Jul-2016
pH	07-Jul-2016	07-Jul-2016
Phenols by HPLC (W)	08-Jul-2016	08-Jul-2016
Sample description	06-Jul-2016	06-Jul-2016
Total Dissolved Solids	08-Jul-2016	08-Jul-2016
Total Organic Carbon	08-Jul-2016	08-Jul-2016



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Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

General

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
\$	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Appendix 6
Survey Data

Site Survey

Location	Irish National Grid		Level	Irish Transverse Mercator	
	Easting	Northing		Easting	Northing
Boreholes					
BH01	322682.046	241116.699	9.09	722606.291	741141.412
BH02	322723.693	241101.730	8.78	722647.929	741126.446
BH03	322658.486	241068.217	9.18	722582.735	741092.941
BH04	322704.205	241038.878	8.69	722628.444	741063.608
BH05	322782.316	241086.430	8.81	722706.539	741111.149
BH06	322771.228	241057.793	8.08	722695.453	741082.519
BH07	322780.166	241027.752	8.87	722704.389	741052.484
BH08	322842.905	241068.667	8.04	722767.115	741093.390
BH09	322816.339	241004.726	8.50	722740.554	741029.463
BH10	322836.012	240973.504	7.72	722760.222	740998.247
Trial Pits					
TP01	322685.933	241141.507	9.30	722610.177	741166.215
TP02	322720.797	241129.362	9.06	722645.034	741154.072
TP03	322750.057	241121.476	8.82	722674.287	741146.188
TP04	322706.163	241109.601	9.14	722630.403	741134.316
TP05	322671.369	241103.974	8.95	722595.616	741128.690
TP06	322692.422	241092.972	8.93	722616.664	741117.690
TP07	322717.886	241072.891	8.72	722642.123	741097.614
TP08	322670.883	241060.687	9.15	722595.130	741085.413
TP09	322647.774	241059.050	9.39	722572.025	741083.776
TP10	322671.093	241044.464	9.32	722595.339	741069.193
TP11	322705.530	241023.880	8.71	722629.769	741048.613
TP12	322794.770	241103.125	8.60	722718.991	741127.841
TP13	322761.031	241088.375	8.61	722685.259	741113.094
TP14	322802.412	241078.600	8.87	722726.631	741103.321
TP15	322800.704	241066.256	8.88	722724.923	741090.980
TP16	322765.585	241051.635	8.10	722689.811	741076.362
TP17	322721.787	241052.649	8.29	722646.023	741077.376
TP18	322783.082	241014.398	8.62	722707.304	741039.133
TP19	322782.642	241004.340	8.84	722706.864	741029.077
TP20	322830.582	241096.180	7.96	722754.795	741120.897

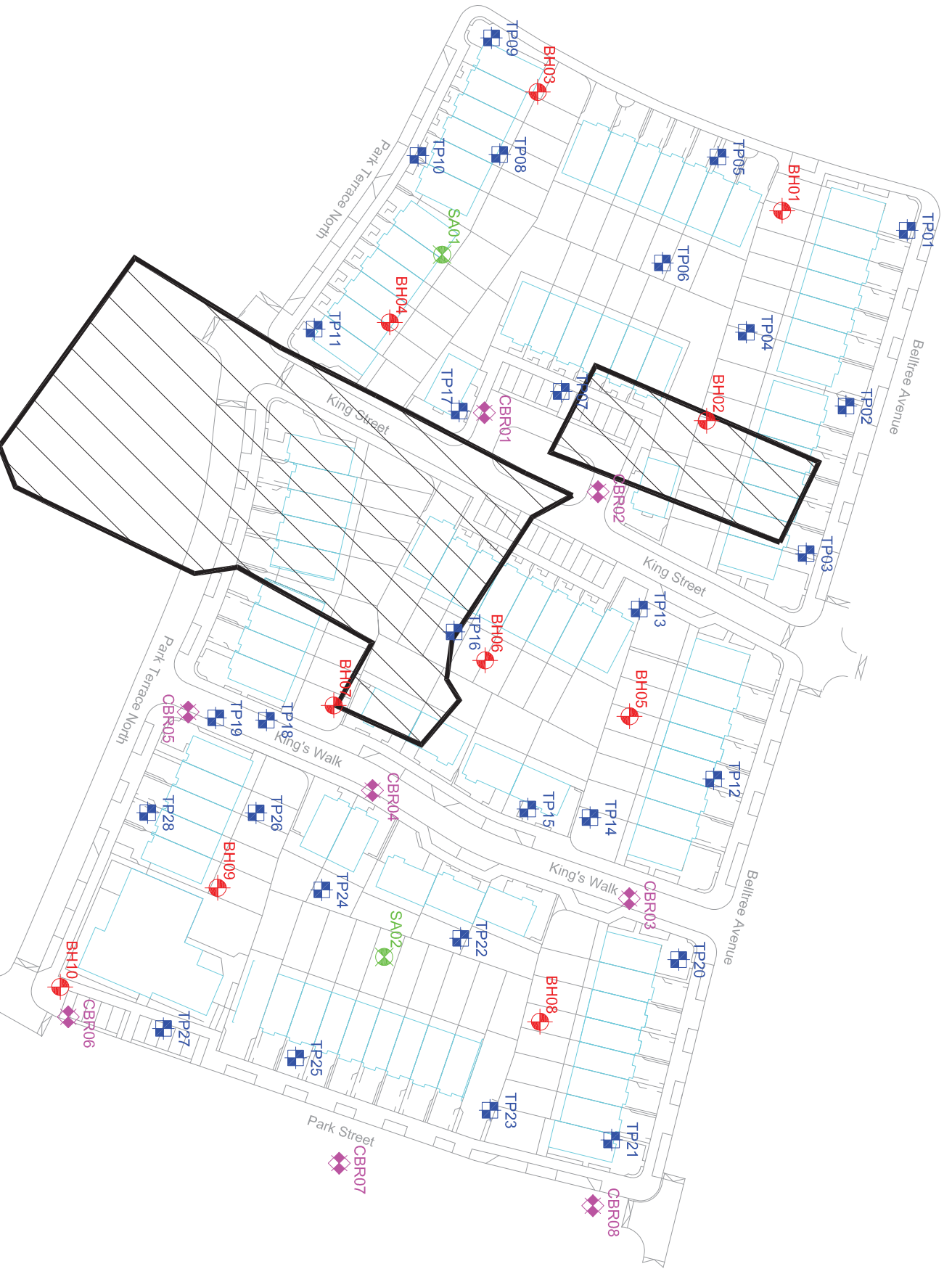
Site Survey

Location	Irish National Grid		Level	Irish Transverse Mercator	
	Easting	Northing		Easting	Northing
TP21	322866.351	241082.890	7.27	722790.556	741107.609
TP22	322826.370	241052.937	8.63	722750.583	741077.663
TP23	322860.464	241058.750	7.59	722784.670	741083.475
TP24	322816.769	241025.389	8.84	722740.984	741050.121
TP25	322850.062	241020.213	7.82	722774.270	741044.946
TP26	322801.481	241012.361	8.71	722725.699	741037.096
TP27	322844.253	240993.983	7.17	722768.462	741018.722
TP28	322801.427	240990.854	8.80	722725.645	741015.594
California Bearing Ratio Tests					
CBR01	322722.121	241057.644	8.53	722646.357	741082.370
CBR02	322737.775	241080.197	8.26	722662.008	741104.918
CBR03	322818.482	241086.393	8.40	722742.697	741111.112
CBR04	322797.024	241035.453	8.67	722721.243	741060.183
CBR05	322781.471	240998.886	8.92	722705.693	741023.624
CBR06	322841.944	240975.112	7.50	722766.153	740999.855
CBR07	322870.960	241028.845	6.82	722795.164	741053.576
CBR08	322879.405	241079.145	7.14	722803.607	741103.865
Soakaway Tests					
SA01	322690.765	241049.262	8.91	722615.007	741073.990
SA02	322830.054	241037.767	8.87	722754.266	741062.496



Site Investigations Ltd
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T: 01 6108768
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Project :	Gannon Homes Ltd
Engineer :	Waterman Moylan
Project :	Bellfree Park, Clongriffin
Date :	04-07-2016
Description :	Site Investigation Plan
Drawing Number :	SIL529401
Scale :	Not To Scale
Rev :	1
Drawn by :	SL



Legend:

- Cable Percussion Borehole
- Trial Pit
- California Bearing Ratio
- Soakaway Test



S.I. Ltd Contract No: 5295

Client: Gannon Homes Ltd
Engineer: Waterman Moylan
Contractor: Site Investigations Ltd

Belltree Green, Clongriffin, Dublin 13
Site Investigation Report

Prepared by:

.....

Stephen Letch

Issue Date:	14/07/2016
Status	Final
Revision	0

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3. Laboratory Testing	3
4. Ground Conditions	3
5. Recommendations and Conclusions	4

Appendices:

1. Cable Percussive Borehole Logs
2. Trial Pit Logs and Photographs
3. Dynamic Probe Logs
4. Soakaway Test Results
5. Laboratory Test Results
6. Survey Data

1. Introduction

On the instructions of Waterman Moylan, Site Investigations Ltd (SIL) were appointed to complete a ground investigation at Belltree Green, Clongriffin, Dublin 13. The investigation was completed for the residential development of the site and was completed on behalf of the Client, Gannon Homes Ltd.

The fieldworks comprised a programme of cable percussive boreholes, trial pits, dynamic probes, soakaways and California Bearing Ratio tests. All fieldwork was carried out in accordance with Eurocode 7: Geotechnical Design and the IEI Specification & Related Documents for Ground Investigation in Ireland (2006). Laboratory testing has been performed on representative soil samples and these were completed in accordance of BS1377: 1990.

This report presents the factual geotechnical data obtained from the field and laboratory testing with interpretation of the ground conditions discussed.

2. Fieldwork

The geotechnical fieldworks were started and completed in June 2016 and comprised the following:

- 9 No. cable percussive boreholes
- 21 No. trial pits
- 21 No. dynamic probes
- 2 No. soakaways
- 5 No. California Bearing Ratio tests

2.1. Cable Percussive Boreholes

Cable percussion boring was undertaken at 9 No. locations using a Dando 150 rig and constructed a 200mm diameter borehole. The boreholes terminated at the scheduled depth of 6.00mbgl at each location. It was not possible to collect undisturbed samples due to the gravel and cobble content of the strata so bulk disturbed samples were recovered at regular intervals.

In order to test the strength of the stratum, Standard Penetration Tests (SPT's) were performed at 1.00m intervals in accordance with BS 1377 (1990). In soils with high gravel and cobble content it is appropriate to use a solid cone (60°) (CPT) instead of the split spoon and this was used throughout the testing. The test is completed over 450mm and the cone is driven 150mm into the stratum to ensure that the test is conducted over an undisturbed zone. The cone is then driven the remaining 300mm and the blows recorded to report the N-Value. The report shows the N-Value with the 75mm incremental blows listed in brackets (e.g. BH01

at 1.00mbgl where N=16-(4,4,4,4)). Where refusal of 50 blows across the test zone was encountered was achieved during testing, the penetration depth is also reported (e.g. BH02 at 4.00mbgl where N=50/235mm-(14,14,15,7/10mm)).

The logs are presented in Appendix 1.

2.2. Trial Pits

21 No. trial pits were completed using a wheeled excavator and were logged by SIL geotechnical engineer. Representative disturbed bulk samples were recovered as the pits were excavated and they were returned to the laboratory for geotechnical testing.

The trial pit logs and photographs are presented in Appendix 2.

2.3. Dynamic Probes

Dynamic probes were carried out at 21 No. locations, adjacent to the trial pits, using a track mounted Competitor 130 machine. The testing complies with the requirements of BS1377: Part 9 (1990) and Eurocode 7: Part 3. The configuration utilised standard DPH (Heavy) probing method comprising a 50kg weight, 500mm drop height and a 43.7mm diameter (90°) cone. The number of blows required to drive the cone each 100mm increment into the sub soil is recorded in accordance with the standards. The dynamic probe provides no information regarding soil type or groundwater conditions.

The dynamic probe results can be used to analyse the strength of the soil strata encountered by the probe. 'Proceedings of the Trinity College Dublin Symposium of Field and Laboratory Testing of Soils for Foundations and Embankments' presents a paper by Foirbart that is most relevant to Irish soil conditions and within this paper the following equations were included:

$$\text{DPH } N_{100} \times 2.5 = \text{SPT } N \text{ value (Granular Soils)}$$

$$C_u = 15 \times \text{DPH } N_{100} + 30 \text{ kPa (Cohesive Soils)}$$

These equations present a relationship between the probe N_{100} value and the SPT N value for granular soils and the shear strength of cohesive soils.

The probe results are presented in Appendix 3 and present the data both numerically and graphically.

2.4. Soakaway Tests

2 No. soakaway tests were completed using a wheeled excavator and were logged by SIL geotechnical engineer. The soakaway test is used to identify possible areas for storm water drainage. The pit was filled with water and the level of the groundwater was recorded over

time. As stipulated by BRE Special Digest 365, the pit should be filled three times and the final cycle is used to provide the infiltration rate. The time taken for the water level to fall from 75% volume to 25% volume is required to calculate the rate of infiltration. However, if the water level does not fall then the test is deemed to have failed and the area is unsuitable as a drainage area

The soakaway logs are presented in Appendix 4.

2.5. California Bearing Ratio tests

At 5 No. locations, undisturbed cylindrical mould samples were taken to complete California Bearing Ratio tests in the laboratory. The results facilitate the designing of the access roads and associated areas. These tests were completed to BS1377: 1990: Part 4, Clause 7 'Determination of California Bearing Ratio'. The results are presented as part of Appendix 5 with the laboratory test data.

2.6. Surveying

Following the completion of all the fieldworks works, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log and the locations are shown on the site plan in Appendix 6.

3. Laboratory Testing

Geotechnical laboratory testing has been carried out on representative soil samples in accordance with BS 1377 (1990). Testing included:

- 2 No. Moisture content
- 2 No. Atterberg limits
- 2 No. Particle size gradings
- 3 No. pH and sulphate
- 3 No. Chloride content
- 3 No. Organic content

Environmental testing was completed by Alcontrol Laboratories Ltd. and consisted of the following:

- 2 No. Waste Acceptance Criteria Analysis

The laboratory test results are presented in Appendix 5.

4. Ground Conditions

4.1. Overburden

A generalised summary of the ground profile at BH04 is shown overleaf. Reference should be made to the individual borehole and trial pit records in Appendices 1 and 2 for the full strata information at specific locations.

- Brown sandy slightly gravelly silty CLAY.
- Stiff brown sandy slightly gravelly silty CLAY with low cobble content.
- Very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content.

The overburden deposits are of glacial origin and the particle size gradings of the cohesive soils display characteristic poorly-graded profiles for the glacial material. Fines contents (i.e. silt & clay) from the gradings show the cohesive soils with 40% and 64% silt/clay and the Atterberg Limits tests show that silty CLAY dominates the site.

4.2. Groundwater

Groundwater details in the boreholes and trial pits during the fieldworks are noted on the logs in Appendices 1 and 2. Groundwater was not encountered in any of the boreholes or trial pits during the fieldworks.

5.0. Recommendations and Conclusions

Please note the following caveats:

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 the exploratory hole locations or below the final level of excavation, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for adjacent unexpected conditions that have not been revealed by the exploratory holes. It is further recommended that all bearing surfaces when excavated should be inspected by a suitably qualified Engineer to verify the information given in this report.

Excavated surfaces in clay strata should be kept dry to avoid softening prior to foundation placement. Foundations should always be taken to a minimum depth of 0.50mBGL to avoid the effects of frost action and possible seasonal shrinkage/swelling.

If it is intended that on-site materials are to be used as fill, then the necessary laboratory testing should be specified by the Client to confirm the suitability. Also, relevant lab testing should be specified where stability of side slopes to excavations is a concern, or where contamination may be an issue.

5.1. Foundations

Due to the unknown depth of foundation and no longer term groundwater information, this analysis assumes the groundwater will not have an effect on the construction or performance of these foundations.

The boreholes encountered firm/stiff brown slightly sandy slightly gravelly CLAY with low cobble content. The SPT N-values at 1.00mbgl vary from 12 (BH02) to 36 (BH09). For the analysis an N-value of 15 was chosen for the purposes of design in this stratum, in accordance with Eurocode 7 (EC 7).

Using an equation proposed by Stroud and Butler, the SPT N-value can be used to calculate the shear strength and this is $C_u=5N$. Therefore, using the value of 15, this indicates that the shear strength of the CLAY is 75kN/m^2 . This can be used to calculate the allowable bearing capacity (ABC) and using a factor of safety of 3 an ABC of 130kN/m^2 would be anticipated.

If higher capacities are required then it would be suggested that the foundations are placed on the stiff black slightly sandy slightly gravelly silty CLAY. This was encountered at various depths from 1.70mbgl (BH06) to 2.80mbgl (BH09) and showed an increase in SPT N-values from 22 (BH02) to 40 (BH04). Using an SPT value of 25 at 2.00mbgl, the shear strength of 125kN/m^2 would suggest that an allowable bearing capacity of 225kN/m^2 could be used when this strata is encountered. This shear strength would be supported by the increase in blow counts in the dynamic probes when correlated with the trial pits.

The following assumptions were made as part of these analyses. If any of these assumptions are not in accordance with detailed design or observations made during construction these recommendations should be re-evaluated.

- The foundation is to be 1m wide.
- Foundations are to be constructed on a level formation of uniform material type (described above).
- All man-made or filled material is to be removed prior to construction.
- The bulk unit weight of the material in this stratum has a minimum density of 19kN/m^3 .
- Based on groundwater observations this analysis assumes the groundwater will not have an effect on the construction or performance of these foundations.
- Foundation formations should be inspected by a competent geotechnical engineer prior to construction so as to verify that the observations made during the ground investigation are consistent with the actual ground conditions at the time of construction.

The trial pits indicate that excavations in the cohesive soils should be stable for a short while at least. However regular inspection of temporary excavations should be completed during construction to ensure that all slopes are stable. Temporary support should be used on any excavation that will be left open for an extended period of time.

5.2. Groundwater

The caveats overleaf relating to interpretation of groundwater levels should be noted:

There is always considerable uncertainty as to the likely rates of water ingress into excavations in clayey soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water.

Furthermore, water levels noted on the borehole and trial pit logs do not generally give an accurate indication of the actual groundwater conditions as the borehole or trial pit is rarely left open for sufficient time for the water level to reach equilibrium.

Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period of groundwater monitoring using any constructed standpipes is required to provide more accurate information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.

Pumping tests would be required to determine likely seepage rates and persistence into excavations taken below the groundwater level. Deep trial pits also aid estimation of seepage rates.

As discussed previously there were no water strikes in the boreholes or trial pits. There is always considerable uncertainty as to the likely rates of water ingress into excavations in cohesive soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water. However, based on this information at the exploratory hole locations to date, it is considered likely that any seepages into excavations will be slow.

If groundwater is encountered during excavations then mechanical pumps will be required to remove the groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

5.3. Soakaway Tests

The graphs in Appendix 4 show that the areas where the soakaways were completed are unsuitable for soakaway design. The BRE Digest stipulates that the pit should half empty within 24hrs, and extrapolation indicates this condition would not be satisfied. The test was terminated at the end of the first (of a possible three) fill/empty cycle since further testing would give even slower fall rates due to increased soil saturation.

The unsuitability of the site for soakaways is further suggested by the soil descriptions of the materials in the area of the site where the soakaway was completed, i.e. clay and silt soils.

5.4. Pavement Design

The summary of the CBR test results in Appendix 5 indicates values generally of 3.2% or more. The CBR tests samples were collected at 0.50mbgl and inspection of the formation strata should be completed prior to construction of the pavement. Once the exact formation levels are finalised then additional in-situ testing could be completed to assist with the detailed pavement design.

5.5. Contamination

Environmental testing was carried out on two samples from the investigation and the results are shown in Appendix 5. For material to be removed from site, landfill acceptability testing (WAC) was carried out to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill. The results were compared with the published waste acceptance limits of BS EN 12457-2.

The disposal suite results indicate that the material would generally be able to be treated as Inert Waste. However discussions about the acceptance of the material must be undertaken with individual landfills before removal of any material from site.

Only two samples were tested for analysis and although no major contamination was noted at the fieldwork locations, any localised contamination may have been missed. Therefore, a testing regime designed by an environmental engineer should be designed on any material that is to be removed from site to ensure that the material stays within the landfill acceptance criteria.

5.6. Aggressive Ground Conditions

The chemical tests results in Appendix 5 indicate a general pH value between 8.83 and 9.22, which is close to neutral.

The maximum value obtained for acid soluble sulphate was 117mg/l as SO_3 . The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground*' guidelines require SO_4 values and after conversion ($\text{SO}_4 = \text{SO}_3 \times 1.2$), the maximum value of 140mg/l shows Class 1 conditions and no special precautions are required.

Appendix 1
Cable Percussive Borehole Logs

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Green

HOLE ID: BH01

Client: Gannon Homes

Co-ordinates: E:722655.353

Consultant: Waterman Moylan

N:741265.757

Site Address: Clongriffin, Dublin 13

Elevation: 8.53 m.O.D.

Boring Started: 17/06/2016

Hole Diameter: 200 mm

Boring Completed: 17/06/2016

Drilled by: J. Moriarty

Rig Type: Dando 150

Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
Brown sandy slightly gravelly silty CLAY.	0.00		8.53						
Stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	0.50		8.03	B	1.00	JM19			
	1.00			SPT(C)	1.00	N=16-(4,4,4,4)			
	2.00			B	2.00	JM20			
	2.00			SPT(C)	2.00	N=24-(5,6,6,7)			
Very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	2.50		6.03	B	3.00	JM21			
	3.00			SPT(C)	3.00	N=36-(8,9,9,10)			
	4.00			B	4.00	JM22			
	4.00			SPT(C)	4.00	N=39-(8,10,10,11)			
	5.00			B	5.00	JM23			
5.00	SPT(C)	5.00	N=40-(7,9,11,13)						
Borehole terminated at scheduled depth.	6.00		2.53	B	6.00	JM24	6.00	17/06/2016	Dry(E)
	7.00								
	8.00								
	9.00								
	10.00								

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
Borehole terminated at scheduled depth.
Borehole backfilled - no installation.

Key to Symbols	
B	Bulk Disturbed Sample
D	Small disturbed sample
W	Water sample
U(9)	Undisturbed sample (drive blows)
SPT(S)	Standard Penetration Test (Split Spoon)
SPT(C)	Standard Penetration Test (Cone)
	Waterstrike depth
	Water level depth 20mins after strike
5.00(E)	Depth to water (E)nd of shift
5.00(S)	Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL_BH_GINT_GPJ_COREHOLE.GDT 14/07/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Green

HOLE ID: BH02

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Started: 20/06/2016
Boring Completed: 20/06/2016
Rig Type: Dando 150

Co-ordinates: E:722697.198
 N:741253.198
Elevation: 8.06 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
Brown sandy slightly gravelly silty CLAY.	0.00		8.06						
Firm becoming stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	0.30		7.76	B SPT(C)	1.00 1.00	JM25 N=12-(2,3,3,4)			
Very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	2.00		5.96	B SPT(C)	2.00 2.00	JM26 N=22-(5,5,5,7)			
	3.00			B SPT(C)	3.00 3.00	JM27 N=36-(7,9,9,11)			
	4.00			B SPT(C)	4.00 4.00	JM28 N=50/235mm-(14,14,15,7/10mm)			
	5.00			B SPT(C)	5.00 5.00	JM29 N=50/215mm-(16,16,18/65mm)			
	6.00			B SPT(C)	6.00 6.00	JM30 N=50/200mm-(15,15,20/50mm)			
Borehole terminated at scheduled depth.	6.00		2.06	B SPT(C)	6.00 6.00	JM30 N=50/200mm-(15,15,20/50mm)	6.00	20/06/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Borehole terminated at scheduled depth.
 Borehole backfilled - no installation.

Key to Symbols	
B	Bulk Disturbed Sample
D	Small disturbed sample
W	Water sample
U(9)	Undisturbed sample (drive blows)
SPT(S)	Standard Penetration Test (Split Spoon)
SPT(C)	Standard Penetration Test (Cone)
	Waterstrike depth
	Water level depth 20mins after strike
5.00(E)	Depth to water (E)nd of shift
5.00(S)	Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL_BH_GINT_GPJ_COREHOLE.GDT_14/07/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Green

HOLE ID: **BH03**

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Started: 17/06/2016
Boring Completed: 17/06/2016
Rig Type: Dando 150

Co-ordinates: E:722676.017
 N:741231.356
Elevation: 8.31 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water			
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)	
Brown sandy slightly gravelly silty CLAY.	0.00		8.31							
Firm brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	0.50		7.81	B	1.00	JM13 N=19-(4,4,5,5)				
	1.00			SPT(C)	1.00					
Very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	2.00		6.01	B	2.00	JM14 N=22-(5,5,6,6)				
	2.30			SPT(C)	2.00					
	3.00			B	3.00					JM15 N=38-(8,8,10,12)
	4.00			SPT(C)	3.00					
4.00	B	4.00	JM16 N=50/5mm-(50/5mm)							
5.00	SPT(C)	4.00								
Borehole terminated at scheduled depth.	5.00		6.01	B	5.00	JM17 N=50-(11,11,13,15)				
	6.00			SPT(C)	5.00					
Borehole terminated at scheduled depth.	6.00		2.31	B	6.00	JM18 N=50/160mm-(14,14,15/10mm)	6.00	17/06/2016	Dry(E)	
	7.00			SPT(C)	6.00					

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Chiselling: 4.20m to 4.50m: 1hr
 Borehole terminated at scheduled depth.
 Borehole backfilled - no installation.

Key to Symbols	
B	Bulk Disturbed Sample
D	Small disturbed sample
W	Water sample
U(9)	Undisturbed sample (drive blows)
SPT(S)	Standard Penetration Test (Split Spoon)
SPT(C)	Standard Penetration Test (Cone)
	Waterstrike depth
	Water level depth 20mins after strike
5.00(E)	Depth to water (E)nd of shift
5.00(S)	Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL BH GINT GPJ COREHOLE.GDT 14/07/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Green

HOLE ID: BH04

Client: Gannon Homes

Co-ordinates: E:722641.826

Consultant: Waterman Moylan

N:741205.241

Site Address: Clongriffin, Dublin 13

Elevation: 8.90 m.O.D.

Boring Started: 16/06/2016

Hole Diameter: 200 mm

Boring Completed: 16/06/2016

Drilled by: J. Moriarty

Rig Type: Dando 150

Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
Brown sandy slightly gravelly silty CLAY.	0.00		8.90						
Stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	0.20		8.70	B SPT(C)	1.00 1.00	JM01 N=19-(4,5,5,5)			
Very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	1.80		7.10	B SPT(C)	2.00 2.00	JM02 N=40-(8,9,9,14)			
	3.00			B SPT(C)	3.00 3.00	JM03 N=50/95mm-(20,30/20mm)			
	4.00			B SPT(C)	4.00 4.00	JM04 N=50/210mm-(15,15,20/60mm)			
	5.00			B SPT(C)	5.00 5.00	JM05 N=50/200mm-(14,17,19/50mm)			
	6.00			B SPT(C)	6.00 6.00	JM06 N=50/170mm-(19,20,11/20mm)			
Borehole terminated at scheduled depth.	6.00		2.90	B SPT(C)	6.00 6.00	JM06 N=50/170mm-(19,20,11/20mm)	6.00	16/06/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Chiselling: 3.50m to 3.90m: 1hr
 Borehole terminated at scheduled depth.
 Borehole backfilled - no installation.

Key to Symbols	
B	Bulk Disturbed Sample
D	Small disturbed sample
W	Water sample
U(9)	Undisturbed sample (drive blows)
SPT(S)	Standard Penetration Test (Split Spoon)
SPT(C)	Standard Penetration Test (Cone)
	Waterstrike depth
	Water level depth 20mins after strike
5.00(E)	Depth to water (E)nd of shift
5.00(S)	Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL BH GINT GPJ COREHOLE.GDT 14/07/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Green

HOLE ID: **BH05**

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Started: 16/06/2016
Boring Completed: 16/06/2016
Rig Type: Dando 150

Co-ordinates: E:722666.702
 N:741176.694
Elevation: 8.80 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
Brown sandy slightly gravelly silty CLAY.	0.00	x	8.80						
Stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	0.20	x	8.60						
	1.00	x		B SPT(C)	1.00	JM07 N=17-(4,4,4,5)			
	2.00	x		B SPT(C)	2.00	JM08 N=26-(6,6,7,7)			
	3.00	x		B SPT(C)	3.00	JM09 N=39-(7,10,11,11)			
	4.00	x		B SPT(C)	4.00	JM10 N=50/185mm-(15,15,20/35mm)			
Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	2.10	x	6.70						
	5.00	x		B SPT(C)	5.00	JM11 N=50/160mm-(18,19,13/10mm)			
	6.00	x		B SPT(C)	6.00	JM12 N=50/170mm-(18,18,14/20mm)	6.00	16/06/2016	Dry(E)
Borehole terminated at scheduled depth.	6.00		2.80						

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Chiselling: 5.30m to 5.50m: 0.5hr
 Borehole terminated at scheduled depth.
 Borehole backfilled - no installation.

<p>B Bulk Disturbed Sample D Small disturbed sample W Water sample U(9) Undisturbed sample (drive blows)</p>	<p>Key to Symbols SPT(S) Standard Penetration Test (Split Spoon) SPT(C) Standard Penetration Test (Cone) ▽ 3.50 Waterstrike depth ▽ 1.50(20) Water level depth 20mins after strike 5.00(E) Depth to water (E)nd of shift 5.00(S) Depth to water (S)tart of shift</p>
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CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Green

HOLE ID: **BH06**

Client: Gannon Homes

Co-ordinates: E:722765.296

Consultant: Waterman Moylan

N:741233.123

Site Address: Clongriffin, Dublin 13

Elevation: 7.81 m.O.D.

Boring Started: 21/06/2016

Hole Diameter: 200 mm

Boring Completed: 21/06/2016

Drilled by: J. Moriarty

Rig Type: Dando 150

Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
Brown sandy slightly gravelly silty CLAY.	0.00		7.81						
Stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	0.30		7.51						
	1.00			B SPT(C)	1.00	JM43 N=22-(4,6,6,6)			
	1.70		6.11	B SPT(C)	2.00	JM44 N=29-(5,7,8,9)			
	3.00			B SPT(C)	3.00	JM45 N=32-(7,7,9,9)			
	4.00			B SPT(C)	4.00	JM46 N=36-(9,8,9,10)			
Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	5.00			B SPT(C)	5.00	JM47 N=44- (7,10,13,14)			
	6.00			B SPT(C)	6.00	JM48 N=50/275mm- (12,12,14,12/50mm)	6.00	21/06/2016	Dry(E)
	6.00		1.81						
Borehole terminated at scheduled depth.	6.00								

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
Borehole terminated at scheduled depth.
Borehole backfilled - no installation.

Key to Symbols	
B Bulk Disturbed Sample	SPT(S) Standard Penetration Test (Split Spoon)
D Small disturbed sample	SPT(C) Standard Penetration Test (Cone)
W Water sample	▽ 3.50 Waterstrike depth
U(9) Undisturbed sample (drive blows)	▽ 1.50(20) Water level depth 20mins after strike
	5.00(E) Depth to water (E)nd of shift
	5.00(S) Depth to water (S)tart of shift

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Green

HOLE ID: BH07

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Started: 22/06/2016
Boring Completed: 22/06/2016
Rig Type: Dando 150

Co-ordinates: E:722814.511
 N:741203.308
Elevation: 7.20 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
Brown sandy slightly gravelly silty CLAY.	0.00	[Symbol]	7.20						
Stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	0.30	[Symbol]	6.90						
	1.00	[Symbol]		B SPT(C)	1.00	JM49 N=20-(5,5,5,5)			
	2.00	[Symbol]		B SPT(C)	2.00	JM50 N=34-(7,9,9,9)			
	3.00	[Symbol]		B SPT(C)	3.00	JM51 N=31-(6,7,9,9)			
	4.00	[Symbol]		B SPT(C)	4.00	JM52 N=37-(9,9,9,10)			
Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	2.00	[Symbol]	5.20						
	5.00	[Symbol]		B SPT(C)	5.00	JM53 N=40-(8,10,10,12)			
Borehole terminated at scheduled depth.	6.00	[Symbol]	1.20	B SPT(C)	6.00	JM54 N=50/200mm-(15,15,20/50mm)	6.00	22/06/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Chiselling: 3.50m to 3.70m: 0.5hr
 Borehole terminated at scheduled depth.
 Borehole backfilled - no installation.

Key to Symbols	
B	Bulk Disturbed Sample
D	Small disturbed sample
W	Water sample
U(9)	Undisturbed sample (drive blows)
SPT(S)	Standard Penetration Test (Split Spoon)
SPT(C)	Standard Penetration Test (Cone)
▽ 3.50	Waterstrike depth
▽ 1.50(20)	Water level depth 20mins after strike
5.00(E)	Depth to water (E)nd of shift
5.00(S)	Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL BH GINT GPJ COREHOLE.GDT 14/07/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Green

HOLE ID: **BH08**

Client: Gannon Homes
Consultant: Waterman Moylan
Site Address: Clongriffin, Dublin 13
Boring Started: 20/06/2016
Boring Completed: 20/06/2016
Rig Type: Dando 150

Co-ordinates: E:722752.141
 N:741186.902
Elevation: 8.27 m.O.D.
Hole Diameter: 200 mm
Drilled by: J. Moriarty
Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
Brown sandy slightly gravelly silty CLAY.	0.00		8.27						
Firm brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	0.30		7.97	B SPT(C)	1.00 1.00	JM31 N=14-(3,3,4,4)			
Stiff brown slightly sandy gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	1.90		6.37	B SPT(C)	2.00 2.00	JM32 N=18-(4,4,5,5)			
Stiff becoming very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	2.30		5.97	B SPT(C)	3.00 3.00	JM33 N=26-(6,6,7,7)			
				B SPT(C)	4.00 4.00	JM34 N=38-(8,8,11,11)			
				B SPT(C)	5.00 5.00	JM35 N=46-(9,11,12,14)			
Borehole terminated at scheduled depth.	6.00		2.27	B SPT(C)	6.00 6.00	JM36 N=50/275mm-(13,13,15,9/50mm)	6.00	20/06/2016	Dry(E)

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
 Borehole terminated at scheduled depth.

Borehole backfilled - no installation.

Key to Symbols

- B Bulk Disturbed Sample
- D Small disturbed sample
- W Water sample
- U(9) Undisturbed sample (drive blows)
- SPT(S) Standard Penetration Test (Split Spoon)
- SPT(C) Standard Penetration Test (Cone)
- ▼ 3.50 Waterstrike depth
- ▽ 1.50(20) Water level depth 20mins after strike
- 5.00(E) Depth to water (E)nd of shift
- 5.00(S) Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL_BH_GINT_GPJ_COREHOLE.GDT 14/07/16

CABLE PERCUSSIVE BOREHOLE RECORD

CONTRACT: Belltree Green

HOLE ID: BH09

Client: Gannon Homes

Co-ordinates: E:722776.312

Consultant: Waterman Moylan

N:741134.155

Site Address: Clongriffin, Dublin 13

Elevation: 7.51 m.O.D.

Boring Started: 21/06/2016

Hole Diameter: 200 mm

Boring Completed: 21/06/2016

Drilled by: J. Moriarty

Rig Type: Dando 150

Logged by: S. Letch

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Progress/Water		
				Type	Depth (m)	Ref No.	Hole Depth (m)	Date	Water Depth (m)
Brown sandy slightly gravelly silty CLAY.	0.00		7.51						
Very stiff brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	0.30		7.21						
	1.00			B SPT(C)	1.00	JM37 N=36-(7,9,9,11)			
	2.00			B SPT(C)	2.00	JM38 N=30-(6,8,8,8)			
	2.80		4.71	B SPT(C)	3.00	JM39 N=37-(7,9,10,11)			
Very stiff dark grey sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	3.00			B SPT(C)	4.00	JM40 N=42-(10,10,11,11)			
	4.00			B SPT(C)	5.00	JM41 N=48-(9,11,14,14)			
	5.00			B SPT(C)	6.00	JM42 N=50/235mm-(14,15,15,6/10mm)	6.00	21/06/2016	Dry(E)
Borehole terminated at scheduled depth.	6.00		1.51	B SPT(C)	6.00				

Remarks: (Note: Stratum bands <200mm are not indicated pictorially)
Borehole terminated at scheduled depth.
Borehole backfilled - no installation.

Key to Symbols	
B Bulk Disturbed Sample	SPT(S) Standard Penetration Test (Split Spoon)
D Small disturbed sample	SPT(C) Standard Penetration Test (Cone)
W Water sample	Waterstrike depth
U(9) Undisturbed sample (drive blows)	Water level depth 20mins after strike
	5.00(E) Depth to water (E)nd of shift
	5.00(S) Depth to water (S)tart of shift

Site Investigations Ltd

BOREHOLE SL_BH_GINT_GPJ_COREHOLE.GDT 14/07/16

Appendix 2
Trial Pit Logs and Photographs

TRIAL PIT RECORD

Contract: Beltree Green, Clongriffin

Hole ID: **TP05**

Client: Gannon Homes Ltd.

Co-ordinates: E:722630.467

Consultant: Waterman Moylan

N:741205.211

Site Address: Clongriffin, Dublin 13

Elevation: 9.03 m.O.D.

Date Completed: 20/06/2016

Logged by: P. McGonagle

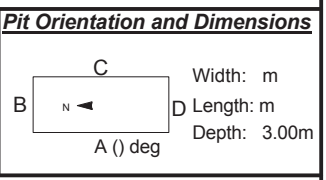
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Brown silty sandy GRAVEL with some cobbles. Cobbles are angular to subangular of limestone.	0.0 0.00		9.03					
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	1.0 1.10		7.93	B	1.00	PM09		
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	1.90 2.0		7.13	B	2.50	PM11		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	6.03					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼^{3.00} Waterstrike depth
 - ▽^{1.50(20)} Water level depth 20mins after strike



TRIAL PIT TP GINT.GPJ COREHOLE.GDT 05/07/16

TRIAL PIT RECORD

Contract: **Beltree Green, Clongriffin**

Hole ID: **TP06**

Client: **Gannon Homes Ltd.**

Co-ordinates: **E:722664.333**

Consultant: **Waterman Moylan**

N:741206.552

Site Address: **Clongriffin, Dublin 13**

Elevation: **8.57 m.O.D.**

Date Completed: **20/06/2016**

Logged by: **P. McGonagle**

Excavator: **JCB 3CX**

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Firm becoming stiff brown sandy gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		8.57	ENV	0.50	PM12		
	1.0			B	1.00	PM13		
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	1.80 2.0		6.77	B	2.00	PM14		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.57					
	4.0							
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:

Pit terminated at scheduled depth.

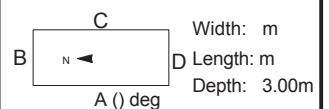
Pit walls stable.

No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼^{3.00} Waterstrike depth
- ▽^{1.50(20)} Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Beltree Green, Clongriffin

Hole ID: TP07

Client: Gannon Homes Ltd.

Co-ordinates: E:722700.029

Consultant: Waterman Moylan

N:741194.719

Site Address: Clongriffin, Dublin 13


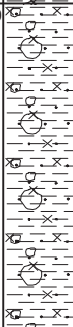
Elevation: 8.57 m.O.D.

Date Completed: 20/06/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		8.57					
	1.0		B	1.00	PM15			
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	1.80 2.0		6.77					
	3.0		B	2.00	PM16			
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.57					
	4.0							
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:

Pit terminated at scheduled depth.

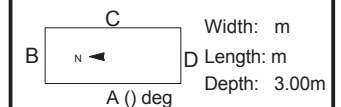
Pit walls stable.

No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- $\nabla_{1.50}$ Waterstrike depth
- $\nabla_{1.50(20)}$ Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT TP GINT.GPJ COREHOLE.GDT 05/07/16

TRIAL PIT RECORD

Contract: **Beltree Green, Clongriffin**

Hole ID: **TP08**

Client: **Gannon Homes Ltd.**

Co-ordinates: **E:722626.624**

Consultant: **Waterman Moylan**

N:741180.408

Site Address: **Clongriffin, Dublin 13**

Elevation: **9.07 m.O.D.**

Date Completed: **20/06/2016**

Logged by: **P. McGonagle**

Excavator: **JCB 3CX**

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		9.07					
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	1.0 2.0 2.00		7.07	B	1.00	PM17		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	6.07					
	4.0 5.0							

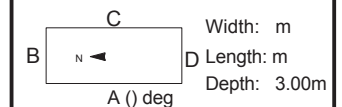
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▽ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Beltree Green, Clongriffin

Hole ID: **TP10**

Client: Gannon Homes Ltd.

Co-ordinates: E:722688.246

Consultant: Waterman Moylan

N:741160.109

Site Address: Clongriffin, Dublin 13

Elevation: 8.66 m.O.D.

Date Completed: 20/06/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		8.66					
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	1.80 2.0		6.86	B	1.00	PM21		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	5.66					
	4.0							
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:

Pit terminated at scheduled depth.

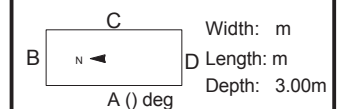
Pit walls stable.

No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼^{3.00} Waterstrike depth
- ▽^{1.50(20)} Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Beltree Green, Clongriffin

Hole ID: **TP11**

Client: Gannon Homes Ltd.

Co-ordinates: E:722784.407

Consultant: Waterman Moylan

N:741228.458

Site Address: Clongriffin, Dublin 13

Elevation: 7.95 m.O.D.

Date Completed: 20/06/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		7.95	B	1.00	PM23		
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	1.80 2.0		6.15					
Pit terminated at scheduled depth.	3.0 3.00	Hole End	4.95					
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:

Pit terminated at scheduled depth.

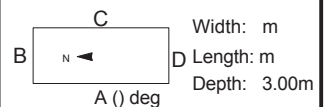
Pit walls stable.

No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼^{3.00} Waterstrike depth
- ▽^{1.50(20)} Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: **Beltree Green, Clongriffin**

Hole ID: **TP12**

Client: **Gannon Homes Ltd.**

Co-ordinates: **E:722819.776**

Consultant: **Waterman Moylan**

N:741217.643

Site Address: **Clongriffin, Dublin 13**

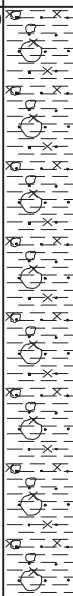
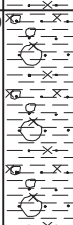
Elevation: **7.27 m.O.D.**

Date Completed: **20/06/2016**

Logged by: **P. McGonagle**

Excavator: **JCB 3CX**

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Firm becoming stiff brown sandy gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		7.27					
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	1.0 2.0 2.20		5.07	B	1.00	PM25		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	4.27					
	4.0 5.0							

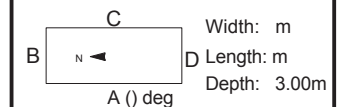
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- W Waterstrike depth
- L Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: **Beltree Green, Clongriffin**

Hole ID: **TP13**

Client: **Gannon Homes Ltd.**

Co-ordinates: **E:722760.258**

Consultant: **Waterman Moylan**

N:741217.678

Site Address: **Clongriffin, Dublin 13**

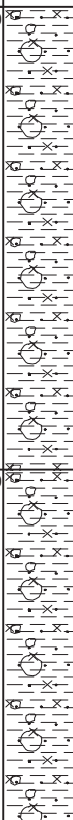
Elevation: **7.84 m.O.D.**

Date Completed: **20/06/2016**



Logged by: **P. McGonagle**

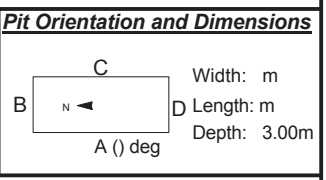
Excavator: **JCB 3CX**

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		7.84	B	1.00	PM27		
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	1.70 2.0		6.14					
Pit terminated at scheduled depth.	3.0 3.00	Hole End	4.84					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

Key to Symbols
 B Bulk disturbed sample
 D Small disturbed sample
 U Undisturbed sample
 V(60) In-situ hand shear vane test(kPa)
 P Hand Penetrometer Test(N value)
 1.50 Waterstrike depth
 1.50(20) Water level depth 20mins after strike



TRIAL PIT TP GINT.GPJ COREHOLE.GDT 05/07/16

TRIAL PIT RECORD

Contract: **Beltree Green, Clongriffin**

Hole ID: **TP14**

Client: **Gannon Homes Ltd.**

Co-ordinates: **E:722774.098**

Consultant: **Waterman Moylan**

N:741192.113

Site Address: **Clongriffin, Dublin 13**

Elevation: **7.90 m.O.D.**

Date Completed: **20/06/2016**

Logged by: **P. McGonagle**

Excavator: **JCB 3CX**

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		7.90	ENV	0.50	PM29		
	1.0		B	1.00	PM30			
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	1.90 2.0		B	6.00	2.00	PM31		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	4.90					
	4.0							
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:

Pit terminated at scheduled depth.

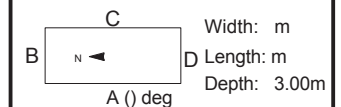
Pit walls stable.

No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼^{3.00} Waterstrike depth
- ▽^{1.50(20)} Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Beltree Green, Clongriffin

Hole ID: **TP15**

Client: Gannon Homes Ltd.

Co-ordinates: E:722805.104

Consultant: Waterman Moylan

N:741191.613

Site Address: Clongriffin, Dublin 13

Elevation: 7.48 m.O.D.

Date Completed: 20/06/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		7.48					
	1.0		B	1.00	PM32			
	1.50		B	1.50	PM33			
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	1.70		5.78					
	2.0			B	2.50	PM34		
Pit terminated at scheduled depth.	3.0 3.00	Hole End	4.48					
	4.0							
	5.0							

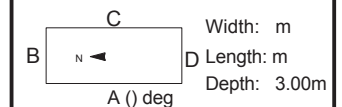
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▽ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Beltree Green, Clongriffin

Hole ID: **TP16**

Client: Gannon Homes Ltd.

Co-ordinates: E:722825.750

Consultant: Waterman Moylan

N:741172.289

Site Address: Clongriffin, Dublin 13

Elevation: 7.30 m.O.D.

Date Completed: 20/06/2016

Logged by: P. McGonagle

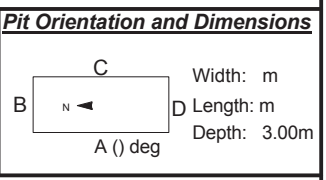
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Firm becoming stiff brown sandy gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		7.30	B	0.50	PM35		
	1.0		B	1.50	PM36			
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	2.0 2.00		5.30					
Pit terminated at scheduled depth.	3.0 3.00	Hole End	4.30					
	4.0							
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼ 3.00 Waterstrike depth
 - ▽ 1.50(20) Water level depth 20mins after strike



TRIAL PIT TP GINT.GPJ COREHOLE.GDT 05/07/16

TRIAL PIT RECORD

Contract: **Beltree Green, Clongriffin**

Hole ID: **TP17**

Client: **Gannon Homes Ltd.**

Co-ordinates: **E:722775.268**

Consultant: **Waterman Moylan**

N:741172.363

Site Address: **Clongriffin, Dublin 13**

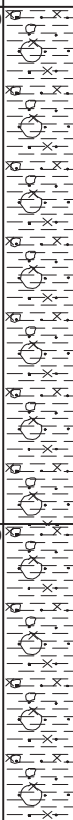
Elevation: **7.77 m.O.D.**

Date Completed: **20/06/2016**

Logged by: **P. McGonagle**

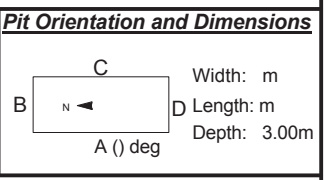
Excavator: **JCB 3CX**

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		7.77	B	1.00	PM37		
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	1.90 2.0		5.87					
Pit terminated at scheduled depth.	3.0 3.00	Hole End	4.77					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼ 3.00 Waterstrike depth
 - ▽ 1.50(20) Water level depth 20mins after strike



TRIAL PIT TP GINT.GPJ COREHOLE.GDT 05/07/16

TRIAL PIT RECORD

Contract: Beltree Green, Clongriffin

Hole ID: **TP18**

Client: Gannon Homes Ltd.

Co-ordinates: E:722745.542

Consultant: Waterman Moylan

N:741160.788

Site Address: Clongriffin, Dublin 13


Elevation: 8.42 m.O.D.

Date Completed: 21/06/2016

Logged by: P. McGonagle

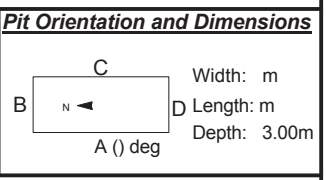
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Brown silty sandy GRAVEL with some cobbles. Cobbles are angular to subangular of limestone.	0.0 0.00		8.42	B	1.00	PM39		
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone. Pit terminated at scheduled depth.	2.90 3.0 3.00		5.52 Hole End 5.42					

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼ 1.50 Waterstrike depth
 - ▽ 1.50(20) Water level depth 20mins after strike



TRIAL PIT TP GINT.GPJ COREHOLE.GDT 05/07/16

TRIAL PIT RECORD

Contract: Beltree Green, Clongriffin

Hole ID: **TP19**

Client: Gannon Homes Ltd.

Co-ordinates: E:722772.489

Consultant: Waterman Moylan

N:741154.753

Site Address: Clongriffin, Dublin 13




Elevation: 7.88 m.O.D.

Date Completed: 21/06/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Firm brown slightly sandy slightly gravelly silty CLAY	0.0 0.00		7.88	B	0.50	PM41		
Brown silty sandy GRAVEL with cobbles and some boulders. Cobbles are angular to subangular of limestone.	0.60 1.0 2.0		7.28	B	2.50	PM42		
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone. Pit terminated at scheduled depth.	2.90 3.0 3.00	 Hole End	4.98 4.88	B	2.90	PM43		
	5.0							

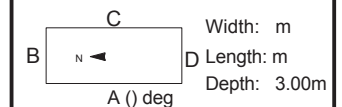
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▽ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TRIAL PIT RECORD

Contract: Beltree Green, Clongriffin

Hole ID: **TP20**

Client: Gannon Homes Ltd.

Co-ordinates: E:722802.255

Consultant: Waterman Moylan

N:741149.310

Site Address: Clongriffin, Dublin 13


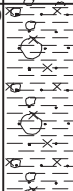
Elevation: 7.39 m.O.D.

Date Completed: 21/06/2016

Logged by: P. McGonagle

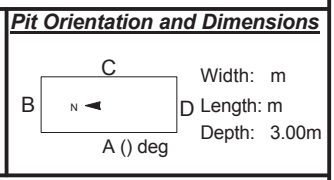
Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date
				Type	Depth (m)	Ref No.		
Brown silty sandy GRAVEL with cobbles and some boulders. Cobbles are angular to subangular of limestone.	0.0 0.00		7.39	B	1.00	PM44		
	1.0							
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	2.30		5.09	B	2.50	PM45		
	3.00							
Pit terminated at scheduled depth.	3.0 3.00	Hole End	4.39					
	4.0							
	5.0							

Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.
Remarks:
 Pit terminated at scheduled depth.
 Pit walls stable.
 No groundwater encountered.

- Key to Symbols**
- B Bulk disturbed sample
 - D Small disturbed sample
 - U Undisturbed sample
 - V(60) In-situ hand shear vane test(kPa)
 - P Hand Penetrometer Test(N value)
 - ▼^{3.50} Waterstrike depth
 - ▽^{1.50(20)} Water level depth 20mins after strike



TRIAL PIT TP GINT.GPJ COREHOLE.GDT 05/07/16

TRIAL PIT RECORD

Contract: Beltree Green, Clongriffin

Hole ID: **TP21**

Client: Gannon Homes Ltd.

Co-ordinates: E:722741.621

Consultant: Waterman Moylan

N:741142.382

Site Address: Clongriffin, Dublin 13

Elevation: 8.37 m.O.D.

Date Completed: 21/06/2016

Logged by: P. McGonagle

Excavator: JCB 3CX

Sheet 1 of 1

DESCRIPTION OF STRATA	Unit Depth (m)	Legend	Elevation (M.O.D.)	Samples/Tests			Water Depth (m)	Date			
				Type	Depth (m)	Ref No.					
Firm becoming stiff brown sandy gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	0.0 0.00		8.37	B	1.00	PM46					
Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content. Cobbles and boulders are angular to subangular of limestone.	2.40		5.97						B	2.50	PM47
Pit terminated at scheduled depth.	3.0 3.00		5.37						Hole End		
	5.0										

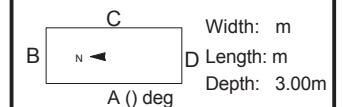
Note: If deemed necessary, pit face sketches are given on the last sheet.
Strata descriptions refer to all faces unless otherwise specified.

Remarks:
Pit terminated at scheduled depth.
Pit walls stable.
No groundwater encountered.

Key to Symbols

- B Bulk disturbed sample
- D Small disturbed sample
- U Undisturbed sample
- V(60) In-situ hand shear vane test(kPa)
- P Hand Penetrometer Test(N value)
- ▼ 3.00 Waterstrike depth
- ▽ 1.50(20) Water level depth 20mins after strike

Pit Orientation and Dimensions



TP01 Pit



TP01 Sidewall



TP01 Spoil



TP02 Pit



TP02 Sidewall



TP02 Spoil



TP03 Pit



TP03 Sidewall



TP03 Spoil



TP04 Pit



TP04 Sidewall



TP04 Spoil



TP05 Pit



TP05 Sidewall



TP05 Spoil



TP06 Pit



TP06 Sidewall



TP06 Spoil



TP07 Pit



TP07 Sidewall



TP07 Spoil



TP08 Pit



TP08 Sidewall



TP08 Spoil



TP09 Pit



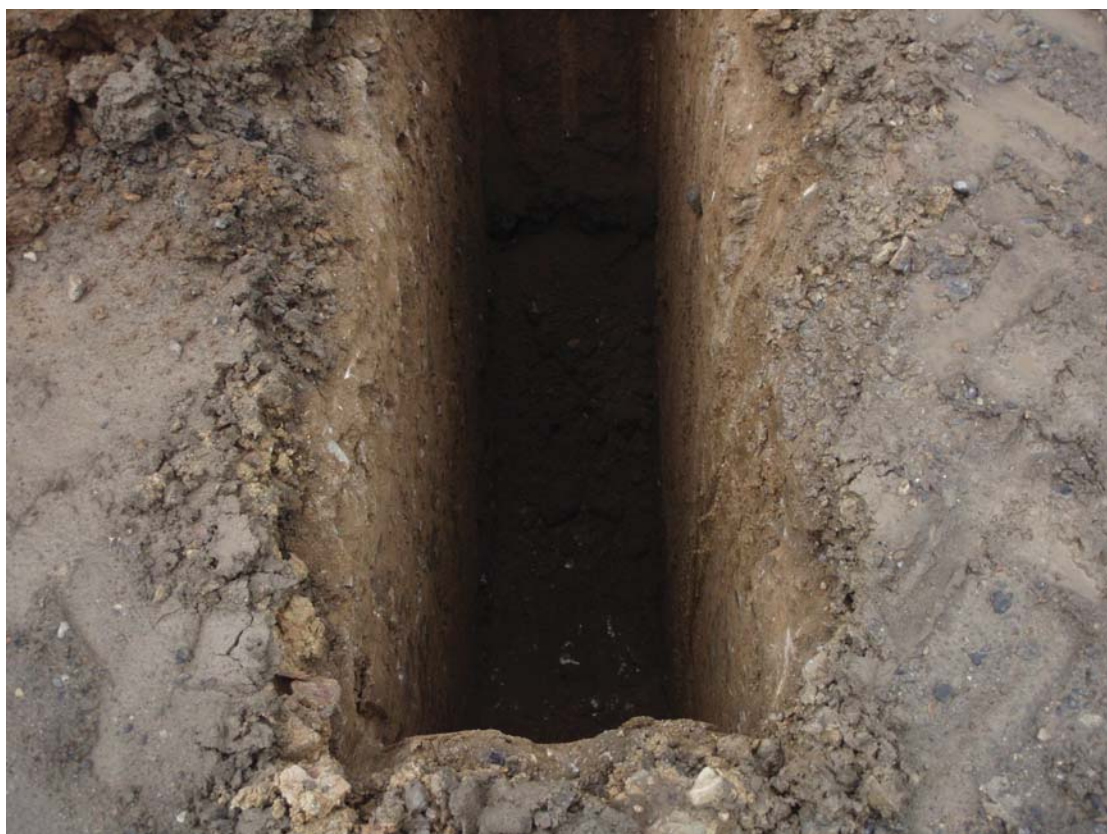
TP09 Sidewall



TP09 Spoil



TP10 Pit



TP10 Sidewall



TP10 Spoil



TP11 Pit



TP11 Sidewall



TP11 Spoil



TP12 Pit



TP12 Sidewall



TP12 Spoil



TP13 Pit



TP13 Sidewall



TP13 Spoil



TP14 Pit



TP14 Sidewall



TP14 Spoil



TP15 Pit



TP15 Sidewall



TP15 Spoil



TP16 Pit



TP16 Sidewall



TP16 Spoil



TP17 Pit



TP17 Sidewall



TP17 Spoil



TP18 Pit



TP18 Sidewall



TP18 Spoil



TP19 Pit



TP19 Sidewall



TP19 Spoil



TP20 Pit



TP20 Sidewall



TP20 Spoil



TP21 Pit



TP21 Sidewall



TP21 Spoil



Appendix 3
Dynamic Probe Logs

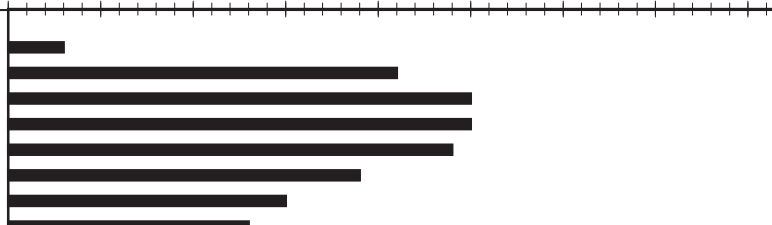


PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP01
SHEET No : 1 OF 1	DATE : 20/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	3 5 17 22 19 16	
1.0	12 8 6 5 4	
1.5	6 5 8 8 13	
2.0	15 18 18 23 35	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.10m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP02
SHEET No : 1 OF 1	DATE : 20/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	0 3 21 25 25 24 19	
1.0	15 13 12 18 18	
1.5	19 16 14 35	
2.0	- - -	
2.5	- -	
3.0	- -	
3.5	- -	
4.0	- -	
4.5	- -	
5.0	- -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 1.60m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP03
SHEET No : 1 OF 1	DATE : 20/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	1 7 14 16 15 11 12 7 7 8 6 7 9 10 21 19 11 20 35	
2.0	-	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 1.90m
2.0		
3.0		
4.0		
5.0		





PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP04
SHEET No : 1 OF 1	DATE : 20/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	1 2 7 21 21 14	
1.0	7 4 5 3	
1.5	5 13 7 5 6	
2.0	5 2 2 9	
2.5	9 12 13 12 13	
3.0	20 27 35 -	
3.5	- - -	
4.0	- - -	
4.5	- - -	
5.0	- -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.90m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP05
SHEET No : 1 OF 1	DATE : 20/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	1 5 4 12 13 9	
1.0	4 3 6 4 3	
1.5	10 11 13 6 6	
2.0	27 35 18	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.20m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP06
SHEET No : 1 OF 1	DATE : 20/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		<div style="display: flex; justify-content: space-between; font-weight: bold; margin-bottom: 5px;"> 0510152025303540 </div>
0.5	0 2 17 26 27 19 24 35	
1.0	-	
1.5	-	
2.0	-	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90°
2.0		
3.0		
4.0		Refusal at 0.80m
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP07
SHEET No : 1 OF 1	DATE : 20/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)																																																																																																						
		0 5 10 15 20 25 30 35 40																																																																																																						
0.5	2 18 31 27 21 12 7 7 9 11 13 5 6 6 13 21 27 14 23 35	<table border="1" style="display: none;"> <caption>Dynamic Probing Diagram Data</caption> <thead> <tr> <th>Depth (m)</th> <th>Reading (Blows/100mm)</th> </tr> </thead> <tbody> <tr><td>0.0 - 0.1</td><td>2</td></tr> <tr><td>0.1 - 0.2</td><td>18</td></tr> <tr><td>0.2 - 0.3</td><td>31</td></tr> <tr><td>0.3 - 0.4</td><td>27</td></tr> <tr><td>0.4 - 0.5</td><td>21</td></tr> <tr><td>0.5 - 0.6</td><td>12</td></tr> <tr><td>0.6 - 0.7</td><td>7</td></tr> <tr><td>0.7 - 0.8</td><td>7</td></tr> <tr><td>0.8 - 0.9</td><td>9</td></tr> <tr><td>0.9 - 1.0</td><td>11</td></tr> <tr><td>1.0 - 1.1</td><td>13</td></tr> <tr><td>1.1 - 1.2</td><td>5</td></tr> <tr><td>1.2 - 1.3</td><td>6</td></tr> <tr><td>1.3 - 1.4</td><td>6</td></tr> <tr><td>1.4 - 1.5</td><td>13</td></tr> <tr><td>1.5 - 1.6</td><td>21</td></tr> <tr><td>1.6 - 1.7</td><td>27</td></tr> <tr><td>1.7 - 1.8</td><td>14</td></tr> <tr><td>1.8 - 1.9</td><td>23</td></tr> <tr><td>1.9 - 2.0</td><td>35</td></tr> <tr><td>2.0 - 2.1</td><td>-</td></tr> <tr><td>2.1 - 2.2</td><td>-</td></tr> <tr><td>2.2 - 2.3</td><td>-</td></tr> <tr><td>2.3 - 2.4</td><td>-</td></tr> <tr><td>2.4 - 2.5</td><td>-</td></tr> <tr><td>2.5 - 2.6</td><td>-</td></tr> <tr><td>2.6 - 2.7</td><td>-</td></tr> <tr><td>2.7 - 2.8</td><td>-</td></tr> <tr><td>2.8 - 2.9</td><td>-</td></tr> <tr><td>2.9 - 3.0</td><td>-</td></tr> <tr><td>3.0 - 3.1</td><td>-</td></tr> <tr><td>3.1 - 3.2</td><td>-</td></tr> <tr><td>3.2 - 3.3</td><td>-</td></tr> <tr><td>3.3 - 3.4</td><td>-</td></tr> <tr><td>3.4 - 3.5</td><td>-</td></tr> <tr><td>3.5 - 3.6</td><td>-</td></tr> <tr><td>3.6 - 3.7</td><td>-</td></tr> <tr><td>3.7 - 3.8</td><td>-</td></tr> <tr><td>3.8 - 3.9</td><td>-</td></tr> <tr><td>3.9 - 4.0</td><td>-</td></tr> <tr><td>4.0 - 4.1</td><td>-</td></tr> <tr><td>4.1 - 4.2</td><td>-</td></tr> <tr><td>4.2 - 4.3</td><td>-</td></tr> <tr><td>4.3 - 4.4</td><td>-</td></tr> <tr><td>4.4 - 4.5</td><td>-</td></tr> <tr><td>4.5 - 4.6</td><td>-</td></tr> <tr><td>4.6 - 4.7</td><td>-</td></tr> <tr><td>4.7 - 4.8</td><td>-</td></tr> <tr><td>4.8 - 4.9</td><td>-</td></tr> <tr><td>4.9 - 5.0</td><td>-</td></tr> </tbody> </table>	Depth (m)	Reading (Blows/100mm)	0.0 - 0.1	2	0.1 - 0.2	18	0.2 - 0.3	31	0.3 - 0.4	27	0.4 - 0.5	21	0.5 - 0.6	12	0.6 - 0.7	7	0.7 - 0.8	7	0.8 - 0.9	9	0.9 - 1.0	11	1.0 - 1.1	13	1.1 - 1.2	5	1.2 - 1.3	6	1.3 - 1.4	6	1.4 - 1.5	13	1.5 - 1.6	21	1.6 - 1.7	27	1.7 - 1.8	14	1.8 - 1.9	23	1.9 - 2.0	35	2.0 - 2.1	-	2.1 - 2.2	-	2.2 - 2.3	-	2.3 - 2.4	-	2.4 - 2.5	-	2.5 - 2.6	-	2.6 - 2.7	-	2.7 - 2.8	-	2.8 - 2.9	-	2.9 - 3.0	-	3.0 - 3.1	-	3.1 - 3.2	-	3.2 - 3.3	-	3.3 - 3.4	-	3.4 - 3.5	-	3.5 - 3.6	-	3.6 - 3.7	-	3.7 - 3.8	-	3.8 - 3.9	-	3.9 - 4.0	-	4.0 - 4.1	-	4.1 - 4.2	-	4.2 - 4.3	-	4.3 - 4.4	-	4.4 - 4.5	-	4.5 - 4.6	-	4.6 - 4.7	-	4.7 - 4.8	-	4.8 - 4.9	-	4.9 - 5.0	-
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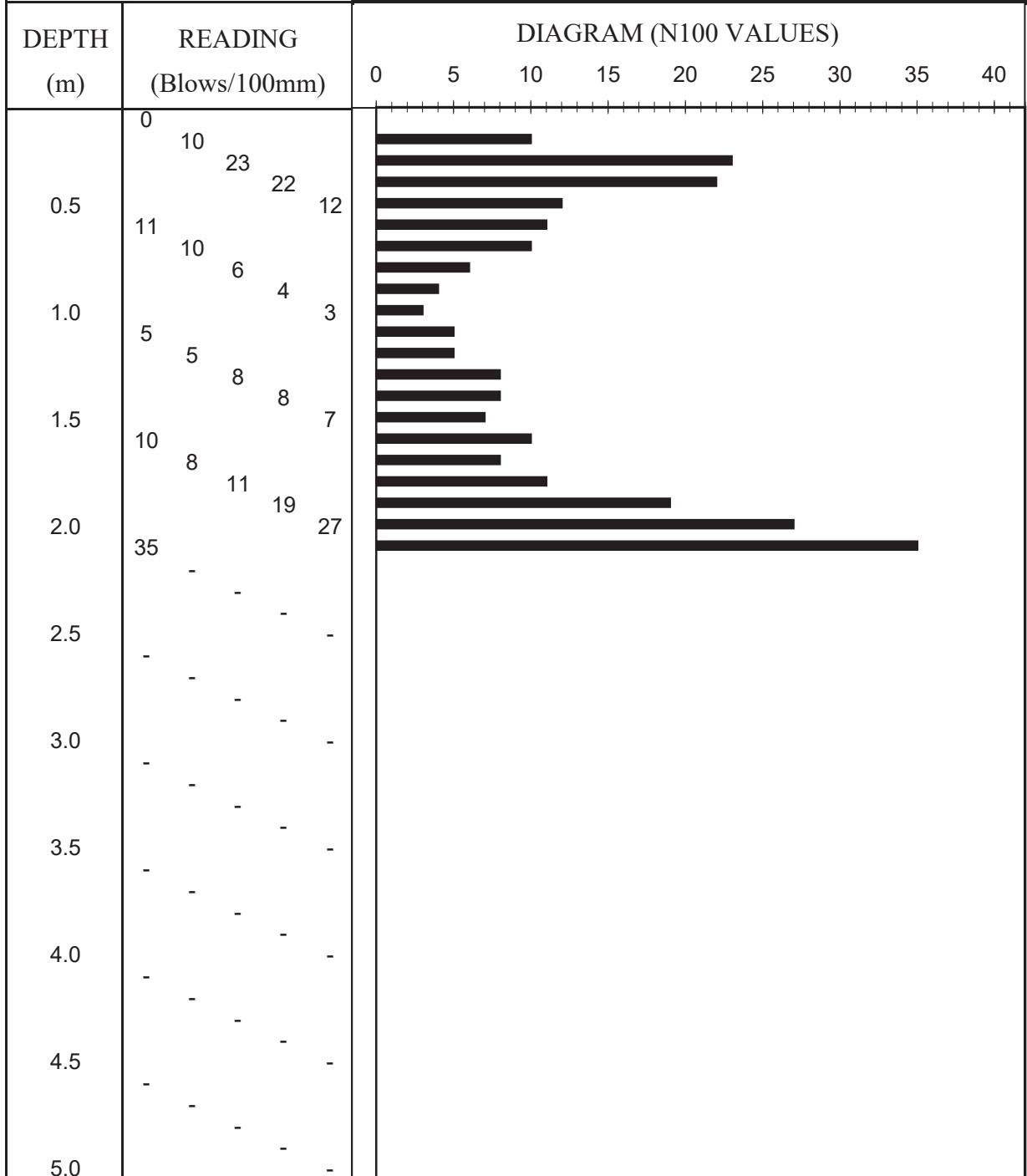
PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP08
SHEET No : 1 OF 1	DATE : 20/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	1 12 24 32 16	
1.0	12 8 8 8 17	
1.5	12 6 4 4 5	
2.0	5 7 7 8 14	
2.5	23 27 35 -	
3.0	- - - -	
3.5	- - - -	
4.0	- - - -	
4.5	- - - -	
5.0	- - - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.20m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP09
SHEET No : 1 OF 1	DATE : 20/06/2016



DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.10m
2.0		
3.0		
4.0		
5.0		

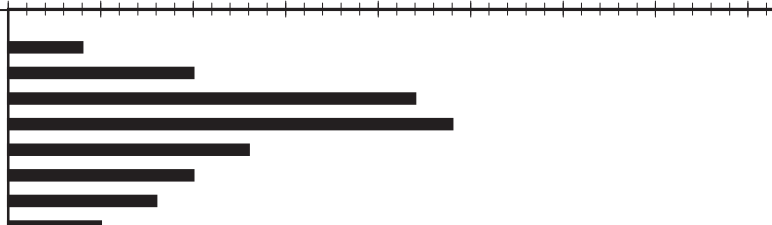



PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP10
SHEET No : 1 OF 1	DATE : 20/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0	7	
0.5	22	
	19	
1.0	17	
	14	
1.5	11	
	14	
2.0	10	
	7	
2.5	7	
	7	
3.0	6	
	10	
3.5	10	
	21	
4.0	16	
	17	
4.5	19	
	18	
5.0	23	
	27	
5.0	35	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.30m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP11
SHEET No : 1 OF 1	DATE : 21/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	0 4 10 22 24 13	
1.0	10 8 5 8 6 3	
1.5	3 3 3 4 5	
2.0	11 21 23 25 30 35	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.30m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP12
SHEET No : 1 OF 1	DATE : 21/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 5 16 27 35	
1.0	-	
1.5	-	
2.0	-	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 0.50m Reattempt made 2m from this location.
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP12A
SHEET No : 1 OF 1	DATE : 21/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	0 3 8 14 19 21 29 35	
1.0	-	
1.5	-	
2.0	-	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 0.80m
2.0		
3.0		
4.0		
5.0		

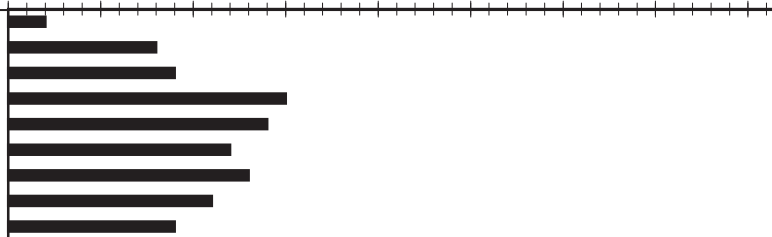




PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP13
SHEET No : 1 OF 1	DATE : 21/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 15 23 20 8	
1.0	9 9 12 24 13	
1.5	8 11 12 10 11	
2.0	12 15 21 16 18	
2.5	27 35 - - -	
3.0	- - - - -	
3.5	- - - - -	
4.0	- - - - -	
4.5	- - - - -	
5.0	- - - - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.20m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

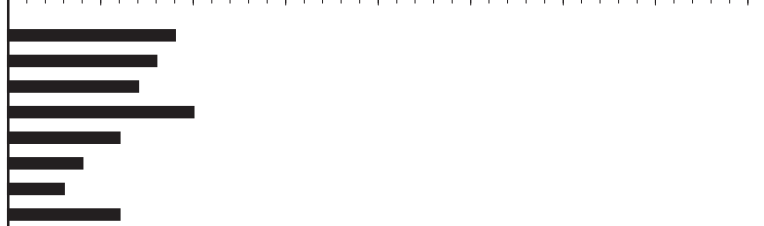

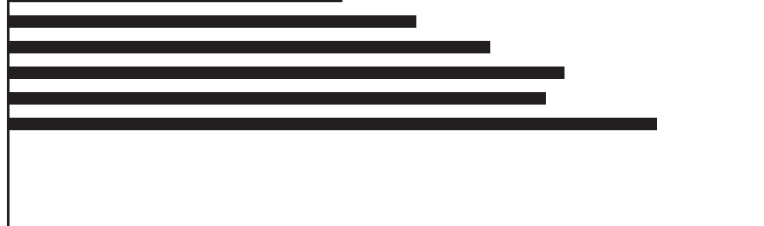



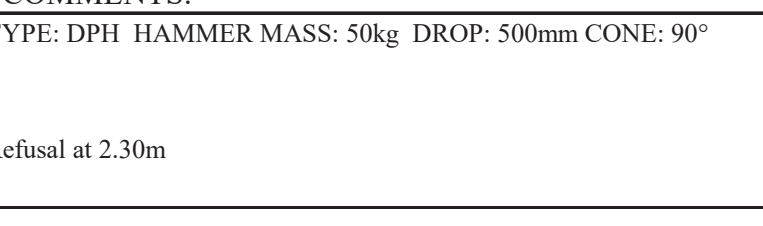

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP14
SHEET No : 1 OF 1	DATE : 21/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 8 9 15 14 12	
1.0	13 11 9 6 5	
1.5	3 3 4 4 4	
2.0	6 8 23 27 31	
2.5	35 -	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	

DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.20m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP15
SHEET No : 1 OF 1	DATE : 21/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	9 8 7 10 6 4 3	
1.0	6 4 5 4	
1.5	6 10 14 14	
2.0	18 22 26 30 29	
2.5	35 -	
3.0	- - -	
3.5	- - -	
4.0	- - -	
4.5	- - -	
5.0	- -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.30m
2.0		
3.0		
4.0		
5.0		

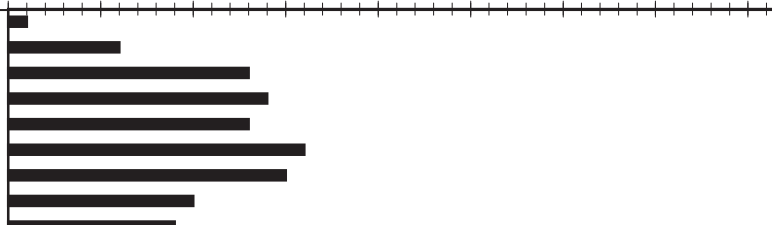



PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP16
SHEET No : 1 OF 1	DATE : 21/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	2 7 15 12 10 8 6 5 4 6 13 8 7 8 8 5 5 7 10 13 18 18 18 17 15 24 27 25 31 35	
3.5	- - - - - - - - -	
4.0	- - - - - - - - -	
4.5	- - - - - - - - -	
5.0	- - - - - - - - -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 3.10m
2.0		
3.0		
4.0		
5.0		












PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP17
SHEET No : 1 OF 1	DATE : 21/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	1 6 13 14 13 16 15 10	
1.0	9 8 7 4	
1.5	9 11 8 6 4	
2.0	7 9 11 13 21 29 35	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.40m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP18
SHEET No : 1 OF 1	DATE : 21/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.0	0	
0.1	2	
0.2	21	
0.3	29	
0.4	26	
0.5	24	
0.6	28	
0.7	24	
0.8	27	
0.9	31	
1.0	28	
1.1	35	
1.2	-	
1.3	-	
1.4	-	
1.5	-	
1.6	-	
1.7	-	
1.8	-	
1.9	-	
2.0	-	
2.1	-	
2.2	-	
2.3	-	
2.4	-	
2.5	-	
2.6	-	
2.7	-	
2.8	-	
2.9	-	
3.0	-	
3.1	-	
3.2	-	
3.3	-	
3.4	-	
3.5	-	
3.6	-	
3.7	-	
3.8	-	
3.9	-	
4.0	-	
4.1	-	
4.2	-	
4.3	-	
4.4	-	
4.5	-	
4.6	-	
4.7	-	
4.8	-	
4.9	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 1.30m
2.0		
3.0		
4.0		
5.0		

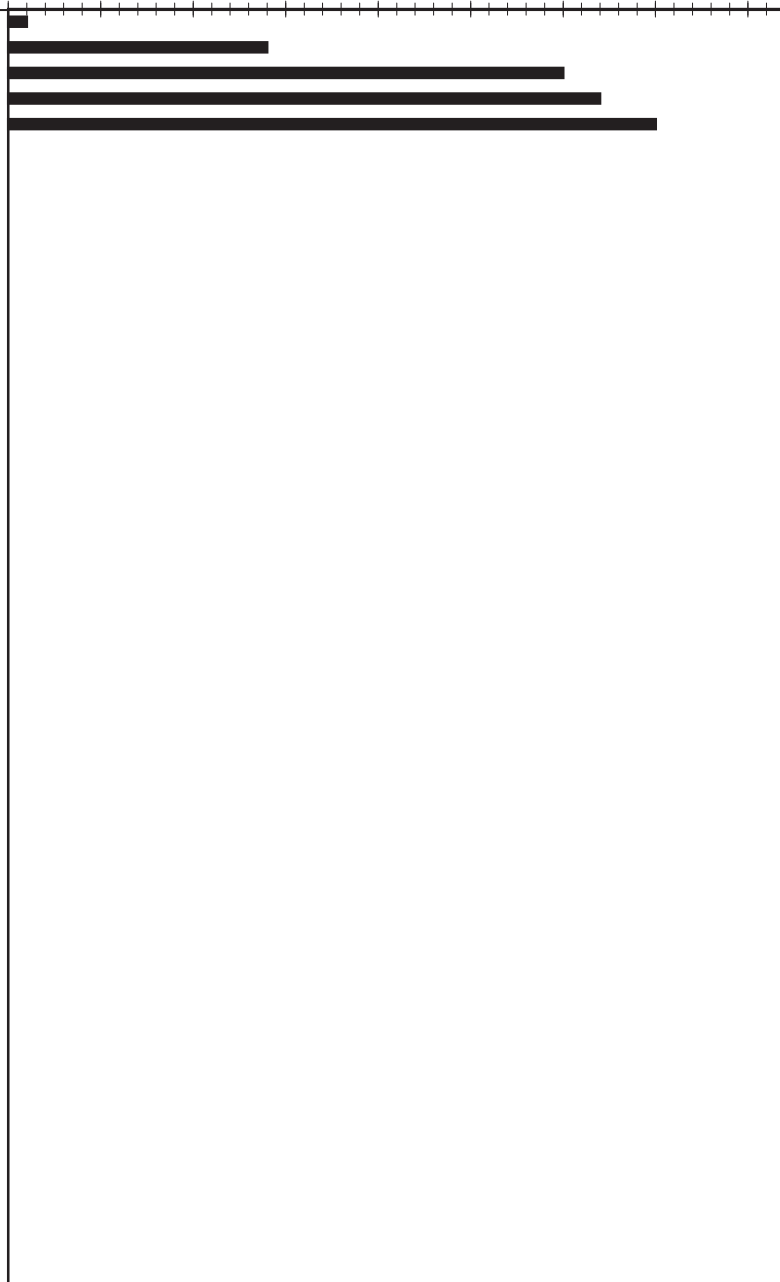
PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP19
SHEET No : 1 OF 1	DATE : 21/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	1 5 5 12 25 17 13	
1.0	12 8 10 17 9	
1.5	10 11 10 6 5	
2.0	6 6 8 7 7	
2.5	9 11 20 27 29 35	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 2.80m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP20
SHEET No : 1 OF 1	DATE : 21/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	1 14 30 32 35	
1.0	-	
1.5	-	
2.0	-	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 0.50m Reattempt made 2m from this location.
2.0		
3.0		
4.0		
5.0		





PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP20A
SHEET No : 1 OF 1	DATE : 21/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
	0	
	8	
	19	
	27	
0.5	26	
	35	
1.0	-	
1.5	-	
2.0	-	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5.0	-	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 0.60m
2.0		
3.0		
4.0		
5.0		

PENNINE DYNAMIC PROBING

SITE : Belltree Green	P.C. No : 5294
CLIENT : Gannon Homes	PROBE No : DP21
SHEET No : 1 OF 1	DATE : 21/06/2016

DEPTH (m)	READING (Blows/100mm)	DIAGRAM (N100 VALUES)
		0 5 10 15 20 25 30 35 40
0.5	1 8 11 8 7 10	
1.0	15 12 10 8 6 7	
1.5	9 9 11 23 27	
2.0	26 35 -	
2.5	- - -	
3.0	- - -	
3.5	- - -	
4.0	- - -	
4.5	- - -	
5.0	- -	
DEPTH (m)	TORQUE (Nm)	COMMENTS:
1.0		TYPE: DPH HAMMER MASS: 50kg DROP: 500mm CONE: 90° Refusal at 1.90m
2.0		
3.0		
4.0		
5.0		

Appendix 4
Soakaway Test Results

SOAKAWAY TEST f-Value Calculations

SIL

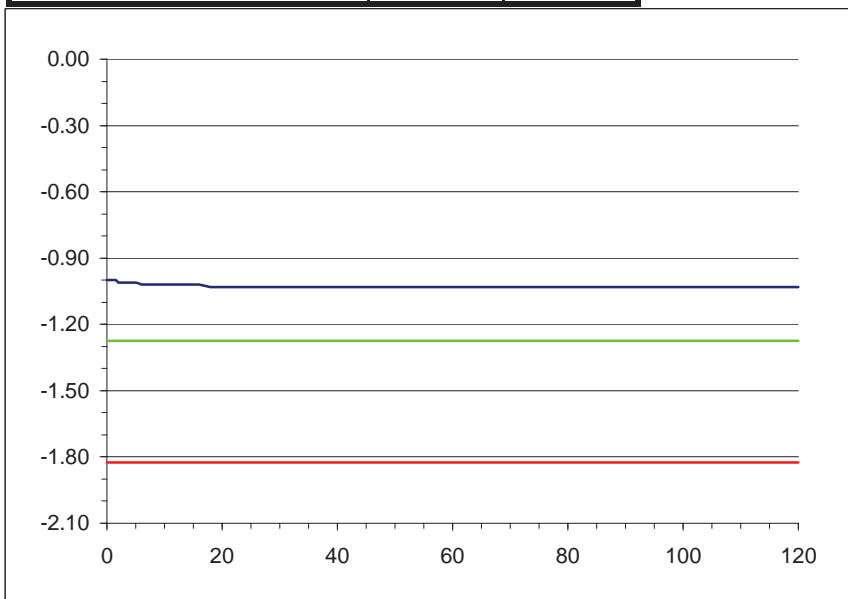
Project Reference:	5295
Contract:	Belltree Green
Location:	Clongriffin, Dublin 13
Test No:	SA01
Date:	20/06/2016

Ground Conditions		
From	To	
0.00	1.40	Firm becoming stiff brown sandy gravelly silty CLAY with some cobble and boulder content.
1.40	2.10	Stiff black slightly sandy slightly gravelly silty CLAY with some cobble and boulder content.

Comments:
Pit walls stable.

Elapsed Time (mins)	Fall of Water (m)
0	-1.00
0.5	-1.00
1	-1.00
1.5	-1.00
2	-1.01
2.5	-1.01
3	-1.01
3.5	-1.01
4	-1.01
4.5	-1.01
5	-1.01
6	-1.02
7	-1.02
8	-1.02
9	-1.02
10	-1.02
12	-1.02
14	-1.02
16	-1.02
18	-1.03
20	-1.03
25	-1.03
30	-1.03
40	-1.03
50	-1.03
60	-1.03
75	-1.03
90	-1.03
120	-1.03

Pit Dimensions (m)		
Length (m)	2.30	m
Width (m)	0.60	m
Depth	2.10	m
Water		
Start Depth of Water	1.00	m
Depth of Water	1.10	m
75% Full	1.275	m
25% Full	1.825	m
75%-25%	0.55	m
Volume of water (75%-25%)	0.759	m ³
Area of Drainage	12.18	m ²
Area of Drainage (75%-25%)	4.57	m ²
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	N/A	min
Time 75% to 25% (sec)	N/A	sec



f = N/A or N/A
m/min m/s

SOAKAWAY TEST f-Value Calculations

SIL

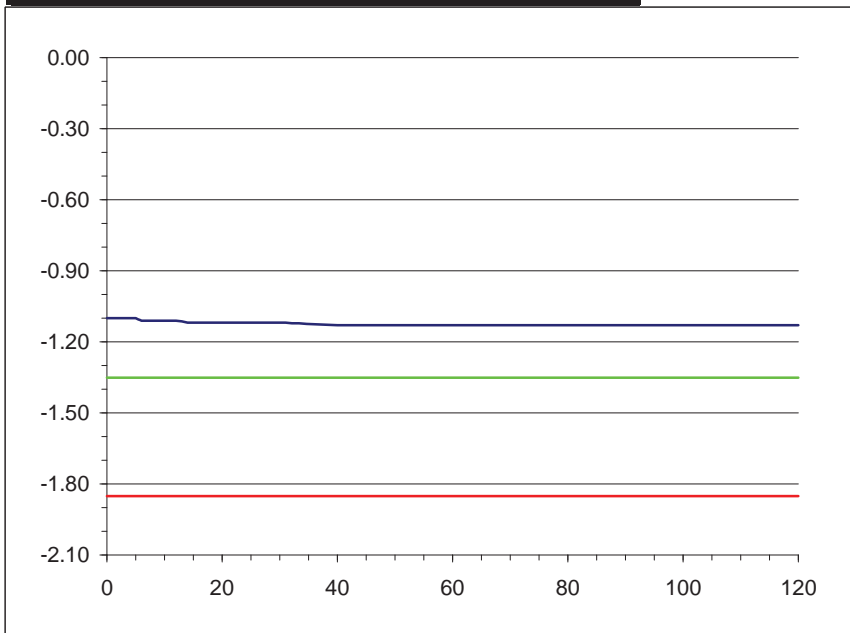
Project Reference:	5295
Contract:	Belltree Green
Location:	Clongriffin, Dublin 13
Test No:	SA02
Date:	20/06/2016

Ground Conditions		
From	To	
0.00	1.40	Firm brown slightly sandy slightly gravelly silty CLAY.
1.40	2.10	Brown silty sandy GRAVEL with cobbles and some boulders.

Comments:
Pit walls stable.

Elapsed Time (mins)	Fall of Water (m)
0	-1.10
0.5	-1.10
1	-1.10
1.5	-1.10
2	-1.10
2.5	-1.10
3	-1.10
3.5	-1.10
4	-1.10
4.5	-1.10
5	-1.10
6	-1.11
7	-1.11
8	-1.11
9	-1.11
10	-1.11
12	-1.11
14	-1.12
16	-1.12
18	-1.12
20	-1.12
25	-1.12
30	-1.12
40	-1.13
50	-1.13
60	-1.13
75	-1.13
90	-1.13
120	-1.13

Pit Dimensions (m)		
Length (m)	2.50	m
Width (m)	0.60	m
Depth	2.10	m
Water		
Start Depth of Water	1.10	m
Depth of Water	1.00	m
75% Full	1.35	m
25% Full	1.85	m
75%-25%	0.5	m
Volume of water (75%-25%)	0.75	m ³
Area of Drainage	13.02	m ²
Area of Drainage (75%-25%)	4.6	m ²
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	N/A	min
Time 75% to 25% (sec)	N/A	sec



f = N/A or N/A
m/min m/s

Appendix 5
Laboratory Test Results

Classification Tests

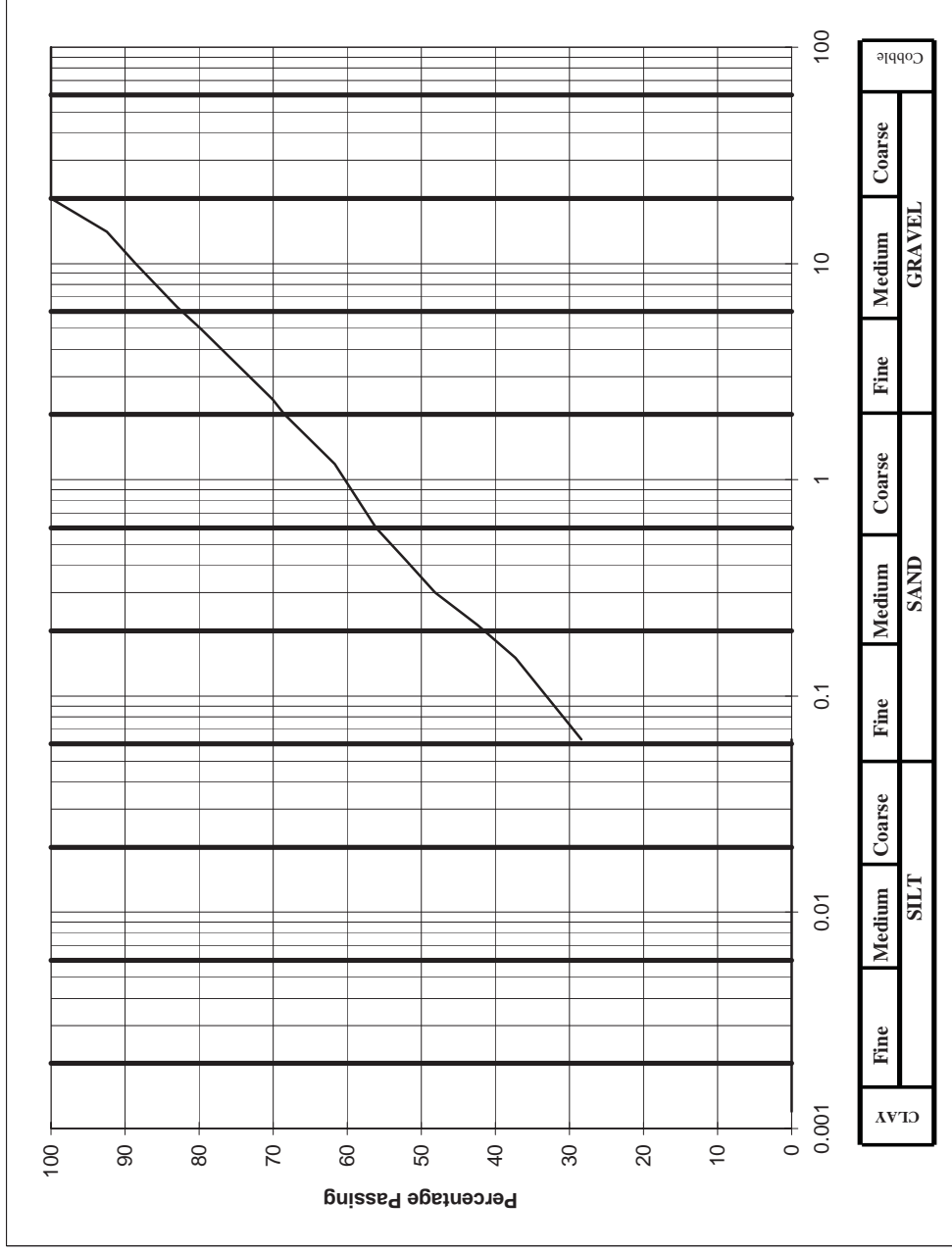
Client	Gannon Homes			
Site	Belltree Green, Clongriffin			
S.I. File No	5295 / 16			
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email siltd@indigo.ie			
Report Date	14th July 2016			

Hole ID	Depth	Sample No	Lab Ref No.	Sample Type	Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Max. Dry Density Mg/m ³	Min. Dry Density Mg/m ³	Particle Density Mg/m ³	% passing 425um	Comments	Remarks
BH03	1.50	JM05	16/573	B	9.0	38	24				52.1		C=Clay; M=Silt Plasticity: L=Low; I=Intermediate; H=High; V=Very High; E=Extremely High
BH08	2.00	JM14	16/575	B	9.3	34	22				52.3		CI CL

BS 1377 Particle Size Analysis

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	0.0630	
90	100	0.0200	
75	100	0.0060	
63	100	0.0020	
50	100		
37.5	100		
28	100		
20	100		
14	92.5		
10	88.6		
6.3	83		
5.0	79.8		
2.36	70.1		
2.00	68.5		
1.18	61.7		
0.600	56.1		
0.425	52.1		
0.300	48.1		
0.212	42.4		
0.150	37.3		
0.063	28		

Cobbles, %	0
Gravel, %	32
Sand, %	41
Clay / Silt, %	28



Client :	Gannon Homes Ltd.
Project :	Clongriffin - Beltree Green

Lab. No. :	16/573
Sample No. :	JM05

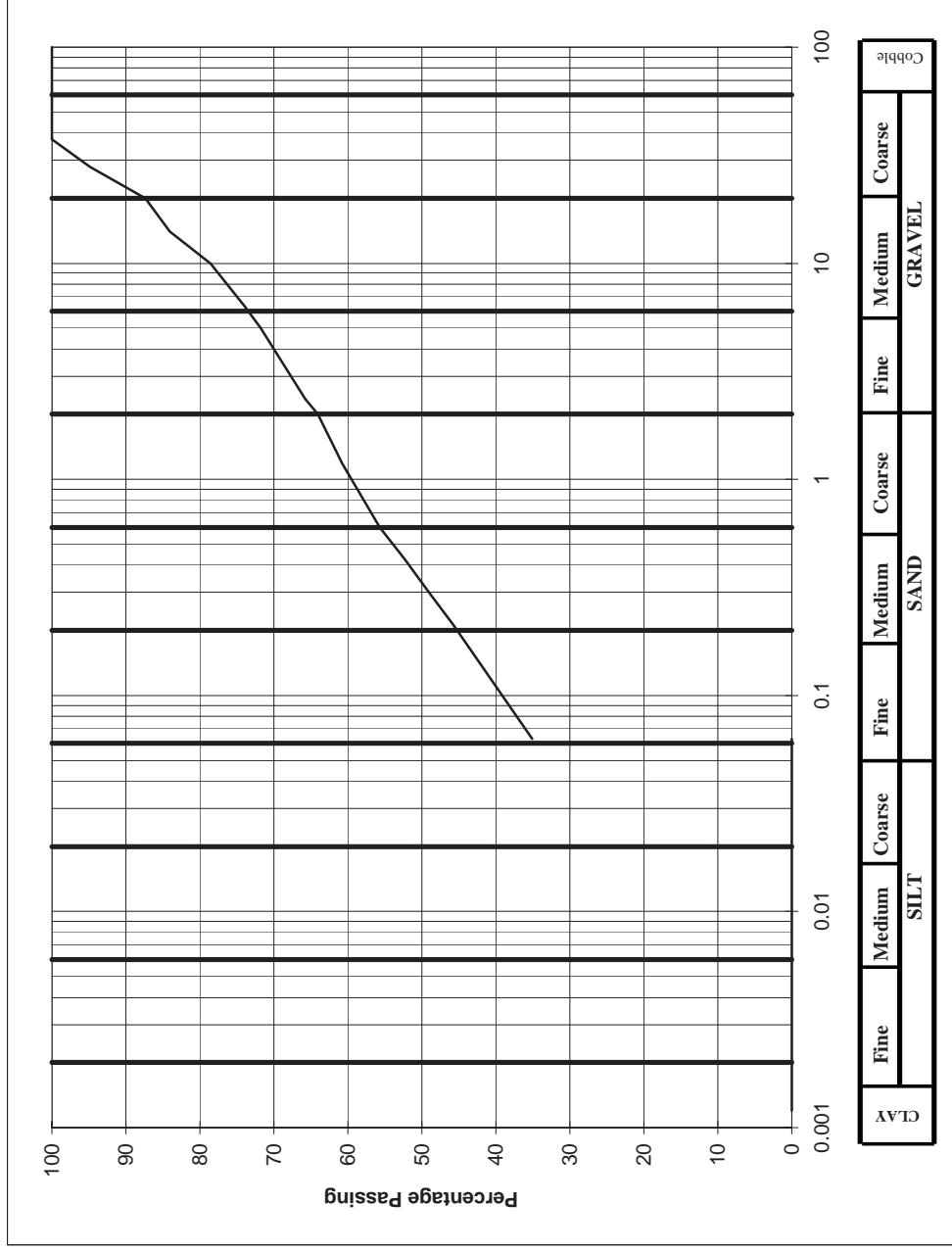
Hole ID :	BH 03
Depth, m :	1.50

Material description :	slightly gravelly sandy silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

BS 1377 Particle Size Analysis

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	0.0630	
90	100	0.0200	
75	100	0.0060	
63	100	0.0020	
50	100		
37.5	100		
28	94.8		
20	87.4		
14	84.1		
10	78.6		
6.3	73.9		
5.0	71.8		
2.36	65.8		
2.00	64.1		
1.18	60.8		
0.600	55.7		
0.425	52.3		
0.300	49.1		
0.212	45.8		
0.150	42.7		
0.063	35		

Cobbles, %	0
Gravel, %	36
Sand, %	29
Clay / Silt, %	35



Client : Gannon Homes Ltd.
 Project : Clongriffin - Beltree Green

Lab. No : 16/575
 Sample No : JM14

Hole ID : BH 08
 Depth, m : 2.00

Material description : slightly sandy gravelly silty CLAY
 Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour.
 Remarks : Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

California Bearing Ratio (CBR) In accordance with BS1377: Part 4: Method 7

Client	Gannon Homes
Site	Belltree Green, Clongriffin
S.I. File No	5295 / 16
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email siltld@indigo.ie
Report Date	14th July 2016

Hole ID	Depth (mBGL)	Sample No	Sample Type	Lab Ref	Moisture Content (%)	CBR Value (%)	Remarks / Material Type
CBR01	0.60	PM01	B	16/579	9.1	4.2	
CBR02	0.60	PM02	B	16/580	8.8	3.7	
CBR03	0.60	PM03	B	16/581	8.3	3.6	
CBR04	0.60	PM04	B	16/582	9.7	4.8	
CBR05	0.60	PM05	B	16/583	7.9	3.2	

Chemical Testing
In accordance with BS 1377: Part 3

Client	Gannon Homes Ltd.
Site	Belltree Green, Clongriffin
S.I. File No	5295 / 16
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email siltd@indigo.ie
Report Date	14th July 2016

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Sulphate Content Acid Soluble (SO ₃) g/L	Sulphate Content Acid Soluble (SO ₃) %	Organic Content %	Chloride ion Content (soil:water ratio 2:1) %	% passing 2mm	Remarks
BH03	1.50	JM05	16/573	9.13	0.117	0.080	2.37	0.33	68.5	
BH05	1.50	JM10	16/574	9.22	0.108	0.071	2.84	0.27	65.8	
BH08	2.00	JM14	16/575	8.83	0.105	0.067	3.09	0.31	64.1	



Site Investigations Ltd
The Grange
Carhugar
12th Lock Road
Lucan
Co. Dublin

Attention: Stephen Letch

CERTIFICATE OF ANALYSIS

Date: 09 July 2016
Customer: D_SITEINV_NCS
Sample Delivery Group (SDG): 160630-16
Your Reference:
Location: Beltree Green
Report No: 368314

We received 2 samples on Wednesday June 29, 2016 and 2 of these samples were scheduled for analysis which was completed on Saturday July 09, 2016. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager



SDG: 160630-16	Location: Beltree Green	Order Number: 67/A/16
Job: D_SITEINV_NCS-81	Customer: Site Investigations Ltd	Report Number: 368314
Client Reference:	Attention: Stephen Letch	Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
13681226	TP06		0.50	27/06/2016
13681227	TP14		0.50	27/06/2016



Only received samples which have had analysis scheduled will be shown on the following pages.



SDG: 160630-16
 Job: D_SITEINV_NCS-81
 Client Reference:

Location: Beltree Green
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 67/A/16
 Report Number: 368314
 Superseded Report:

SOLID Results Legend  Test  No Determination Possible	Lab Sample No(s)	13681226	13681227	
	Customer Sample Reference	TP06	TP14	
	AGS Reference			
	Depth (m)	0.50	0.50	
	Container	250g Amber Jar (AL 1kg TUB 60g VOC (ALE215))	250g Amber Jar (AL 1kg TUB 60g VOC (ALE215))	
ANC at pH4 and ANC at pH 6	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Anions by Kone (w)	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CEN Readings	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Fluoride	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GRO by GC-FID (S)	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Loss on Ignition in soils	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Mercury Dissolved	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Mineral Oil	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PAH Value of soil	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PCBs by GCMS	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
pH	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Phenols by HPLC (W)	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sample description	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



SDG: 160630-16
 Job: D_SITEINV_NCS-81
 Client Reference:

Location: Beltree Green
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 67/A/16
 Report Number: 368314
 Superseded Report:

SOLID Results Legend <input checked="" type="checkbox"/> Test <input type="checkbox"/> No Determination Possible	Lab Sample No(s)		13681226	13681227
	Customer Sample Reference		TP06	TP14
	AGS Reference			
	Depth (m)		0.50	0.50
	Container		250g Amber Jar (AL) 1kg TUB	60g VOC (ALE215) 1kg TUB 250g Amber Jar (AL)
Total Dissolved Solids	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Total Organic Carbon	All	NDPs: 0 Tests: 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

SDG: 160630-16
Job: D_SITEINV_NCS-81
Client Reference:
Location: Beltree Green
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 67/A/16
Report Number: 368314
Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
13681226	TP06	0.50	Dark Brown	Silt Loam	0.002 - 0.063 mm	Vegetation	Stones
13681227	TP14	0.50	Dark Brown	Silt Loam	0.002 - 0.063 mm	Stones	N/A

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



SDG: 160630-16
Job: D_SITEINV_NCS-81
Client Reference:

Location: Beltree Green
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 67/A/16
Report Number: 368314
Superseded Report:

Table with columns: Results Legend, Customer Sample R, TP06, TP14, Component, LOD/Units, Method, and numerical data for various chemical tests like Moisture Content Ratio, Loss on ignition, Mineral oil, PCB congeners, etc.



SDG: 160630-16
Job: D_SITEINV_NCS-81
Client Reference:

Location: Beltree Green
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 67/A/16
Report Number: 368314
Superseded Report:

GRO by GC-FID (S)

Table with columns for Component, LOD/Units, Method, and results for samples TP06 and TP14. Includes a Results Legend and Customer Sample R details.

SDG: 160630-16
 Job: D_SITEINV_NCS-81
 Client Reference:

Location: Beltree Green
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 67/A/16
 Report Number: 368314
 Superseded Report:

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.098
Mass of dry sample (kg)	0.175
Particle Size <4mm	>95%

Site Location	Beltree Green
Natural Moisture Content (%)	9.53
Dry Matter Content (%)	91.3

Case	
SDG	160630-16
Lab Sample Number(s)	13681226
Sampled Date	27-Jun-2016
Customer Sample Ref.	TP06
Depth (m)	0.50

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	>6	-
-	-	-
-	-	-

Solid Waste Analysis	Result
Total Organic Carbon (%)	0.809
Loss on Ignition (%)	2.56
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	72.4
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	8.61
ANC to pH 6 (mol/kg)	0.571
ANC to pH 4 (mol/kg)	3.92

Eluate Analysis	C2 Conc ⁿ in 10:1 eluate (mg/l)		A2 10:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.000374	<0.00012	0.00374	<0.0012	0.5	2	25
Barium	0.00862	<0.00003	0.0862	<0.0003	20	100	300
Cadmium	<0.0001	<0.0001	<0.001	<0.001	0.04	1	5
Chromium	0.00105	<0.00022	0.0105	<0.0022	0.5	10	70
Copper	<0.00085	<0.00085	<0.0085	<0.0085	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00594	<0.00024	0.0594	<0.0024	0.5	10	30
Nickel	0.000489	<0.00015	0.00489	<0.0015	0.4	10	40
Lead	0.000063	<0.00002	0.00063	<0.0002	0.5	10	50
Antimony	0.000611	<0.00016	0.00611	<0.0016	0.06	0.7	5
Selenium	0.000481	<0.00039	0.00481	<0.0039	0.1	0.5	7
Zinc	0.000682	<0.00041	0.00682	<0.0041	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	19.9	<2	199	<20	1000	20000	50000
Total Dissolved Solids	71.4	<5	714	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	06-Jul-2016
pH (pH Units)	8.90
Conductivity (µS/cm)	90.90
Temperature (°C)	20.50
Volume Leachant (Litres)	0.891

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

SDG: 160630-16
 Job: D_SITEINV_NCS-81
 Client Reference:

Location: Beltree Green
 Customer: Site Investigations Ltd
 Attention: Stephen Letch

Order Number: 67/A/16
 Report Number: 368314
 Superseded Report:

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.096
Mass of dry sample (kg)	0.175
Particle Size <4mm	>95%

Site Location	Beltree Green
Natural Moisture Content (%)	7.08
Dry Matter Content (%)	93.4

Case	
SDG	160630-16
Lab Sample Number(s)	13681227
Sampled Date	27-Jun-2016
Customer Sample Ref.	TP14
Depth (m)	0.50

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	>6	-
-	-	-
-	-	-

Solid Waste Analysis	Result
Total Organic Carbon (%)	0.37
Loss on Ignition (%)	1.3
Sum of BTEX (mg/kg)	0.0604
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	18.9
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	8.94
ANC to pH 6 (mol/kg)	0.708
ANC to pH 4 (mol/kg)	5.32

Eluate Analysis	C2 Conc ⁿ in 10:1 eluate (mg/l)		A2 10:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.000269	<0.00012	0.00269	<0.0012	0.5	2	25
Barium	0.00462	<0.00003	0.0462	<0.0003	20	100	300
Cadmium	<0.0001	<0.0001	<0.001	<0.001	0.04	1	5
Chromium	0.000974	<0.00022	0.00974	<0.0022	0.5	10	70
Copper	<0.00085	<0.00085	<0.0085	<0.0085	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00363	<0.00024	0.0363	<0.0024	0.5	10	30
Nickel	0.000343	<0.00015	0.00343	<0.0015	0.4	10	40
Lead	<0.00002	<0.00002	<0.0002	<0.0002	0.5	10	50
Antimony	0.000594	<0.00016	0.00594	<0.0016	0.06	0.7	5
Selenium	<0.00039	<0.00039	<0.0039	<0.0039	0.1	0.5	7
Zinc	<0.00041	<0.00041	<0.0041	<0.0041	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	44.7	<5	447	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	06-Jul-2016
pH (pH Units)	8.98
Conductivity (µS/cm)	57.60
Temperature (°C)	20.40
Volume Leachant (Litres)	0.894

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

09/07/2016 10:57:22
 10:57:16 09/07/2016

SDG: 160630-16
Job: D_SITEINV_NCS-81
Client Reference:

Location: Beltree Green
Customer: Site Investigations Ltd
Attention: Stephen Letch

Order Number: 67/A/16
Report Number: 368314
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step		
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition		
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water		
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser		
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils		
TM182	CEN/TC 292 - WI 292046-characterization of waste-leaching Behaviour Tests- Acid and Base Neutralization Capacity Test	Determination of Acid Neutralisation Capacity (ANC) Using Autotitration in Soils		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM213	In-house Method	Rapid Determination of PAHs by GC-FID		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



SDG: 160630-16
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Superseded Report:

Test Completion Dates

Lab Sample No(s)	13681226	13681227
Customer Sample Ref.	TP06	TP14
AGS Ref.		
Depth	0.50	0.50
Type	SOLID	SOLID
ANC at pH4 and ANC at pH 6	08-Jul-2016	08-Jul-2016
Anions by Kone (w)	08-Jul-2016	08-Jul-2016
CEN 10:1 Leachate (1 Stage)	06-Jul-2016	06-Jul-2016
CEN Readings	07-Jul-2016	07-Jul-2016
Dissolved Metals by ICP-MS	08-Jul-2016	08-Jul-2016
Dissolved Organic/Inorganic Carbon	08-Jul-2016	08-Jul-2016
Fluoride	08-Jul-2016	08-Jul-2016
GRO by GC-FID (S)	08-Jul-2016	08-Jul-2016
Loss on Ignition in soils	08-Jul-2016	08-Jul-2016
Mercury Dissolved	08-Jul-2016	08-Jul-2016
Mineral Oil	09-Jul-2016	09-Jul-2016
PAH Value of soil	07-Jul-2016	07-Jul-2016
PCBs by GCMS	08-Jul-2016	08-Jul-2016
pH	07-Jul-2016	07-Jul-2016
Phenols by HPLC (W)	08-Jul-2016	08-Jul-2016
Sample description	06-Jul-2016	06-Jul-2016
Total Dissolved Solids	08-Jul-2016	08-Jul-2016
Total Organic Carbon	08-Jul-2016	08-Jul-2016



SDG: 160630-16
Job: D_SITEINV_NCS-81
Client Reference:

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Attention: Stephen Letch

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Report Number: 368314
Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

General

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
\$	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anorthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Appendix 6
Survey Data

Site Survey

Location	Irish National Grid		Level	Irish Transverse Mercator	
	Easting	Northing		Easting	Northing
Boreholes					
BH01	322731.117	241241.071	8.53	722655.353	741265.757
BH02	322772.971	241228.509	8.06	722697.198	741253.198
BH03	322751.786	241206.663	8.31	722676.017	741231.356
BH04	322717.588	241180.542	8.90	722641.826	741205.241
BH05	322742.470	241151.989	8.80	722666.702	741176.694
BH06	322841.084	241208.431	7.81	722765.296	741233.123
BH07	322890.310	241178.609	7.20	722814.511	741203.308
BH08	322827.927	241162.199	8.27	722752.141	741186.902
BH09	322852.104	241109.441	7.51	722776.312	741134.155
Trial Pits					
TP01	322717.396	241227.448	8.40	722641.634	741252.137
TP02	322718.256	241207.315	8.42	722642.494	741232.008
TP03	322751.575	241221.284	8.02	722675.806	741245.974
TP04	322765.390	241188.070	8.36	722689.618	741212.767
TP05	322706.227	241180.512	9.03	722630.467	741205.211
TP06	322740.100	241181.853	8.57	722664.333	741206.552
TP07	322775.804	241170.018	8.57	722700.029	741194.719
TP08	322702.383	241155.703	9.07	722626.624	741180.408
TP09	322729.097	241166.843	8.59	722653.332	741191.545
TP10	322764.018	241135.400	8.66	722688.246	741160.109
TP11	322860.199	241203.765	7.95	722784.407	741228.458
TP12	322895.576	241192.948	7.27	722819.776	741217.643
TP13	322836.045	241192.982	7.84	722760.258	741217.678
TP14	322849.888	241167.412	7.90	722774.098	741192.113
TP15	322880.901	241166.912	7.48	722805.104	741191.613
TP16	322901.552	241147.584	7.30	722825.750	741172.289
TP17	322851.059	241147.657	7.77	722775.268	741172.363
TP18	322821.327	241136.080	8.42	722745.542	741160.788
TP19	322848.279	241130.044	7.88	722772.489	741154.753
TP20	322878.052	241124.600	7.39	722802.255	741149.310
TP21	322817.405	241117.670	8.37	722741.621	741142.382
California Bearing Ratio Locations					
CBR01	322705.336	241204.325	8.73	722629.577	741229.019
CBR02	322753.343	241185.758	8.45	722677.573	741210.456
CBR03	322827.242	241165.672	8.26	722751.456	741190.374
CBR04	322872.259	241160.525	7.54	722796.464	741185.228
CBR05	322884.296	241112.301	6.91	722808.498	741137.014
Soakaway Tests					
SA01	322712.284	241167.078	9.01	722636.523	741191.780
SA02	322845.527	241122.670	7.67	722769.737	741147.381



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Project : Gannon Homes Ltd
Engineer : Waterman Moynan
Project : Belltree Green, Clongriffin

Date : 04-07-2016
Description : Site Investigation Plan
Scale : Not To Scale
Rev : 1
Drawn by : SL

Legend:
 Cable Percussion Borehole
 Trial Pit
 California Bearing Ratio
 Soakaway Test



Grange Road, Donaghmede
Ground Investigation
Report
(No. 9211)
January 2004

**Site Investigation Works
For the
Proposed Development at Grange Road,
Donaghmede, Dublin 13**

Ground Investigation Report

**Client: Gannon Homes Ltd
Engineer: John Moylan & Associates Consulting Engineers**

January 2004

IGSL Ltd

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| Appendix 2 | -Trial Pit logs |
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| Appendix 4 | -Location Drawing |

FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

General.

Recommendations made, and opinions expressed in the report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held for conditions which have not been revealed by exploratory work, or which occur between exploratory hole locations. Whilst the report may suggest the likely configuration of strata, both between exploratory hole locations, or below the maximum depth of the investigation, this is only indicative, and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

Boring Procedures.

Unless otherwise stated, the 'Shell and Auger' technique of soft ground boring has been employed. All boring operations sampling and/or logging of soils and in-situ testing complies with the recommendations of the British Standard Code of Practice BS 5930 (1999), 'Site Investigation' and BS 1377:1990, 'Methods of test for soils for civil engineering purposes'.

Whilst the technique allows the maximum data to be obtained in soft ground, some disturbance and variation of soft and layered soils is unavoidable. Attention is drawn to this condition, whenever it is suspected. Where cobbles and boulders are recorded, no conclusion should be drawn concerning the size, presence, lithological nature, or numbers per unit volume of ground.

Where peat has been encountered during siteworks, samples have been logged in accordance with BS 5930:1999 Part 6 Identification and description of soils,

Routine Sampling.

Undisturbed samples of soils, predominantly cohesive in nature are obtained unless otherwise stated by a 104mm diameter open-drive tube sampler. In granular soils, and where undisturbed sampling is inappropriate, disturbed samples are collected. Smaller disturbed samples are also recovered at intervals to allow a visual examination of the full strata section.

In-Situ Testing.

Standard penetration tests, utilising either the standard split spoon sampler or solid cone and automatic trip-hammer are conducted unless otherwise where required by instruction. Subsequent to a seating drive of 150mm, a summation for the number of blows for 300mm penetration is recorded on the boring records together with the blow count for each 75mm penetration. In cases where incomplete penetration is obtained, the number of blows for the recorded value of penetration are noted. In coarse granular soils, a cone end is fitted to the sampler and a similar procedure adopted.

Groundwater.

The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level.

Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage condition, tidal variation or other causes.

Retention of Samples.

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded.

Unless a period of retention of samples is agreed, it is our normal practice to discard all soil samples one month after submission of our final report.

1. INTRODUCTION

At the request of Gannon Homes Ltd and John Moylan and Associates Consulting Engineers, IGSL Ltd have undertaken the geotechnical investigation work for the Proposed Development at Grange Road, Donaghmede, Dublin 13. The proposed development will include the construction of many residential units, multistory apartments with basements, hospitals, a railway station, a railway underpass and associated roads and services.

The ground investigation work was carried out under the direction of John Moylan and Associates Consulting Engineers to determine the ground conditions in each of the following areas: the main square; block 20; block 21; block 22; block 2; block 1; block 18 and site B. The investigation fieldwork comprised of eighteen cable percussion boreholes and eight trial pits.

The primary objectives of the investigation were as follows:

- Determine the sequence, consistency and strength of superficial soils in the proposed development area.
- To evaluate groundwater conditions in various areas.
- Provide samples for laboratory testing.

It is noted that the soil samples were logged in accordance with BS 5930, Code of Practice for Site Investigations (1999). This report presents the geotechnical data obtained from the exploratory holes and laboratory test data. A discussion of ground conditions is also included.

2. FIELDWORK

This is a green field site that stretches over approximately one hundred acres or more and generally comprises of gentle sloping arable land dotted with patches of marshy ground, which are concentrated in the south west of the site. The site is bounded by roads on the north and west, by the dart line on the east and green areas on the southern end.

Trial pits and boreholes were located in the proposed areas of the individual units. They consist of multistory buildings with shallow and basement foundations.

The fieldwork programme for the works was undertaken during the period September 2004 and comprised the following:

- Eighteen 200mm diameter cable percussion boreholes
- Eight trial pits
- Associated sampling and in-situ testing

2.1 Boreholes

The cable percussion boreholes were sunk using a Dando 150 rig and employed conventional cable tool boring methods.

Bulk disturbed soil samples were taken at approximately 1m intervals or change of strata. Likewise, Standard Penetration Tests (SPT's) were carried out at 1m intervals. Undisturbed samples (U100) were attempted in the 'cohesive' soils but due to the granular nature of the soil they were unsuccessful. Given the mainly coarse composition of the sub-soils a solid cone (60°) was used in each of the SPT tests.

Groundwater monitoring standpipes were installed in BH8, 13, 23 and 25A. The standpipes were installed with pea gravel response zone, cement - bentonite pellet grout seal and steel headwork covers were concreted in place.

Details of the strata encountered, SPT N-Values, groundwater strikes, chiselling (hard strata boring) and standpipe installations are presented on the boring records in Appendix 1.

2.2 Trial Pits

The trial pits were excavated using a JCB and were logged and sampled by an IGSL engineering geologist.

Representative bulk disturbed samples of the superficial soils were taken, These were labelled, sealed and returned to the laboratory in Newbridge, Co. Kildare for testing. Details of groundwater strikes and stability of the trial pit sidewalls were noted as the excavation progressed. The trial pit was backfilled with the arisings and reinstated to the satisfaction of the Engineer. The trial pit logs are presented in Appendix 2.

3.0 LABORATORY TESTING

On completion of site operations a schedule of laboratory tests were produced by IGSL. Tests were carried out in IGSLs laboratory in Newbridge, Co. Kildare.

4.0 GROUND CONDITIONS

The ground conditions in the proposed development areas comprised generally of a combination of the following units:

- Sandy, gravelly CLAY/SILT with occasional cobbles and boulders
- SILT
- Sandy, gravelly CLAY with occasional cobbles and boulders
- Sandy, medium coarse GRAVEL with occasional cobbles
- Clayey, gravelly medium coarse SAND with occasional cobbles

Trial pits generally terminated between 2.5 and 3.0m bgl while most boreholes refused at 7 or 8m bgl. The superficial deposits mostly consisted of sandy, gravelly CLAY with varying strengths. TP 10A; 11A; 12A, 16 and BH 16 uncovered SANDS and GRAVELS at varying depths.

Groundwater strikes were recorded in TP 10A; 11A and 12A and subsequently led to sidewall instability. Groundwater monitoring standpipes were generally installed in each of the individual proposed development areas. Groundwater levels in the standpipes were measured throughout the ground investigation fieldwork period. This data is shown in Table 1 and shows levels in the overburden to be standing at approximately 0.5/0.7m blg while BH 13 has a groundwater level at 0.10m bgl.

5.0. DISCUSSION

On examination of the trial pit trenches and boreholes the following is recommended.

5.1 Main Square

The superficial deposits in this area within the first 2.50m are predominantly classed as firm, brown, sandy, gravelly CLAY. With increasing depth the material changes to a very stiff to hard CLAY with N values reaching refusal.

Foundations for a two to three storey building with a basement structure should be taken down to the competent very stiff to hard, black, sandy, gravelly clay sub – stratum at approximately 2.70m bgl. This material will give an allowable bearing pressure of 250 kN/m². When excavating the basement structure appropriate shoring and benching of the slopes should be applied to ensure stability and immediate concrete blinding should be implemented to prevent against degradation of the soils.

Visual inspection of all excavations should take place and standard safety precautions relating to personnel working in trenches should be adopted

The stiff gravelly clay seen in the borehole records is known to be glacial in origin and therefore over consolidated. Hence settlement within this material will be minimal and not expected to cause problems. If a basement is proposed for this building the high water level should be noted and uplift should be evaluated.

Groundwater was observed in each of the boreholes. A groundwater monitoring standpipe was installed in BH25A and revealed a standing water level at 0.70m bgl.

5.2 Block 20

The substratum for BH21, 22A and 23 generally reveal a very soft to soft clay, which increases in strength to a very stiff to hard sandy, gravelly clay from approximately 2.5 –3.0m bgl.

In terms of strength and load carrying capabilities the over consolidated glacial till of sandy, gravelly CLAY/SILT would give an allowable bearing capacity of 250 kN/m². The foundation depths vary throughout this site. The suitable competent sub – stratum in BH 23 is encountered at 2.60m bgl while in BH 21 and 22A it is at 3.50 and 3.70m bgl. A basement structure is proposed for this site, so again appropriate shoring and benching of the slopes should be applied to ensure stability and immediate concrete blinding should be implemented.

Settlement will be minimal due to the over consolidated nature of the sandy, gravelly CLAY which is glacial in origin

Groundwater strikes were encountered in each of the three boreholes. A standing water level of approximately 0.50m blg was established and should be considered against uplift in the basement structure.

5.3 Site B

Trial pits TP 14 to 16 reveal deposits of firm/stiff sandy, gravelly CLAY over stiff/dense CLAY/SILT and SAND. TP17 shows 900mm of MADE GROUND overlying this material. Shear vanes taken at 0.50m established an average kPA of 61. This classes the stratum at that level as firm except for TP 16, which appears to be stiff.

From visual inspection and trial pit records, foundations are recommended to be placed on the very stiff – hard / dense CLAY and SAND. This will give the required bearing pressure of 200 kN/m² for the proposed 3/4 storey building. Taking all the trial pits into consideration the average excavation depth would be approximately 2.0m blg. Supervision of all excavations should take place to make sure foundations are placed at the correct level and standard safety precautions relating to personnel working in trenches should be adopted.

If higher foundation depths are required further investigation by means of dynamic probing would be recommended.

There were no groundwater strikes encountered in the trial pits therefore all excavations should be stable and dry. Settlement will be minimal due to the over consolidated nature of the founding material.

5.4 Block 21

Foundations for Block 21 should be taken down to the competent stiff to very stiff glacial till sub stratum between 2.70 and 2.80m bgl. The high STP's that were taken in the boreholes suggest an allowable bearing pressure of 250kN/m².

Where low SPT – N values appear in BH 16 the above mentioned foundations have deepened to perhaps a depth of 6.0m bgl to achieve the above mentioned allowable bearing pressure.

A groundwater monitoring standpipe was installed in BH 18 and revealed a standing water level at 0.50m bgl. This should be taken into consideration with the possibility of uplift in the basement structure.

Excavations for the basement structure should be monitored to make sure of trench stability. Concrete blinding should be implemented immediately to prevent against degradation of the site.

5.5 Block 18

Trial pits 10A, 12A, and 13A reveal superficial deposits of firm/stiff sandy, gravelly CLAY over stiff to hard, black sandy gravelly CLAY. A very loose GRAVEL appears at in TP 11A causing severe collapse of the trial pit sidewalls and as a result the pit had to be terminated.

The proposed four storey building would be founded again on the glacial stiff to very stiff gravelly CLAY at an average depth of approximately 2.0m bgl. This again would give a required allowable bearing pressure of 200 kN/m².

Excavations could prove to be difficult due to the sidewall collapse experienced in most of the trial pits. Groundwater seepage was observed between 1.40 – 1.70m bgl which added to trench instability. This is highlighted in TP11A as the pit was terminated due to sidewall collapse. Further investigation by means of dynamic probing is recommended to establish a bearing pressure in this material and to confirm the very stiff horizon.

5.6 Block 22

The superficial deposits for this proposed structure are classed as soft/firm SILT/CLAY overlying the stiff/very stiff black/brown CLAY which again appears to be the suitable founding stratum.

This sub stratum is capable of carrying the load of a four/five storey building with a basement structure. Foundation depths should be placed at approximately 4.80m bgl. Giving an allowable bearing pressure of 250 kN/m² this glacial deposit is a sound founding medium. It is readily controlled and due to its' over consolidated nature settlement would be minimal.

Groundwater was encountered in both boreholes. This should be considered with regard to the proposed basement structure. Excavation slopes should perhaps be 1.5:1 so as to ensure stability. Visual inspection should of all excavations should be carried out and standard safety precautions implemented.

5.7 Block 2

The top 3.50m of the overburden is comprised of soft/firm, sandy, gravelly CLAY overlying the very stiff to hard, over consolidated CLAY.

Foundations for the proposed block 2 require an allowable bearing pressure of 250 kN/m². The over consolidated glacial till at approximately 3.50m bgl would meet this requirement.

A groundwater monitoring standpipe was installed in BH 13 and showed a standing water level at 0.10m bgl. This high water level should be taken into consideration with regard to the proposed basement structure for block 2. Excavations should be visually inspected and appropriate shoring and benching of the slopes should be applied to ensure stability and immediate concrete blinding should be implemented.

5.8 Block 1

The soil profile is much the same in this proposed development area with a soft/firm CLAY/SILT overlying the stiff to hard sandy gravelly CLAY

Foundations for this proposed structure should be taken down to the competent sub stratum between 2.50 to 3.0m bgl. With high SPT – N values this material is capable of carrying loads of up to 250 kN/m².

Groundwater strikes were observed in all boreholes. The groundwater monitoring standpipe in BH 8 suggests a standing water level at 0.20m bgl. This water level should be regarded when dealing with the issue of uplift in basement structures.

Due to the nature of the glacial till basement excavations should be readily controlled and settlement minimal. Excavation slopes should perhaps be 1.5:1 to ensure trench stability. Visual inspection of all excavations should take place and standard safety precautions relating to personnel working in trenches should be adopted

NOTES:
 1. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
 2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.

LEGEND:
 ⊕ BH 3 : DENOTES BORE HOLE TEST
 ⊠ TP 2 : DENOTES TRIAL PIT TEST
 ⊠ DP 1 : DENOTES DYNAMIC PROBE
 ⊙ CR 1 : DENOTES CR TEST LOCATION



BOREHOLES/TRIAL PITS TO BE CONFIRMED

REFER TO DRAWING No. 03-190-5002 FOR TRIAL PIT INFORMATION

C	SIZE OF PLOTS IF PLOTTED		
B	1:10-1:50 REDUCED		S.F. R0
A	1:20-1:50 REDUCED		LL R0
REV.	DATE	AMENDMENT	DRN APPD
CAD REF: H:\CAD\03\03-190\AM\SITE INVESTIGATION\PRELIM			

STATUS: **FOR INFORMATION NOT FOR CONSTRUCTION**

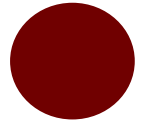
JOHN MOYLAN & ASSOCIATES
 CONSULTING ENGINEERS
 79, MERION SQUARE, DUBLIN 2
 TEL. No. 6615337 FAX No. 6610255
 e-mail: moylan@joa.ie

CLIENT: GANNON HOMES LTD
 ARCHITECT: CONROY CROWE KELLY
 PROJECT: PROPOSED DEVELOPMENT AT ORANGE ROAD, DONAGHEE, DUBLIN 13
 TITLE: SITE INVESTIGATION LAYOUT

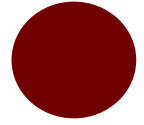
DRWN:	DESIGNED:	APPROVED:	DATE:
GOT	JMB	JMB	22/10/03
SCALE:	JOB NO.:	DRG. NO.:	REVISION:
1:1500	03-190	2001	2

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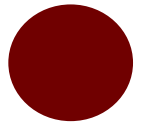
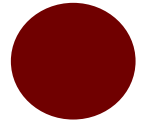
Appendix 13.1



Traffic Counts



Transport



SITE 1



Origin Arm A R123(E)

	Destination : Arm A R123(E)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	0	0	0	0	0	0	0	0
00:15	0	0	0	0	0	0	0	0
00:30	0	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0
03:15	0	0	0	0	0	0	0	0
03:30	0	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0
04:15	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	0	0	0
04:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0
05:15	0	0	0	0	0	0	0	0
05:30	0	0	0	0	0	0	0	0
05:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0

	Destination : Arm B Balgriffin Park							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
	5	0	0	0	0	0	0	5
	3	0	0	0	0	0	0	3
	4	0	0	0	0	0	0	4
	2	0	0	0	0	0	0	2
	14	0	0	0	0	0	0	14
	2	0	0	0	0	0	0	2
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	4	0	0	0	0	0	0	4
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	2	1	0	0	0	0	0	3
	5	1	0	0	0	0	0	6
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	2	1	0	0	0	0	0	3
	7	0	0	0	0	0	1	8
	17	2	0	0	0	0	1	20
	11	0	0	0	0	0	0	11
	21	2	0	0	1	0	1	25
	30	3	0	0	0	0	1	34
	43	5	0	0	1	0	1	50
	105	10	0	0	2	0	3	120
	48	0	0	1	0	0	0	49
	65	1	0	0	0	0	1	67
	52	3	0	0	0	0	0	55

	Destination : Arm C R123(W)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
	9	0	0	0	0	0	0	9
	3	1	0	0	0	0	0	4
	2	0	0	0	0	0	1	3
	10	0	0	0	0	0	0	10
	24	1	0	0	0	0	1	26
	1	0	0	0	0	0	0	1
	4	0	0	0	0	0	0	4
	4	0	0	0	0	0	0	4
	3	0	0	0	0	0	0	3
	12	0	0	0	0	0	0	12
	2	0	0	0	0	0	0	2
	0	0	0	0	0	0	0	0
	2	1	0	0	0	0	0	3
	2	0	0	0	0	0	0	2
	6	1	0	0	0	0	0	7
	4	0	0	0	0	0	0	4
	3	0	0	0	0	0	0	3
	7	1	0	0	0	0	0	8
	7	0	0	0	0	0	0	7
	21	1	0	0	0	0	0	22
	3	0	1	0	0	0	0	4
	1	0	0	0	0	0	0	1
	2	1	0	0	0	0	0	3
	2	1	0	0	0	0	0	3
	8	2	1	0	0	0	0	11
	4	0	0	0	0	0	0	4
	7	0	0	0	0	0	0	7
	9	1	0	0	0	0	0	10
	15	1	0	0	0	0	1	17
	35	2	0	0	0	0	1	38
	12	4	0	0	1	1	1	19
	39	2	0	0	0	1	3	45
	69	3	0	0	0	0	1	73
	63	8	0	0	0	0	1	72
	183	17	0	0	1	2	6	209
	78	6	1	0	2	1	2	90
	100	10	0	0	2	1	1	114
	108	6	3	1	0	0	4	122
	98	6	1	0	0	0	4	109
	384	28	5	1	4	2	11	435
	91	4	1	0	1	1	3	101
	83	4	0	1	0	0	2	90
	124	2	1	0	0	3	3	133

Arm Totals
14
7
7
12
40
3
5
4
4
16
2
0
4
2
8
4
4
8
7
23
5
2
4
6
17
4
7
11
18
40
20
53
76
80
229
101
139
156
159
555
150
157
188

08:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0
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12:30	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0
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14:30	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
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17:30	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0

49	1	1	0	0	0	0	0	51
214	5	1	1	0	0	1	222	
44	3	1	0	0	0	0	48	
34	5	0	0	0	0	0	39	
21	5	0	0	0	0	0	26	
17	3	0	0	0	0	1	21	
116	16	1	0	0	0	1	134	
15	4	1	0	0	0	0	20	
28	4	0	0	0	0	0	32	
20	3	0	0	0	0	1	24	
27	5	0	0	0	0	0	32	
90	16	1	0	0	0	1	108	
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18	0	0	0	0	0	0	18	
15	2	1	0	0	0	0	18	
24	2	0	0	0	0	1	27	
73	7	1	0	0	0	3	84	
25	3	0	0	0	0	0	28	
17	1	1	0	0	0	0	19	
21	2	0	0	0	0	0	23	
31	2	0	0	0	0	1	34	
94	8	1	0	0	0	1	104	
25	2	0	0	0	0	0	27	
37	2	0	0	0	0	0	39	
16	5	0	0	0	0	0	21	
29	3	0	0	0	0	0	32	
107	12	0	0	0	0	0	119	
34	1	0	0	0	0	0	35	
36	2	0	0	0	0	0	38	
32	2	0	0	0	0	0	34	
44	3	0	1	0	0	0	48	
146	8	0	1	0	0	0	155	
36	6	0	0	1	0	1	44	
29	2	0	0	0	0	1	32	
38	2	0	0	0	1	0	41	
32	5	0	0	0	0	0	37	
135	15	0	0	1	1	2	154	
43	5	1	0	0	0	0	49	
54	5	1	0	1	0	3	64	
40	6	1	0	0	0	1	48	
35	4	0	0	0	0	1	40	
172	20	3	0	1	0	5	201	
31	4	1	0	0	0	2	38	
31	4	0	0	0	0	1	36	
32	5	0	0	0	0	1	38	
26	1	0	0	0	0	1	28	
120	14	1	0	0	0	5	140	

111	8	2	0	0	1	3	125
409	18	4	1	1	5	11	449
103	9	2	2	0	0	1	117
96	9	2	2	0	1	0	110
80	10	0	0	0	0	0	90
67	7	0	2	0	0	0	76
346	35	4	6	0	1	1	393
58	3	2	1	0	1	0	65
68	4	3	1	1	2	0	79
62	10	2	1	0	0	0	75
64	6	2	1	0	0	1	74
252	23	9	4	1	3	1	293
45	4	2	0	0	0	0	51
63	3	3	2	0	0	1	72
59	9	1	1	0	1	1	72
51	17	1	0	0	0	0	69
218	33	7	3	0	1	2	264
51	7	1	0	0	1	0	60
40	4	2	0	1	0	0	47
58	5	0	1	0	1	1	66
47	12	1	0	0	0	0	60
196	28	4	1	1	2	1	233
45	13	2	1	0	0	0	61
73	6	1	0	1	0	0	81
68	8	3	1	0	0	1	81
69	7	3	0	0	0	1	80
255	34	9	2	1	0	2	303
64	4	3	0	0	0	0	71
48	9	2	2	0	0	0	61
80	7	2	1	1	0	0	91
80	8	0	0	1	1	0	90
272	28	7	3	2	1	0	313
65	13	3	0	0	1	1	83
51	9	2	2	0	0	0	64
74	11	3	0	0	0	0	88
86	16	3	0	0	0	0	105
276	49	11	2	0	1	1	340
98	20	1	1	1	0	0	121
84	18	1	1	0	0	1	105
70	16	1	1	0	2	1	91
61	13	0	0	0	0	0	74
313	67	3	3	1	2	2	391
62	20	1	1	0	2	1	87
61	9	2	0	0	0	1	73
59	5	1	0	0	0	1	66
50	5	0	1	0	0	0	56
232	39	4	2	0	2	3	282

176
671
165
149
116
97
527
85
111
99
106
401
72
90
90
96
348
88
66
89
94
337
88
120
102
112
422
106
99
125
138
468
127
96
129
142
494
170
169
139
114
592
125
109
104
84
422

18:00	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
19:00	0	0	0	0	0	0	0	0	0
19:15	0	0	0	0	0	0	0	0	0
19:30	0	0	0	0	0	0	0	0	0
19:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0
20:15	0	0	0	0	0	0	0	0	0
20:30	1	0	0	0	0	0	0	0	1
20:45	0	0	0	0	0	0	0	0	0
1 Hr	1	0	0	0	0	0	0	0	1
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21:15	0	0	0	0	0	0	0	0	0
21:30	0	0	0	0	0	0	0	0	0
21:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0
22:15	0	0	0	0	0	0	0	0	0
22:30	0	0	0	0	0	0	0	0	0
22:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0
23:15	0	0	0	0	0	0	0	0	0
23:30	0	0	0	0	0	0	0	0	0
23:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	0	1

42	1	0	0	0	0	0	1	44
48	5	0	0	0	0	0	0	53
37	2	0	0	0	0	0	2	41
41	3	0	0	0	0	0	1	45
168	11	0	0	0	0	0	4	183
31	4	0	0	0	0	0	0	35
49	3	0	0	0	0	0	0	52
52	4	0	0	0	0	0	0	56
43	2	0	0	0	0	0	0	45
175	13	0	0	0	0	0	0	188
31	0	1	0	0	0	0	1	33
23	1	0	0	0	0	0	0	24
34	4	0	0	0	0	0	0	38
31	4	0	0	0	0	0	1	36
119	9	1	0	0	0	0	2	131
29	1	0	0	0	0	0	1	31
25	1	0	0	0	0	0	0	26
20	1	0	0	0	0	0	2	23
10	0	0	0	0	0	0	0	10
84	3	0	0	0	0	0	3	90
11	0	0	0	0	0	0	0	11
10	0	0	0	0	0	0	1	11
6	0	0	0	0	0	0	0	6
13	0	0	0	0	0	0	0	13
40	0	0	0	0	0	0	1	41
3	0	0	0	0	0	0	0	3
8	0	0	0	0	0	0	1	9
6	0	0	0	0	0	0	0	6
2	0	0	0	0	0	0	0	2
19	0	0	0	0	0	0	1	20
2021	170	10	2	4	1	34	2242	

76	4	0	0	0	0	0	0	80
61	9	1	0	0	0	0	0	71
56	5	0	0	0	0	0	0	61
62	7	1	0	1	0	1	1	72
255	25	2	0	1	0	1	1	284
49	5	0	0	0	0	0	1	55
47	3	0	0	1	1	2	2	54
53	6	1	0	0	1	0	0	61
58	2	0	0	0	0	1	2	63
207	16	1	0	1	3	5	5	233
41	0	0	0	0	0	0	0	41
27	4	0	0	0	2	1	1	34
48	2	2	1	0	0	0	0	53
47	1	0	0	0	0	0	0	48
163	7	2	1	0	2	1	1	176
50	2	0	0	1	1	0	0	54
44	4	0	0	0	0	1	1	49
40	1	0	0	0	0	0	1	42
44	1	0	0	0	0	0	0	45
178	8	0	0	1	1	2	2	190
28	2	0	0	0	0	0	0	30
21	0	0	0	0	1	0	0	22
19	2	0	0	0	0	0	0	21
8	1	0	0	0	0	0	0	9
76	5	0	0	0	1	0	0	82
19	1	0	0	0	0	0	0	20
8	0	0	0	0	0	0	0	8
12	0	0	0	0	0	0	0	12
7	0	0	0	0	0	0	0	7
46	1	0	0	0	0	0	0	47
4367	468	73	29	15	29	52	5033	

124
124
102
117
467
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108
421
74
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123
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67
7276

Origin Arm B Balgriffin Park

	Destination : Arm A R123(E)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	5	0	0	0	0	0	0	5
00:15	2	0	0	0	0	0	0	2
00:30	2	0	0	0	0	0	0	2
00:45	0	0	0	0	0	0	0	0
1 Hr	9	0	0	0	0	0	0	9
01:00	1	0	0	0	0	0	0	1
01:15	1	0	0	0	0	0	0	1
01:30	0	0	0	0	0	0	0	0
01:45	1	0	0	0	0	0	0	1
1 Hr	3	0	0	0	0	0	0	3

	Destination : Arm B Balgriffin Park							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	0	0	0	0	0	0	0	0
00:15	0	0	0	0	0	0	0	0
00:30	0	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0

	Destination : Arm C R123(W)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	1	0	0	0	0	0	0	1
00:15	2	0	0	0	0	0	0	2
00:30	3	1	0	0	0	0	0	4
00:45	1	0	0	0	0	0	0	1
1 Hr	7	1	0	0	0	0	0	8
01:00	0	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	0
01:30	1	0	0	0	0	0	0	1
01:45	0	0	0	0	0	0	0	0
1 Hr	1	0	0	0	0	0	0	1

	Arm Totals
4	
6	
1	
17	
1	
1	
1	
1	
4	

23:45	10	0	0	0	0	0	0	10
1 Hr	54	0	0	0	0	0	0	54
Total	4241	451	74	25	15	16	50	4872

	3	0	0	0	0	0	0	3
	7	1	0	0	0	0	0	8
Total	1329	132	11	7	3	6	5	1493

	0	0	0	0	0	0	0	0	13
	0	0	0	0	0	0	0	0	62
Total	0	0	0	0	0	0	0	0	6365

ORIGIN SUMMARY

	Origin : Arm A R123(E)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	14	0	0	0	0	0	0	14
00:15	6	1	0	0	0	0	0	7
00:30	6	0	0	0	0	0	1	7
00:45	12	0	0	0	0	0	0	12
1 Hr	38	1	0	0	0	0	1	40
01:00	3	0	0	0	0	0	0	3
01:15	5	0	0	0	0	0	0	5
01:30	4	0	0	0	0	0	0	4
01:45	4	0	0	0	0	0	0	4
1 Hr	16	0	0	0	0	0	0	16
02:00	2	0	0	0	0	0	0	2
02:15	0	0	0	0	0	0	0	0
02:30	3	1	0	0	0	0	0	4
02:45	2	0	0	0	0	0	0	2
1 Hr	7	1	0	0	0	0	0	8
03:00	4	0	0	0	0	0	0	4
03:15	4	0	0	0	0	0	0	4
03:30	7	1	0	0	0	0	0	8
03:45	7	0	0	0	0	0	0	7
1 Hr	22	1	0	0	0	0	0	23
04:00	4	0	1	0	0	0	0	5
04:15	2	0	0	0	0	0	0	2
04:30	3	1	0	0	0	0	0	4
04:45	4	2	0	0	0	0	0	6
1 Hr	13	3	1	0	0	0	0	17
05:00	4	0	0	0	0	0	0	4
05:15	7	0	0	0	0	0	0	7
05:30	10	1	0	0	0	0	0	11
05:45	16	1	0	0	0	0	1	18
1 Hr	37	2	0	0	0	0	1	40
06:00	13	4	0	0	1	1	1	20
06:15	46	3	0	0	0	1	3	53
06:30	71	4	0	0	0	0	1	76
06:45	70	8	0	0	0	0	2	80
1 Hr	200	19	0	0	1	2	7	229
07:00	89	6	1	0	2	1	2	101
07:15	121	12	0	0	3	1	2	139
07:30	138	9	3	1	0	0	5	156

	Origin : Arm B Balgriffin Park							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
	6	0	0	0	0	0	0	6
	4	0	0	0	0	0	0	4
	5	1	0	0	0	0	0	6
	1	0	0	0	0	0	0	1
	16	1	0	0	0	0	0	17
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	4	0	0	0	0	0	0	4
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	2
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	4	0	0	0	0	0	0	4
	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	2
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	4	0	0	0	0	0	0	4
	0	0	0	0	0	0	0	0
	2	1	0	0	0	0	0	3
	1	0	0	0	0	0	0	1
	5	1	0	0	0	0	0	6
	1	0	0	0	0	0	0	1
	3	1	0	0	0	0	0	4
	3	1	0	0	0	0	0	4
	6	0	0	0	0	1	0	7
	13	2	0	0	0	1	0	16
	4	1	0	0	0	0	0	5
	8	3	0	0	0	0	0	11
	10	3	1	0	0	0	0	14
	12	2	0	0	0	0	0	14
	34	9	1	0	0	0	0	44
	19	4	0	0	0	0	2	25
	20	6	1	0	0	0	0	27
	41	5	1	0	1	0	2	50

	Origin : Arm C R123(W)							Total	Origin Totals
	Car	LGV	OGV1	OGV2	PSV	MC	PC		
	8	1	0	0	0	0	0	9	29
	4	0	0	0	0	0	0	4	15
	9	0	0	0	0	0	0	9	22
	4	1	0	0	0	0	0	5	18
	25	2	0	0	0	0	0	27	84
	3	0	0	0	0	0	0	3	7
	2	0	0	0	0	0	0	2	8
	6	0	0	0	0	0	0	6	11
	3	0	0	0	0	0	0	3	8
	14	0	0	0	0	0	0	14	34
	4	0	0	0	0	0	0	4	7
	3	0	0	0	0	0	0	3	4
	6	0	0	0	0	0	0	6	10
	5	0	0	0	0	0	0	5	7
	18	0	0	0	0	0	0	18	28
	3	0	1	0	0	0	0	4	8
	8	0	0	0	0	0	0	8	14
	6	0	0	0	0	0	0	6	15
	3	0	0	0	0	0	0	3	11
	20	0	1	0	0	0	0	21	48
	2	0	0	0	0	0	0	2	7
	2	0	0	0	0	0	0	2	6
	2	0	0	0	0	0	1	3	10
	3	2	0	0	0	0	1	6	13
	9	2	0	0	0	0	2	13	36
	0	1	0	0	0	0	0	1	6
	4	0	0	0	1	0	1	6	17
	2	0	0	0	0	0	0	2	17
	9	4	1	0	0	0	0	14	39
	15	5	1	0	1	0	1	23	79
	11	3	0	0	0	0	0	14	39
	19	4	0	0	0	0	0	23	87
	21	6	0	0	0	1	0	28	118
	36	10	1	0	0	0	1	48	142
	87	23	1	0	0	1	1	113	386
	39	17	2	0	0	1	0	59	185
	53	18	0	2	0	0	1	74	240
	64	21	0	0	2	0	1	88	294

07:45	141	11	1	0	1	0	5	159
1 Hr	489	38	5	1	6	2	14	555
08:00	139	4	1	1	1	1	3	150
08:15	148	5	0	1	0	0	3	157
08:30	176	5	1	0	0	3	3	188
08:45	160	9	3	0	0	1	3	176
1 Hr	623	23	5	2	1	5	12	671
09:00	147	12	3	2	0	0	1	165
09:15	130	14	2	2	0	1	0	149
09:30	101	15	0	0	0	0	0	116
09:45	84	10	0	2	0	0	1	97
1 Hr	462	51	5	6	0	1	2	527
10:00	73	7	3	1	0	1	0	85
10:15	96	8	3	1	1	2	0	111
10:30	82	13	2	1	0	0	1	99
10:45	91	11	2	1	0	0	1	106
1 Hr	342	39	10	4	1	3	2	401
11:00	61	7	2	0	0	0	2	72
11:15	81	3	3	2	0	0	1	90
11:30	74	11	2	1	0	1	1	90
11:45	75	19	1	0	0	0	1	96
1 Hr	291	40	8	3	0	1	5	348
12:00	76	10	1	0	0	1	0	88
12:15	57	5	3	0	1	0	0	66
12:30	79	7	0	1	0	1	1	89
12:45	78	14	1	0	0	0	1	94
1 Hr	290	36	5	1	1	2	2	337
13:00	70	15	2	1	0	0	0	88
13:15	110	8	1	0	1	0	0	120
13:30	84	13	3	1	0	0	1	102
13:45	98	10	3	0	0	0	1	112
1 Hr	362	46	9	2	1	0	2	422
14:00	98	5	3	0	0	0	0	106
14:15	84	11	2	2	0	0	0	99
14:30	112	9	2	1	1	0	0	125
14:45	124	11	0	1	1	1	0	138
1 Hr	418	36	7	4	2	1	0	468
15:00	101	19	3	0	1	1	2	127
15:15	80	11	2	2	0	0	1	96
15:30	112	13	3	0	0	1	0	129
15:45	118	21	3	0	0	0	0	142
1 Hr	411	64	11	2	1	2	3	494
16:00	141	25	2	1	1	0	0	170
16:15	138	23	2	1	1	0	4	169
16:30	110	22	2	1	0	2	2	139
16:45	96	17	0	0	0	0	1	114
1 Hr	485	87	6	3	2	2	7	592

47	5	4	0	0	1	1	58
127	20	6	0	1	1	5	160
39	5	1	0	0	1	1	47
61	9	2	0	1	1	2	76
51	4	1	0	0	1	0	57
59	6	0	1	2	0	0	68
210	24	4	1	3	3	3	248
46	9	0	1	0	0	1	57
47	2	0	0	0	0	0	49
32	3	1	0	0	0	0	36
38	7	1	0	0	0	1	47
163	21	2	1	0	0	2	189
38	7	0	0	0	0	1	46
39	6	0	0	0	0	0	45
33	1	0	0	0	0	0	34
34	3	1	0	0	0	0	38
144	17	1	0	0	0	1	163
40	6	1	0	0	0	0	47
44	1	0	0	0	0	1	46
42	3	0	0	0	0	0	45
37	3	0	0	0	0	0	40
163	13	1	0	0	0	1	178
52	6	2	0	0	0	0	60
44	5	1	1	0	0	1	52
36	3	1	0	0	0	1	41
47	4	2	0	0	0	0	53
179	18	6	1	0	0	2	206
45	6	0	0	0	0	0	51
41	3	2	0	0	0	0	46
46	7	0	0	0	1	0	54
41	9	1	0	0	0	0	51
173	25	3	0	0	1	0	202
58	4	1	0	0	0	1	64
69	5	1	0	0	0	0	75
57	10	0	1	0	0	1	69
66	4	2	0	0	0	0	72
250	23	4	1	0	0	2	280
34	9	1	0	1	0	0	45
61	9	3	0	0	0	0	73
59	6	0	1	1	1	1	69
70	6	1	1	0	0	1	79
224	30	5	2	2	1	2	266
60	7	0	0	1	0	1	69
63	6	3	1	0	1	0	74
68	11	1	0	0	0	0	80
60	10	0	1	0	1	0	72
251	34	4	2	1	2	1	295

92	19	1	2	2	0	0	116
248	75	3	4	4	1	2	337
106	12	5	0	0	0	0	123
111	10	2	2	0	1	0	126
119	10	0	1	1	0	0	131
90	12	3	1	0	0	0	106
426	44	10	4	1	1	0	486
75	10	3	3	0	0	3	94
64	11	3	2	0	0	1	81
59	14	2	0	0	0	1	76
51	12	4	0	1	0	0	68
249	47	12	5	1	0	5	319
62	8	2	0	0	0	0	72
46	7	5	1	0	0	0	59
51	15	1	2	0	0	1	70
60	15	3	0	0	0	0	78
219	45	11	3	0	0	1	279
67	13	0	1	0	0	0	81
51	10	2	0	0	0	0	63
59	9	3	0	1	0	0	72
70	6	2	0	0	0	0	78
247	38	7	1	1	0	0	294
71	9	2	1	0	0	0	83
74	7	2	0	0	1	0	84
68	14	0	0	1	1	1	85
82	4	0	0	0	0	0	86
295	34	4	1	1	2	1	338
76	8	1	0	0	1	1	87
76	6	1	2	0	0	0	85
94	9	2	1	1	0	1	108
77	10	2	1	0	0	0	90
323	33	6	4	1	1	2	370
105	5	1	1	0	0	0	112
87	9	0	0	0	0	0	96
81	11	1	1	0	0	1	95
70	8	4	1	0	0	0	83
343	33	6	3	0	0	1	386
88	7	2	1	1	0	0	99
89	7	2	1	0	1	0	100
100	4	2	3	1	0	0	110
115	12	3	1	1	1	1	134
392	30	9	6	3	2	1	443
124	6	1	0	0	1	1	133
110	12	1	1	0	0	1	125
121	13	0	0	1	0	1	136
111	6	3	0	0	1	3	124
466	37	5	1	1	2	6	518

333
1052
320
359
376
350
1405
316
279
228
212
1035
203
215
203
222
843
200
199
207
214
820
231
202
215
233
881
226
251
264
253
994
282
270
289
293
1134
271
269
308
355
1203
372
368
355
310
1405

17:00	93	24	2	1	0	2	3	125
17:15	92	13	2	0	0	0	2	109
17:30	91	10	1	0	0	0	2	104
17:45	76	6	0	1	0	0	1	84
1 Hr	352	53	5	2	0	2	8	422
18:00	118	5	0	0	0	0	1	124
18:15	109	14	1	0	0	0	0	124
18:30	93	7	0	0	0	0	2	102
18:45	103	10	1	0	1	0	2	117
1 Hr	423	36	2	0	1	0	5	467
19:00	80	9	0	0	0	0	1	90
19:15	96	6	0	0	1	1	2	106
19:30	105	10	1	0	0	1	0	117
19:45	101	4	0	0	0	1	2	108
1 Hr	382	29	1	0	1	3	5	421
20:00	72	0	1	0	0	0	1	74
20:15	50	5	0	0	0	2	1	58
20:30	83	6	2	1	0	0	0	92
20:45	78	5	0	0	0	0	1	84
1 Hr	283	16	3	1	0	2	3	308
21:00	79	3	0	0	1	1	1	85
21:15	69	5	0	0	0	0	1	75
21:30	60	2	0	0	0	0	3	65
21:45	54	1	0	0	0	0	0	55
1 Hr	262	11	0	0	1	1	5	280
22:00	39	2	0	0	0	0	0	41
22:15	31	0	0	0	0	1	1	33
22:30	25	2	0	0	0	0	0	27
22:45	21	1	0	0	0	0	0	22
1 Hr	116	5	0	0	0	1	1	123
23:00	22	1	0	0	0	0	0	23
23:15	16	0	0	0	0	0	1	17
23:30	18	0	0	0	0	0	0	18
23:45	9	0	0	0	0	0	0	9
1 Hr	65	1	0	0	0	0	1	67

Total	6389	638	83	31	19	30	86	7276
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DESTINATION SUMMARY

Destination : Arm A R123(E)								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

00:00	13	0	0	0	0	0	0	13
00:15	6	0	0	0	0	0	0	6
00:30	11	0	0	0	0	0	0	11
00:45	4	1	0	0	0	0	0	5
1 Hr	34	1	0	0	0	0	0	35

66	4	0	0	0	0	0	2	72
64	7	0	0	0	0	0	0	71
86	8	0	0	1	1	1	1	97
90	4	0	0	0	0	0	2	96
306	23	0	0	1	1	5	336	
74	8	0	0	0	0	0	0	82
88	1	0	0	0	0	0	3	92
65	5	0	0	0	1	3	74	
73	2	0	0	0	0	0	0	75
300	16	0	0	0	1	6	323	
84	6	0	0	0	0	0	0	90
53	7	0	0	0	1	0	61	
56	1	0	0	0	1	3	61	
37	7	0	0	0	0	0	0	44
230	21	0	0	0	2	3	256	
35	2	0	0	0	1	0	38	
35	3	0	0	0	0	0	38	
51	0	1	0	0	0	0	0	52
38	1	0	0	0	0	0	0	39
159	6	1	0	0	1	0	167	
29	1	0	0	0	0	1	31	
31	1	0	0	0	0	0	32	
20	1	0	0	0	0	0	21	
30	0	0	0	0	0	0	30	
110	3	0	0	0	0	1	114	
17	0	0	0	0	0	0	17	
15	0	0	0	0	0	0	15	
16	0	0	0	0	0	0	16	
10	0	0	0	1	0	0	11	
58	0	0	0	1	0	0	59	
9	1	0	0	0	0	0	10	
9	0	0	0	0	0	0	9	
4	0	0	0	0	0	0	4	
5	0	0	0	0	0	0	5	
27	1	0	0	0	0	0	28	

3152	308	38	8	9	14	34	3563
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Destination : Arm B Balgriffin Park								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

5	1	0	0	0	0	0	6
3	0	0	0	0	0	0	3
4	0	0	0	0	0	0	4
2	0	0	0	0	0	0	2
14	1	0	0	0	0	0	15

111	14	1	0	0	1	1	128
133	13	1	0	0	1	2	150
138	10	1	0	1	1	2	153
152	9	0	0	1	2	4	168
534	46	3	0	2	5	9	599
153	13	1	0	0	1	5	173
150	8	2	0	1	1	4	166
130	5	0	0	0	1	9	145
124	12	0	0	0	1	1	138
557	38	3	0	1	4	19	622
110	3	0	0	0	0	0	113
110	4	0	0	0	0	1	115
111	5	1	0	0	1	0	118
83	6	0	0	0	0	0	89
414	18	1	0	0	1	1	435
78	4	1	0	0	0	0	83
73	5	1	0	0	1	1	81
59	4	0	0	0	0	0	63
61	4	0	0	0	0	0	65
271	17	2	0	0	1	1	292
67	5	0	0	0	1	1	74
53	2	0	0	0	0	0	55
36	4	0	0	1	0	0	41
33	2	0	0	0	0	0	35
189	13	0	0	1	1	1	205
44	1	0	0	0	0	0	45
35	1	0	0	0	0	0	36
34	0	0	0	0	0	1	35
35	0	0	0	0	0	0	35
148	2	0	0	0	0	1	151
28	1	0	0	0	0	0	29
9	0	0	0	0	0	0	9
11	0	0	0	0	0	0	11
13	0	0	0	0	0	0	13
61	1	0	0	0	0	0	62

5570	583	85	32	18	22	55	6365
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Destination : Arm C R123(W)								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

10	0	0	0	0	0	0	10
5	1	0	0	0	0	0	6
5	1	0	0	0	0	1	7
11	0	0	0	0	0	0	11
31	2	0	0	0	0	1	34

325
330
354
348
1357
379
382
321
330
1412
293
282
296
241
1112
195
177
207
188
767
190
162
127
120
599
103
84
78
68
333
62
35
33
27
157

17204

Dest Totals

29
15
22
18
84

01:00	3	0	0	0	0	0	0	0	3
01:15	3	0	0	0	0	0	0	0	3
01:30	5	0	0	0	0	0	0	0	5
01:45	4	0	0	0	0	0	0	0	4
1 Hr	15	0	0	0	0	0	0	0	15
02:00	4	0	0	0	0	0	0	0	4
02:15	4	0	0	0	0	0	0	0	4
02:30	5	0	0	0	0	0	0	0	5
02:45	4	0	0	0	0	0	0	0	4
1 Hr	17	0	0	0	0	0	0	0	17
03:00	2	0	1	0	0	0	0	0	3
03:15	8	0	0	0	0	0	0	0	8
03:30	6	0	0	0	0	0	0	0	6
03:45	4	0	0	0	0	0	0	0	4
1 Hr	20	0	1	0	0	0	0	0	21
04:00	2	0	0	0	0	0	0	0	2
04:15	3	0	0	0	0	0	0	0	3
04:30	4	1	0	0	0	0	0	1	6
04:45	3	1	0	0	0	0	0	1	5
1 Hr	12	2	0	0	0	0	0	2	16
05:00	1	0	0	0	0	0	0	0	1
05:15	4	1	0	0	1	0	1	1	7
05:30	3	0	0	0	0	0	0	0	3
05:45	12	3	1	0	0	0	0	0	16
1 Hr	20	4	1	0	1	0	1	1	27
06:00	10	4	0	0	0	0	0	0	14
06:15	17	6	0	0	0	0	0	0	23
06:30	21	6	1	0	0	0	0	0	28
06:45	28	10	1	0	0	0	0	0	39
1 Hr	76	26	2	0	0	0	0	0	104
07:00	35	13	2	0	0	1	1	1	52
07:15	45	16	1	2	0	0	1	1	65
07:30	48	21	1	0	1	0	2	2	73
07:45	79	17	4	1	0	0	1	1	102
1 Hr	207	67	8	3	1	1	5	292	292
08:00	93	11	4	0	0	1	1	1	110
08:15	120	12	2	2	1	1	1	1	139
08:30	126	10	1	0	1	1	1	0	139
08:45	105	11	3	1	2	0	0	0	122
1 Hr	444	44	10	3	4	3	2	2	510
09:00	66	12	1	4	0	0	4	4	87
09:15	69	12	2	2	0	0	1	1	86
09:30	63	15	2	0	0	0	1	1	81
09:45	54	15	5	0	1	0	1	1	76
1 Hr	252	54	10	6	1	0	7	7	330
10:00	60	14	1	0	0	0	1	1	76
10:15	55	9	4	1	0	0	0	0	69

3	0	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
6	0	0	0	0	0	0	0	0	6
1	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0	0	4
1	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	4
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
2	2	0	0	0	0	0	0	0	4
5	2	0	0	0	0	0	0	0	7
0	1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
1	1	0	0	0	0	0	0	0	2
3	2	0	0	0	0	0	0	0	5
3	0	0	0	0	0	0	0	0	3
14	1	0	0	0	0	0	0	0	15
7	1	0	0	0	1	0	0	0	9
20	1	0	0	0	0	0	2	2	23
44	3	0	0	0	1	2	2	2	50
23	6	0	0	0	0	0	0	0	29
40	9	0	0	1	0	1	1	1	51
55	7	0	0	1	0	1	1	1	64
88	10	0	1	3	0	1	1	1	103
206	32	0	1	5	0	3	247	247	247
87	5	2	1	0	0	0	0	0	95
101	4	0	0	0	0	1	106	106	106
80	5	0	1	0	0	0	0	0	86
72	6	1	0	0	0	0	0	0	79
340	20	3	2	0	0	1	366	366	366
73	7	3	0	0	0	0	0	0	83
54	6	1	0	0	0	0	0	0	61
31	6	0	0	0	0	0	0	0	37
28	5	0	0	0	0	1	34	34	34
186	24	4	0	0	0	1	215	215	215
30	4	2	0	0	0	0	0	0	36
40	4	1	0	0	0	0	0	0	45

1	0	0	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0	0	4
5	0	0	0	0	0	0	0	0	5
3	0	0	0	0	0	0	0	0	3
13	0	0	0	0	0	0	0	0	13
2	0	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0	0
2	1	0	0	0	0	0	0	0	3
2	0	0	0	0	0	0	0	0	2
6	1	0	0	0	0	0	0	0	7
4	0	0	0	0	0	0	0	0	4
4	0	0	0	0	0	0	0	0	4
7	1	0	0	0	0	0	0	0	8
7	0	0	0	0	0	0	0	0	7
22	1	0	0	0	0	0	0	0	23
3	0	1	0	0	0	0	0	0	4
2	0	0	0	0	0	0	0	0	2
2	1	0	0	0	0	0	0	0	3
3	1	0	0	0	0	0	0	0	4
10	2	1	0	0	0	0	0	0	13
4	0	0	0	0	0	0	0	0	4
9	0	0	0	0	0	0	0	0	9
11	2	0	0	0	0	0	0	0	13
18	1	0	0	0	1	1	1	1	21
42	3	0	0	0	1	1	1	1	47
15	4	0	0	1	1	1	1	1	22
42	3	0	0	0	1	3	49	49	49
74	6	0	0	0	0	1	81	81	81
70	9	0	0	0	0	1	80	80	80
201	22	0	0	1	2	6	232	232	232
89	8	1	0	2	1	3	104	104	104
109	11	0	0	2	1	1	124	124	124
140	7	3	1	1	0	5	157	157	157
113	8	2	0	0	1	4	128	128	128
451	34	6	1	5	3	13	513	513	513
104	5	1	0	1	1	3	115	115	115
99	8	2	1	0	1	3	114	114	114
140	4	1	0	0	3	3	151	151	151
132	10	2	1	0	1	3	149	149	149
475	27	6	2	1	6	12	529	529	529
129	12	2	2	0	0	1	146	146	146
118	9	2	2	0	1	0	132	132	132
98	11	1	0	0	0	0	110	110	110
91	9	0	2	0	0	0	102	102	102
436	41	5	6	0	1	1	490	490	490
83	4	2	1	0	1	0	91	91	91
86	8	3	1	1	2	0	101	101	101

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79
39
87
118
142
386
185
240
294
333
1052
320
359
376
350
1405
316
279
228
212
1035
203
215

10:30	53	13	1	2	0	0	0	1	70
10:45	60	12	2	0	0	0	0	2	74
1 Hr	228	48	8	3	0	0	0	2	289
11:00	75	16	0	0	0	0	0	0	91
11:15	71	7	2	0	0	0	0	1	81
11:30	62	9	3	0	1	0	0	0	75
11:45	77	7	2	0	0	0	0	0	86
1 Hr	285	39	7	0	1	0	1	1	333
12:00	78	9	4	1	0	0	0	0	92
12:15	80	8	3	0	0	1	0	0	92
12:30	67	15	0	0	1	0	0	0	83
12:45	89	5	1	0	0	0	0	0	95
1 Hr	314	37	8	1	1	1	0	0	362
13:00	95	12	1	0	0	0	0	1	109
13:15	72	6	3	2	0	0	0	0	83
13:30	89	10	2	1	1	0	0	1	104
13:45	82	11	1	1	0	0	0	0	95
1 Hr	338	39	7	4	1	0	2	2	391
14:00	107	6	1	1	0	0	0	0	115
14:15	107	10	1	0	0	0	0	0	118
14:30	97	16	1	1	0	0	0	1	116
14:45	99	9	6	1	0	0	0	0	115
1 Hr	410	41	9	3	0	0	1	1	464
15:00	86	10	2	0	2	0	0	0	100
15:15	110	12	2	0	0	1	0	0	125
15:30	108	6	2	2	1	1	0	0	120
15:45	132	13	3	1	1	1	1	1	152
1 Hr	436	41	9	3	4	3	1	1	497
16:00	127	9	1	0	1	1	1	1	140
16:15	121	15	3	0	0	0	0	1	140
16:30	130	12	1	0	1	0	0	1	145
16:45	123	12	3	0	0	0	2	3	143
1 Hr	501	48	8	0	2	3	6	5	568
17:00	127	12	0	0	0	1	2	2	142
17:15	130	16	1	0	0	1	2	2	150
17:30	147	13	1	0	2	1	2	1	166
17:45	171	11	0	0	1	2	5	5	190
1 Hr	575	52	2	0	3	5	11	10	648
18:00	172	18	1	0	0	1	4	4	196
18:15	182	8	2	0	1	0	4	4	197
18:30	131	7	0	0	0	2	10	10	150
18:45	137	8	0	0	0	1	1	1	147
1 Hr	622	41	3	0	1	4	19	19	690
19:00	143	4	0	0	0	0	0	0	147
19:15	129	10	0	0	0	0	1	1	140
19:30	122	5	1	0	0	2	2	2	132
19:45	95	7	0	0	0	0	0	0	102

33	6	0	0	0	0	0	1	40
40	9	1	0	0	0	0	0	50
1 Hr	143	23	4	0	0	0	1	171
35	5	0	1	0	0	2	43	
29	3	0	0	0	0	0	32	
32	5	1	0	0	0	0	38	
37	2	0	0	0	0	0	40	
1 Hr	133	15	1	1	0	0	3	153
47	5	0	0	0	0	0	52	
37	4	1	0	0	0	0	42	
37	4	0	0	0	0	1	43	
50	3	0	0	0	0	1	54	
1 Hr	171	16	1	0	0	1	2	191
39	3	0	0	0	1	0	43	
60	3	0	0	0	0	0	63	
43	7	0	0	0	0	0	50	
48	7	1	0	0	0	0	56	
1 Hr	190	20	1	0	0	1	0	212
68	2	0	0	0	0	0	70	
56	3	0	0	0	0	0	59	
52	4	0	0	0	0	0	56	
59	4	0	1	0	0	0	64	
1 Hr	235	13	0	1	0	0	1	249
59	7	0	1	1	0	1	69	
52	4	0	1	0	0	1	58	
62	4	0	1	0	1	0	68	
56	6	1	0	0	0	0	63	
1 Hr	229	21	1	3	1	1	2	258
69	6	1	0	0	0	0	76	
79	6	1	1	1	0	3	91	
65	9	1	0	0	0	0	76	
61	6	0	0	0	0	1	68	
1 Hr	274	27	3	1	1	0	5	311
53	8	2	0	0	0	2	65	
68	6	0	0	0	0	1	75	
64	7	0	0	0	1	1	73	
62	3	0	0	0	0	1	66	
1 Hr	247	24	2	0	0	1	5	279
73	3	0	0	0	0	2	78	
71	6	0	0	0	1	0	78	
73	3	0	0	0	0	3	79	
70	7	0	0	0	0	1	78	
1 Hr	287	19	0	0	0	1	6	313
47	5	0	0	0	0	0	52	
71	3	0	0	0	0	0	74	
66	5	0	0	0	0	0	71	
57	4	0	0	0	0	0	61	

80	10	2	1	0	0	0	93	
85	8	3	1	0	0	1	98	
1 Hr	334	30	10	4	1	3	1	383
58	5	3	0	0	0	0	66	
76	4	3	2	0	0	1	86	
81	9	1	1	0	1	1	94	
68	19	1	0	0	0	0	88	
1 Hr	283	37	8	3	0	1	2	334
74	11	1	0	0	1	0	87	
58	5	2	1	1	0	1	68	
79	5	1	1	0	1	2	89	
68	14	2	0	0	0	0	84	
1 Hr	279	35	6	2	1	2	3	328
57	14	2	1	0	0	0	74	
95	8	1	0	1	0	0	105	
92	12	3	1	0	1	1	110	
86	11	4	0	0	0	1	102	
1 Hr	330	45	10	2	1	1	2	391
86	6	4	0	0	0	1	97	
77	12	2	2	0	0	0	93	
101	10	2	2	1	0	1	117	
102	10	0	0	1	1	0	114	
1 Hr	366	38	8	4	2	1	2	421
78	18	4	0	0	1	1	102	
68	11	5	2	0	0	0	86	
101	13	3	1	1	0	1	120	
115	20	3	1	0	0	1	140	
1 Hr	362	62	15	4	1	1	3	448
129	23	1	1	1	0	1	156	
111	20	2	2	0	1	1	137	
104	25	1	1	0	2	1	134	
83	15	0	1	0	0	0	99	
1 Hr	427	83	4	5	1	3	3	526
90	22	1	1	0	2	2	118	
91	11	2	0	0	0	1	105	
104	8	1	0	0	0	2	115	
85	5	0	1	0	0	1	92	
1 Hr	370	46	4	2	0	2	6	430
100	5	0	0	0	0	0	105	
94	9	1	0	0	0	3	107	
84	7	0	0	0	0	1	92	
93	9	1	0	1	0	1	105	
1 Hr	371	30	2	0	1	0	5	409
84	9	0	0	0	0	1	94	
59	4	0	0	1	2	2	68	
84	6	1	0	0	1	1	93	
69	6	0	0	0	1	2	78	

203
222
843
200
199
207
214
820
231
202
215
233
881
226
251
264
253
994
282
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289
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1134
271
269
308
355
1203
372
368
355
310
1405
325
330
354
348
1357
379
382
321
330
1412
293
282
296
241

1 Hr	489	26	1	0	0	2	3	521
20:00	82	4	1	0	0	0	0	87
20:15	80	7	1	0	0	0	1	89
20:30	79	2	0	0	0	0	0	81
20:45	70	4	0	0	0	0	0	74
1 Hr	311	17	2	0	0	0	1	331
21:00	71	5	0	0	0	1	1	78
21:15	66	1	0	0	0	0	0	67
21:30	40	2	0	0	1	0	0	43
21:45	50	1	0	0	0	0	0	51
1 Hr	227	9	0	0	1	1	1	239
22:00	47	0	0	0	0	0	0	47
22:15	38	1	0	0	0	0	0	39
22:30	38	0	0	0	0	0	1	39
22:45	33	0	0	0	1	0	0	34
1 Hr	156	1	0	0	1	0	1	159
23:00	29	1	0	0	0	0	0	30
23:15	15	0	0	0	0	0	0	15
23:30	12	0	0	0	0	0	0	12
23:45	13	0	0	0	0	0	0	13
1 Hr	69	1	0	0	0	0	0	70

Total	6058	638	96	26	22	23	66	6929
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241	17	0	0	0	0	0	0	258
50	2	1	0	0	0	0	1	54
40	1	0	0	0	0	1	0	42
51	6	0	0	0	0	0	0	57
41	5	0	0	0	0	0	1	47
182	14	1	0	0	0	1	2	200
42	1	0	0	0	0	0	2	45
31	2	0	0	0	0	0	0	33
28	3	0	0	0	0	0	2	33
16	1	0	0	0	0	0	0	17
117	7	0	0	0	0	0	4	128
16	1	0	0	0	0	0	0	17
15	0	0	0	0	0	0	1	16
15	0	0	0	0	0	0	0	15
19	0	0	0	0	0	0	0	19
65	1	0	0	0	0	0	1	67
7	1	0	0	0	0	0	0	8
8	0	0	0	0	0	0	1	9
6	0	0	0	0	0	0	0	6
5	0	0	0	0	0	0	0	5
26	1	0	0	0	0	0	1	28

3352	302	21	9	7	7	39	3737
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296	25	1	0	1	4	6	333
53	0	0	0	0	1	0	54
38	5	0	0	0	2	1	46
63	2	3	1	0	0	0	69
66	1	0	0	0	0	0	67
220	8	3	1	0	3	1	236
62	3	0	0	1	1	0	67
56	5	0	0	0	0	1	62
48	2	0	0	0	0	1	51
51	1	0	0	0	0	0	52
217	11	0	0	1	1	2	232
37	2	0	0	0	0	0	39
28	0	0	0	0	1	0	29
22	2	0	0	0	0	0	24
14	1	0	0	0	0	0	15
101	5	0	0	0	1	0	107
23	1	0	0	0	0	0	24
11	0	0	0	0	0	0	11
15	0	0	0	0	0	0	15
9	0	0	0	0	0	0	9
58	1	0	0	0	0	0	59

5701	589	89	36	17	36	70	6538
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1112
195
177
207
188
767
190
162
127
120
599
103
84
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157

17204

SITE 2



Origin : Arm A Balgriffin Park

	Destination : Arm A Balgriffin Park							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	0	0	0	0	0	0	0	0
00:15	0	0	0	0	0	0	0	0
00:30	0	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0
03:15	0	0	0	0	0	0	0	0
03:30	0	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0
04:15	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	0	0	0
04:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0
05:15	0	0	0	0	0	0	0	0
05:30	0	0	0	0	0	0	0	0
05:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0

	Destination : Arm B Belmayne(E)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
	4	0	0	0	0	0	0	4
	4	1	0	0	0	0	0	5
	3	0	0	0	0	0	0	3
	2	0	0	0	0	0	0	2
	13	1	0	0	0	0	0	14
	3	0	0	0	0	0	0	3
	3	2	0	0	0	0	0	5
	4	0	0	0	0	0	0	4
	1	0	0	0	0	0	0	1
	11	2	0	0	0	0	0	13
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	2
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	2	1	0	0	0	0	1	4
	3	2	0	0	0	0	1	6
	4	1	0	0	0	0	0	5
	11	0	0	0	0	0	0	11
	6	0	0	0	0	0	0	6
	15	0	0	0	0	0	0	15
	36	1	0	0	0	0	0	37
	18	4	0	0	0	0	0	22
	40	8	0	0	1	0	1	50
	49	3	0	0	0	0	0	52
	60	7	0	1	3	0	1	72
	167	22	0	1	4	0	2	196
	60	5	2	0	0	0	1	68
	59	2	0	0	0	0	0	61
	36	2	1	1	0	0	0	40

	Destination : Arm C Belmayne							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	2	0	0	0	0	0	0	2
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	1	1	0	0	0	0	0	2
	1	1	0	0	0	0	0	2
	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	2
	11	1	0	0	0	0	0	12
	26	1	0	1	0	0	0	28
	39	2	0	1	0	0	0	42
	35	2	0	0	0	0	0	37
	49	0	0	0	0	0	1	50
	30	1	1	0	0	0	0	32

Arm Totals
4
5
4
3
16
3
5
4
1
13
1
1
1
0
3
2
0
0
0
2
1
0
0
0
2
1
0
0
0
0
4
0
0
0
0
7
5
11
6
17
39
22
52
64
100
238
105
111
72

08:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0
09:30	1	0	0	0	0	0	0	0	1
09:45	0	0	0	0	0	0	0	0	0
1 Hr	1	0	0	0	0	0	0	0	1
10:00	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0

50	4	0	1	0	0	0	0	55
205	13	3	2	0	0	0	1	224
42	8	0	1	0	0	0	0	51
60	5	0	0	0	0	0	0	65
23	7	0	1	0	0	0	0	31
35	4	0	1	0	0	0	0	40
160	24	0	3	0	0	0	0	187
37	4	3	0	0	0	0	0	44
34	6	1	0	0	0	0	0	41
30	2	0	0	0	0	0	0	32
29	3	1	1	0	0	1	0	35
130	15	5	1	0	1	0	0	152
32	2	0	0	0	0	0	1	35
27	2	0	0	0	0	0	0	29
35	4	0	0	0	0	0	0	39
35	3	1	0	0	0	0	0	39
129	11	1	0	0	0	0	1	142
45	2	0	0	0	0	0	0	47
33	4	0	0	0	0	0	0	37
37	8	1	0	0	0	0	0	46
42	4	0	0	0	0	0	0	46
157	18	1	0	0	0	0	0	176
38	6	0	0	1	0	0	0	45
57	7	1	0	0	1	0	0	66
48	3	0	0	0	0	0	0	51
44	6	0	0	0	0	0	0	50
187	22	1	0	1	1	0	0	212
39	3	0	0	0	0	0	1	43
43	4	0	0	2	0	0	0	49
44	5	0	0	0	0	0	0	49
70	1	0	0	1	0	0	0	72
196	13	0	0	3	0	1	0	213
51	4	0	0	0	0	2	0	57
51	7	0	0	0	0	0	1	59
42	4	0	0	0	0	0	0	46
53	4	0	0	0	0	0	1	58
197	19	0	0	0	0	0	4	220
44	3	1	0	0	0	0	0	48
57	6	1	0	0	0	0	0	64
51	6	1	0	0	0	0	2	60
53	4	1	0	0	1	0	0	59
205	19	4	0	0	0	1	2	231
56	7	0	0	0	0	0	1	64
56	4	1	0	0	0	0	0	61
55	2	1	0	0	2	0	0	60
54	2	0	0	0	2	2	0	60
221	15	2	0	0	0	4	3	245

19	1	0	0	0	0	0	1	21
133	4	1	0	0	0	0	2	140
21	3	1	0	0	0	0	0	25
8	0	0	0	0	0	0	0	8
7	0	0	0	0	0	0	0	7
0	1	1	0	0	0	0	0	2
36	4	2	0	0	0	0	0	42
6	3	0	0	0	0	0	0	9
5	0	2	0	0	0	0	0	7
4	0	0	0	0	0	0	0	4
7	0	0	0	0	0	0	0	7
22	3	2	0	0	0	0	0	27
3	1	0	0	0	0	0	0	4
5	1	0	0	0	0	0	0	6
3	1	0	0	0	0	0	0	4
7	0	0	0	0	0	0	0	7
18	3	0	0	0	0	0	0	21
6	1	0	0	0	0	0	0	7
3	1	0	0	0	0	0	0	4
4	0	0	0	0	0	0	0	4
4	0	0	0	0	0	0	0	4
17	2	0	0	0	0	0	0	19
7	1	0	0	0	0	0	0	8
8	2	0	0	0	0	0	0	10
4	1	1	0	0	0	0	0	6
9	1	0	0	0	0	0	0	10
28	5	1	0	0	0	0	0	34
10	0	0	0	0	0	0	0	10
12	1	0	0	0	0	0	0	13
5	0	0	0	0	0	0	0	5
16	0	0	0	0	0	0	0	16
43	1	0	0	0	0	0	0	44
9	0	0	0	0	0	0	0	9
8	0	0	0	0	0	1	0	9
4	1	0	0	0	0	0	0	5
8	1	0	0	0	0	0	0	9
29	2	0	0	0	0	1	0	32
9	1	0	0	0	0	0	0	10
7	1	0	0	0	0	0	0	8
8	1	0	0	0	0	0	1	10
11	3	0	0	0	0	0	0	14
35	6	0	0	0	0	0	1	42
12	0	0	0	0	0	0	0	12
10	1	0	0	0	0	0	0	12
10	0	0	0	0	0	0	0	10
6	2	0	0	0	0	0	1	9
38	3	0	0	0	0	0	2	43

76
364
76
73
39
42
230
53
48
36
42
179
39
35
43
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163
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41
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53
76
57
60
246
53
62
54
88
257
66
68
51
67
252
58
72
70
73
273
76
73
70
69
288

18:00	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
19:00	0	0	0	0	0	0	0	0	0
19:15	0	0	0	0	0	0	0	0	0
19:30	0	0	0	0	0	0	0	0	0
19:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0
20:15	0	0	0	0	0	0	0	0	0
20:30	0	0	0	0	0	0	0	0	0
20:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0
21:15	0	0	0	0	0	0	0	0	0
21:30	0	0	0	0	0	0	0	0	0
21:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0
22:15	0	0	0	0	0	0	0	0	0
22:30	0	0	0	0	0	0	0	0	0
22:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0
23:15	0	0	0	0	0	0	0	0	0
23:30	0	0	0	0	0	0	0	0	0
23:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	0	1

66	5	0	0	0	0	0	1	72
62	1	0	0	0	0	1	0	64
43	3	1	0	0	0	1	0	48
59	7	0	0	1	0	0	0	67
230	16	1	0	1	2	1	251	
32	2	0	0	0	0	0	0	34
47	1	0	1	0	0	0	0	49
36	2	0	0	0	0	0	0	38
34	4	0	0	0	0	0	0	38
149	9	0	1	0	0	0	159	
40	1	0	0	0	0	0	0	41
30	3	0	0	0	0	0	0	33
28	2	0	0	0	0	0	1	31
37	3	0	0	0	0	0	1	41
135	9	0	0	0	0	2	146	
45	1	0	0	0	0	0	0	46
31	1	0	0	0	0	0	0	32
24	2	0	0	0	0	0	0	26
20	1	0	0	0	0	1	0	22
120	5	0	0	0	1	0	126	
16	1	0	0	0	0	0	1	18
28	0	0	0	0	0	0	1	29
12	0	0	0	0	0	0	0	12
13	0	0	0	0	0	0	0	13
69	1	0	0	0	0	2	72	
8	0	0	0	0	0	0	0	8
12	0	0	0	0	0	0	0	12
5	0	0	0	0	0	0	0	5
4	0	0	0	0	0	0	0	4
29	0	0	0	0	0	0	29	
2753	239	18	8	9	10	20	3057	

10	0	0	0	0	0	0	0	10
9	1	0	0	0	0	0	0	10
6	0	0	0	0	0	0	0	6
13	1	0	0	0	0	0	0	14
38	2	0	0	0	0	0	40	
7	1	0	0	0	0	0	0	8
16	1	0	0	0	0	0	0	17
9	0	0	0	0	0	0	0	9
6	0	0	0	0	0	0	3	9
38	2	0	0	0	0	3	43	
5	1	1	0	0	0	0	0	7
3	1	0	0	0	0	0	0	4
4	0	0	0	0	0	0	0	4
3	1	0	0	0	0	0	1	5
15	3	1	0	0	0	1	20	
8	0	0	0	0	0	0	0	8
7	0	0	0	0	0	0	0	7
4	0	0	0	0	0	0	0	4
6	0	0	0	0	0	0	0	6
25	0	0	0	0	0	0	25	
4	0	0	0	0	0	0	0	4
4	0	0	0	0	0	0	0	4
1	0	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0	4
13	0	0	0	0	0	0	13	
1	0	0	0	0	0	0	0	1
2	1	0	0	0	0	0	0	3
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
3	1	0	0	0	0	0	4	
577	44	7	1	0	1	9	639	

82
74
54
81
291
42
66
47
47
202
48
37
35
46
166
54
39
30
28
151
22
33
13
17
85
9
15
5
4
33
3697

Origin : Arm B Belmayne(E)

Destination :	Arm A	Balgriffin Park	Total					
	Car	LGV	OGV1	OGV2	PSV	MC	PC	

00:00	5	0	0	0	0	0	1	6
00:15	5	0	0	0	0	0	1	6
00:30	3	0	0	0	0	0	0	3
00:45	1	0	0	0	0	0	0	1
1 Hr	14	0	0	0	0	0	2	16
01:00	1	0	0	0	0	0	0	1
01:15	2	0	0	0	0	0	0	2
01:30	1	0	0	0	0	0	0	1
01:45	0	0	0	0	0	0	0	0
1 Hr	4	0	0	0	0	0	0	4

Destination :	Arm B	Belmayne(E)	Total					
	Car	LGV	OGV1	OGV2	PSV	MC	PC	

0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

Destination :	Arm C	Belmayne(W)	Total					
	Car	LGV	OGV1	OGV2	PSV	MC	PC	

1	1	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
2	1	0	0	0	0	0	0	3
2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	3

8
6
3
2
19
3
3
1
0
7

23:45	1	0	0	0	0	0	0	1
1 Hr	2	0	0	0	0	0	0	2
Total	393	38	3	0	1	2	1	438

	2	0	0	0	0	0	0	2
	12	0	0	0	0	0	0	12
	1130	133	14	17	3	4	15	1316

	0	0	0	0	0	0	0	0	3
	0	0	0	0	0	0	0	0	14
	8	1	0	0	0	0	0	9	1763

ORIGIN SUMMARY

	Origin : Arm A Balgriffin Park							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	4	0	0	0	0	0	0	4
00:15	4	1	0	0	0	0	0	5
00:30	4	0	0	0	0	0	0	4
00:45	3	0	0	0	0	0	0	3
1 Hr	15	1	0	0	0	0	0	16
01:00	3	0	0	0	0	0	0	3
01:15	3	2	0	0	0	0	0	5
01:30	4	0	0	0	0	0	0	4
01:45	1	0	0	0	0	0	0	1
1 Hr	11	2	0	0	0	0	0	13
02:00	1	0	0	0	0	0	0	1
02:15	1	0	0	0	0	0	0	1
02:30	1	0	0	0	0	0	0	1
02:45	0	0	0	0	0	0	0	0
1 Hr	3	0	0	0	0	0	0	3
03:00	2	0	0	0	0	0	0	2
03:15	0	0	0	0	0	0	0	0
03:30	0	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0
1 Hr	2	0	0	0	0	0	0	2
04:00	1	0	0	0	0	0	0	1
04:15	0	0	0	0	0	0	0	0
04:30	1	0	0	0	0	0	0	1
04:45	0	2	0	0	0	0	0	2
1 Hr	2	2	0	0	0	0	0	4
05:00	0	0	0	0	0	0	0	0
05:15	2	1	0	0	0	0	0	3
05:30	0	0	0	0	0	0	0	0
05:45	2	1	0	0	0	0	1	4
1 Hr	4	2	0	0	0	0	1	7
06:00	4	1	0	0	0	0	0	5
06:15	11	0	0	0	0	0	0	11
06:30	6	0	0	0	0	0	0	6
06:45	16	1	0	0	0	0	0	17
1 Hr	37	2	0	0	0	0	0	39
07:00	18	4	0	0	0	0	0	22
07:15	42	8	0	0	1	0	1	52
07:30	60	4	0	0	0	0	0	64

	Origin : Arm B Belmayne(E)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
	6	1	0	0	0	0	1	8
	5	0	0	0	0	0	1	6
	3	0	0	0	0	0	0	3
	2	0	0	0	0	0	0	2
	16	1	0	0	0	0	2	19
	3	0	0	0	0	0	0	3
	3	0	0	0	0	0	0	3
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	7
	2	0	0	0	0	0	0	2
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	3
	2	0	0	0	0	0	0	2
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	5	0	0	0	0	0	0	5
	3	0	0	0	0	0	0	3
	1	0	0	0	0	0	0	1
	3	0	0	0	0	0	0	3
	2	0	0	0	0	0	0	2
	9	0	0	0	0	0	0	9
	1	1	0	0	0	0	0	2
	3	2	0	0	0	0	0	5
	8	1	0	0	0	0	0	9
	8	0	0	0	0	0	0	8
	20	4	0	0	0	0	0	24
	10	1	0	0	0	0	0	11
	10	4	1	0	0	0	0	15
	13	3	1	0	0	0	0	17
	20	1	0	0	0	0	0	21
	53	9	2	0	0	0	0	64
	34	2	0	0	1	1	0	38
	34	6	0	1	1	1	0	43
	77	7	3	1	0	0	0	88

	Origin : Arm C Belmayne(W)							Total	Origin Totals
	Car	LGV	OGV1	OGV2	PSV	MC	PC		
	1	1	0	0	0	0	0	2	14
	0	0	0	0	0	0	0	0	11
	1	0	0	0	0	0	0	1	8
	0	0	0	0	0	0	0	0	5
	2	1	0	0	0	0	0	3	38
	0	0	0	0	0	0	0	0	6
	1	0	0	0	0	0	0	1	9
	0	0	0	0	0	0	0	0	5
	0	0	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1	21
	1	0	0	0	0	0	0	1	4
	2	0	0	0	0	0	0	2	4
	0	0	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1	1
	4	0	0	0	0	0	0	4	10
	1	0	0	0	0	0	0	1	5
	0	0	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1	8
	0	0	0	0	0	0	0	0	4
	2	0	0	0	0	0	0	2	3
	0	0	0	0	0	0	0	0	4
	0	0	0	0	0	0	0	0	4
	2	0	0	0	0	0	0	2	15
	1	0	0	0	0	0	0	1	3
	0	0	0	0	0	0	0	0	8
	0	0	0	0	0	0	0	0	9
	0	0	0	0	0	0	0	0	12
	1	0	0	0	0	0	0	1	32
	4	0	0	0	0	0	0	4	20
	5	2	0	0	0	0	0	7	33
	7	2	0	0	0	0	0	9	32
	13	8	1	1	0	0	0	23	61
	29	12	1	1	0	0	0	43	146
	10	2	0	0	0	0	0	12	72
	21	7	0	0	0	0	0	28	123
	28	4	2	2	0	0	0	36	188

07:45	86	8	0	2	3	0	1	100
1 Hr	206	24	0	2	4	0	2	238
08:00	95	7	2	0	0	0	1	105
08:15	108	2	0	0	0	0	1	111
08:30	66	3	2	1	0	0	0	72
08:45	69	5	0	1	0	0	1	76
1 Hr	338	17	4	2	0	0	3	364
09:00	63	11	1	1	0	0	0	76
09:15	68	5	0	0	0	0	0	73
09:30	31	7	0	1	0	0	0	39
09:45	35	5	1	1	0	0	0	42
1 Hr	197	28	2	3	0	0	0	230
10:00	43	7	3	0	0	0	0	53
10:15	39	6	3	0	0	0	0	48
10:30	34	2	0	0	0	0	0	36
10:45	36	3	1	1	0	1	0	42
1 Hr	152	18	7	1	0	1	0	179
11:00	35	3	0	0	0	0	1	39
11:15	32	3	0	0	0	0	0	35
11:30	38	5	0	0	0	0	0	43
11:45	42	3	1	0	0	0	0	46
1 Hr	147	14	1	0	0	0	1	163
12:00	51	3	0	0	0	0	0	54
12:15	36	5	0	0	0	0	0	41
12:30	41	8	1	0	0	0	0	50
12:45	46	4	0	0	0	0	0	50
1 Hr	174	20	1	0	0	0	0	195
13:00	45	7	0	0	1	0	0	53
13:15	65	9	1	0	0	1	0	76
13:30	52	4	1	0	0	0	0	57
13:45	53	7	0	0	0	0	0	60
1 Hr	215	27	2	0	1	1	0	246
14:00	49	3	0	0	0	0	1	53
14:15	55	5	0	0	2	0	0	62
14:30	49	5	0	0	0	0	0	54
14:45	86	1	0	0	1	0	0	88
1 Hr	239	14	0	0	3	0	1	257
15:00	60	4	0	0	0	0	2	66
15:15	59	7	0	0	0	1	1	68
15:30	46	5	0	0	0	0	0	51
15:45	61	5	0	0	0	0	1	67
1 Hr	226	21	0	0	0	1	4	252
16:00	53	4	1	0	0	0	0	58
16:15	64	7	1	0	0	0	0	72
16:30	59	7	1	0	0	0	3	70
16:45	64	7	1	0	0	1	0	73
1 Hr	240	25	4	0	0	1	3	273

78	5	1	1	0	0	2	87
223	20	4	3	2	2	2	256
88	9	0	2	0	1	2	102
113	9	0	1	0	2	0	125
97	10	0	0	0	0	1	108
88	4	4	1	1	0	1	99
386	32	4	4	1	3	4	434
52	3	1	3	0	0	0	59
51	7	2	0	0	0	0	60
46	4	2	2	0	0	0	54
36	8	1	0	0	0	0	45
185	22	6	5	0	0	0	218
46	4	3	0	0	0	0	53
40	9	2	1	0	0	1	53
44	4	2	0	0	0	1	51
44	11	4	2	0	1	0	62
174	28	11	3	0	1	2	219
30	4	1	0	0	1	0	36
48	8	1	1	0	1	0	59
44	10	1	1	0	0	1	57
53	6	0	0	0	1	1	61
175	28	3	2	0	3	2	213
37	4	5	0	0	1	0	47
45	4	1	1	0	0	0	51
51	7	1	0	0	0	0	59
67	6	4	1	0	0	1	79
200	21	11	2	0	1	1	236
61	6	0	1	0	0	1	69
62	4	1	1	0	0	1	69
54	12	1	0	0	0	0	67
65	4	0	0	0	0	2	71
242	26	2	2	0	0	4	276
71	5	1	1	0	0	0	78
91	6	2	0	1	0	2	102
48	8	1	2	1	0	1	61
48	7	2	0	0	1	2	60
258	26	6	3	2	1	5	301
47	6	0	0	1	0	0	54
61	2	0	0	1	0	0	64
54	9	2	0	1	0	0	66
66	9	2	0	0	1	1	79
228	26	4	0	3	1	1	263
83	11	2	0	1	1	0	98
92	7	2	0	0	0	0	101
77	8	1	0	0	0	0	86
75	10	1	0	0	1	3	90
327	36	6	0	1	2	3	375

29	2	0	0	1	0	0	32
88	15	2	2	1	0	0	108
36	5	0	1	0	0	0	42
31	3	0	0	1	0	0	35
42	6	0	1	0	0	1	50
39	3	1	1	0	0	1	45
148	17	1	3	1	0	2	172
31	2	1	0	1	0	0	35
17	3	0	1	0	0	0	21
5	2	2	0	0	0	0	9
12	2	0	1	0	0	1	16
65	9	3	2	1	0	1	81
9	1	0	0	0	1	0	11
15	3	0	1	0	0	0	19
15	3	0	1	0	1	0	20
6	3	1	0	0	0	0	10
45	10	1	2	0	2	0	60
7	1	0	1	0	0	0	9
13	1	0	0	0	0	0	14
20	3	0	0	0	0	0	23
16	3	2	0	0	0	0	21
56	8	2	1	0	0	0	67
24	7	1	1	0	0	0	33
20	1	1	1	0	0	0	23
17	2	0	0	0	0	0	19
21	1	0	1	0	0	0	23
82	11	2	3	0	0	0	98
17	2	0	2	0	0	0	21
33	4	0	0	0	0	0	37
36	5	0	1	0	0	0	42
20	1	1	0	0	0	0	22
106	12	1	3	0	0	0	122
17	1	0	0	0	0	1	19
31	3	0	0	0	0	0	34
56	3	0	0	0	0	1	60
32	1	0	0	0	0	0	33
136	8	0	0	0	0	2	146
16	3	1	0	0	0	0	20
31	4	1	0	0	0	0	36
26	6	0	0	0	1	0	33
14	3	1	0	0	0	0	18
87	16	3	0	0	1	0	107
23	4	0	0	1	0	0	28
36	3	0	0	0	0	2	41
36	7	0	0	0	1	0	44
39	6	0	0	0	0	0	45
134	20	0	0	1	1	2	158

219
602
249
271
230
220
970
170
154
102
103
529
117
120
107
114
458
84
108
123
128
443
134
115
128
152
529
143
182
166
153
644
150
198
175
181
704
140
168
150
164
622
184
214
200
208
806

17:00	68	7	0	0	0	0	1	76
17:15	66	5	1	0	0	0	1	73
17:30	65	2	1	0	0	2	0	70
17:45	60	4	0	0	0	2	3	69
1 Hr	259	18	2	0	0	4	5	288
18:00	76	5	0	0	0	0	1	82
18:15	71	2	0	0	0	1	0	74
18:30	49	3	1	0	0	1	0	54
18:45	72	8	0	0	1	0	0	81
1 Hr	268	18	1	0	1	2	1	291
19:00	39	3	0	0	0	0	0	42
19:15	63	2	0	1	0	0	0	66
19:30	45	2	0	0	0	0	0	47
19:45	40	4	0	0	0	0	3	47
1 Hr	187	11	0	1	0	0	3	202
20:00	45	2	1	0	0	0	0	48
20:15	33	4	0	0	0	0	0	37
20:30	32	2	0	0	0	0	1	35
20:45	40	4	0	0	0	0	2	46
1 Hr	150	12	1	0	0	0	3	166
21:00	53	1	0	0	0	0	0	54
21:15	38	1	0	0	0	0	0	39
21:30	28	2	0	0	0	0	0	30
21:45	26	1	0	0	0	1	0	28
1 Hr	145	5	0	0	0	1	0	151
22:00	20	1	0	0	0	0	1	22
22:15	32	0	0	0	0	0	1	33
22:30	13	0	0	0	0	0	0	13
22:45	17	0	0	0	0	0	0	17
1 Hr	82	1	0	0	0	0	2	85
23:00	9	0	0	0	0	0	0	9
23:15	14	1	0	0	0	0	0	15
23:30	5	0	0	0	0	0	0	5
23:45	4	0	0	0	0	0	0	4
1 Hr	32	1	0	0	0	0	0	33

Total	3331	283	25	9	9	11	29	3697
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DESTINATION SUMMARY

Destination : Arm A Balgriffin Park								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

00:00	5	1	0	0	0	0	1	7
00:15	5	0	0	0	0	0	1	6
00:30	3	0	0	0	0	0	0	3
00:45	1	0	0	0	0	0	0	1
1 Hr	14	1	0	0	0	0	2	17

100	11	1	0	0	0	0	2	114
81	7	0	1	0	0	0	1	90
80	8	1	0	0	2	0	0	91
113	9	0	1	0	2	0	0	125
374	35	2	2	0	4	3	420	
83	8	0	0	0	0	0	0	91
119	9	0	0	0	0	0	2	130
78	4	0	0	0	0	0	0	82
65	9	1	0	0	0	0	2	77
345	30	1	0	0	0	4	380	
89	1	0	0	0	0	0	0	90
58	4	0	0	0	0	0	0	62
48	6	0	0	0	0	1	55	
78	3	0	0	0	0	0	0	81
273	14	0	0	0	0	1	288	
48	3	0	0	0	0	2	53	
50	2	1	0	0	0	0	53	
44	2	0	0	0	0	0	46	
32	2	0	0	0	0	0	34	
174	9	1	0	0	0	2	186	
30	1	1	0	0	0	0	32	
27	0	0	0	0	0	0	27	
35	0	0	0	0	0	0	35	
21	3	0	0	0	0	0	24	
113	4	1	0	0	0	0	118	
25	0	0	0	0	0	0	25	
17	1	0	0	0	0	0	18	
15	0	0	0	0	0	0	15	
8	0	0	0	0	0	0	8	
65	1	0	0	0	0	0	66	
9	1	0	0	0	0	0	10	
11	0	0	0	0	0	0	11	
9	0	0	0	0	0	1	10	
9	0	0	0	0	0	0	9	
38	1	0	0	0	0	1	40	

3893	373	64	26	9	18	37	4420
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Destination : Arm B Belmayne(E)								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

5	0	0	0	0	0	0	5
4	1	0	0	0	0	0	5
4	0	0	0	0	0	0	4
2	0	0	0	0	0	0	2
15	1	0	0	0	0	0	16

31	4	1	0	0	0	0	0	36
41	2	0	0	0	0	1	0	44
40	2	0	0	0	0	0	1	43
41	3	0	0	0	0	1	0	45
153	11	1	0	0	0	2	1	168
46	1	0	0	0	0	0	0	47
43	3	0	0	0	0	0	2	48
42	1	0	0	0	0	0	1	44
27	2	0	0	0	0	0	1	30
158	7	0	0	0	0	4	169	
19	1	0	0	0	0	0	0	20
27	1	0	0	0	0	0	0	28
19	2	0	0	0	0	0	2	23
22	0	0	0	0	0	0	0	22
87	4	0	0	0	0	0	2	93
18	1	0	0	0	0	0	0	19
15	2	0	0	0	0	0	0	17
16	2	0	0	0	0	0	0	18
11	2	0	0	0	0	0	0	13
60	7	0	0	0	0	0	0	67
9	0	0	0	0	0	0	0	9
16	0	0	0	0	0	0	2	18
4	1	0	0	0	0	0	0	5
7	0	0	0	0	0	0	0	7
36	1	0	0	0	0	0	2	39
10	0	0	0	0	0	0	0	10
11	2	0	0	0	0	0	0	13
10	0	0	0	0	0	0	0	10
5	1	0	0	0	0	0	0	6
36	3	0	0	0	0	0	0	39
5	0	0	0	0	0	0	0	5
1	0	0	0	0	0	0	0	1
5	0	0	0	0	0	0	0	5
3	0	0	0	0	0	0	0	3
14	0	0	0	0	0	0	0	14

1531	172	17	17	4	6	16	1763
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Destination : Arm C Belmayne(W)								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

1	1	0	0	0	0	0	2
0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	1
2	0	0	0	0	0	0	2
4	1	0	0	0	0	0	5

226
207
204
239
876
220
252
180
188
840
152
156
125
150
583
120
107
99
93
419
95
84
70
59
308
57
64
38
31
190
24
27
20
16
87

9880

Dest Totals

14
11
8
5
38

01:00	1	0	0	0	0	0	0	1
01:15	2	0	0	0	0	0	0	2
01:30	1	0	0	0	0	0	0	1
01:45	0	0	0	0	0	0	0	0
1 Hr	4	0	0	0	0	0	0	4
02:00	1	0	0	0	0	0	0	1
02:15	2	0	0	0	0	0	0	2
02:30	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0
1 Hr	3	0	0	0	0	0	0	3
03:00	1	0	0	0	0	0	0	1
03:15	1	0	0	0	0	0	0	1
03:30	0	0	0	0	0	0	0	0
03:45	1	0	0	0	0	0	0	1
1 Hr	3	0	0	0	0	0	0	3
04:00	2	0	0	0	0	0	0	2
04:15	3	0	0	0	0	0	0	3
04:30	2	0	0	0	0	0	0	2
04:45	2	0	0	0	0	0	0	2
1 Hr	9	0	0	0	0	0	0	9
05:00	0	1	0	0	0	0	0	1
05:15	3	2	0	0	0	0	0	5
05:30	6	1	0	0	0	0	0	7
05:45	5	0	0	0	0	0	0	5
1 Hr	14	4	0	0	0	0	0	18
06:00	9	1	0	0	0	0	0	10
06:15	5	2	1	0	0	0	0	8
06:30	9	1	1	0	0	0	0	11
06:45	13	1	0	0	0	0	0	14
1 Hr	36	5	2	0	0	0	0	43
07:00	22	2	0	0	1	1	0	26
07:15	23	5	0	0	1	1	0	30
07:30	47	4	2	0	0	0	0	53
07:45	51	4	1	1	0	0	1	58
1 Hr	143	15	3	1	2	2	1	167
08:00	57	7	0	1	0	1	1	67
08:15	59	6	0	0	1	1	0	67
08:30	57	10	0	0	0	0	1	68
08:45	49	6	2	0	1	0	1	59
1 Hr	222	29	2	1	2	2	3	261
09:00	44	2	1	2	0	0	0	49
09:15	49	6	1	0	0	0	0	56
09:30	40	4	1	0	0	0	0	45
09:45	32	6	0	0	0	0	0	38
1 Hr	165	18	3	2	0	0	0	188
10:00	40	4	2	0	0	1	0	47
10:15	39	8	2	0	0	0	1	50

3	0	0	0	0	0	0	0	3
4	2	0	0	0	0	0	0	6
4	0	0	0	0	0	0	0	4
1	0	0	0	0	0	0	0	1
12	2	0	0	0	0	0	0	14
2	0	0	0	0	0	0	0	2
2	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
5	0	0	0	0	0	0	0	5
2	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	2	0	0	0	0	0	0	2
1	2	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	1
1	1	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0
2	1	0	0	0	0	0	1	4
4	2	0	0	0	0	0	1	7
6	1	0	0	0	0	0	0	7
15	2	0	0	0	0	0	0	17
12	2	0	0	0	0	0	0	14
28	8	1	1	0	0	0	0	38
61	13	1	1	0	0	0	0	76
26	6	0	0	0	0	0	0	32
58	15	0	0	1	0	1	1	75
74	7	2	2	0	0	0	0	85
82	9	0	1	4	0	1	1	97
240	37	2	3	5	0	2	2	289
87	7	2	1	0	0	1	1	98
79	4	0	0	0	0	0	0	83
60	6	1	2	0	0	1	1	70
79	5	1	2	0	0	1	1	88
305	22	4	5	0	0	3	3	339
66	10	1	1	1	0	0	0	79
74	7	0	1	0	0	0	0	82
26	9	2	1	0	0	0	0	38
43	6	1	2	0	0	1	1	53
209	32	4	5	1	0	1	1	252
44	5	3	0	0	0	0	0	52
43	8	1	1	0	0	0	0	53

2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	2
2	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	2
3	0	0	0	0	0	0	0	3
7	0	0	0	0	0	0	0	7
3	0	0	0	0	0	0	0	3
6	2	0	0	0	0	0	0	8
5	2	0	0	0	0	0	0	7
8	1	0	0	0	0	0	0	9
22	5	0	0	0	0	0	0	27
14	0	0	0	0	0	0	0	14
16	1	0	1	0	0	0	0	18
44	4	1	1	0	0	0	0	50
60	2	0	1	0	0	1	1	64
134	7	1	3	0	0	1	1	146
75	7	0	1	0	0	1	1	84
114	4	0	1	0	1	1	1	121
88	3	1	0	0	0	0	0	92
68	1	2	1	0	0	1	1	73
345	15	3	3	0	1	3	3	370
36	4	1	1	0	0	0	0	42
13	2	1	0	0	0	0	0	16
16	0	1	2	0	0	0	0	19
8	3	1	0	0	0	0	0	12
73	9	4	3	0	0	0	0	89
14	3	1	0	0	0	0	0	18
12	2	2	1	0	0	0	0	17

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32
61
146
72
123
188
219
602
249
271
230
220
970
170
154
102
103
529
117
120

10:30	40	2	1	0	0	0	1	44
10:45	40	5	4	1	0	1	0	51
1 Hr	159	19	9	1	0	2	2	192
11:00	26	4	1	0	0	0	0	31
11:15	49	6	1	1	0	1	0	58
11:30	41	6	1	0	0	0	1	49
11:45	43	7	1	0	0	1	1	53
1 Hr	159	23	4	1	0	2	2	191
12:00	38	7	3	0	0	1	0	49
12:15	46	4	0	0	0	0	0	50
12:30	46	5	0	0	0	0	0	51
12:45	56	5	3	0	0	0	0	64
1 Hr	186	21	6	0	0	1	0	214
13:00	51	5	0	0	0	0	0	56
13:15	51	4	1	0	0	0	0	56
13:30	47	11	1	0	0	0	0	59
13:45	55	2	0	0	0	0	2	59
1 Hr	204	22	2	0	0	0	2	230
14:00	53	5	1	0	0	0	0	59
14:15	66	5	2	0	1	0	1	75
14:30	45	7	0	1	1	0	1	55
14:45	50	6	2	0	0	1	2	61
1 Hr	214	23	5	1	2	1	4	250
15:00	43	5	0	0	1	0	0	49
15:15	49	1	1	0	1	0	0	52
15:30	52	7	1	0	1	1	0	62
15:45	53	5	1	0	0	1	0	60
1 Hr	197	18	3	0	3	2	0	223
16:00	57	3	1	0	1	1	0	63
16:15	71	5	1	0	0	0	0	77
16:30	65	8	1	0	0	0	0	74
16:45	60	9	1	0	0	1	3	74
1 Hr	253	25	4	0	1	2	3	288
17:00	92	8	2	0	0	0	2	104
17:15	69	4	0	0	0	0	0	73
17:30	69	8	1	0	0	2	0	80
17:45	84	6	0	1	0	1	0	92
1 Hr	314	26	3	1	0	3	2	349
18:00	76	8	0	0	0	0	0	84
18:15	93	8	0	0	0	0	1	102
18:30	60	4	0	0	0	0	0	64
18:45	57	8	1	0	0	0	1	67
1 Hr	286	28	1	0	0	0	2	317
19:00	65	1	0	0	0	0	0	66
19:15	52	3	0	0	0	0	0	55
19:30	34	5	0	0	0	0	0	39
19:45	64	2	0	0	0	0	0	66

39	5	0	1	0	1	0	46
34	6	2	1	0	1	0	44
160	24	6	3	0	2	0	195
38	2	0	1	0	0	1	42
35	3	0	0	0	0	0	38
51	5	0	0	0	0	0	56
47	4	2	0	0	0	0	53
171	14	2	1	0	0	1	189
58	5	1	1	0	0	0	65
45	5	1	1	0	0	0	52
51	9	1	0	0	0	0	61
60	5	0	1	0	0	0	66
214	24	3	3	0	0	0	244
52	8	0	2	1	0	0	63
79	9	1	0	0	1	0	90
77	6	0	1	0	0	0	84
60	7	1	0	0	0	0	68
268	30	2	3	1	1	0	305
49	4	0	0	0	0	2	55
64	6	0	0	2	0	0	72
90	7	0	0	0	0	1	98
92	2	0	0	1	0	0	95
295	19	0	0	3	0	3	320
61	7	1	0	0	0	2	71
73	10	0	0	0	0	1	84
63	9	0	0	0	0	0	72
63	7	1	0	0	0	1	72
260	33	2	0	0	0	4	299
61	6	1	0	1	0	0	69
89	9	1	0	0	0	2	101
79	11	1	0	0	1	2	94
81	9	1	0	0	1	0	92
310	35	4	0	1	2	4	356
76	10	0	0	0	0	1	87
88	6	1	0	0	1	0	96
83	3	1	0	0	2	1	90
88	5	0	0	0	3	2	98
335	24	2	0	0	6	4	371
100	6	0	0	0	0	1	107
96	3	0	0	0	1	2	102
76	4	1	0	0	1	1	83
80	8	0	0	1	0	0	89
352	21	1	0	1	2	4	381
49	3	0	0	0	0	0	52
65	1	0	1	0	0	0	67
50	4	0	0	0	0	2	56
52	4	0	0	0	0	0	56

14	2	1	0	0	0	0	17
12	6	0	1	0	0	0	19
52	13	4	2	0	0	0	71
8	2	0	0	0	1	0	11
9	3	0	0	0	0	0	12
10	7	0	1	0	0	0	18
21	1	0	0	0	0	0	22
48	13	0	1	0	1	0	63
16	2	2	0	0	0	0	20
10	1	1	1	0	0	0	13
12	3	1	0	0	0	0	16
18	1	1	1	0	0	1	22
56	7	5	2	0	0	1	71
20	2	0	1	0	0	1	24
30	4	0	1	0	0	1	36
18	4	1	0	0	0	0	23
23	3	0	0	0	0	0	26
91	13	1	2	0	0	2	109
35	0	0	1	0	0	0	36
47	3	0	0	0	0	1	51
18	2	1	1	0	0	0	22
24	1	0	0	0	0	0	25
124	6	1	2	0	0	1	134
19	1	0	0	0	0	0	20
29	2	0	0	0	1	0	32
11	4	1	0	0	0	0	16
25	5	1	0	0	0	1	32
84	12	2	0	0	1	1	100
41	10	1	0	0	0	0	52
32	3	1	0	0	0	0	36
28	3	0	0	0	0	1	32
37	5	0	0	0	0	0	42
138	21	2	0	0	0	1	162
31	4	0	0	0	0	0	35
31	4	0	1	0	0	2	38
33	1	0	0	0	0	0	34
42	5	0	0	0	1	1	49
137	14	0	1	0	1	3	156
29	0	0	0	0	0	0	29
44	3	0	0	0	0	1	48
33	0	0	0	0	0	0	33
27	3	0	0	0	0	2	32
133	6	0	0	0	0	3	142
33	1	0	0	0	0	0	34
31	3	0	0	0	0	0	34
28	1	0	0	0	0	1	30
24	1	0	0	0	0	3	28

107
114
458
84
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123
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[Return To Dashboard](#)

[Convert to PCU](#)

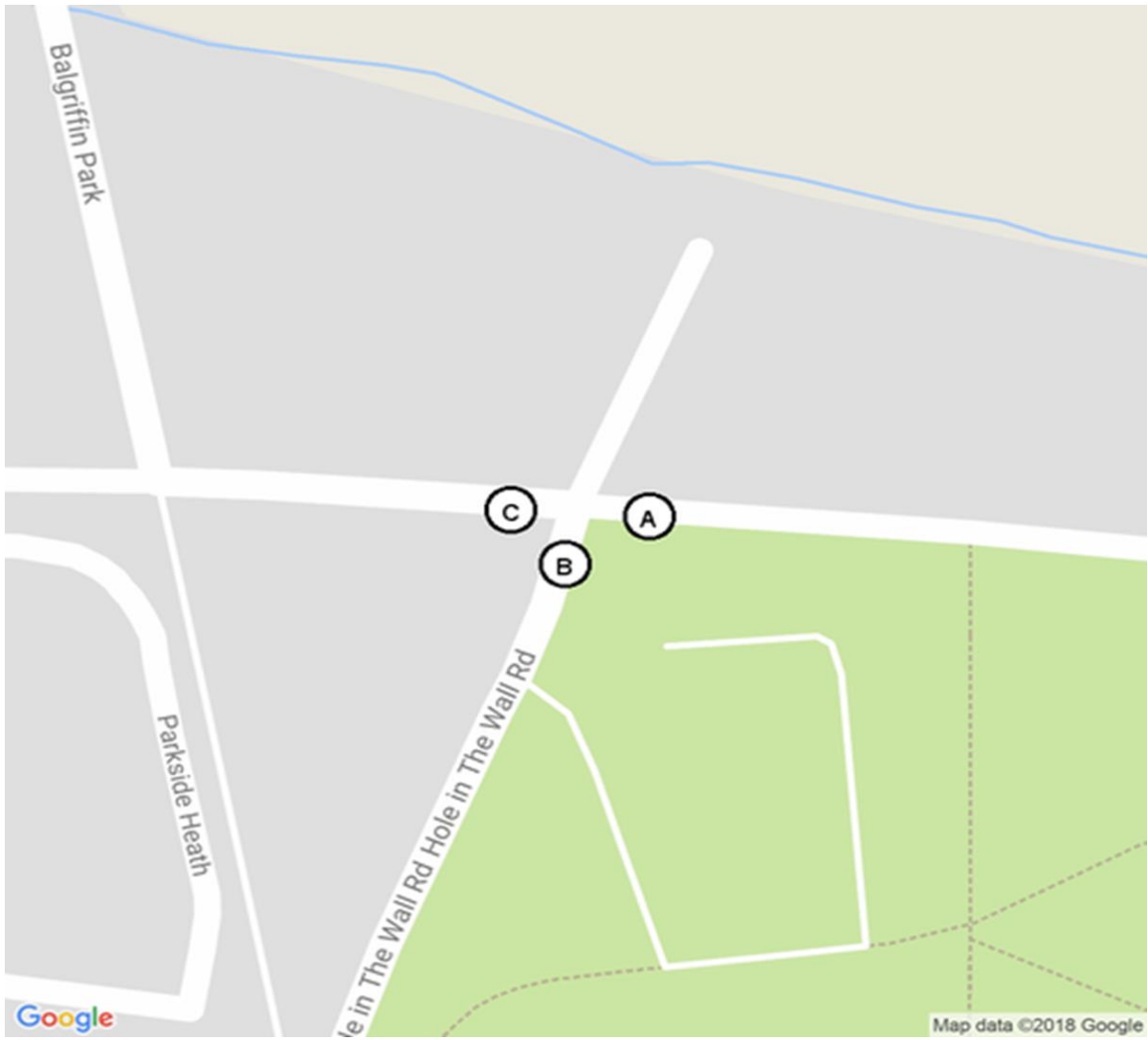
1 Hr	215	11	0	0	0	0	0	226
20:00	41	3	0	0	0	0	0	44
20:15	41	2	1	0	0	0	0	44
20:30	34	1	0	0	0	0	0	35
20:45	28	0	0	0	0	0	0	28
1 Hr	144	6	1	0	0	0	0	151
21:00	33	1	1	0	0	0	0	35
21:15	24	0	0	0	0	0	0	24
21:30	29	0	0	0	0	0	0	29
21:45	19	3	0	0	0	0	0	22
1 Hr	105	4	1	0	0	0	0	110
22:00	20	0	0	0	0	0	0	20
22:15	18	1	0	0	0	0	0	19
22:30	13	0	0	0	0	0	0	13
22:45	5	0	0	0	0	0	0	5
1 Hr	56	1	0	0	0	0	0	57
23:00	8	1	0	0	0	0	0	9
23:15	6	0	0	0	0	0	0	6
23:30	9	0	0	0	0	0	0	9
23:45	7	0	0	0	0	0	0	7
1 Hr	30	1	0	0	0	0	0	31
Total	3135	300	49	8	10	17	23	3542

216	12	0	1	0	0	2	231	
52	2	0	0	0	0	0	54	
42	4	0	0	0	0	0	46	
40	4	0	0	0	0	1	45	
43	5	0	0	0	0	1	49	
177	15	0	0	0	0	2	194	
48	1	0	0	0	0	0	49	
43	1	0	0	0	0	2	46	
27	3	0	0	0	0	0	30	
25	1	0	0	0	1	0	27	
143	6	0	0	0	1	2	152	
21	1	0	0	0	0	1	23	
38	2	0	0	0	0	1	41	
20	0	0	0	0	0	0	20	
17	1	0	0	0	0	0	18	
96	4	0	0	0	0	2	102	
13	0	0	0	0	0	0	13	
14	0	0	0	0	0	0	14	
9	0	0	0	0	0	0	9	
6	0	0	0	0	0	0	6	
42	0	0	0	0	0	0	42	
Total	3893	372	33	25	12	14	35	4384

116	6	0	0	0	0	4	126	
18	1	1	0	0	0	2	22	
15	2	0	0	0	0	0	17	
18	1	0	0	0	0	0	19	
12	3	0	0	0	0	1	16	
63	7	1	0	0	0	3	74	
11	0	0	0	0	0	0	11	
14	0	0	0	0	0	0	14	
11	0	0	0	0	0	0	11	
10	0	0	0	0	0	0	10	
46	0	0	0	0	0	0	46	
14	0	0	0	0	0	0	14	
4	0	0	0	0	0	0	4	
5	0	0	0	0	0	0	5	
8	0	0	0	0	0	0	8	
31	0	0	0	0	0	0	31	
2	0	0	0	0	0	0	2	
6	1	0	0	0	0	0	7	
1	0	0	0	0	0	1	2	
3	0	0	0	0	0	0	3	
12	1	0	0	0	0	1	14	
Total	1727	156	24	19	0	4	24	1954

583
120
107
99
93
419
95
84
70
59
308
57
64
38
31
190
24
27
20
16
87
9880

SITE 3



08:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
15:00	0	0	1	0	0	0	0	0	1
15:15	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	1	0	0	0	0	0	1
16:00	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0

3	0	0	0	0	0	0	0	0	3
10	1	0	0	0	0	1	0	0	12
4	0	0	0	0	0	0	0	0	4
2	0	0	0	0	0	0	0	0	2
7	1	0	0	0	0	0	0	0	8
1	0	0	0	0	0	0	0	0	1
14	1	0	0	0	0	0	0	0	15
1	1	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	2
5	0	1	0	0	0	0	0	0	6
9	1	1	0	0	0	0	0	0	11
0	0	0	0	0	0	0	0	0	0
1	0	1	0	0	0	0	0	0	2
0	1	0	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0	0	4
5	1	1	0	0	0	0	0	0	7
2	0	0	0	0	0	0	0	0	2
4	0	0	0	0	0	0	0	0	4
4	1	0	0	0	0	0	0	0	5
2	0	0	0	0	0	0	0	0	2
12	1	0	0	0	0	0	0	0	13
3	0	1	0	0	0	0	0	0	4
2	0	0	2	0	0	0	0	0	4
2	0	0	0	0	0	0	0	0	2
6	0	0	0	0	0	0	0	0	6
13	0	1	2	0	0	0	0	0	16
0	0	0	0	0	0	0	0	0	0
5	1	0	0	0	0	0	0	0	6
4	0	0	0	0	0	0	0	0	4
2	0	0	0	0	0	0	0	0	2
11	1	0	0	0	0	0	0	0	12
2	0	0	0	0	0	0	0	0	2
2	2	0	0	0	0	0	0	0	4
4	1	0	0	0	0	0	0	0	5
2	0	0	0	0	0	0	0	0	2
10	3	0	0	0	0	0	0	0	13
2	0	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	0	1
1	1	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0	0
4	1	0	0	0	0	0	0	0	5
4	1	0	0	0	0	0	0	0	5
2	0	0	0	0	0	0	0	0	2
2	0	0	0	0	0	0	0	0	2
10	1	0	0	0	0	0	0	0	11

27	0	1	0	0	0	0	1	29
115	10	1	3	0	1	2	132	
11	0	0	3	0	0	0	14	
3	3	0	0	0	0	0	6	
8	1	0	2	0	0	0	11	
7	2	0	0	0	0	0	9	
29	6	0	5	0	0	0	40	
8	0	1	0	0	0	0	9	
3	1	0	1	0	0	0	5	
7	3	0	0	0	0	0	10	
4	2	0	2	0	1	0	9	
22	6	1	3	0	1	0	33	
5	1	0	0	0	1	0	7	
6	1	0	1	0	0	0	8	
4	2	0	1	0	0	1	8	
9	0	0	0	0	0	0	9	
24	4	0	2	0	1	1	32	
7	0	3	0	0	0	0	10	
2	0	1	1	0	0	0	4	
7	1	1	0	0	0	0	9	
10	1	1	1	0	0	0	13	
26	2	6	2	0	0	0	36	
7	1	0	1	0	0	0	9	
11	3	1	1	0	0	1	17	
10	4	0	0	0	0	0	14	
6	1	0	0	0	0	0	7	
34	9	1	2	0	0	1	47	
13	0	0	1	0	0	0	14	
23	1	0	0	0	0	1	25	
11	1	0	2	0	0	0	14	
6	0	0	0	0	1	0	7	
53	2	0	3	0	1	1	60	
5	1	0	0	0	0	0	6	
12	2	0	0	0	0	0	14	
4	1	0	0	0	0	0	5	
11	3	1	0	0	0	1	16	
32	7	1	0	0	0	1	41	
22	6	1	0	1	0	0	30	
14	3	1	0	0	0	0	18	
7	5	1	0	0	0	0	13	
16	2	0	0	0	0	0	18	
59	16	3	0	1	0	0	79	
16	3	0	0	0	0	1	20	
11	0	0	0	0	0	0	11	
16	1	0	0	0	0	0	17	
15	4	0	0	0	0	0	19	
58	8	0	0	0	0	1	67	

32
144
18
8
19
10
55
11
6
12
15
44
7
10
9
13
39
12
8
14
15
49
13
21
16
13
63
14
31
18
9
72
9
18
10
18
55
32
19
15
18
84
25
13
19
21
78

23:45	4	0	0	0	0	0	0	4
1 Hr	13	1	0	0	0	0	0	14
Total	729	111	10	21	1	2	17	891

	2	0	0	0	0	0	0	2
	27	1	0	0	0	0	0	28
Total	3121	304	21	3	10	9	30	3498

	0	0	0	0	0	0	0	0	6
	0	0	0	0	0	0	0	0	42
Total	8	0	1	1	0	0	0	10	4399

ORIGIN SUMMARY

	Origin : Arm A Belmayne(E)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	0	1	0	0	0	0	0	1
00:15	0	0	0	0	0	0	0	0
00:30	0	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	0
1 Hr	0	1	0	0	0	0	0	1
01:00	1	1	0	0	0	0	0	2
01:15	0	0	0	0	0	0	0	0
01:30	1	0	0	0	0	0	0	1
01:45	0	1	0	0	0	0	0	1
1 Hr	2	2	0	0	0	0	0	4
02:00	1	0	0	0	0	0	0	1
02:15	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0
02:45	0	1	0	0	0	0	0	1
1 Hr	1	1	0	0	0	0	0	2
03:00	0	0	0	0	0	0	0	0
03:15	0	0	0	0	0	0	0	0
03:30	1	0	0	0	0	0	0	1
03:45	0	0	0	0	0	0	0	0
1 Hr	1	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	0
04:15	1	0	0	0	0	0	0	1
04:30	2	0	0	0	0	0	0	2
04:45	0	0	0	0	0	0	0	0
1 Hr	3	0	0	0	0	0	0	3
05:00	1	0	0	0	0	0	0	1
05:15	1	0	0	0	0	0	0	1
05:30	4	0	0	0	0	0	0	4
05:45	3	0	0	0	0	0	0	3
1 Hr	9	0	0	0	0	0	0	9
06:00	5	0	0	0	0	0	0	5
06:15	6	5	0	0	0	0	0	11
06:30	8	1	0	0	0	0	0	9
06:45	6	0	0	0	0	0	1	7
1 Hr	25	6	0	0	0	0	1	32
07:00	11	1	0	0	0	0	0	12
07:15	9	2	0	1	0	0	0	12
07:30	26	3	1	0	0	0	0	30

	Origin : Arm B Hole in The Wall Road							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
	6	0	0	0	0	0	1	7
	5	0	0	0	0	0	1	6
	3	0	0	0	0	0	0	3
	3	0	0	0	0	0	0	3
	17	0	0	0	0	0	2	19
	2	0	0	0	0	0	0	2
	3	0	0	0	0	0	0	3
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	6
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	2
	2	1	0	0	0	0	0	3
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	5	1	0	0	0	0	0	6
	3	0	0	0	0	0	0	3
	0	0	0	0	0	0	0	0
	0	0	0	0	0	1	0	1
	2	0	0	0	0	0	0	2
	5	0	0	0	0	1	0	6
	1	1	0	0	0	0	0	2
	2	2	0	0	0	0	0	4
	5	1	0	0	0	0	0	6
	6	0	0	0	0	0	0	6
	14	4	0	0	0	0	0	18
	7	1	0	0	0	0	0	8
	4	1	0	0	0	0	0	5
	8	2	1	0	0	0	0	11
	14	1	0	0	0	0	0	15
	33	5	1	0	0	0	0	39
	24	2	0	0	1	1	1	29
	27	5	1	0	1	1	0	35
	54	6	2	1	0	0	0	63

	Origin : Arm C Belmayne(W)							Total	Origin Totals
	Car	LGV	OGV1	OGV2	PSV	MC	PC		
	6	0	0	0	0	0	0	6	14
	4	1	0	0	0	0	0	5	11
	4	0	0	0	0	0	0	4	7
	2	0	0	0	0	0	0	2	5
	16	1	0	0	0	0	0	17	37
	3	0	0	0	0	0	0	3	7
	4	2	0	0	0	0	0	6	9
	4	0	0	0	0	0	0	4	6
	1	0	0	0	0	0	0	1	2
	12	2	0	0	0	0	0	14	24
	2	0	0	0	0	0	0	2	4
	2	0	0	0	0	0	0	2	3
	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1	2
	5	0	0	0	0	0	0	5	9
	1	0	0	0	0	0	0	1	4
	0	0	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0	2
	0	0	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1	8
	1	0	0	0	0	0	0	1	4
	0	0	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0	3
	0	2	0	0	0	0	0	2	4
	1	2	0	0	0	0	0	3	12
	1	0	0	0	0	0	0	1	4
	1	1	0	0	0	0	0	2	7
	0	0	0	0	0	0	0	0	10
	2	1	0	0	0	0	1	4	13
	4	2	0	0	0	0	1	7	34
	6	1	0	0	0	0	0	7	20
	15	2	0	0	0	0	1	18	34
	11	3	0	0	0	0	0	14	34
	27	9	1	1	0	0	0	38	60
	59	15	1	1	0	0	1	77	148
	27	5	0	0	0	0	0	32	73
	59	13	0	0	1	0	1	74	121
	75	6	2	2	0	0	1	86	179

07:45	17	1	0	0	0	0	2	20
1 Hr	63	7	1	1	0	0	2	74
08:00	24	2	0	2	0	0	1	29
08:15	34	4	0	1	0	1	0	40
08:30	37	5	0	0	0	1	0	43
08:45	30	0	1	0	0	0	1	32
1 Hr	125	11	1	3	0	2	2	144
09:00	15	0	0	3	0	0	0	18
09:15	5	3	0	0	0	0	0	8
09:30	15	2	0	2	0	0	0	19
09:45	8	2	0	0	0	0	0	10
1 Hr	43	7	0	5	0	0	0	55
10:00	9	1	1	0	0	0	0	11
10:15	4	1	0	1	0	0	0	6
10:30	9	3	0	0	0	0	0	12
10:45	9	2	1	2	0	1	0	15
1 Hr	31	7	2	3	0	1	0	44
11:00	5	1	0	0	0	1	0	7
11:15	7	1	1	1	0	0	0	10
11:30	4	3	0	1	0	0	1	9
11:45	13	0	0	0	0	0	0	13
1 Hr	29	5	1	2	0	1	1	39
12:00	9	0	3	0	0	0	0	12
12:15	6	0	1	1	0	0	0	8
12:30	11	2	1	0	0	0	0	14
12:45	12	1	1	1	0	0	0	15
1 Hr	38	3	6	2	0	0	0	49
13:00	10	1	1	1	0	0	0	13
13:15	13	3	1	3	0	0	1	21
13:30	12	4	0	0	0	0	0	16
13:45	12	1	0	0	0	0	0	13
1 Hr	47	9	2	4	0	0	1	63
14:00	13	0	0	1	0	0	0	14
14:15	28	2	0	0	0	0	1	31
14:30	15	1	0	2	0	0	0	18
14:45	8	0	0	0	0	1	0	9
1 Hr	64	3	0	3	0	1	1	72
15:00	7	1	1	0	0	0	0	9
15:15	14	4	0	0	0	0	0	18
15:30	8	2	0	0	0	0	0	10
15:45	13	3	1	0	0	0	1	18
1 Hr	42	10	2	0	0	0	1	55
16:00	24	6	1	0	1	0	0	32
16:15	15	3	1	0	0	0	0	19
16:30	8	6	1	0	0	0	0	15
16:45	16	2	0	0	0	0	0	18
1 Hr	63	17	3	0	1	0	0	84

64	6	1	0	0	0	0	0	71
169	19	4	1	2	2	1	1	198
70	7	0	0	0	1	2	80	
89	4	0	0	0	1	0	94	
63	6	0	0	0	0	1	70	
59	4	2	2	1	0	0	68	
281	21	2	2	1	2	3	312	
42	3	1	0	0	0	0	46	
48	4	2	0	0	0	0	54	
38	3	1	0	0	0	0	42	
33	5	1	0	0	0	0	39	
161	15	5	0	0	0	0	181	
41	4	3	0	0	0	0	48	
37	7	1	0	0	0	1	46	
39	4	2	0	0	0	1	46	
41	8	4	0	0	0	0	53	
158	23	10	0	0	0	2	193	
25	3	1	0	0	0	0	29	
47	6	1	0	0	1	0	55	
42	7	1	0	0	0	0	50	
43	7	0	0	0	1	1	52	
157	23	3	0	0	2	1	186	
33	4	2	0	0	1	0	40	
44	5	0	0	0	0	0	49	
45	5	0	1	0	0	0	51	
60	5	3	0	0	0	1	69	
182	19	5	1	0	1	1	209	
54	6	0	0	0	0	1	61	
51	2	0	0	0	0	0	53	
44	8	1	0	0	0	0	53	
59	5	0	0	0	0	3	67	
208	21	1	0	0	0	4	234	
62	6	1	0	0	0	0	69	
79	5	2	0	1	0	1	88	
31	9	1	1	1	0	0	43	
45	7	1	0	0	0	2	55	
217	27	5	1	2	0	3	255	
41	5	0	0	1	0	0	47	
46	3	0	0	1	0	0	50	
53	9	2	0	1	0	0	65	
60	5	1	0	0	1	0	67	
200	22	3	0	3	1	0	229	
56	8	1	0	0	1	0	66	
79	5	1	0	0	0	0	85	
71	4	0	0	0	0	0	75	
65	8	1	0	0	1	3	78	
271	25	3	0	0	2	3	304	

80	10	0	1	4	0	1	96
241	34	2	3	5	0	3	288
85	7	2	1	0	0	1	96
75	4	0	0	0	0	1	80
64	6	1	2	0	0	1	74
76	6	1	2	0	0	0	85
300	23	4	5	0	0	3	335
70	11	1	1	0	0	0	83
74	7	0	1	0	0	0	82
27	9	2	1	0	0	0	39
43	6	1	2	0	0	1	53
214	33	4	5	0	0	1	257
45	7	2	0	0	0	0	54
41	10	1	1	0	0	0	53
37	6	0	1	0	1	1	46
36	9	2	1	0	1	1	50
159	32	5	3	0	2	2	203
37	2	0	1	0	0	1	41
37	3	0	0	0	0	0	40
50	5	0	0	0	0	0	55
49	4	2	0	0	0	0	55
173	14	2	1	0	0	1	191
56	5	1	1	0	0	0	63
44	7	0	1	0	0	0	52
51	9	1	0	0	0	0	61
59	7	1	1	0	0	0	68
210	28	3	3	0	0	0	244
50	9	0	2	1	0	0	62
78	9	1	0	0	0	1	89
77	6	0	1	0	0	0	84
60	7	1	0	0	0	0	68
265	31	2	3	1	0	1	303
49	4	0	0	0	0	0	53
59	5	0	0	2	0	0	66
93	9	0	0	0	0	1	103
92	4	0	0	1	0	0	97
293	22	0	0	3	0	1	319
63	7	1	0	0	0	2	73
71	11	0	0	0	0	1	83
63	10	0	0	0	0	0	73
65	8	1	0	0	0	2	76
262	36	2	0	0	0	5	305
59	8	1	0	1	0	0	69
89	9	1	0	0	0	4	103
78	12	1	0	0	0	3	94
81	10	1	0	0	1	0	93
307	39	4	0	1	1	7	359

187
560
205
214
187
185
791
147
144
100
102
493
113
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104
118
440
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163
153
148
600
136
185
164
161
646
129
151
148
161
589
167
207
184
189
747

17:00	20	4	0	0	0	0	1	25
17:15	13	0	0	0	0	0	0	13
17:30	18	1	0	0	0	0	0	19
17:45	17	4	0	0	0	0	0	21
1 Hr	68	9	0	0	0	0	1	78
18:00	13	2	0	0	0	0	0	15
18:15	19	2	0	0	0	0	0	21
18:30	20	1	0	0	0	0	0	21
18:45	16	3	0	0	0	0	2	21
1 Hr	68	8	0	0	0	0	2	78
19:00	19	0	0	0	0	0	0	19
19:15	13	1	0	0	0	0	0	14
19:30	7	2	0	0	0	0	1	10
19:45	22	0	0	0	0	0	0	22
1 Hr	61	3	0	0	0	0	1	65
20:00	7	0	0	0	0	0	0	7
20:15	8	1	0	0	0	0	0	9
20:30	7	0	0	0	0	0	0	7
20:45	11	2	0	0	0	0	0	13
1 Hr	33	3	0	0	0	0	0	36
21:00	5	1	0	0	0	0	0	6
21:15	6	0	0	0	0	0	0	6
21:30	9	0	0	0	0	0	0	9
21:45	4	0	0	0	0	0	0	4
1 Hr	24	1	0	0	0	0	0	25
22:00	2	1	0	0	0	0	0	3
22:15	5	0	0	0	0	0	0	5
22:30	0	0	0	0	0	0	0	0
22:45	2	0	0	0	0	0	0	2
1 Hr	9	1	0	0	0	0	0	10
23:00	1	0	0	0	0	0	0	1
23:15	3	0	0	0	0	0	0	3
23:30	2	0	0	0	0	0	0	2
23:45	1	0	0	0	0	0	0	1
1 Hr	7	0	0	0	0	0	0	7
Total	856	114	18	23	1	5	13	1030

DESTINATION SUMMARY

Destination : Arm A Belmayne(E)								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

00:00	2	0	0	0	0	0	0	2
00:15	1	1	0	0	0	0	0	2
00:30	1	0	0	0	0	0	0	1
00:45	0	0	0	0	0	0	0	0
1 Hr	4	1	0	0	0	0	0	5

90	5	1	0	0	0	0	1	97
77	8	0	1	0	0	0	1	87
62	7	1	0	0	0	2	0	72
98	6	0	1	0	2	0	0	107
327	26	2	2	0	4	2	0	363
79	7	0	0	0	0	0	0	86
105	7	0	0	0	0	3	0	115
70	3	0	0	0	0	0	0	73
56	6	1	0	0	1	0	0	64
310	23	1	0	0	1	3	0	338
77	1	0	0	0	0	0	0	78
52	4	0	0	0	0	0	0	56
43	5	0	0	0	0	0	0	48
64	2	0	0	0	0	0	0	66
236	12	0	0	0	0	0	0	248
42	3	0	0	0	0	2	0	47
43	2	1	0	0	0	1	0	47
39	1	0	0	0	0	1	0	41
24	1	0	0	0	0	0	0	25
148	7	1	0	0	0	4	0	160
28	1	1	0	0	0	1	0	31
26	0	0	0	0	0	0	0	26
30	0	0	0	0	0	0	0	30
21	3	0	0	0	0	0	0	24
105	4	1	0	0	0	1	0	111
25	0	0	0	0	0	0	0	25
15	1	0	0	0	0	0	0	16
13	1	0	0	0	0	0	0	14
5	0	0	0	0	0	0	0	5
58	2	0	0	0	0	0	0	60
10	1	0	0	0	0	0	0	11
10	0	0	0	0	0	0	0	10
10	0	1	0	0	0	1	0	12
10	0	0	0	0	0	0	0	10
40	1	1	0	0	0	1	0	43
3310	300	48	7	8	16	31	0	3720

Destination : Arm B Hole in The Wall Road								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

4	0	0	0	0	0	0	0	4
3	0	0	0	0	0	0	0	3
3	0	0	0	0	0	0	0	3
3	0	0	0	0	0	0	0	3
13	0	0	0	0	0	0	0	13

76	10	0	0	0	0	0	1	87
88	7	1	0	0	0	1	0	97
83	3	1	0	0	0	2	1	90
87	6	0	0	0	0	3	2	98
334	26	2	0	0	0	6	4	372
97	7	0	0	0	0	0	1	105
98	3	0	0	0	0	1	2	104
74	5	1	0	0	0	1	0	81
84	8	0	0	0	1	0	0	93
353	23	1	0	0	1	2	3	383
45	4	0	0	0	0	0	0	49
60	3	0	1	0	0	0	0	64
50	4	0	0	0	0	0	3	57
49	4	0	0	0	0	0	3	56
204	15	0	1	0	0	0	6	226
49	3	0	0	0	0	0	0	52
44	4	0	0	0	0	0	1	49
39	5	0	0	0	0	0	1	45
43	5	0	0	0	0	0	0	48
175	17	0	0	0	0	0	2	194
46	2	0	0	0	0	0	1	49
44	1	0	0	0	0	0	2	47
25	3	0	0	0	0	0	0	28
23	3	0	0	0	0	0	1	27
138	9	0	0	0	0	0	4	151
21	2	0	0	0	0	0	1	24
36	4	0	0	0	0	0	1	41
19	1	0	0	0	0	0	0	20
16	2	0	0	0	0	0	0	18
92	9	0	0	0	0	0	2	103
11	2	0	0	0	0	0	0	13
14	0	0	0	0	0	0	0	14
9	0	0	0	0	0	0	0	9
6	0	0	0	0	0	0	0	6
40	2	0	0	0	0	0	0	42
3858	415	32	25	11	11	47	0	4399

Destination : Arm C Belmayne(W)								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

6	1	0	0	0	0	1	0	8
5	0	0	0	0	0	0	1	6
3	0	0	0	0	0	0	0	3
2	0	0	0	0	0	0	0	2
16	1	0	0	0	0	2	0	19

209
197
181
226
813
206
240
175
178
799
146
134
115
144
539
106
105
93
86
390
86
79
67
55
287
52
62
34
25
173
25
27
23
17
92
9149

Dest Totals

14
11
7
5
37

01:00	1	0	0	0	0	0	0	1
01:15	0	0	0	0	0	0	0	0
01:30	1	0	0	0	0	0	0	1
01:45	0	0	0	0	0	0	0	0
1 Hr	2	0	0	0	0	0	0	2
02:00	1	0	0	0	0	0	0	1
02:15	1	0	0	0	0	0	0	1
02:30	0	0	0	0	0	0	0	0
02:45	1	0	0	0	0	0	0	1
1 Hr	3	0	0	0	0	0	0	3
03:00	0	1	0	0	0	0	0	1
03:15	0	0	0	0	0	0	0	0
03:30	1	0	0	0	0	0	0	1
03:45	0	0	0	0	0	0	0	0
1 Hr	1	1	0	0	0	0	0	2
04:00	0	0	0	0	0	0	0	0
04:15	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	0	0	0
04:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0
05:15	0	0	0	0	0	0	0	0
05:30	0	0	0	0	0	0	0	0
05:45	1	0	0	0	0	0	0	1
1 Hr	1	0	0	0	0	0	0	1
06:00	0	0	0	0	0	0	0	0
06:15	4	0	0	0	0	0	1	5
06:30	1	3	0	0	0	0	0	4
06:45	9	8	0	1	0	0	0	18
1 Hr	14	11	0	1	0	0	1	27
07:00	7	2	0	0	0	0	0	9
07:15	11	3	1	0	0	0	0	15
07:30	16	4	1	1	0	0	1	23
07:45	10	6	0	1	0	0	0	17
1 Hr	44	15	2	2	0	0	1	64
08:00	10	2	0	1	0	0	0	13
08:15	17	1	0	0	0	0	1	19
08:30	19	2	1	2	0	0	0	24
08:45	18	1	0	2	0	0	0	21
1 Hr	64	6	1	5	0	0	1	77
09:00	12	2	0	1	0	0	0	15
09:15	10	1	0	1	0	0	0	12
09:30	4	4	0	1	0	0	0	9
09:45	9	2	0	1	0	0	0	12
1 Hr	35	9	0	4	0	0	0	48
10:00	10	4	0	0	0	0	0	14
10:15	7	2	0	1	0	0	0	10

3	0	0	0	0	0	0	0	3
4	2	0	0	0	0	0	0	6
4	0	0	0	0	0	0	0	4
1	1	0	0	0	0	0	0	2
12	3	0	0	0	0	0	0	15
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	1
2	1	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	2	0	0	0	0	0	0	2
1	2	0	0	0	0	0	0	3
2	0	0	0	0	0	0	0	2
2	1	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	1
2	1	0	0	0	0	0	1	4
7	2	0	0	0	0	0	1	10
7	1	0	0	0	0	0	0	8
12	3	0	0	0	0	0	0	15
13	0	0	0	0	0	0	0	13
18	1	1	0	0	0	0	0	20
50	5	1	0	0	0	0	0	56
20	4	0	0	0	0	0	0	24
51	10	0	0	1	0	1	1	63
62	5	0	0	0	0	0	0	67
73	6	0	0	4	0	1	1	84
206	25	0	0	5	0	2	2	238
79	6	2	0	0	0	0	1	88
58	4	0	0	0	0	0	0	62
51	4	0	0	0	0	1	1	57
63	5	1	0	0	0	0	0	69
251	19	3	0	0	0	1	2	276
65	9	1	0	0	0	0	0	75
66	6	0	0	0	0	0	0	72
30	6	2	0	0	0	0	0	38
37	4	1	1	0	0	1	1	44
198	25	4	1	0	0	1	2	229
38	4	2	0	0	0	0	0	44
35	8	1	0	0	0	0	0	44

2	1	0	0	0	0	0	0	3
3	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
6	1	0	0	0	0	0	0	7
2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	3
2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
5	0	0	0	0	0	0	0	5
3	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	1
2	0	0	0	0	1	0	0	3
2	0	0	0	0	0	0	0	2
8	0	0	0	0	1	0	0	9
1	1	0	0	0	0	0	0	2
2	2	0	0	0	0	0	0	4
8	1	0	0	0	0	0	1	9
8	0	0	0	0	0	0	0	8
19	4	0	0	0	0	0	0	23
11	1	0	0	0	0	0	0	12
9	5	0	0	0	0	0	0	14
13	3	1	0	0	0	0	0	17
20	1	0	0	0	0	0	1	22
53	10	1	0	0	0	0	1	65
35	2	0	0	1	1	1	1	40
33	7	0	1	1	1	0	0	43
77	6	4	2	0	0	0	0	89
78	5	1	0	0	0	0	2	86
223	20	5	3	2	2	3	3	258
90	8	0	2	0	1	3	0	104
123	7	0	1	0	2	0	0	133
94	11	0	0	0	0	0	1	106
84	4	3	2	1	0	1	0	95
391	30	3	5	1	3	5	5	438
50	3	1	3	0	0	0	0	57
51	7	2	0	0	0	0	0	60
46	4	1	2	0	0	0	0	53
38	7	1	0	0	0	0	0	46
185	21	5	5	0	0	0	0	216
47	4	4	0	0	0	0	0	55
40	8	1	1	0	0	0	1	51

7
9
6
2
24
4
3
0
2
9
4
1
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34
20
34
34
60
148
73
121
179
187
560
205
214
187
185
791
147
144
100
102
493
113
105

10:30	7	3	2	1	0	1	0	14
10:45	5	2	1	1	0	1	1	11
1 Hr	29	11	3	3	0	2	1	49
11:00	6	0	0	0	0	0	0	6
11:15	7	0	0	0	0	0	0	7
11:30	10	1	0	0	0	0	0	11
11:45	7	1	2	0	0	0	0	10
1 Hr	30	2	2	0	0	0	0	34
12:00	11	1	1	1	0	0	0	14
12:15	7	5	0	1	0	0	0	13
12:30	9	2	1	1	0	0	0	13
12:45	12	2	1	1	0	0	0	16
1 Hr	39	10	3	4	0	0	0	56
13:00	12	2	0	2	0	0	0	16
13:15	16	2	0	0	0	0	0	18
13:30	13	0	0	1	0	0	0	14
13:45	7	4	0	0	0	0	0	11
1 Hr	48	8	0	3	0	0	0	59
14:00	10	1	0	0	0	0	0	11
14:15	20	0	0	0	0	0	0	20
14:30	25	1	0	1	0	0	0	27
14:45	20	1	0	0	0	0	0	21
1 Hr	75	3	0	1	0	0	0	79
15:00	7	1	2	0	0	0	0	10
15:15	16	3	0	0	0	0	1	20
15:30	9	1	0	0	0	0	0	10
15:45	11	1	1	0	0	0	1	14
1 Hr	43	6	3	0	0	0	2	54
16:00	17	2	0	0	1	0	0	20
16:15	15	1	0	0	0	0	2	18
16:30	15	3	0	0	0	0	1	19
16:45	23	4	0	0	0	0	0	27
1 Hr	70	10	0	0	1	0	3	84
17:00	14	2	0	0	0	0	0	16
17:15	27	1	0	0	0	0	0	28
17:30	20	0	0	0	0	0	1	21
17:45	19	4	0	0	0	0	1	24
1 Hr	80	7	0	0	0	0	2	89
18:00	27	4	0	0	0	0	0	31
18:15	24	1	0	0	0	0	1	26
18:30	28	1	0	0	0	0	0	29
18:45	17	1	0	0	0	1	0	19
1 Hr	96	7	0	0	0	1	1	105
19:00	14	1	0	0	0	0	0	15
19:15	10	1	0	0	0	0	0	11
19:30	12	1	0	0	0	0	1	14
19:45	15	0	0	0	0	0	1	16

35	3	0	0	0	0	1	39
36	7	2	0	0	0	0	45
144	22	5	0	0	0	1	172
31	2	0	1	0	0	1	35
34	3	1	0	0	0	0	38
41	5	0	0	0	0	0	46
46	4	0	0	0	0	0	50
152	14	1	1	0	0	1	169
50	4	0	0	0	0	0	54
42	3	0	0	0	0	0	45
46	8	0	0	0	0	0	54
51	5	0	0	0	0	0	56
189	20	0	0	0	0	0	209
43	7	1	0	1	0	0	52
62	7	1	2	0	0	1	73
67	6	0	0	0	0	0	73
61	4	1	0	0	0	0	66
233	24	3	2	1	0	1	264
43	3	0	0	0	0	0	46
50	6	0	0	2	0	0	58
74	8	0	0	0	0	1	83
76	3	0	0	1	0	0	80
243	20	0	0	3	0	1	267
59	6	0	0	0	0	2	67
57	10	0	0	0	0	0	67
61	11	0	0	0	0	0	72
58	7	0	0	0	0	1	66
235	34	0	0	0	0	3	272
45	6	1	0	0	0	0	52
76	8	1	0	0	0	2	87
66	10	1	0	0	0	2	79
64	6	1	0	0	1	0	72
251	30	4	0	0	1	4	290
67	9	0	0	0	0	1	77
69	6	1	0	0	1	0	77
65	3	1	0	0	2	0	71
72	2	0	0	0	3	1	78
273	20	2	0	0	6	2	303
76	3	0	0	0	0	1	80
82	3	0	0	0	1	1	87
55	4	1	0	0	1	0	61
73	7	0	0	1	0	0	81
286	17	1	0	1	2	2	309
38	3	0	0	0	0	0	41
56	3	0	1	0	0	0	60
40	3	0	0	0	0	2	45
43	4	0	0	0	0	2	49

43	7	0	0	0	0	1	51
45	10	4	2	0	1	0	62
175	29	9	3	0	1	2	219
30	4	1	0	0	1	0	36
50	7	1	1	0	1	0	60
45	9	1	1	0	0	1	57
52	6	0	0	0	1	1	60
177	26	3	2	0	3	2	213
37	4	5	0	0	1	0	47
45	4	1	1	0	0	0	51
52	6	1	0	0	0	0	59
68	6	4	1	0	0	1	80
202	20	11	2	0	1	1	237
59	7	0	1	0	0	1	68
64	5	1	1	0	0	1	72
53	12	1	0	0	0	0	66
63	5	0	0	0	0	3	71
239	29	2	2	0	0	5	277
71	6	1	1	0	0	0	79
96	6	2	0	1	0	2	107
40	10	1	2	1	0	0	54
49	7	1	0	0	1	2	60
256	29	5	3	2	1	4	300
45	6	0	0	1	0	0	52
58	5	0	0	1	0	0	64
54	9	2	0	1	0	0	66
69	8	2	0	0	1	1	81
226	28	4	0	3	1	1	263
77	14	2	0	1	1	0	95
92	8	2	0	0	0	0	102
76	9	1	0	0	0	0	86
75	10	1	0	0	1	3	90
320	41	6	0	1	2	3	373
105	8	1	0	0	0	2	116
82	8	0	1	0	0	1	92
78	8	1	0	0	2	0	89
111	10	0	1	0	2	0	124
376	34	2	2	0	4	3	421
86	9	0	0	0	0	0	95
116	8	0	0	0	0	3	127
81	4	0	0	0	0	0	85
66	9	1	0	0	0	2	78
349	30	1	0	0	0	5	385
89	1	0	0	0	0	0	90
59	4	0	0	0	0	0	63
48	7	0	0	0	0	1	56
77	2	0	0	0	0	0	79

104
118
440
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114
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115
144

[Return To Dashboard](#)

[Convert to PCU](#)

1 Hr	51	3	0	0	0	0	2	56
20:00	9	1	0	0	0	0	0	10
20:15	9	0	0	0	0	0	0	9
20:30	9	2	0	0	0	0	0	11
20:45	9	2	0	0	0	0	0	11
1 Hr	36	5	0	0	0	0	0	41
21:00	9	0	0	0	0	0	1	10
21:15	13	0	0	0	0	0	2	15
21:30	6	1	0	0	0	0	0	7
21:45	8	0	0	0	0	0	0	8
1 Hr	36	1	0	0	0	0	3	40
22:00	8	0	0	0	0	0	0	8
22:15	13	2	0	0	0	0	0	15
22:30	5	0	0	0	0	0	0	5
22:45	3	1	0	0	0	0	0	4
1 Hr	29	3	0	0	0	0	0	32
23:00	3	1	0	0	0	0	0	4
23:15	4	0	0	0	0	0	0	4
23:30	5	0	0	0	0	0	0	5
23:45	6	0	0	0	0	0	0	6
1 Hr	18	1	0	0	0	0	0	19
Total	848	120	14	23	1	3	17	1026

177	13	0	1	0	0	4	195
41	2	0	0	0	0	0	43
37	4	0	0	0	0	1	42
32	3	0	0	0	0	1	36
35	4	0	0	0	0	0	39
145	13	0	0	0	0	2	160
43	2	0	0	0	0	0	45
36	1	0	0	0	0	0	37
23	2	0	0	0	0	0	25
19	3	0	0	0	0	1	23
121	8	0	0	0	0	1	130
16	2	0	0	0	0	1	19
25	2	0	0	0	0	1	28
14	1	0	0	0	0	0	15
12	1	0	0	0	0	0	13
67	6	0	0	0	0	2	75
10	1	0	0	0	0	0	11
12	0	0	0	0	0	0	12
7	0	0	0	0	0	0	7
2	0	0	0	0	0	0	2
31	1	0	0	0	0	0	32
3288	324	24	5	10	10	30	3691

273	14	0	0	0	0	1	288
48	3	0	0	0	0	2	53
49	3	1	0	0	0	1	54
44	1	0	0	0	0	1	46
34	2	0	0	0	0	0	36
175	9	1	0	0	0	4	189
27	2	1	0	0	0	1	31
27	0	0	0	0	0	0	27
35	0	0	0	0	0	0	35
21	3	0	0	0	0	0	24
110	5	1	0	0	0	1	117
24	1	0	0	0	0	0	25
18	1	0	0	0	0	0	19
13	1	0	0	0	0	0	14
8	0	0	0	0	0	0	8
63	3	0	0	0	0	0	66
9	1	0	0	0	0	0	10
11	0	0	0	0	0	0	11
9	0	1	0	0	0	1	11
9	0	0	0	0	0	0	9
38	1	1	0	0	0	1	41
3888	385	60	27	9	19	44	4432

539
106
105
93
86
390
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SITE 4



Origin : Arm A Marrsfield Avenue(ESE)

Destination : Arm A Marrsfield Avenue(ESE)								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

00:00	0	0	0	0	0	0	0	0
00:15	0	0	0	0	0	0	0	0
00:30	0	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0
03:15	0	0	0	0	0	0	0	0
03:30	0	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0
04:15	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	0	0	0
04:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0
05:15	0	0	0	0	0	0	0	0
05:30	0	0	0	0	0	0	0	0
05:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0

Destination : Arm B Park Avenue								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

00:00	0	0	0	0	0	0	0	0
00:15	0	0	0	0	0	0	0	0
00:30	0	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0
03:15	0	0	0	0	0	0	0	0
03:30	0	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0
04:15	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	0	0	0
04:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0
05:15	0	0	0	0	0	0	0	0
05:30	0	0	0	0	0	0	0	0
05:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	1	1
06:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	1	1
07:00	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0
07:30	1	0	0	0	0	0	0	1
07:45	0	0	0	0	0	0	0	0
1 Hr	1	0	0	0	0	0	0	1
08:00	1	0	0	0	0	0	0	1
08:15	1	0	0	0	0	0	0	1
08:30	1	0	0	0	0	0	0	1

Destination : Arm C Marrsfield Avenue(WNW)								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

00:00	0	0	0	0	0	0	0	0
00:15	0	0	0	0	0	0	0	0
00:30	0	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
01:00	1	0	0	0	0	0	0	1
01:15	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0
1 Hr	1	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0
03:15	0	0	0	0	0	0	0	0
03:30	0	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0
04:15	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	0	0	0
04:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
05:00	1	0	0	0	0	0	0	1
05:15	1	0	0	0	0	0	0	1
05:30	0	0	0	0	0	0	0	0
05:45	3	0	0	0	0	0	0	3
1 Hr	5	0	0	0	0	0	0	5
06:00	8	0	0	0	0	0	0	8
06:15	4	2	0	0	0	0	1	7
06:30	4	0	0	0	0	0	0	4
06:45	3	1	0	0	0	0	2	6
1 Hr	19	3	0	0	0	0	3	25
07:00	9	0	0	0	0	0	0	9
07:15	11	2	0	1	0	0	0	14
07:30	11	1	0	0	0	0	0	12
07:45	12	1	0	1	0	0	0	14
1 Hr	43	4	0	2	0	0	0	49
08:00	12	3	0	0	0	0	3	18
08:15	7	0	1	0	0	0	0	8
08:30	10	1	0	1	0	0	0	12

Arm Totals

00:00	0
00:15	0
00:30	0
00:45	0
1 Hr	0
01:00	1
01:15	0
01:30	0
01:45	0
1 Hr	1
02:00	0
02:15	0
02:30	0
02:45	0
1 Hr	0
03:00	0
03:15	0
03:30	0
03:45	0
1 Hr	0
04:00	0
04:15	0
04:30	0
04:45	0
1 Hr	0
05:00	1
05:15	1
05:30	0
05:45	3
1 Hr	5
06:00	8
06:15	7
06:30	5
06:45	6
1 Hr	26
07:00	9
07:15	14
07:30	13
07:45	14
1 Hr	50
08:00	19
08:15	9
08:30	13

08:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0

0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	3
0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0	0	4
6	0	0	0	0	0	0	0	0	6
0	1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	1
0	1	0	0	0	0	0	0	0	1
2	1	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	3
2	0	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	3
2	0	0	0	0	0	0	0	2	4
7	0	0	0	0	0	0	0	2	9
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
3	1	0	0	0	0	0	0	0	4
3	0	0	0	0	0	0	0	0	3
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
6	1	0	0	0	0	0	0	0	7
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0	0	4

10	0	0	2	0	1	0	13
39	4	1	3	0	1	3	51
6	0	1	0	0	0	0	7
4	0	0	1	0	0	0	5
4	1	1	1	0	0	0	7
6	1	0	1	0	0	1	9
20	2	2	3	0	0	1	28
3	3	0	0	0	0	0	6
3	0	1	0	0	0	0	4
2	1	0	1	0	0	0	4
3	2	2	0	0	0	0	7
11	6	3	1	0	0	0	21
2	0	0	2	0	0	0	4
6	1	1	0	0	0	0	8
4	2	2	0	0	0	0	8
5	2	1	1	0	0	0	9
17	5	4	3	0	0	0	29
7	0	0	0	0	0	0	7
6	1	1	1	0	0	1	10
8	0	1	0	0	0	0	9
3	1	0	0	0	0	0	4
24	2	2	1	0	0	1	30
5	1	0	0	0	0	0	6
5	1	0	0	0	0	0	6
2	1	0	0	0	0	0	3
10	1	0	0	0	0	0	11
22	4	0	0	0	0	0	26
2	0	0	1	0	0	0	3
8	0	1	0	0	0	0	9
8	3	0	1	0	0	0	12
2	1	1	1	0	0	0	5
20	4	2	3	0	0	0	29
2	1	2	0	0	0	0	5
4	1	1	0	0	0	0	6
8	1	0	0	0	0	0	9
16	1	0	1	0	0	0	18
30	4	3	1	0	0	0	38
16	4	0	0	0	0	0	20
6	7	0	1	0	0	1	15
12	7	0	0	0	0	0	19
7	3	0	0	0	0	0	10
41	21	0	1	0	0	1	64
14	1	0	0	0	0	0	15
9	0	0	0	0	0	0	9
8	1	0	0	0	0	0	9
12	2	0	0	0	0	0	14
43	4	0	0	0	0	0	47

13
54
7
6
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34
7
5
4
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23
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3
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12
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30
9
9
9
18
45
20
15
19
11
65
16
9
11
15
51

18:00	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
19:00	0	0	0	0	0	0	0	0	0
19:15	0	0	0	0	0	0	0	0	0
19:30	0	0	0	0	0	0	0	0	0
19:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0
20:15	0	0	0	0	0	0	0	0	0
20:30	0	0	0	0	0	0	0	0	0
20:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0
21:15	0	0	0	0	0	0	0	0	0
21:30	0	0	0	0	0	0	0	0	0
21:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0
22:15	0	0	0	0	0	0	0	0	0
22:30	0	0	0	0	0	0	0	0	0
22:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0
23:15	0	0	0	0	0	0	0	0	0
23:30	0	0	0	0	0	0	0	0	0
23:45	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0

1	0	0	0	0	0	0	2	3
2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
5	0	0	0	0	0	0	2	7
1	0	0	0	0	0	0	0	1
4	0	0	0	0	0	0	1	5
2	0	0	0	0	0	0	0	2
2	0	0	0	0	0	0	0	2
9	0	0	0	0	0	0	1	10
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
5	0	0	0	0	0	0	0	5
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	1	2
3	0	0	0	0	0	0	1	4
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
Total	60	3	0	0	0	0	7	70

6	2	0	0	0	0	0	0	8
2	2	0	0	0	0	0	1	5
6	1	0	0	0	0	0	0	7
9	0	0	0	0	0	0	0	9
23	5	0	0	0	0	0	1	29
8	1	0	0	0	0	0	0	9
6	0	0	0	0	0	0	0	6
7	1	0	0	0	0	0	0	8
10	0	0	0	0	0	0	0	10
31	2	0	0	0	0	0	0	33
4	0	0	0	0	0	0	0	4
5	0	0	0	0	0	0	0	5
2	0	0	0	0	0	0	0	2
4	0	0	0	0	0	0	0	4
15	0	0	0	0	0	0	0	15
4	0	0	0	0	0	0	0	4
2	0	0	0	0	0	0	0	2
5	1	0	0	0	0	0	0	6
1	0	0	0	0	0	0	0	1
12	1	0	0	0	0	0	0	13
2	0	0	0	0	0	0	0	2
5	1	0	0	0	0	0	0	6
2	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0
9	1	0	0	0	0	0	0	10
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	4
1	0	0	0	0	0	0	0	1
5	0	0	0	0	0	0	0	5
Total	430	72	17	18	0	1	10	548

11	
7	
8	
10	
36	
10	
11	
10	
12	
43	
5	
6	
4	
5	
20	
5	
2	
7	
3	
17	
2	
7	
3	
0	
12	
0	
1	
4	
1	
6	
Total	618

Origin : Arm B Park Avenue

Destination :	Arm A	Marrsfield Avenue(E)	Total				
Car	LG	OGV1	OGV2	PSV	MC	PC	

00:00	0	0	0	0	0	0	0	0
00:15	0	0	0	0	0	0	0	0
00:30	0	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0

Destination :	Arm B	Park Avenue	Total				
Car	LG	OGV1	OGV2	PSV	MC	PC	

0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0

Destination :	Arm C	Marrsfield Avenue(WNW)	Total				
Car	LG	OGV1	OGV2	PSV	MC	PC	

1	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

1	
0	
0	
0	
1	
0	
0	
0	
0	
0	
0	
Total	0

23:45	4	0	0	0	0	0	0	4
1 Hr	14	1	0	0	0	0	0	15
Total	414	67	14	18	0	0	14	529

	1	0	0	0	0	0	0	1
	4	0	0	0	0	0	0	4
Total	365	44	4	0	0	1	9	423

	0	0	0	0	0	0	0	0	5
	0	0	0	0	0	0	0	0	19
Total	3	0	0	0	0	0	0	3	955

ORIGIN SUMMARY

	Origin : Arm A Marrsfield Avenue(E)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	0	0	0	0	0	0	0	0
00:15	0	0	0	0	0	0	0	0
00:30	0	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
01:00	1	0	0	0	0	0	0	1
01:15	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0
1 Hr	1	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0
03:15	0	0	0	0	0	0	0	0
03:30	0	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0
04:15	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	0	0	0
04:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
05:00	1	0	0	0	0	0	0	1
05:15	1	0	0	0	0	0	0	1
05:30	0	0	0	0	0	0	0	0
05:45	3	0	0	0	0	0	0	3
1 Hr	5	0	0	0	0	0	0	5
06:00	8	0	0	0	0	0	0	8
06:15	4	2	0	0	0	0	1	7
06:30	4	0	0	0	0	0	1	5
06:45	3	1	0	0	0	0	2	6
1 Hr	19	3	0	0	0	0	4	26
07:00	9	0	0	0	0	0	0	9
07:15	11	2	0	1	0	0	0	14
07:30	12	1	0	0	0	0	0	13

	Origin : Arm B Park Avenue							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
1 Hr	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
1 Hr	2	0	0	0	0	0	0	2
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
1 Hr	1	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	2
1 Hr	4	0	0	0	0	0	0	4
	1	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1
	2	1	0	0	0	0	0	3
1 Hr	4	1	0	0	0	0	0	5
	4	0	0	0	0	0	0	4
	4	2	0	0	0	0	0	6
	11	0	0	0	0	0	0	11

	Origin : Arm C Marrsfield Avenue(WNW)							Total	Origin Totals
	Car	LGV	OGV1	OGV2	PSV	MC	PC		
	2	0	0	0	0	0	1	3	4
	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1	1
	0	0	0	0	0	0	1	1	1
1 Hr	3	0	0	0	0	0	2	5	6
	0	0	0	0	0	0	0	0	1
	2	0	0	0	0	0	0	2	2
	1	0	0	0	0	0	0	1	1
	0	0	0	0	0	0	0	0	0
1 Hr	3	0	0	0	0	0	0	3	4
	1	0	0	0	0	0	0	1	1
	1	0	0	0	0	0	0	1	1
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
1 Hr	2	0	0	0	0	0	0	2	2
	1	0	0	0	0	0	0	1	2
	2	0	0	0	0	0	0	2	3
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
1 Hr	3	0	0	0	0	0	0	3	5
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0	2
	0	0	0	0	0	0	0	0	2
	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	1	6
1 Hr	1	0	0	0	0	0	0	1	10
	1	0	0	0	0	0	0	1	10
	0	0	0	0	0	0	1	1	8
	4	5	0	0	0	0	0	9	15
	8	4	0	0	0	0	0	12	21
1 Hr	13	9	0	0	0	0	1	23	54
	4	5	0	1	0	0	0	10	23
	14	5	0	0	0	0	0	19	39
	14	1	0	1	0	0	1	17	41

07:45	12	1	0	1	0	0	0	14
1 Hr	44	4	0	2	0	0	0	50
08:00	13	3	0	0	0	0	3	19
08:15	8	0	1	0	0	0	0	9
08:30	11	1	0	1	0	0	0	13
08:45	10	0	0	2	0	1	0	13
1 Hr	42	4	1	3	0	1	3	54
09:00	6	0	1	0	0	0	0	7
09:15	5	0	0	1	0	0	0	6
09:30	5	1	1	1	0	0	0	8
09:45	10	1	0	1	0	0	1	13
1 Hr	26	2	2	3	0	0	1	34
10:00	3	4	0	0	0	0	0	7
10:15	4	0	1	0	0	0	0	5
10:30	2	1	0	1	0	0	0	4
10:45	3	2	2	0	0	0	0	7
1 Hr	12	7	3	1	0	0	0	23
11:00	3	0	0	2	0	0	0	5
11:15	6	1	1	0	0	0	0	8
11:30	5	2	2	0	0	0	0	9
11:45	5	3	1	1	0	0	0	10
1 Hr	19	6	4	3	0	0	0	32
12:00	8	0	0	0	0	0	0	8
12:15	7	1	1	1	0	0	1	11
12:30	9	0	1	0	0	0	0	10
12:45	3	1	0	0	0	0	0	4
1 Hr	27	2	2	1	0	0	1	33
13:00	7	1	0	0	0	0	0	8
13:15	5	1	0	0	0	0	0	6
13:30	5	1	0	0	0	0	0	6
13:45	12	1	0	0	0	0	2	15
1 Hr	29	4	0	0	0	0	2	35
14:00	2	0	0	1	0	0	0	3
14:15	8	0	1	0	0	0	0	9
14:30	8	3	0	1	0	0	0	12
14:45	3	1	1	1	0	0	0	6
1 Hr	21	4	2	3	0	0	0	30
15:00	5	2	2	0	0	0	0	9
15:15	7	1	1	0	0	0	0	9
15:30	8	1	0	0	0	0	0	9
15:45	16	1	0	1	0	0	0	18
1 Hr	36	5	3	1	0	0	0	45
16:00	16	4	0	0	0	0	0	20
16:15	6	7	0	1	0	0	1	15
16:30	12	7	0	0	0	0	0	19
16:45	8	3	0	0	0	0	0	11
1 Hr	42	21	0	1	0	0	1	65

5	2	0	0	0	0	0	0	7
24	4	0	0	0	0	0	0	28
11	1	0	0	0	0	1	1	14
19	0	0	0	0	0	0	0	19
30	0	0	0	0	0	0	0	30
12	0	0	0	0	0	0	0	12
72	1	0	0	0	0	1	1	75
5	1	0	0	0	0	0	0	6
13	0	0	0	0	0	0	0	13
5	0	0	0	0	0	0	0	5
1	0	0	0	0	0	0	0	1
24	1	0	0	0	0	0	0	25
4	2	0	0	0	0	0	0	6
2	0	0	0	0	0	0	1	3
5	0	0	0	0	0	0	0	5
7	0	0	0	0	0	0	0	7
18	2	0	0	0	0	0	1	21
4	1	0	0	0	0	0	0	5
4	3	0	0	0	0	0	0	7
4	0	1	0	0	0	0	0	5
4	0	0	0	0	0	0	0	4
16	4	1	0	0	0	0	0	21
8	2	0	0	0	0	0	0	10
1	0	0	0	0	0	0	0	1
4	1	0	0	0	0	0	0	5
10	1	0	0	0	0	0	0	11
23	4	0	0	0	0	0	0	27
3	0	0	0	0	0	0	0	3
7	0	0	0	0	0	0	0	7
2	1	0	0	0	0	0	0	3
4	1	1	0	0	0	0	0	6
16	2	1	0	0	0	0	0	19
11	2	0	0	0	0	0	0	13
17	0	1	0	0	0	0	0	18
5	0	0	0	0	0	0	0	5
5	0	0	0	0	0	0	0	5
38	2	1	0	0	0	0	0	41
6	1	0	0	0	0	0	0	7
11	0	1	0	0	0	0	0	12
3	0	0	0	0	0	0	1	4
7	2	0	0	0	0	0	3	12
27	3	1	0	0	0	0	4	35
9	0	0	0	0	0	0	0	9
4	1	1	0	0	0	0	0	6
2	0	0	0	0	0	0	0	2
6	1	0	0	0	0	0	0	7
21	2	1	0	0	0	0	0	24

10	2	2	0	0	0	0	0	14
42	13	2	2	0	0	0	1	60
14	3	0	1	0	0	0	0	18
12	1	0	1	0	0	0	2	16
12	1	0	1	0	0	0	0	14
16	0	1	0	0	0	0	0	17
54	5	1	3	0	0	0	2	65
15	1	1	1	0	0	0	0	18
7	1	0	1	0	0	0	0	9
5	1	0	1	0	0	0	0	7
7	3	0	0	0	0	0	0	10
34	6	1	3	0	0	0	0	44
3	1	1	1	0	0	0	0	6
7	3	1	0	0	0	0	0	11
2	2	0	1	0	0	0	0	5
7	0	1	1	0	0	0	0	9
19	6	3	3	0	0	0	0	31
6	4	0	1	0	0	0	1	12
8	3	2	0	0	0	0	0	13
7	0	1	1	0	0	0	0	9
5	3	0	0	0	0	0	1	9
26	10	3	2	0	0	0	2	43
10	0	0	1	0	0	0	0	11
8	4	1	0	0	0	0	0	13
3	2	0	0	0	0	1	0	6
7	3	0	0	0	0	0	0	10
28	9	1	1	0	0	1	0	40
7	1	1	0	0	0	0	0	9
13	3	0	0	0	0	0	0	16
12	0	0	1	0	0	0	1	14
10	2	0	0	0	0	0	0	12
42	6	1	1	0	0	0	1	51
10	0	0	1	0	0	0	0	11
6	4	1	1	0	0	0	0	12
32	4	0	0	0	0	0	0	36
12	0	1	1	0	0	0	0	14
60	8	2	3	0	0	0	0	73
9	0	1	1	0	0	0	0	11
10	1	0	0	0	0	0	1	12
12	1	0	1	0	0	0	0	14
13	2	0	0	0	0	0	0	15
44	4	1	2	0	0	0	1	52
25	0	2	0	0	0	0	0	27
13	1	0	0	0	0	0	0	14
13	2	0	0	0	0	0	0	15
16	5	0	0	0	0	0	0	21
67	8	2	0	0	0	0	0	77

35
138
51
44
57
42
194
31
28
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103
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14
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100
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29
23
33
105
27
39
53
25
144
27
33
27
45
132
56
35
36
39
166

17:00	15	1	0	0	0	0	0	16
17:15	9	0	0	0	0	0	0	9
17:30	10	1	0	0	0	0	0	11
17:45	13	2	0	0	0	0	0	15
1 Hr	47	4	0	0	0	0	0	51
18:00	7	2	0	0	0	0	2	11
18:15	4	2	0	0	0	0	1	7
18:30	7	1	0	0	0	0	0	8
18:45	10	0	0	0	0	0	0	10
1 Hr	28	5	0	0	0	0	3	36
19:00	9	1	0	0	0	0	0	10
19:15	10	0	0	0	0	0	1	11
19:30	9	1	0	0	0	0	0	10
19:45	12	0	0	0	0	0	0	12
1 Hr	40	2	0	0	0	0	1	43
20:00	5	0	0	0	0	0	0	5
20:15	6	0	0	0	0	0	0	6
20:30	4	0	0	0	0	0	0	4
20:45	5	0	0	0	0	0	0	5
1 Hr	20	0	0	0	0	0	0	20
21:00	5	0	0	0	0	0	0	5
21:15	2	0	0	0	0	0	0	2
21:30	6	1	0	0	0	0	0	7
21:45	2	0	0	0	0	0	1	3
1 Hr	15	1	0	0	0	0	1	17
22:00	2	0	0	0	0	0	0	2
22:15	6	1	0	0	0	0	0	7
22:30	3	0	0	0	0	0	0	3
22:45	0	0	0	0	0	0	0	0
1 Hr	11	1	0	0	0	0	0	12
23:00	0	0	0	0	0	0	0	0
23:15	1	0	0	0	0	0	0	1
23:30	4	0	0	0	0	0	0	4
23:45	1	0	0	0	0	0	0	1
1 Hr	6	0	0	0	0	0	0	6
Total	490	75	17	18	0	1	17	618

DESTINATION SUMMARY

Destination : Arm A Marrsfield Avenue(ESE)								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

00:00	1	0	0	0	0	0	1	2
00:15	0	0	0	0	0	0	0	0
00:30	1	0	0	0	0	0	0	1
00:45	0	0	0	0	0	0	1	1
1 Hr	2	0	0	0	0	0	2	4

6	1	0	0	0	0	0	1	8
3	1	0	0	0	0	0	0	4
10	1	0	0	0	0	0	0	11
17	3	0	0	0	0	0	1	21
36	6	0	0	0	0	0	2	44
11	0	0	0	0	0	0	0	11
13	0	0	0	0	0	0	0	13
4	0	0	0	0	0	0	0	4
14	0	0	0	0	0	0	1	15
42	0	0	0	0	0	0	1	43
7	0	0	0	0	0	0	1	8
8	0	0	0	0	0	0	0	8
5	0	0	0	0	0	0	0	5
8	0	0	0	0	0	0	0	8
28	0	0	0	0	0	0	1	29
9	0	0	0	0	0	0	0	9
7	0	0	0	0	0	0	0	7
2	0	0	0	0	0	0	0	2
4	1	0	0	0	0	0	0	5
22	1	0	0	0	0	0	0	23
9	0	0	0	0	0	0	1	10
3	0	0	0	0	0	0	0	3
3	0	0	0	0	0	0	0	3
0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	1	16
3	1	0	0	0	0	1	0	5
2	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
5	1	0	0	0	0	1	0	7
0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	4
3	0	0	0	0	0	0	0	3
0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	7
Total	446	34	5	0	0	2	11	498

Destination : Arm B Park Avenue								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1

10	2	0	0	0	0	0	0	12
21	2	1	0	0	0	0	1	25
18	2	0	0	0	0	0	0	20
24	2	0	0	0	0	0	3	29
73	8	1	0	0	0	0	4	86
19	2	0	0	0	0	0	2	23
28	1	0	0	0	0	0	0	29
10	3	0	0	0	0	0	0	13
16	1	0	0	0	0	0	0	17
73	7	0	0	0	0	0	2	82
11	3	0	0	0	0	0	0	14
20	0	0	0	0	0	0	0	20
16	1	0	0	0	0	0	0	17
8	0	0	0	0	0	0	0	8
55	4	0	0	0	0	0	0	59
14	1	0	0	0	0	0	0	15
16	1	0	0	0	0	0	1	18
10	0	0	0	0	0	0	2	12
12	0	0	0	0	0	0	1	13
52	2	0	0	0	0	0	4	58
9	2	0	0	0	0	0	1	12
10	2	0	0	0	0	0	0	12
15	0	0	0	0	0	0	0	15
13	0	0	0	0	0	0	0	13
47	4	0	0	0	0	0	1	52
9	0	0	0	0	0	0	0	9
5	1	0	0	0	0	0	0	6
3	0	0	0	0	0	0	2	5
6	0	0	0	0	0	0	0	6
23	1	0	0	0	0	0	2	26
1	0	0	0	0	0	0	0	1
8	1	0	0	0	0	0	0	9
4	0	0	0	0	0	0	0	4
5	0	0	0	0	0	0	0	5
18	1	0	0	0	0	0	0	19
Total	782	111	18	20	0	1	23	955

Destination : Arm C Marrsfield Avenue(WNW)								Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1

36
38
42
65
181
45
49
25
42
161
32
39
32
28
131
29
31
18
23
101
27
17
25
16
85
16
15
8
6
45
1
14
11
6
32
2071

[Return To Dashboard](#)

[Convert to PCU](#)

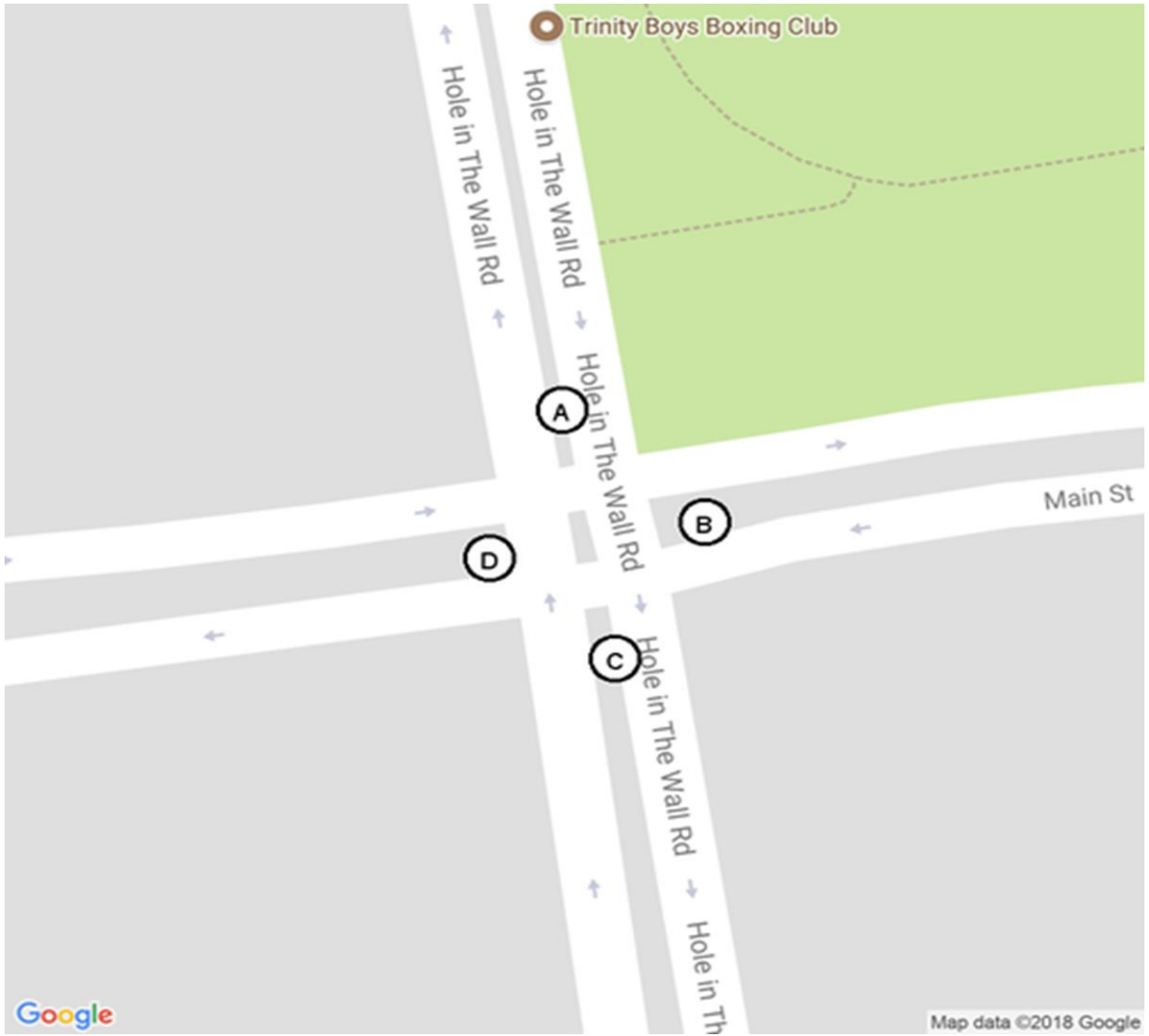
1 Hr	41	0	0	0	0	0	1	42
20:00	9	1	0	0	0	0	0	10
20:15	12	0	0	0	0	0	1	13
20:30	9	0	0	0	0	0	2	11
20:45	4	0	0	0	0	0	1	5
1 Hr	34	1	0	0	0	0	4	39
21:00	8	0	0	0	0	0	0	8
21:15	7	1	0	0	0	0	0	8
21:30	11	0	0	0	0	0	0	11
21:45	11	0	0	0	0	0	0	11
1 Hr	37	1	0	0	0	0	0	38
22:00	10	1	0	0	0	1	0	12
22:15	4	1	0	0	0	0	0	5
22:30	3	0	0	0	0	0	2	5
22:45	4	0	0	0	0	0	0	4
1 Hr	21	2	0	0	0	1	2	26
23:00	1	0	0	0	0	0	0	1
23:15	10	1	0	0	0	0	0	11
23:30	4	0	0	0	0	0	0	4
23:45	4	0	0	0	0	0	0	4
1 Hr	19	1	0	0	0	0	0	20
Total	517	79	14	20	0	1	20	651

37	4	0	0	0	0	1	42
8	0	0	0	0	0	0	8
8	1	0	0	0	0	0	9
4	0	0	0	0	0	0	4
9	0	0	0	0	0	0	9
29	1	0	0	0	0	0	30
6	2	0	0	0	0	1	9
4	1	0	0	0	0	0	5
7	0	0	0	0	0	0	7
2	0	0	0	0	0	1	3
19	3	0	0	0	0	2	24
2	0	0	0	0	0	0	2
3	0	0	0	0	0	0	3
1	0	0	0	0	0	0	1
1	0	0	0	0	0	0	1
7	0	0	0	0	0	0	7
0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	3
1	0	0	0	0	0	0	1
1	0	0	0	0	0	0	1
5	0	0	0	0	0	0	5
425	47	4	0	0	1	16	493

45	2	0	0	0	0	0	47
11	0	0	0	0	0	0	11
9	0	0	0	0	0	0	9
3	0	0	0	0	0	0	3
8	1	0	0	0	0	0	9
31	1	0	0	0	0	0	32
9	0	0	0	0	0	1	10
4	0	0	0	0	0	0	4
6	1	0	0	0	0	0	7
2	0	0	0	0	0	0	2
21	1	0	0	0	0	1	23
2	0	0	0	0	0	0	2
6	1	0	0	0	0	0	7
2	0	0	0	0	0	0	2
1	0	0	0	0	0	0	1
11	1	0	0	0	0	0	12
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	6
1	0	0	0	0	0	0	1
7	0	0	0	0	0	0	7
776	94	22	18	0	2	15	927

131
29
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101
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SITE 5



	Destination : Arm A Hole in The Wall Road(NNW)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	1	0	0	0	0	0	0	1
00:15	1	0	0	0	0	0	0	1
00:30	1	0	0	0	0	0	0	1
00:45	0	0	0	0	0	0	0	0
1 Hr	3	0	0	0	0	0	0	3
01:00	0	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0
03:15	0	0	0	0	0	0	0	0
03:30	0	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
04:00	1	0	0	0	0	0	0	1
04:15	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	1	0	1
04:45	1	0	0	0	0	0	0	1
1 Hr	2	0	0	0	0	1	0	3
05:00	0	0	0	0	0	0	0	0
05:15	1	1	0	0	0	0	0	2
05:30	2	1	0	0	0	0	0	3
05:45	2	0	0	0	0	0	0	2
1 Hr	5	2	0	0	0	0	0	7
06:00	3	0	0	0	0	0	0	3
06:15	0	0	0	0	0	0	0	0
06:30	2	1	0	0	0	0	0	3
06:45	6	0	0	0	0	0	0	6
1 Hr	11	1	0	0	0	0	0	12
07:00	7	1	0	0	0	0	1	9
07:15	9	1	0	0	0	0	0	10
07:30	14	2	0	0	0	0	0	16
07:45	18	2	0	0	0	1	0	21
1 Hr	48	6	0	0	0	1	1	56
08:00	27	3	0	0	0	0	1	31
08:15	24	3	0	0	0	0	0	27
08:30	20	1	0	0	0	0	0	21
08:45	11	1	0	1	0	0	0	13
1 Hr	82	8	0	1	0	0	1	92
09:00	6	2	0	0	0	0	0	8
09:15	7	0	0	0	0	0	0	7
09:30	5	1	0	0	0	0	0	6
09:45	5	1	0	0	0	0	0	6
1 Hr	23	4	0	0	0	0	0	27
10:00	3	0	0	0	0	0	0	3
10:15	9	0	0	0	0	0	0	9
10:30	6	1	0	0	0	0	0	7
10:45	4	1	1	0	0	0	0	6
1 Hr	22	2	1	0	0	0	0	25
11:00	1	1	1	0	0	0	0	3
11:15	6	0	0	0	0	0	0	6
11:30	7	0	0	0	0	0	0	7
11:45	4	1	0	0	0	0	0	5
1 Hr	18	2	1	0	0	0	0	21
12:00	3	1	0	0	0	0	0	4

	Destination : Arm B Main Street(E)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	0	0	0	0	0	0	0	0
00:15	0	0	0	0	0	0	0	0
00:30	0	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0
03:15	0	0	0	0	0	0	0	0
03:30	0	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0
04:15	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	0	0	0
04:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0
05:15	0	0	0	0	0	0	0	0
05:30	0	0	0	0	0	0	0	0
05:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0

	Destination : Arm C Hole in The Wall Road(S)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	13	1	0	0	0	0	0	14
00:15	6	0	0	0	0	0	0	6
00:30	8	0	0	0	0	0	0	8
00:45	4	0	0	0	0	0	0	4
1 Hr	31	1	0	0	0	0	0	32
01:00	4	1	0	0	0	0	0	5
01:15	2	1	0	0	0	0	0	3
01:30	3	0	0	0	0	0	0	3
01:45	1	0	0	0	0	0	0	1
1 Hr	10	2	0	0	0	0	0	12
02:00	2	0	0	0	0	0	0	2
02:15	1	0	0	0	0	0	0	1
02:30	2	0	0	0	0	0	0	2
02:45	1	0	0	0	0	0	0	1
1 Hr	6	0	0	0	0	0	0	6
03:00	0	0	0	0	0	0	0	0
03:15	1	1	0	0	0	0	0	2
03:30	4	0	0	0	0	0	0	4
03:45	3	0	0	0	0	0	0	3
1 Hr	8	1	0	0	0	0	0	9
04:00	2	0	0	0	0	0	0	2
04:15	4	1	0	0	0	1	0	6
04:30	7	0	0	0	0	0	0	7
04:45	8	0	0	0	0	0	0	8
1 Hr	21	1	0	0	0	1	0	23
05:00	2	1	0	0	0	0	0	3
05:15	11	2	0	0	0	0	0	13
05:30	8	1	0	0	0	0	0	9
05:45	18	1	0	0	0	0	0	19
1 Hr	39	5	0	0	0	0	0	44
06:00	18	2	0	0	2	0	0	22
06:15	14	4	0	0	1	1	0	20
06:30	30	8	0	0	2	0	1	41
06:45	35	8	0	0	1	0	0	44
1 Hr	97	22	0	0	6	1	1	127
07:00	45	4	0	0	2	2	0	53
07:15	58	7	0	0	1	0	0	66
07:30	42	4	0	0	5	0	0	51
07:45	66	4	1	0	1	0	0	72
1 Hr	211	19	1	0	9	2	0	242
08:00	48	4	1	0	3	0	0	56
08:15	48	3	0	0	2	0	0	53
08:30	66	4	0	0	1	1	0	72
08:45	37	5	0	0	2	0	0	44
1 Hr	199	16	1	0	8	1	0	225
09:00	34	3	0	0	1	0	0	38
09:15	29	2	0	1	1	0	0	33
09:30	37	0	0	1	3	1	1	43
09:45	35	6	0	0	1	0	1	43
1 Hr	135	11	0	2	6	1	2	157
10:00	40	5	1	0	1	0	0	47
10:15	31	4	0	0	1	1	0	37
10:30	40	6	0	0	2	0	0	48
10:45	35	3	1	0	1	0	0	40
1 Hr	146	18	2	0	5	1	0	172
11:00	24	1	3	1	2	0	0	31
11:15	29	5	0	0	1	0	0	35
11:30	37	3	0	0	1	0	0	41
11:45	26	5	1	0	1	0	0	33
1 Hr	116	14	4	1	5	0	0	140
12:00	29	4	0	0	1	0	0	34

	Destination : Arm D Main Street(W)							Total
	Car	LGV	OGV1					

00:00	4	0	0	0	0	0	0	0	4
00:15	4	0	0	0	0	0	0	0	4
00:30	3	0	0	0	0	0	0	0	3
00:45	3	0	0	0	0	0	0	0	3
1 Hr	14	0	0	0	0	0	0	0	14
01:00	3	0	0	0	0	0	0	0	3
01:15	3	2	0	0	0	0	0	0	5
01:30	4	0	0	0	0	0	0	0	4
01:45	2	1	0	0	0	0	0	0	3
1 Hr	12	3	0	0	0	0	0	0	15
02:00	1	0	0	0	0	0	0	0	1
02:15	1	0	0	0	0	0	0	0	1
02:30	0	0	0	0	0	0	0	0	0
02:45	0	1	0	0	0	0	0	0	1
1 Hr	2	1	0	0	0	0	0	0	3
03:00	1	0	0	0	0	0	0	0	1
03:15	0	0	0	0	0	0	0	0	0
03:30	0	0	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0	0
1 Hr	1	0	0	0	0	0	0	0	1
04:00	1	0	0	0	0	0	0	0	1
04:15	0	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	0	0	0	0
04:45	0	2	0	0	0	0	0	0	2
1 Hr	1	2	0	0	0	0	0	0	3
05:00	1	0	0	0	0	0	0	0	1
05:15	1	1	0	0	0	0	0	0	2
05:30	3	0	0	0	0	0	0	0	3
05:45	3	0	0	0	0	0	0	0	3
1 Hr	8	1	0	0	0	0	0	0	9
06:00	6	1	0	0	0	0	0	0	7
06:15	15	1	0	0	0	0	0	0	16
06:30	14	0	0	0	0	0	0	0	14
06:45	15	1	0	0	0	0	0	0	16
1 Hr	50	3	0	0	0	0	0	0	53
07:00	25	3	2	0	0	0	0	0	30
07:15	50	7	0	0	1	0	1	1	59
07:30	69	6	0	0	0	0	0	1	76
07:45	73	7	2	0	4	0	4	0	90
1 Hr	217	23	4	0	5	0	6	2	255
08:00	81	7	1	0	0	0	0	1	90
08:15	65	1	0	0	0	0	0	0	66
08:30	47	6	0	0	0	1	0	0	54
08:45	65	3	1	0	0	0	0	1	70
1 Hr	258	17	2	0	0	1	2	2	280
09:00	68	11	1	0	0	0	0	0	80
09:15	72	6	0	0	0	0	0	0	78
09:30	33	5	0	0	0	0	0	0	38
09:45	42	7	1	1	0	0	0	0	51
1 Hr	215	29	2	1	0	0	0	0	247
10:00	34	1	3	0	0	0	0	0	38
10:15	37	10	0	0	0	0	0	0	47
10:30	34	5	1	0	0	0	0	0	40
10:45	45	3	4	0	0	0	0	1	53
1 Hr	150	19	8	0	0	0	0	1	178
11:00	28	3	2	0	0	0	0	1	34
11:15	34	3	1	0	0	0	0	0	38
11:30	47	3	1	0	0	0	0	0	51
11:45	48	4	1	0	0	0	0	0	53
1 Hr	157	13	5	0	0	0	0	1	176
12:00	49	3	2	0	0	0	0	0	54
12:15	46	4	1	0	0	0	0	0	51
12:30	49	8	3	0	0	0	0	0	60
12:45	52	6	2	0	0	0	0	0	60

14	1	0	0	0	0	0	0	15
7	0	0	0	0	0	0	0	7
9	0	0	0	0	0	0	0	9
4	0	0	0	0	0	0	0	4
34	1	0	0	0	0	0	0	35
4	1	0	0	0	0	0	0	5
2	1	0	0	0	0	0	0	3
3	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	1
10	2	0	0	0	0	0	0	12
2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
6	0	0	0	0	0	0	0	6
0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	2
4	0	0	0	0	0	0	0	4
3	0	0	0	0	0	0	0	3
8	1	0	0	0	0	0	0	9
3	0	0	0	0	0	0	0	3
4	1	0	0	0	1	0	0	6
7	0	0	0	0	1	0	0	8
9	0	0	0	0	0	0	0	9
23	1	0	0	0	2	0	0	26
2	1	0	0	0	0	0	0	3
12	3	0	0	0	0	0	0	15
10	2	0	0	0	0	0	0	12
20	1	0	0	0	0	0	0	21
44	7	0	0	0	0	0	0	51
21	2	0	0	2	0	0	0	25
14	4	0	0	1	1	0	0	20
32	9	0	0	2	0	1	4	44
41	8	0	0	1	0	0	0	50
108	23	0	0	6	1	1	1	139
52	5	0	0	2	2	1	0	62
67	8	0	0	1	0	0	0	76
56	6	0	0	5	0	0	0	67
85	6	1	0	1	1	0	0	94
260	25	1	0	9	3	1	1	299
75	7	1	0	3	0	1	0	87
72	6	0	0	2	0	0	0	80
87	5	0	0	1	1	0	0	94
49	6	0	1	2	0	0	0	58
283	24	1	1	8	1	1	1	319
40	5	0	0	1	0	0	0	46
36	2	0	1	1	0	0	0	40
42	1	0	1	3	1	1	0	49
40	7	0	0	1	0	1	0	49
158	15	0	2	6	1	2	1	184
43	5	1	0	1	0	0	0	50
40	4	0	0	1	1	0	0	46
46	7	0	0	2	0	0	0	55
39	4	2	0	1	0	0	0	46
168	20	3	0	5	1	0	0	197
25	2	4	1	2	0	0	0	34
35	5	0	0	1	0	0	0	41
44	3	0	0	1	0	0	0	48
30	6	1	0	1	0	0	0	38
134	16	5	1	5	0	0	0	161
32	5	0	0	1	0	0	0	38
50	1	0	0	1	0	1	0	53
31	5	0	0	3	0	0	0	39
34	9	0	0	1	0	0	0	44

14	1	0	0	0	0	0	1	16
18	0	0	0	0	0	0	0	18
9	0	0	0	0	0	0	0	9
13	0	0	0	0	0	0	1	14
54	1	0	0	0	0	0	2	57
7	1	0	0	0	0	0	0	8
8	0	0	0	0	0	0	0	8
4	0	0	0	0	0	0	0	4
5	0	0	0	0	0	0	0	5
24	1	0	0	0	0	0	0	25
3	0	0	0	0	0	0	0	3
3	0	0	0	0	0	0	0	3
2	0	0	0	0	0	0	0	2
2	0	0	0	0	0	0	0	2
10	0	0	0	0	0	0	0	10
2	1	0	0	0	0	0	0	3
3	0	0	0	0	0	0	0	3
3	0	0	0	0	0	0	0	3
2	0	0	0	0	0	0	0	2
10	1	0	0	0	0	0	0	11
5	0	0	0	0	0	0	0	5
6	1	0	0	0	0	0	0	7
3	0	0	0	0	0	0	0	3
5	0	0	0	0	0	0	0	5
19	1	0	0	0	0	0	0	20
0	1	0	0	0	0	0	0	1
4	1	0	0	0	0	0	0	5
7	0	0	0	0	0	0	0	7
10	0	0	0	2	0	0	0	12
21	2	0	0	2	0	0	0	25
11	1	0	0	1	0	0	0	13
24	4	1	0	3	0	2	3	34
19	2	1	0	2	1	0	0	25
37	6	0	0	2	0	1	4	46
91	13	2	0	8	1	3	1	118
31	7	0	0	3	1	0	0	42
44	6	2	0	4	1	1	1	58
69	4	5	1	2	0	0	0	81
59	7	1	0	3	0	1	1	71
203	24	8	1	12	2	2	2	252
64	7	0	0	1	0	2	0	74
92	4	0	0	2	1	0	0	99
62	7	0	0	0	0	1	0	70
75	8	1	3	3	0	0	0	90
293	26	1	3	6	1	3	3	333
91	1	2	0	1	0	0	0	95
91	13	1	0	2	0	1	1	108
69	6	2	0	2	1	0	0	80
52	7	0	0	2	0	1	0	62
303	27	5	0	7	1	2	2	345
58	14	3	0	2	0	0	0	77
50	12	2	0	1	0	1	0	66
55	5	4	1	2	0	1	0	68
63	8	4	0	1	0	0	0	76
226	39	13	1	6	0	2	2	287
44	9	0	0	0	0	0	0	53
68	8	2	0	1	1	0	0	80
62	9	1	0	1	0	0	0	73
65	9	2	0	2	1	1	0	80
239	35	5	0	4	2	1	1	286
63	8	3						

1 Hr	196	21	8	0	0	0	0	225
13:00	44	6	1	0	0	0	0	51
13:15	62	5	0	2	1	1	0	71
13:30	74	8	0	0	0	0	0	82
13:45	57	6	2	0	0	0	0	65
1 Hr	237	25	3	2	1	1	0	269
14:00	45	4	0	0	0	0	0	49
14:15	47	4	1	0	2	0	0	54
14:30	74	6	0	0	0	0	0	80
14:45	79	6	0	0	0	0	0	85
1 Hr	245	20	1	0	2	0	0	268
15:00	65	6	1	0	0	0	2	74
15:15	54	7	0	0	0	0	0	61
15:30	74	9	2	0	0	0	1	86
15:45	58	9	1	0	0	0	1	69
1 Hr	251	31	4	0	0	0	4	290
16:00	45	5	3	0	0	0	0	53
16:15	78	6	3	0	0	0	1	88
16:30	61	11	2	0	0	0	3	77
16:45	76	4	1	0	0	1	0	82
1 Hr	260	26	9	0	0	1	4	300
17:00	75	8	0	1	0	0	0	84
17:15	66	6	1	0	0	1	1	75
17:30	69	3	1	0	0	2	0	75
17:45	74	0	1	0	2	1	1	79
1 Hr	284	17	3	1	2	4	2	313
18:00	77	9	0	0	0	0	2	88
18:15	80	6	0	0	1	0	1	88
18:30	63	4	1	0	0	1	2	71
18:45	75	6	0	0	1	0	1	83
1 Hr	295	25	1	0	2	1	6	330
19:00	55	3	0	0	0	0	0	58
19:15	59	4	0	0	0	0	0	63
19:30	42	2	0	1	0	0	2	47
19:45	49	3	0	0	0	0	0	52
1 Hr	205	12	0	1	0	0	2	220
20:00	54	3	0	0	0	0	1	58
20:15	36	4	1	0	0	0	0	41
20:30	38	2	0	0	0	0	1	41
20:45	40	4	0	0	0	0	0	44
1 Hr	168	13	1	0	0	0	2	184
21:00	44	2	0	0	0	0	0	46
21:15	34	1	0	0	0	0	0	35
21:30	26	2	0	0	0	0	0	28
21:45	25	1	0	0	0	1	0	27
1 Hr	129	6	0	0	0	1	0	136
22:00	16	2	0	0	0	0	1	19
22:15	26	0	0	0	0	0	1	27
22:30	16	0	0	0	0	0	0	16
22:45	17	0	0	0	0	0	0	17
1 Hr	75	2	0	0	0	0	2	79
23:00	11	0	1	0	0	0	0	12
23:15	10	0	0	0	0	0	0	10
23:30	8	0	0	0	0	0	0	8
23:45	3	0	0	0	0	0	0	3
1 Hr	32	0	1	0	0	0	0	33

Total 3462 309 52 5 12 9 32 3881

DESTINATION SUMMARY

	Destination : Arm A Hole in The Wall Road(NNW)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	4	0	0	0	0	0	0	4

147	20	0	0	6	0	1	174
50	0	0	0	2	0	0	52
44	8	1	0	2	0	0	55
37	4	0	0	2	0	0	43
42	2	0	0	1	0	0	45
173	14	1	0	7	0	0	195
45	5	0	0	0	0	0	50
59	4	2	1	1	0	0	67
31	8	0	0	2	0	0	41
42	3	0	0	2	0	0	47
177	20	2	1	5	0	0	205
42	3	1	0	1	1	0	48
31	2	0	1	1	0	0	35
42	3	1	0	2	0	0	48
54	5	0	0	1	0	0	60
169	13	2	1	5	1	0	191
83	6	0	0	1	1	0	91
62	4	0	0	2	0	0	68
65	5	0	0	2	0	0	72
71	3	0	0	1	1	0	76
281	18	0	0	6	2	0	307
80	5	0	0	2	0	0	87
66	7	0	1	1	0	0	75
62	2	1	0	2	0	0	67
114	9	0	0	1	1	0	125
322	23	1	1	6	1	0	354
83	5	0	0	3	0	1	92
111	7	0	0	1	2	1	122
70	1	0	0	2	0	0	73
68	1	0	0	2	0	0	71
332	14	0	0	8	2	2	358
96	3	0	0	2	0	0	101
72	1	0	0	2	0	0	75
53	4	1	0	0	0	0	58
82	3	0	0	1	0	0	86
303	11	1	0	5	0	0	320
75	5	0	2	0	0	0	82
53	3	1	1	0	0	2	60
59	1	0	1	1	0	0	62
34	3	0	2	0	0	0	39
221	12	1	6	1	0	2	243
48	4	1	0	1	0	0	54
50	2	0	0	1	0	0	53
21	1	0	0	1	0	0	23
32	2	0	0	0	0	0	34
151	9	1	0	3	0	0	164
28	0	0	0	1	0	0	29
24	1	0	0	2	0	0	27
20	0	0	0	1	0	0	21
10	0	0	0	0	0	0	10
82	1	0	0	4	0	0	87
14	0	0	0	2	0	0	16
15	0	0	0	2	0	0	17
15	1	0	0	0	0	0	16
12	0	0	0	0	0	0	12
56	1	0	0	4	0	0	61

Total 3650 291 19 13 99 15 10 4097

	Destination : Arm B Main Street(E)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	12	1	0	0	0	0	1	14

281	38	8	1	6	1	2	337
90	8	0	0	0	0	2	100
82	4	0	0	3	1	0	90
83	9	2	0	0	0	0	94
95	3	2	1	3	0	2	106
350	24	4	1	6	1	4	390
88	9	0	0	3	0	0	100
92	7	2	0	1	0	0	102
88	13	2	0	2	1	0	106
97	6	2	1	0	1	2	109
365	35	6	1	6	2	2	417
98	8	1	0	4	0	1	112
87	5	0	0	3	0	0	95
100	14	1	0	2	1	0	118
115	7	3	0	1	3	0	129
400	34	5	0	10	4	1	454
96	7	1	0	0	0	1	105
134	7	0	0	5	0	0	146
120	10	1	0	1	0	4	136
114	13	1	2	0	1	2	133
464	37	3	2	6	1	7	520
139	15	1	1	1	1	1	159
121	11	0	0	3	1	1	137
123	16	0	0	2	3	0	144
138	13	0	1	1	1	1	155
521	55	1	2	7	6	3	595
161	7	0	0	2	1	4	175
134	9	0	0	1	0	0	144
118	11	0	0	2	0	6	137
134	10	1	0	1	0	2	148
547	37	1	0	6	1	12	604
130	6	0	0	3	0	2	141
103	10	0	0	0	0	1	114
110	8	0	0	2	1	2	123
123	5	0	0	1	0	0	129
466	29	0	0	6	1	5	507
80	3	2	0	2	2	1	90
98	12	2	0	1	0	2	115
87	5	0	0	1	0	0	93
61	3	0	0	2	0	3	69
326	23	4	0	6	2	6	367
81	3	1	0	1	0	0	86
58	8	0	0	1	0	1	68
67	3	0	0	0	0	0	70
58	9	0	0	0	0	0	67
264	23	1	0	2	0	1	291
57	0	0	0	1	0	1	59
43	3	0	0	2	0	0	48
31	0	0	0	1	0	1	33
29	3	0	0	1	0	2	35
160	6	0	0	5	0	4	175
32	1	0	0	2	0	0	35
27	2	0	0	0	0	0	29
20	1	1	0	0	0	2	24
14	1	0	0	0	0	0	15
93	5	1	0	2	0	2	103

Total 5730 516 68 12 113 26 64 6529

	Destination : Arm C Hole in The Wall Road(S)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	16	1	0	0	0	0	0	17

6	2	0	0	0	0	0	8
2	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	1
2	0	0	0	0	0	0	2
5	0	0	0	0	0	0	5
0	0	1	0	0	0	0	1
1	0	0	0	0	0	0	1
1	0	0	0	0	0	0	1
1	0	0	0	0	0	0	1
3	0	1	0	0	0	0	4
1	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	2
4	0	0	0	0	0	0	4
7	0	0	0	0	0	0	7
0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	3
3	1	0	0	0	0	0	4
1	0	0	0	0	0	0	1
7	1	0	0	0			

00:15	6	0	0	0	0	0	0	0	6
00:30	2	0	0	0	0	0	0	0	2
00:45	3	0	0	0	0	0	0	0	3
1 Hr	15	0	0	0	0	0	0	0	15
01:00	1	1	0	0	0	0	0	0	2
01:15	3	0	0	0	0	0	0	0	3
01:30	1	0	0	0	0	0	0	0	1
01:45	0	0	0	0	0	0	0	0	0
1 Hr	5	1	0	0	0	0	0	0	6
02:00	1	0	0	0	0	0	0	0	1
02:15	1	0	0	0	0	0	0	0	1
02:30	0	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0	0
1 Hr	2	0	0	0	0	0	0	0	2
03:00	1	0	0	0	0	0	0	0	1
03:15	2	0	0	0	0	0	0	0	2
03:30	1	0	0	0	0	0	0	0	1
03:45	1	0	0	0	0	0	0	0	1
1 Hr	5	0	0	0	0	0	0	0	5
04:00	3	0	0	0	0	0	0	0	3
04:15	0	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	1	0	0	1
04:45	2	0	0	0	0	0	0	0	2
1 Hr	5	0	0	0	0	1	0	0	6
05:00	0	1	0	0	0	0	0	0	1
05:15	3	1	0	0	0	0	0	0	4
05:30	6	1	0	0	0	0	0	0	7
05:45	6	0	0	0	0	0	0	0	6
1 Hr	15	3	0	0	0	0	0	0	18
06:00	7	1	0	0	0	0	0	0	8
06:15	5	1	1	0	0	0	0	0	7
06:30	9	1	1	0	0	0	0	0	11
06:45	17	1	0	0	1	0	1	0	20
1 Hr	38	4	2	0	1	0	1	0	46
07:00	24	2	0	0	0	1	1	1	28
07:15	29	5	2	0	1	1	1	1	39
07:30	58	4	3	1	0	0	0	0	66
07:45	60	6	1	0	0	1	1	1	69
1 Hr	171	17	6	1	1	3	3	3	202
08:00	70	7	0	0	0	0	3	0	80
08:15	100	6	0	0	0	1	0	0	107
08:30	61	6	0	0	0	0	1	0	68
08:45	52	4	1	2	1	0	0	0	60
1 Hr	283	23	1	2	1	1	4	0	315
09:00	47	3	2	0	0	0	0	0	52
09:15	50	5	1	0	0	0	1	0	57
09:30	43	6	2	0	0	0	0	0	51
09:45	31	3	0	0	0	0	0	0	34
1 Hr	171	17	5	0	0	0	1	0	194
10:00	41	6	2	0	0	0	0	0	49
10:15	39	8	2	0	0	0	1	0	50
10:30	40	5	3	0	0	0	1	0	49
10:45	44	8	4	0	0	0	0	0	56
1 Hr	164	27	11	0	0	0	2	0	204
11:00	23	4	1	0	0	0	0	0	28
11:15	50	6	1	0	0	1	0	0	58
11:30	44	8	1	0	0	0	0	0	53
11:45	43	5	1	0	0	1	1	0	51
1 Hr	160	23	4	0	0	2	1	0	190
12:00	37	5	3	0	0	1	0	0	46
12:15	46	4	0	0	0	0	1	0	51
12:30	49	6	0	1	0	0	0	0	56
12:45	54	5	3	0	0	0	1	0	63
1 Hr	186	20	6	1	0	1	2	0	216

13	0	0	0	0	0	0	0	0	13
8	0	0	0	0	0	0	0	0	8
11	0	0	0	0	0	0	0	1	12
44	1	0	0	0	0	0	0	2	47
6	0	0	0	0	0	0	0	0	6
5	1	0	0	0	0	0	0	0	6
5	0	0	0	0	0	0	0	0	5
5	0	0	0	0	0	0	0	0	5
21	1	0	0	0	0	0	0	0	22
2	0	0	0	0	0	0	0	0	2
2	0	0	0	0	0	0	0	0	2
2	0	0	0	0	0	0	0	0	2
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8	0	0	0	0	0	0	0	0	8
1	1	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	1
4	1	0	0	0	0	0	0	0	5
3	0	0	0	0	0	0	0	0	3
5	1	0	0	0	0	0	0	0	6
3	0	0	0	0	0	0	0	0	3
4	0	0	0	0	0	0	0	0	4
15	1	0	0	0	0	0	0	0	16
0	0	0	0	0	0	0	0	0	0
2	2	0	0	0	0	0	0	0	4
3	0	0	0	0	0	0	0	0	3
7	0	0	0	2	0	0	0	0	9
12	2	0	0	2	0	0	0	0	16
6	0	0	0	1	0	0	0	0	7
27	3	0	0	3	0	2	3	0	35
16	2	0	0	2	1	0	0	0	21
32	6	0	0	1	0	0	0	0	39
81	11	0	0	7	1	2	1	2	102
20	7	0	0	3	0	0	0	0	30
35	4	0	0	3	0	0	0	0	42
55	3	2	0	2	0	0	0	0	62
36	3	0	0	3	0	0	1	0	43
146	17	2	0	11	0	1	1	1	177
52	3	0	0	1	0	0	0	0	56
39	2	0	0	2	0	0	0	0	43
28	5	0	0	0	0	0	0	0	33
55	7	0	2	2	0	0	0	0	66
174	17	0	2	5	0	0	0	0	198
73	3	1	0	1	0	0	0	0	78
70	8	0	0	2	0	0	0	0	80
31	3	0	0	2	1	0	0	0	37
34	6	0	0	2	0	1	0	0	43
208	20	1	0	7	1	1	1	1	238
24	8	1	0	2	0	0	0	0	35
24	5	0	0	1	0	0	0	0	30
27	3	1	1	2	0	0	0	0	34
28	1	2	0	1	0	0	0	0	32
103	17	4	1	6	0	0	0	0	131
26	6	0	0	0	0	0	0	0	32
27	4	2	0	1	0	0	0	0	34
29	1	0	0	1	0	0	0	0	31
31	5	1	0	2	0	0	0	0	39
113	16	3	0	4	0	0	0	0	136
32	4	0	0	0	0	0	0	0	36
37	10	1	0	1	0	0	0	0	49
27	7	1	0	2	0	0	0	0	37
35	3	0	0	3	0	0	0	0	41
131	24	2	0	6	0	0	0	0	163

10	0	0	0	0	0	0	0	0	10
11	0	0	0	0	0	0	0	0	11
6	0	0	0	0	0	0	0	0	6
43	1	0	0	0	0	0	0	0	44
7	1	0	0	0	0	0	0	0	8
5	2	0	0	0	0	0	0	0	7
5	0	0	0	0	0	0	0	0	5
3	1	0	0	0	0	0	0	0	4
20	4	0	0	0	0	0	0	0	24
3	0	0	0	0	0	0	0	0	3
2	0	0	0	0	0	0	0	0	2
2	0	0	0	0	0	0	0	0	2
1	1	0	0	0	0	0	0	0	2
8	1	0	0	0	0	0	0	0	9
1	0	0	0	0	0	0	0	0	1
1	1	0	0	0	0	0	0	0	2
5	0	0	0	0	0	0	0	0	5
3	0	0	0	0	0	0	0	0	3
10	1	0	0	0	0	0	0	0	11
3	0	0	0	0	0	0	0	0	3
5	1	0	0	0	1	0	0	0	7
8	0	0	0	0	0	0	0	0	8
8	2	0	0	0	0	0	0	0	10
24	3	0	0	0	1	0	0	0	28
3	1	0	0	0	0	0	0	0	4
12	2	0	0	0	0	0	0	0	14
11	1	0	0	0	0	0	0	0	12
20	1	0	0	0	0	0	0	0	21
46	5	0	0	0	0	0	0	0	51
24	3	0	0	2	0	0	0	0	29
23	5	0	0	1	1	0	0	0	30
42	8	0	0	2	0	1	0	0	53
45	8	0	0	1	0	1	0	0	55
134	24	0	0	6	1	2	1	2	167
68	6	2	0	2	2	0	0	0	80
97	12	0	0	2	0	1	0	0	112
84	9	0	0	5	0	1	0	0	99
124	11	3	0	5	0	4	0	0	147
373	38	5	0	14	2	6	2	6	438
99	11	2	0	3	0	1	0	0	116
94	3	0	0	2	0	0	0	0	99
110	7	0	0	1	2	0	0	0	120
81	6	1	0	2	0	1	0	0	91
384	27	3	0	8	2	2	2	2	426
80	11	0	0	1	0	0	0	0	92
82	8	0	1	1	0	0	0	0	92
66	3	0	1	3	1	1	0	0	75
71	12	1	1	1	0	1	0	0	87
299	34	1	3	6	1	2	2	2	346
72									

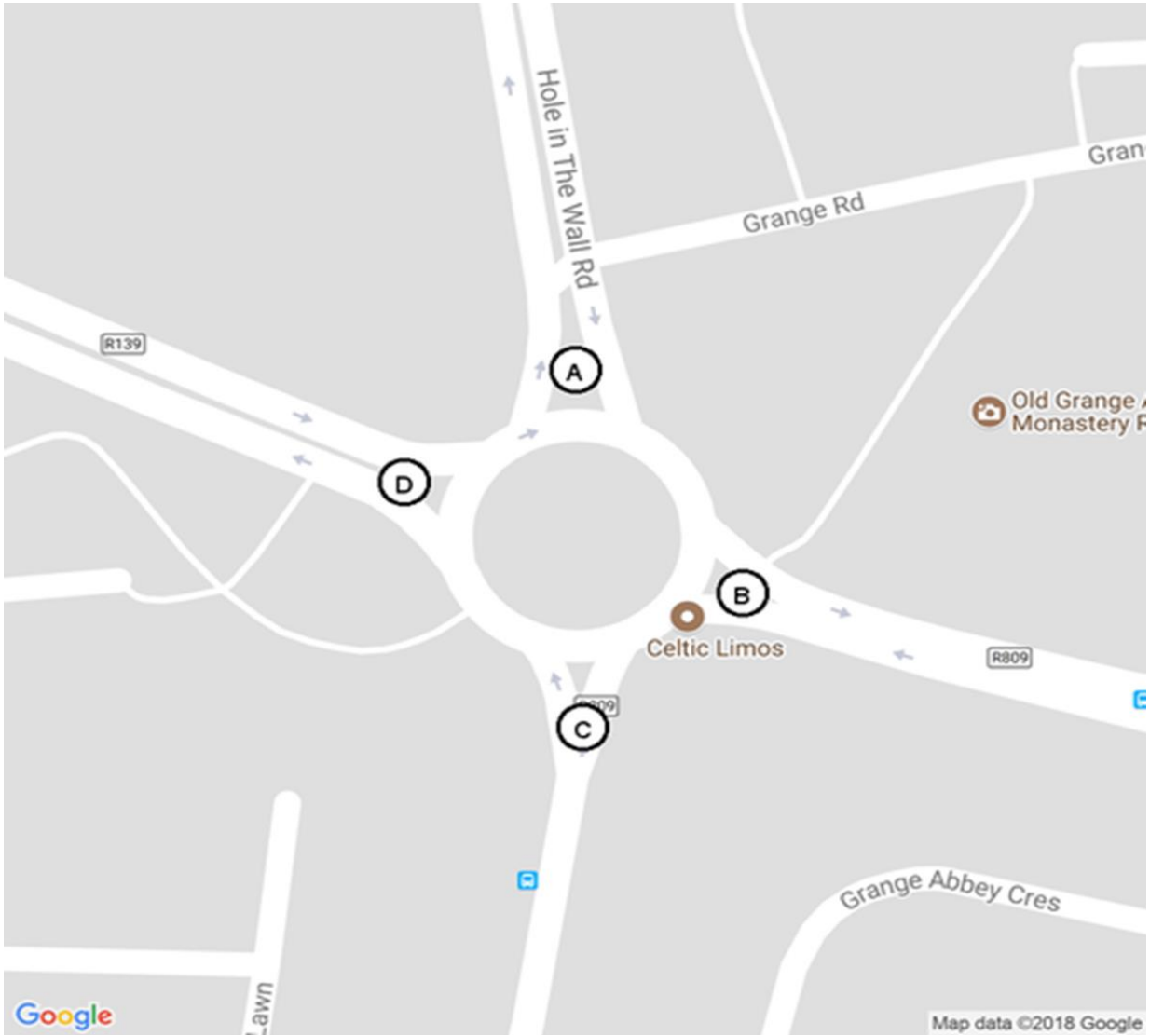
13:00	59	5	0	0	0	0	1	65
13:15	52	2	0	0	0	0	0	54
13:30	42	8	2	0	0	0	0	52
13:45	65	4	1	0	0	0	2	72
1 Hr	218	19	3	0	0	0	3	243
14:00	66	7	0	0	0	0	0	73
14:15	79	4	2	1	1	0	0	87
14:30	38	6	1	0	1	0	0	46
14:45	50	6	2	0	0	0	2	60
1 Hr	233	23	5	1	2	0	2	266
15:00	46	5	1	0	1	0	0	53
15:15	48	3	0	0	1	0	0	52
15:30	56	10	2	0	1	0	0	69
15:45	69	5	2	0	0	1	0	77
1 Hr	219	23	5	0	3	1	0	251
16:00	54	7	1	0	0	1	0	63
16:15	81	5	0	0	0	0	0	86
16:30	72	5	1	0	0	0	2	80
16:45	71	8	1	2	0	1	2	85
1 Hr	278	25	3	2	0	2	4	314
17:00	92	7	1	0	0	0	1	101
17:15	78	8	0	1	0	0	1	88
17:30	66	9	1	0	0	2	0	78
17:45	107	8	0	1	0	2	0	118
1 Hr	343	32	2	2	0	4	2	385
18:00	88	7	0	0	0	0	1	96
18:15	111	8	0	0	0	0	1	120
18:30	62	4	0	0	0	0	2	68
18:45	62	6	1	0	0	0	1	70
1 Hr	323	25	1	0	0	0	5	354
19:00	81	4	0	0	0	0	0	85
19:15	50	5	0	0	0	0	0	55
19:30	43	8	0	0	0	0	0	51
19:45	68	3	0	0	0	0	0	71
1 Hr	242	20	0	0	0	0	0	262
20:00	49	2	1	0	0	0	0	52
20:15	46	2	1	0	0	0	1	50
20:30	42	2	0	0	0	0	0	44
20:45	23	1	0	0	0	0	1	25
1 Hr	160	7	2	0	0	0	2	171
21:00	31	1	1	0	0	0	0	33
21:15	30	1	0	0	0	0	0	31
21:30	25	0	0	0	0	0	0	25
21:45	23	2	0	0	0	0	0	25
1 Hr	109	4	1	0	0	0	0	114
22:00	25	0	0	0	0	0	0	25
22:15	18	1	0	0	0	0	0	19
22:30	13	0	0	0	0	0	0	13
22:45	6	0	0	0	0	0	1	7
1 Hr	62	1	0	0	0	0	1	64
23:00	8	1	0	0	0	0	0	9
23:15	11	0	0	0	0	0	0	11
23:30	14	0	1	0	0	0	1	16
23:45	7	0	0	0	0	0	0	7
1 Hr	40	1	1	0	0	0	1	43
Total	3447	315	58	9	8	15	34	3886

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39	4	0	0	4	1	0	0	48
57	2	0	0	0	0	0	0	59
44	1	1	1	3	0	0	0	50
180	11	1	1	7	1	0	0	201
32	5	1	0	3	0	0	0	41
26	5	0	0	0	0	0	0	31
68	8	1	0	1	1	0	0	79
72	2	0	1	0	1	0	0	76
198	20	2	1	4	2	0	0	227
71	5	0	0	3	0	2	0	81
48	3	0	0	2	0	0	0	53
68	6	0	0	1	1	0	0	76
70	4	1	0	1	2	0	0	78
257	18	1	0	7	3	2	0	288
71	4	0	0	0	0	1	0	76
79	4	0	0	5	0	0	0	88
75	6	0	0	1	0	2	0	84
68	7	0	0	0	0	0	0	75
293	21	0	0	6	0	3	0	323
83	12	0	1	1	1	0	0	98
80	6	0	0	3	1	0	0	90
87	8	0	0	2	2	0	0	99
92	9	1	0	1	1	1	0	105
342	35	1	1	7	5	1	0	392
106	4	0	0	2	1	2	0	115
89	5	0	0	1	0	0	0	95
88	9	0	0	2	0	4	0	103
102	6	0	0	1	0	1	0	110
385	24	0	0	6	1	7	0	423
82	3	0	0	3	0	2	0	90
70	5	0	0	0	0	1	0	76
87	1	0	0	2	1	2	0	93
76	4	0	0	1	0	0	0	81
315	13	0	0	6	1	5	0	340
57	3	1	0	2	2	0	0	65
64	10	1	0	1	0	1	0	77
58	4	0	0	1	0	0	0	63
46	5	0	0	2	0	0	0	53
225	22	2	0	6	2	1	0	258
58	2	0	0	1	0	0	0	61
44	7	0	0	1	0	1	0	53
48	4	0	0	0	0	0	0	52
45	8	0	0	0	0	0	0	53
195	21	0	0	2	0	1	0	219
35	0	0	0	1	0	1	0	37
30	2	0	0	2	0	0	0	34
28	0	0	0	1	0	1	0	30
26	3	0	0	1	0	1	0	31
119	5	0	0	5	0	3	0	132
30	0	0	0	2	0	0	0	32
18	2	0	0	0	0	0	0	20
11	1	0	0	0	0	0	1	13
9	1	0	0	0	0	0	0	10
68	4	0	0	2	0	1	0	75

87	5	1	0	2	0	0	0	95
94	11	1	2	2	1	0	0	111
94	11	0	0	2	0	0	0	107
86	6	1	0	1	0	0	0	94
361	33	3	2	7	1	0	0	407
78	6	0	0	0	0	0	0	84
93	6	3	0	3	0	0	0	105
87	13	0	0	2	0	0	0	102
95	7	0	0	2	0	0	0	104
353	32	3	0	7	0	0	0	395
87	7	2	0	1	1	1	0	99
75	8	0	1	1	0	0	0	85
91	10	2	0	2	0	1	0	106
90	12	1	0	1	0	1	0	105
343	37	5	1	5	1	3	0	395
97	7	3	0	1	0	0	0	108
114	8	3	0	2	0	1	0	128
97	15	2	0	2	0	3	0	119
120	5	1	0	1	2	0	0	129
428	35	9	0	6	2	4	0	484
119	9	0	1	2	0	0	0	131
93	10	1	0	1	1	1	0	107
101	4	1	0	2	1	0	0	109
124	5	0	0	3	0	1	0	133
437	28	2	1	8	2	2	0	480
130	10	0	0	3	0	3	0	146
123	9	0	0	2	2	1	0	137
100	3	1	0	2	1	1	0	108
110	5	0	0	3	0	1	0	119
463	27	1	0	10	3	6	0	510
117	5	0	0	2	0	0	0	124
109	5	0	0	2	0	2	0	118
74	5	1	1	0	0	2	0	83
112	4	0	0	1	0	0	0	117
412	19	1	1	5	0	4	0	442
103	6	0	2	0	0	1	0	112
78	7	2	1	0	0	2	0	90
81	2	0	1	1	0	1	0	86
65	4	0	2	0	0	0	0	71
327	19	2	6	1	0	4	0	359
83	6	1	0	1	0	0	0	91
68	3	0	0	1	0	0	0	72
41	2	0	0	1	0	0	0	44
47	2	0	0	0	1	0	0	50
239	13	1	0	3	1	0	0	257
40	2	0	0	1	0	1	0	44
45	1	0	0	2	0	1	0	49
27	0	0	0	1	0	0	0	28
23	0	0	0	4	0	0	0	23
135	3	0	0	4	0	2	0	144
18	0	1	0	2	0	0	0	21
22	0	0	0	2	0	0	0	24
18	1	0	0	0	0	0	0	19
14	0	0	0	0	0	0	0	14
72	1	1	0	4	0	0	0	78

0	0	0	0	0	0	0	1	1
3	0	0	0	0	0	0	0	3
2	0	0	0	0	0	0	0	2
1	0	1	0	0	0	0	0	2
6	0	1	0	0	0	0	1	8
2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	2
6	0	0	0	0	0	0	0	6
2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
3	0	0	0	0	0	0	0	3
2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	8
2	0	0	0	0	0	0	0	2
3	0	0	0	0	0	0	0	3
5	1	0	0	0	0	0	0	6
3	0	0	0	0	0	0	0	3
13	1	0	0	0	0	0	0	14
0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	4
7	0	0	0	0	0	0	0	7
2</								

SITE 6



Origin Arm A Hole in The Wall Road

	Destination : Arm A Hole in The Wall Road							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	0	0	0	0	0	0	0	0
00:15	0	0	0	0	0	0	0	0
00:30	0	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0
03:15	0	0	0	0	0	0	0	0
03:30	0	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0
04:15	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	0	0	0
04:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0
05:15	0	0	0	0	0	0	0	0
05:30	0	0	0	0	0	0	0	0
05:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0

	Destination : Arm B R809(ESE)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
2	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
5	0	0	0	0	0	0	0	5
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
3	0	0	0	0	0	0	0	3
5	0	0	0	0	0	0	0	5
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	1
2	3	0	0	0	0	0	0	5
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
3	0	0	0	0	0	0	0	3
6	0	0	0	0	0	0	0	6
3	1	0	0	0	0	0	0	4
4	1	0	0	0	0	0	0	5
11	0	0	0	0	0	0	0	11
8	1	0	0	0	0	0	0	9
26	3	0	0	0	0	0	0	29
4	1	2	0	0	0	0	0	7
19	3	0	0	0	0	0	0	22
18	2	0	0	0	0	0	0	20
24	4	1	0	1	0	0	0	30
65	10	3	0	1	0	0	0	79
26	2	0	0	0	0	0	0	28
25	6	0	0	0	0	0	0	31
18	0	0	0	0	0	0	0	18
33	7	1	0	0	0	0	0	41
102	15	1	0	0	0	0	0	118
20	3	0	0	0	0	0	0	23
19	5	0	0	0	0	0	0	24
12	3	0	0	0	0	0	0	15
20	2	0	0	0	0	0	0	22
71	13	0	0	0	0	0	0	84
11	2	0	0	0	0	0	0	13
12	4	0	0	0	0	0	0	16
8	3	0	0	0	0	0	0	11
13	2	1	0	0	0	0	0	16
44	11	1	0	0	0	0	0	56
6	4	1	0	0	0	0	0	11
17	4	0	0	0	0	0	0	21
15	3	0	0	0	0	0	0	18
15	4	0	0	0	0	0	0	19
53	15	1	0	0	0	0	0	69

	Destination : Arm C R809(S)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
10	2	0	0	0	0	0	0	12
6	0	0	0	0	0	0	0	6
9	1	0	0	0	0	0	0	10
4	0	0	0	0	0	0	0	4
29	3	0	0	0	0	0	0	32
5	0	0	0	0	0	0	0	5
4	2	0	0	0	0	0	0	6
4	0	0	0	0	0	0	0	4
3	0	0	0	0	0	0	0	3
16	2	0	0	0	0	0	0	18
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0	4
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
5	0	0	0	0	0	0	0	5
9	0	0	0	0	0	0	0	9
2	1	0	0	0	0	0	0	3
1	1	0	0	0	0	0	0	2
5	1	0	0	0	0	0	0	6
8	2	0	0	0	0	0	0	10
16	5	0	0	0	0	0	0	21
17	1	0	0	0	0	0	0	18
13	2	0	0	1	0	0	0	16
31	2	0	0	1	0	0	0	34
33	6	0	0	1	0	0	0	42
94	11	0	0	3	0	2	2	110
47	3	0	0	2	0	1	1	53
68	9	0	0	2	0	2	2	81
58	9	0	0	2	0	3	3	72
91	8	2	0	3	0	2	2	106
264	29	2	0	9	0	8	3	312
82	5	3	0	0	0	1	1	91
78	5	0	0	2	0	2	2	87
70	4	0	0	1	0	1	1	76
75	2	0	0	1	1	0	0	79
305	16	3	0	4	1	4	4	333
61	8	1	0	1	0	1	1	72
60	8	1	0	1	1	1	1	72
44	6	0	0	1	0	1	1	52
55	7	0	0	1	0	3	3	66
220	29	2	0	4	1	6	2	262
53	5	0	0	0	0	1	1	59
40	9	0	0	1	0	0	0	50
46	6	0	0	1	0	0	0	53
46	4	1	0	1	0	0	0	52
185	24	1	0	3	0	1	2	214
44	2	1	0	1	0	0	0	48
37	2	0	0	1	0	0	0	40
49	1	0	0	0	0	0	0	50
50	3	0	0	1	0	0	0	54
180	8	1	0	3	0	0	0	192

	Destination : Arm D R139							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
6	0	0	0	1	0	0	0	7
5	0	0	0	0	0	0	0	5
5	0	0	0	0	0	0	0	5
3	0	0	0	0	0	0	0	3
19	0	0	0	1	0	0	0	20
2	1	0	0	0	0	0	0	3
3	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	1
0	1	0	0	0	0	0	0	1
6	2	0	0	0	0	0	0	8
3	0	1	0	0	0	0	0	4
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
3								

	Destination : Arm A Hole in the Wall Road							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	3	0	0	0	0	0	0	3
00:15	1	0	0	0	0	0	0	1
00:30	3	0	0	0	0	0	0	3
00:45	3	0	0	0	0	0	0	3
1 Hr	10	0	0	0	0	0	0	10
01:00	0	0	0	0	0	0	0	0
01:15	1	0	0	0	0	0	0	1
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0
1 Hr	1	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
03:00	0	1	0	0	0	0	0	1
03:15	1	0	0	0	0	0	0	1
03:30	1	0	0	0	0	0	0	1
03:45	0	0	0	0	0	0	0	0
1 Hr	2	1	0	0	0	0	0	3
04:00	1	0	0	0	0	0	0	1
04:15	2	0	0	0	0	0	0	2
04:30	0	0	0	0	0	0	0	0
04:45	0	0	0	0	0	0	0	0
1 Hr	3	0	0	0	0	0	0	3
05:00	0	1	0	0	0	0	0	1
05:15	1	0	0	0	0	0	0	1
05:30	2	0	0	0	0	0	0	2
05:45	1	0	0	0	0	0	0	1
1 Hr	4	1	0	0	0	0	0	5
06:00	0	1	0	0	0	0	0	1
06:15	4	1	0	0	0	0	0	5
06:30	2	0	0	0	0	0	0	2
06:45	2	0	0	0	0	0	0	2
1 Hr	8	2	0	0	0	0	0	10
07:00	4	1	0	0	0	0	0	5
07:15	9	2	0	0	0	0	0	11
07:30	14	2	0	0	0	0	0	16
07:45	6	4	0	0	0	0	0	10
1 Hr	33	9	0	0	0	0	0	42
08:00	13	0	1	0	0	0	0	14
08:15	21	1	0	1	0	0	0	23
08:30	15	2	0	0	0	0	0	17
08:45	21	2	0	1	0	0	0	24
1 Hr	70	5	1	2	0	0	0	78
09:00	27	1	1	0	0	0	0	29
09:15	14	5	1	0	0	0	0	20
09:30	17	3	0	0	0	0	0	20
09:45	9	3	0	0	0	0	0	12
1 Hr	67	12	2	0	0	0	0	81
10:00	7	6	0	0	0	0	0	13
10:15	12	1	0	0	0	0	0	13
10:30	14	2	1	0	0	0	0	17
10:45	11	0	0	0	0	0	0	11
1 Hr	44	9	1	0	0	0	0	54
11:00	14	4	0	0	0	0	0	18
11:15	16	3	1	0	0	1	0	21
11:30	13	5	1	0	0	0	0	19
11:45	10	3	0	0	0	0	0	13
1 Hr	53	15	2	0	0	1	0	71
12:00	21	9	0	0	0	0	0	30

	Destination : Arm B R809(ESE)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	0	0	0	0	0	0	0	0
00:15	0	0	0	0	0	0	0	0
00:30	0	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0
03:15	0	0	0	0	0	0	0	0
03:30	0	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0
04:15	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	0	0	0
04:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0
05:15	0	0	0	0	0	0	0	0
05:30	0	0	0	0	0	0	0	0
05:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0

	Destination : Arm C R809(S)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	0	0	0	0	0	0	0	0
00:15	1	0	0	0	0	0	0	1
00:30	0	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	0
1 Hr	1	0	0	0	0	0	0	1
01:00	1	0	0	0	0	0	0	1
01:15	2	1	0	0	0	0	0	3
01:30	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0
1 Hr	3	1	0	0	0	0	0	4
02:00	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0
1 Hr	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0
03:15	1	0	0	0	0	0	0	1
03:30	0	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0
1 Hr	1	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	0
04:15	1	1	0	0	0	0	0	2
04:30	0	0	0	0	0	0	0	0
04:45	0	0	0	0	0	0	0	0
1 Hr	1	1	0	0	0	0	0	2
05:00	0	0	0	0	0	0	0	0
05:15	1	0	0	0	1	1	0	3
05:30	1	0	0	0	0	0	0	1
05:45	2	1	1	0	0	0	0	4
1 Hr	4	1	1	0	1	1	0	8
06:00	3	1	0	0	0	0	0	4
06:15	1	0	1	0	0	0	0	2
06:30	1	0	0	0	0	0	0	1
06:45	10	0	0	0	0	0	0	10
1 Hr	15	1	1	0	0	0	0	17
07:00	13	0	0	1	0	1	0	15
07:15	23	1	0	0	0	0	0	24
07:30	19	0	0	0	0	1	0	20
07:45	32	0	0	1	0	0	0	33
1 Hr	87	1	0	2	0	2	0	92
08:00	32	6	0	0	0	0	2	40
08:15	56	2	1	0	0	0	1	60
08:30	65	3	1	0	0	0	0	69
08:45	61	0	1	0	0	0	0	62
1 Hr	214	11	3	0	0	0	3	231
09:00	53	3	0	0	0	0	0	56
09:15	32	4	1	0	0	0	0	37
09:30	26	3	0	0	0	0	0	29
09:45	47	6	0	0	0	0	0	53
1 Hr	158	16	1	0	0	0	0	175
10:00	43	0	3	0	0	0	0	46
10:15	39	1	0	0	0	0	0	40
10:30	50	0	0	0	0	0	0	50
10:45	29	1	0	0	0	0	0	30
1 Hr	161	2	3	0	0	0	0	166
11:00	55	1	0	0	0	1	0	57
11:15	33	0	0	0	0	0	0	33
11:30	49	2	0	0	0	1	0	52
11:45	46	1	0	0	0	1	0	48
1 Hr	183	4	0	0	0	3	0	190
12:00	40	2	0	0	0	0	2	44

	Destination : Arm D R139							Total
	Car	LGV	OGV1	OGV2				

00:00	10	0	0	0	0	0	0	0	10
00:15	14	1	0	0	0	0	0	0	15
00:30	5	0	0	0	0	0	0	0	5
00:45	10	0	0	0	0	0	0	0	10
1 Hr	39	1	0	0	0	0	0	0	40
01:00	4	1	1	0	0	0	0	0	6
01:15	6	0	0	0	0	0	0	0	6
01:30	3	0	0	0	0	0	0	0	3
01:45	5	0	0	0	0	0	0	0	5
1 Hr	18	1	1	0	0	0	0	0	20
02:00	5	0	0	0	0	0	0	0	5
02:15	2	0	0	0	0	0	0	0	2
02:30	2	0	0	0	0	0	0	0	2
02:45	2	0	0	0	0	0	0	0	2
1 Hr	11	0	0	0	0	0	0	0	11
03:00	1	0	0	0	0	0	0	0	1
03:15	2	0	0	0	0	0	0	0	2
03:30	2	0	0	0	0	0	0	0	2
03:45	2	0	0	0	0	0	0	0	2
1 Hr	7	0	0	0	0	0	0	0	7
04:00	2	0	0	0	0	0	0	0	2
04:15	6	0	0	0	0	0	0	0	6
04:30	3	0	0	0	0	0	0	0	3
04:45	4	0	0	0	0	0	0	0	4
1 Hr	15	0	0	0	0	0	0	0	15
05:00	1	0	0	0	0	0	0	0	1
05:15	3	0	0	0	0	0	0	0	3
05:30	3	0	0	0	0	0	0	0	3
05:45	0	0	0	0	2	0	0	0	2
1 Hr	7	0	0	0	2	0	0	0	9
06:00	7	0	0	0	1	0	0	0	8
06:15	13	2	0	0	3	0	1	1	19
06:30	11	2	0	0	2	1	0	1	16
06:45	25	4	0	0	0	0	0	0	29
1 Hr	56	8	0	0	6	1	1	1	72
07:00	18	3	0	0	3	0	0	0	24
07:15	18	0	1	0	3	0	0	0	22
07:30	33	0	2	1	1	0	0	0	37
07:45	25	2	1	0	2	0	0	0	30
1 Hr	94	5	4	1	9	0	0	0	113
08:00	39	6	0	0	2	0	0	0	47
08:15	28	2	0	0	2	0	0	0	32
08:30	28	4	0	0	0	0	0	0	32
08:45	20	3	0	1	2	0	0	0	26
1 Hr	115	15	0	1	6	0	0	0	137
09:00	35	2	0	0	2	0	0	0	39
09:15	45	4	0	0	1	0	0	0	50
09:30	26	0	1	0	2	1	0	0	30
09:45	20	2	1	0	2	0	0	0	25
1 Hr	126	8	2	0	7	1	0	0	144
10:00	22	4	0	1	2	0	0	0	29
10:15	12	6	0	0	1	0	0	0	19
10:30	21	1	1	1	2	0	0	0	26
10:45	8	2	1	0	1	0	0	0	12
1 Hr	63	13	2	2	6	0	0	0	86
11:00	19	5	0	0	0	0	0	0	24
11:15	18	2	1	0	1	0	0	0	22
11:30	17	1	1	0	1	0	1	0	21
11:45	16	3	1	0	2	0	0	1	23
1 Hr	70	11	3	0	4	0	2	1	90
12:00	10	1	2	0	0	0	0	0	13
12:15	27	3	1	1	1	0	1	1	34
12:30	29	1	1	0	2	0	0	0	33

9	0	1	0	2	1	0	0	13
10	0	0	0	0	0	0	1	11
9	2	0	0	0	0	0	0	11
8	0	1	0	0	0	0	0	9
36	2	2	0	2	1	1	1	44
8	0	0	0	0	0	0	0	8
6	1	0	0	0	0	0	0	7
2	0	0	0	0	0	0	0	2
2	1	0	0	0	0	0	0	3
18	2	0	0	0	0	0	0	20
5	0	0	0	0	0	0	0	5
2	0	0	0	0	0	0	0	2
1	1	1	0	0	0	0	0	3
0	1	0	0	0	0	0	0	1
8	2	1	0	0	0	0	0	11
1	1	0	0	0	0	0	0	2
1	1	0	0	0	0	0	0	2
1	0	1	0	0	0	0	0	2
4	0	0	0	0	0	0	0	4
7	2	1	0	0	0	0	0	10
4	1	1	0	0	0	0	0	6
4	0	0	0	0	0	0	0	4
4	2	1	0	0	0	0	0	7
4	1	0	0	0	0	0	0	5
16	4	2	0	0	0	0	0	22
9	2	0	0	0	0	0	1	12
1	1	0	0	0	0	0	0	2
12	2	0	2	0	0	0	1	17
28	5	2	1	0	0	0	0	36
50	10	2	3	0	0	0	2	67
27	1	1	0	1	1	1	1	32
42	2	1	0	1	1	2	4	49
95	9	2	2	1	2	1	1	112
91	7	0	1	0	0	0	0	99
255	19	4	3	3	4	4	4	292
41	23	1	1	0	0	0	0	66
86	29	1	1	2	0	2	1	121
103	28	1	1	2	3	2	1	140
107	29	4	1	0	0	0	0	141
337	109	7	4	4	3	4	4	468
104	24	2	2	1	2	2	2	137
111	15	3	1	1	1	2	1	134
102	12	3	1	1	0	1	1	120
96	15	1	1	0	1	1	1	115
413	66	9	5	3	4	6	5	506
61	19	2	2	0	0	0	0	84
56	24	6	4	0	0	0	0	90
45	17	4	2	0	0	0	0	68
53	22	7	1	0	0	1	1	84
215	82	19	9	0	0	1	1	326
52	20	2	0	1	1	0	0	76
68	18	4	1	2	0	0	0	93
56	23	2	4	0	0	0	0	85
68	18	6	1	0	1	1	1	95
244	79	14	6	3	2	1	1	349
64	37	3	4	1	0	0	0	109
56	15	4	2	1	0	0	0	78
60	15	12	6	0	0	0	0	93
61	13	5	2	0	0	0	0	81
241	80	24	14	2	0	0	0	361
53	15	6	4	0	0	0	0	78
85	16	8	2	1	1	2	1	115
72	11	3	1	1	0	0	0	88

15	2	0	0	1	0	0	0	18
4	2	0	0	1	0	0	0	7
7	0	1	0	0	0	0	0	8
11	0	0	0	0	0	0	0	11
37	4	1	0	2	0	0	0	44
3	0	0	0	0	0	0	0	3
7	0	0	0	0	0	0	0	7
5	0	0	0	0	0	0	0	5
4	0	0	0	0	0	0	0	4
19	0	0	0	0	0	0	0	19
4	0	0	0	0	0	0	0	4
3	0	0	0	0	0	0	0	3
0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	3
10	0	0	0	0	0	0	0	10
2	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
1	0	1	0	0	0	0	0	2
5	0	1	0	0	0	0	0	6
2	0	0	0	0	0	0	0	2
4	0	0	0	0	0	0	0	4
7	0	1	0	0	0	0	0	8
2	1	0	0	0	0	0	0	3
15	1	1	0	0	0	0	0	17
3	0	0	1	0	0	0	0	4
11	0	0	0	0	0	0	0	11
7	1	2	0	0	0	0	0	10
14	0	3	1	0	0	0	0	18
35	1	5	2	0	0	0	0	43
9	1	3	0	1	0	0	0	14
13	2	0	1	0	0	0	0	16
20	3	0	0	1	0	1	1	25
29	4	1	0	1	0	0	0	35
71	10	4	1	3	0	1	1	90
24	8	2	0	2	0	0	0	36
38	11	1	1	1	0	0	0	52
55	14	3	0	0	0	0	0	72
69	10	0	0	3	2	0	0	84
186	43	6	1	6	2	0	0	244
117	4	2	0	1	0	0	0	124
106	6	5	0	2	1	0	0	120
146	7	6	0	0	0	0	0	159
82	8	3	0	0	0	0	0	93
451	25	16	0	3	1	0	0	496
57	16	1	1	0	0	0	0	75
71	7	4	4	0	0	0	0	86
53	8	3	0	1	1	0	0	66
54	10	2	0	3	0	0	0	69
235	41	10	5	4	1	0	0	296
39	8	1	1	2	0	0	0	51
48	13	2	0	0	0	0	0	63
37	13	5	0	0	0	0	0	55
66	9	3	0	2	0	0	0	80
190	43	11	1	4	0	0	0	249
41	8	3	0	2	0	0	0	54
61	10	2	0	0	0	0	0	73
57	9	2	0	0	0	0	0	68
63	17	4	0	2	0	0	0	86
222	44	11	0	4	0	0	0	281
49	10	1	1	0	0	0	0	61
58	10	3	0					

12:45	14	2	0	0	3	0	0	19
1 Hr	80	7	4	1	6	0	1	99
13:00	32	1	0	0	1	0	0	34
13:15	43	4	1	0	2	1	0	51
13:30	29	2	1	0	0	0	0	32
13:45	27	3	1	0	3	0	1	35
1 Hr	131	10	3	0	6	1	1	152
14:00	25	6	0	0	3	0	0	34
14:15	29	1	1	0	0	0	0	31
14:30	35	1	3	0	1	2	0	42
14:45	39	5	0	1	1	0	2	48
1 Hr	128	13	4	1	5	2	2	155
15:00	49	4	1	0	3	0	0	57
15:15	33	0	1	0	2	0	1	37
15:30	40	1	1	0	1	0	0	43
15:45	49	1	2	0	1	3	0	56
1 Hr	171	6	5	0	7	3	1	193
16:00	30	2	0	0	0	2	0	34
16:15	56	0	0	0	5	0	0	61
16:30	50	2	1	0	1	0	2	56
16:45	39	3	1	3	0	0	3	49
1 Hr	175	7	2	3	6	2	5	200
17:00	34	7	0	0	1	0	0	42
17:15	47	2	0	0	3	1	0	53
17:30	48	6	0	0	2	0	0	56
17:45	52	3	0	1	1	0	0	57
1 Hr	181	18	0	1	7	1	0	208
18:00	77	2	0	0	2	1	1	83
18:15	50	7	0	0	1	0	0	58
18:30	60	6	0	0	2	1	1	70
18:45	55	3	0	0	1	0	0	59
1 Hr	242	18	0	0	6	2	2	270
19:00	54	0	0	0	3	1	0	58
19:15	49	2	0	0	1	0	0	52
19:30	45	5	0	0	1	0	0	51
19:45	49	3	0	0	1	0	0	53
1 Hr	197	10	0	0	6	1	0	214
20:00	42	5	0	0	2	1	0	50
20:15	40	8	0	0	1	0	0	49
20:30	34	3	0	0	1	0	0	38
20:45	34	1	0	0	2	0	0	37
1 Hr	150	17	0	0	6	1	0	174
21:00	38	2	0	0	1	1	0	42
21:15	29	1	0	0	1	0	1	32
21:30	35	5	0	0	0	1	0	41
21:45	23	6	0	0	0	0	1	30
1 Hr	125	14	0	0	2	2	2	145
22:00	28	1	0	0	1	0	1	31
22:15	23	3	0	0	2	0	0	28
22:30	25	1	0	0	1	0	1	28
22:45	24	2	0	0	1	0	1	28
1 Hr	100	7	0	0	5	0	3	115
23:00	24	1	0	0	2	0	0	27
23:15	19	0	0	0	0	0	1	20
23:30	11	0	2	0	0	0	1	14
23:45	10	3	0	0	0	0	0	13
1 Hr	64	4	2	0	2	0	2	74
Total	2365	193	32	10	104	17	22	2743

ORIGIN SUMMARY

Origin :	Arm A Hole in The Wall Road							Total
Car	LGV	OGV1	OGV2	PSV	MC	PC		

93	20	3	2	0	0	2	120	
303	62	20	9	2	1	4	401	
62	12	1	1	0	2	0	78	
80	5	2	1	2	1	1	92	
62	12	6	3	0	0	0	83	
107	14	6	1	0	2	0	130	
311	43	15	6	2	5	1	383	
89	21	3	1	1	0	1	116	
86	22	4	4	1	2	2	121	
89	14	3	2	1	0	0	109	
86	14	9	1	0	0	0	110	
350	71	19	8	3	2	3	456	
74	17	3	3	1	1	0	99	
75	13	8	1	0	1	1	99	
78	19	4	1	0	0	0	102	
80	12	1	0	0	0	0	93	
307	61	16	5	1	2	1	393	
68	12	0	0	0	0	0	80	
75	10	1	1	1	1	0	89	
79	17	3	0	0	1	0	100	
82	11	0	0	0	2	0	95	
304	50	4	1	1	4	0	364	
93	13	3	0	0	0	0	109	
96	3	4	1	0	0	0	104	
88	12	1	0	0	0	1	102	
83	5	1	2	0	3	1	95	
360	33	9	3	0	3	2	410	
90	6	0	0	1	0	2	99	
89	10	0	0	0	0	1	100	
75	5	0	0	0	0	1	81	
99	4	1	0	1	0	0	105	
353	25	1	0	2	0	4	385	
99	4	2	0	0	2	0	107	
83	11	0	0	0	0	0	94	
105	1	0	0	0	2	0	108	
72	6	0	0	0	0	0	78	
359	22	2	0	0	4	0	387	
93	4	0	0	1	0	1	99	
46	1	0	0	0	2	0	49	
57	1	0	0	0	3	0	61	
66	1	0	0	0	1	0	68	
262	7	0	0	1	6	1	277	
63	6	0	0	0	0	0	69	
57	5	0	0	0	0	1	63	
30	3	0	0	0	0	1	34	
41	7	0	0	0	0	0	48	
191	21	0	0	0	0	2	214	
51	1	0	0	0	0	0	53	
41	2	0	0	0	0	1	44	
26	0	0	0	0	1	0	27	
30	2	0	0	1	0	0	33	
148	5	0	0	1	1	2	157	
33	0	0	1	0	0	0	34	
27	4	0	0	0	0	0	31	
18	1	1	0	1	0	0	21	
20	1	1	0	0	0	0	22	
98	6	2	1	1	0	0	108	
Total	5186	863	173	77	31	42	39	6411

Origin : Arm B R809(ESE)

Car	LGV	OGV1	OGV2	PSV	MC	PC	Total
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65	12	3	0	0	0	0	80	
241	42	12	1	1	0	0	297	
64	17	4	0	0	0	0	85	
65	2	3	1	1	0	0	72	
65	11	4	0	3	0	0	83	
70	13	3	2	0	0	0	88	
264	43	14	3	4	0	0	328	
83	6	2	0	0	0	0	91	
77	8	1	2	0	0	0	88	
71	16	5	0	1	0	0	93	
62	6	0	1	0	0	1	70	
293	36	8	3	1	0	1	342	
64	4	0	0	0	0	1	69	
73	2	3	0	0	0	0	78	
76	5	1	0	1	2	0	85	
78	2	1	1	1	0	0	83	
291	13	5	1	2	2	1	315	
80	1	4	1	1	0	0	87	
62	4	1	0	2	1	0	70	
83	6	2	0	1	1	0	93	
110	2	0	0	0	0	0	112	
335	13	7	1	4	2	0	362	
68	6	1	0	0	0	0	75	
85	6	0	0	2	0	0	93	
71	1	0	0	0	0	0	72	
85	6	0	1	1	0	0	93	
309	19	1	1	3	0	0	333	
90	3	0	0	1	1	0	95	
111	1	0	0	0	1	0	113	
121	1	0	0	1	1	0	124	
98	2	0	1	1	0	0	102	
420	7	0	1	3	3	0	434	
89	2	1	0	1	0	0	93	
75	3	0	0	1	0	0	79	
72	1	0	0	1	1	0	75	
70	3	0	1	0	1	0	75	
306	9	1	1	3	2	0	322	
65	1	0	0	0	0	0	66	
87	2	0	0	0	1	0	90	
77	2	0	1	0	1	0	81	
70	10	0	0	0	0	0	80	
299	15	0	1	0	2	0	317	
43	3	0	0	0	2	0	48	
60	1	0	0	1	0	0	62	
45	2	0	1	0	0	0	48	
47	2	0	0	2	1	0	52	
195	8	0	1	3	3	0	210	
35	1	0	0	0	0	0	36	
30	1	0	0	0	0	0	31	
33	0	0	0	0	1	0	34	
31	0	1	0	1	0	0	33	
129	2	1	0	1	1	0	134	
23	1	0	0	0	1	0	25	
24	0	0	0	0	0	0	24	
27	0	0	0	0	0	0	27	
15	1	0	0	0	1	0	17	
89	2	0	0	0	2	0	93	
Total	4647	421	115	24	51	21	3	5282

Origin : Arm C R809(S)

Car	LGV	OGV1	OGV2	PSV	MC	PC	Total
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0	0	0	0	0	0	0	0	219
0	0	0	0	0	0	0	0	797
0	0	0	0	0	0	0	0	197
0	0	0	0	0	0	0	0	215
0	0	0	0	0	0	0	0	198
0	0	0	0	0	0	0	0	253
0	0	0	0	0	0	0	0	863
0	0	0	0	0	0	0	0	241
0	0	0	0	0	0	0	0	240
0	0	0	0	0	0	0	0	244
0	0	0	0	0	0	0	0	228
0	0	0	0	0	0	0	0	953
0	0	0	0	0	0	0	0	225
0	0	0	0	0	0	0	0	214
0	0	0	0	0	0	0	0	230
0	0	0	0	0	0	0	0	232
0	0	0	0	0	0	0	0	901
0	0	0	0	0	0	0	0	201
0	0	0	0	0	0	0	0	220
0	0	0	0	0	0	0	0	249
0	0	0	0	0	0	0	0	256
0	0	0	0					

00:00	18	2	0	0	1	0	0	21
00:15	11	0	0	0	0	0	0	11
00:30	16	1	0	0	0	0	0	17
00:45	8	0	0	0	0	0	0	8
1 Hr	53	3	0	0	1	0	0	57
01:00	8	1	0	0	0	0	0	9
01:15	7	2	0	0	0	0	0	9
01:30	6	0	0	0	0	0	0	6
01:45	6	1	0	0	0	0	0	7
1 Hr	27	4	0	0	0	0	0	31
02:00	3	0	1	0	0	0	0	4
02:15	2	0	0	0	0	0	0	2
02:30	3	0	0	0	0	0	0	3
02:45	4	1	0	0	0	0	0	5
1 Hr	12	1	1	0	0	0	0	14
03:00	0	0	0	0	0	0	0	0
03:15	2	1	0	0	0	0	0	3
03:30	6	0	0	0	0	0	0	6
03:45	5	0	0	0	0	0	0	5
1 Hr	13	1	0	0	0	0	0	14
04:00	2	0	0	0	0	0	0	2
04:15	9	1	0	0	0	0	0	10
04:30	10	0	0	0	0	0	0	10
04:45	10	2	0	0	0	0	0	12
1 Hr	31	3	0	0	0	0	0	34
05:00	7	3	0	0	0	0	1	11
05:15	16	1	0	0	0	0	0	17
05:30	13	1	0	0	0	0	1	15
05:45	33	2	0	0	0	0	0	35
1 Hr	69	7	0	0	0	0	2	78
06:00	31	3	0	0	2	0	0	36
06:15	37	6	0	0	1	1	3	48
06:30	59	15	0	0	2	0	2	78
06:45	61	13	0	0	1	0	2	77
1 Hr	188	37	0	0	6	1	7	239
07:00	88	8	2	0	2	3	3	106
07:15	129	17	2	0	2	0	4	154
07:30	110	16	1	0	5	0	3	135
07:45	172	17	3	0	4	0	3	199
1 Hr	499	58	8	0	13	3	13	594
08:00	156	8	4	0	3	2	1	174
08:15	148	13	0	0	3	0	3	167
08:30	132	6	0	0	1	2	1	142
08:45	144	12	1	0	2	1	2	162
1 Hr	580	39	5	0	9	5	7	645
09:00	116	15	1	0	1	0	1	134
09:15	114	14	1	0	1	2	1	133
09:30	83	10	0	1	3	1	2	100
09:45	104	12	0	1	1	0	3	121
1 Hr	417	51	2	2	6	3	7	488
10:00	100	11	4	0	1	0	1	117
10:15	76	14	0	0	1	1	0	92
10:30	86	10	2	0	2	0	0	100
10:45	87	7	3	0	1	0	0	98
1 Hr	349	42	9	0	5	1	1	407
11:00	81	12	3	1	2	0	2	101
11:15	71	9	0	0	1	0	2	83
11:30	92	7	2	0	1	0	0	102
11:45	95	13	1	0	1	0	0	110
1 Hr	339	41	6	1	5	0	4	396
12:00	92	8	2	0	1	0	0	103
12:15	100	9	1	0	1	0	0	111
12:30	84	18	1	0	3	0	1	107
12:45	114	13	4	0	1	2	0	134

40	0	0	0	0	1	0	0	41
24	0	0	0	1	0	0	0	25
13	0	1	0	0	0	0	0	14
8	1	0	0	0	0	0	0	9
85	1	1	0	1	1	0	0	89
6	1	1	0	0	0	0	0	8
11	2	0	0	0	0	0	0	13
6	0	0	0	0	0	0	0	6
5	0	0	0	0	0	0	0	5
28	3	1	0	0	0	0	0	32
0	0	1	0	0	0	0	0	1
1	1	0	0	0	0	0	0	2
3	1	0	0	0	0	0	0	4
1	0	0	0	0	0	0	0	1
5	2	1	0	0	0	0	0	8
2	1	0	0	0	0	0	0	3
9	0	0	0	0	0	0	0	9
4	0	0	0	0	0	0	0	4
2	3	0	0	0	0	0	0	5
17	4	0	0	0	0	0	0	21
6	0	0	1	0	0	0	0	7
11	2	1	0	0	0	0	1	15
7	1	1	0	0	0	0	0	9
10	2	1	0	0	0	0	0	13
34	5	3	1	0	0	0	1	44
5	3	1	0	1	0	0	0	10
11	1	0	0	1	1	0	0	14
19	1	0	0	0	1	1	22	
25	7	1	0	0	0	0	0	33
60	12	2	0	2	2	1	79	
32	3	1	0	0	0	2	38	
31	5	2	1	1	0	1	41	
76	12	0	0	1	0	0	89	
94	17	4	0	1	0	1	117	
233	37	7	1	3	0	4	285	
117	11	3	2	2	1	0	136	
102	15	2	2	1	1	2	125	
127	19	1	1	1	3	3	155	
109	20	2	3	2	0	1	137	
455	65	8	8	6	5	6	553	
131	19	3	0	1	3	3	160	
135	23	3	1	2	2	1	167	
133	16	3	0	1	0	0	153	
144	20	5	3	4	2	0	178	
543	78	14	4	8	7	4	658	
168	18	6	1	4	1	0	198	
149	23	6	4	3	1	0	186	
108	22	8	1	3	1	0	143	
125	28	5	5	2	3	0	168	
550	91	25	11	12	6	0	695	
109	22	8	1	1	0	0	141	
129	15	6	1	1	0	0	152	
128	26	2	3	2	2	0	163	
113	20	5	1	1	0	1	141	
479	83	21	6	5	2	1	597	
134	22	1	3	1	1	1	163	
131	15	5	6	1	1	0	159	
126	31	2	1	3	1	0	164	
121	27	9	4	2	2	0	165	
512	95	17	14	7	5	1	651	
137	28	3	2	1	1	2	174	
123	21	4	1	0	1	1	151	
122	17	8	1	1	1	0	150	
133	22	7	2	1	1	1	167	

26	1	0	0	0	0	0	0	27
20	2	0	0	0	0	0	0	22
20	2	0	0	0	0	0	0	22
14	0	0	0	0	0	0	1	15
80	5	0	0	0	0	0	1	86
17	2	0	0	0	0	0	0	19
8	0	0	0	0	0	0	0	8
5	1	0	0	0	0	0	0	6
5	1	0	0	0	0	0	0	6
35	4	0	0	0	0	0	0	39
6	0	0	0	0	0	0	0	6
3	0	1	0	0	0	0	0	4
6	1	0	0	0	0	0	0	7
5	1	0	0	0	0	0	0	6
20	2	1	0	0	0	0	0	23
6	1	0	0	0	0	0	0	7
0	0	0	0	0	0	0	0	0
4	1	0	0	0	0	0	0	5
2	1	0	0	0	0	0	0	3
12	3	0	0	0	0	0	0	15
11	2	3	0	0	0	0	0	16
10	2	0	0	0	0	0	0	12
14	0	0	0	0	0	0	0	14
13	2	2	0	0	0	0	0	17
48	6	5	0	0	0	0	0	59
5	0	1	0	2	0	0	0	8
16	3	0	0	0	0	2	21	
30	4	0	0	0	0	0	0	34
38	4	0	0	1	1	0	0	44
89	11	1	0	3	1	2	107	
37	5	0	1	3	1	0	47	
63	10	1	1	1	0	0	76	
65	10	3	1	4	0	0	83	
79	22	1	2	3	2	1	110	
244	47	5	5	11	3	1	316	
99	13	5	0	2	1	0	120	
100	22	1	0	5	2	1	131	
122	13	3	1	2	1	0	142	
136	17	4	1	5	1	1	165	
457	65	13	2	14	5	2	558	
162	23	1	0	2	1	1	190	
186	16	2	0	3	1	2	210	
165	19	1	0	1	0	1	187	
203	10	7	0	2	1	1	224	
716	68	11	0	8	3	5	811	
208	14	5	0	0	0	0	227	
200	18	4	0	1	0	1	224	
131	13	8	0	1	1	0	154	
136	23	5	1	1	1	1	168	
675	68	22	1	3	2	2	773	
130	17	2	1	3	0	0	153	
131	19	2	1	1	0	1	155	
133	8	6	0	1	0	0	148	
128	13	8	1	1	1	0	152	
522	57	18	3	6	1	1	608	
125	22	6	0	1	0	0	154	
158	15	4	0	3	2	0	182	
144	18	3	2	0	1	0	168	
160	12	4	2	2	1	1	182	
587	67	17	4	6	4	1	686	
179	18	8	0	1	1	0	207	
170	18	2	0	0	0	0	190	
157	25	1	1	2	1	2	189	
155	15	2	0	0	1	1	174	

34	2	1	0	3	1	0	0	41
28	3	0	0	1	0	1	0	33
21	2	1	0	0	0	0	0	24
29	0	1	0	0	0	0	0	30
112	7	3	0	4				

1 Hr	390	48	8	0	6	2	1	455
13:00	104	6	1	0	2	0	1	114
13:15	117	12	1	1	2	1	0	134
13:30	103	14	0	1	1	0	0	119
13:45	99	6	1	0	2	0	1	109
1 Hr	423	38	3	2	7	1	2	476
14:00	100	8	1	0	2	0	0	111
14:15	121	11	3	0	3	0	1	139
14:30	100	15	1	0	2	0	0	118
14:45	121	11	0	0	2	0	0	134
1 Hr	442	45	5	0	9	0	1	502
15:00	127	6	3	0	0	1	0	137
15:15	94	10	1	1	2	0	1	109
15:30	174	14	2	0	3	0	1	194
15:45	125	12	1	0	2	1	0	141
1 Hr	520	42	7	1	7	2	2	581
16:00	120	15	3	0	1	1	1	141
16:15	131	10	4	0	2	1	0	148
16:30	129	17	2	0	2	0	1	151
16:45	131	6	1	0	1	2	0	141
1 Hr	511	48	10	0	6	4	2	581
17:00	133	9	0	1	2	0	2	147
17:15	113	13	1	0	1	0	0	128
17:30	121	8	0	0	2	2	0	133
17:45	160	9	1	0	1	2	1	174
1 Hr	527	39	2	1	6	4	3	582
18:00	137	10	0	0	3	0	1	151
18:15	148	8	0	0	2	2	1	161
18:30	122	4	0	0	2	1	0	129
18:45	137	9	1	0	3	0	0	150
1 Hr	544	31	1	0	10	3	2	591
19:00	145	9	0	0	2	0	0	156
19:15	138	6	0	0	2	0	2	148
19:30	108	9	1	1	0	0	2	121
19:45	148	6	0	0	1	0	0	155
1 Hr	539	30	1	1	5	0	4	580
20:00	123	7	0	0	2	0	1	133
20:15	97	9	2	0	1	0	2	111
20:30	94	2	0	0	1	1	2	100
20:45	80	2	0	0	2	0	0	84
1 Hr	394	20	2	0	6	1	5	428
21:00	97	5	1	0	1	0	0	104
21:15	75	4	0	0	1	0	0	80
21:30	62	2	0	0	1	0	2	67
21:45	62	2	0	0	0	1	0	65
1 Hr	296	13	1	0	3	1	2	316
22:00	39	3	0	0	1	0	0	43
22:15	51	2	0	0	2	0	1	56
22:30	29	0	0	0	1	0	0	30
22:45	32	0	0	0	0	0	0	32
1 Hr	151	5	0	0	4	0	1	161
23:00	25	1	1	0	2	0	0	29
23:15	35	1	0	0	2	0	0	38
23:30	19	2	0	0	0	0	0	21
23:45	26	1	0	0	0	0	1	28
1 Hr	105	5	1	0	4	0	1	116
Total	7419	651	72	8	118	31	67	8366

DESTINATION SUMMARY

	Destination : Arm A Hole in The Wall Road							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
00:00	20	0	0	0	0	0	0	20

515	88	22	6	3	4	4	642	
157	35	1	5	1	1	0	200	
159	20	2	1	1	0	2	185	
172	18	4	1	1	0	0	196	
165	16	6	3	2	1	0	193	
653	89	13	10	5	2	2	774	
158	19	3	2	1	0	0	183	
147	21	6	2	0	2	0	178	
148	24	5	1	1	0	0	179	
155	21	8	2	3	1	0	190	
608	85	22	7	5	3	0	730	
160	38	2	1	1	2	0	204	
143	28	7	2	2	2	0	184	
136	23	7	2	2	1	0	171	
170	27	1	2	3	1	0	204	
609	116	17	7	8	6	0	763	
157	30	6	0	1	0	1	195	
164	27	0	2	1	0	0	174	
154	33	2	2	0	5	2	198	
157	33	3	0	1	1	1	196	
632	123	11	4	3	6	4	783	
199	27	5	0	2	3	0	236	
153	20	2	0	0	0	0	176	
151	20	3	0	1	1	1	177	
145	16	0	0	2	2	2	167	
648	83	10	0	5	6	4	756	
146	19	2	0	1	0	1	169	
140	24	0	0	0	0	2	166	
132	17	0	0	1	1	0	151	
148	15	0	0	1	1	1	166	
566	75	2	0	3	2	4	652	
145	15	0	1	3	0	0	164	
108	11	0	0	1	1	1	122	
107	13	0	0	0	0	0	120	
128	12	0	0	1	0	0	141	
488	51	0	1	5	1	1	547	
123	13	0	0	1	0	0	137	
108	7	1	0	1	0	0	117	
86	6	0	0	1	1	1	95	
94	4	0	0	1	4	5	108	
411	30	1	0	4	5	6	457	
87	9	0	0	1	0	0	97	
105	7	0	0	1	2	0	115	
75	3	0	0	1	1	0	80	
100	9	1	0	2	2	0	114	
367	28	1	0	5	5	0	406	
94	1	1	0	0	0	0	96	
90	6	0	0	1	0	0	97	
68	4	0	0	0	0	0	72	
46	4	0	0	1	0	0	51	
298	15	1	0	2	0	0	316	
50	1	0	0	0	0	0	51	
29	1	0	0	1	0	0	31	
36	1	0	0	0	0	0	37	
24	2	0	0	0	0	0	26	
139	5	0	0	1	0	0	145	
Total	8935	1264	200	80	93	68	43	10683

	Destination : Arm B R809(ESE)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
15	0	1	0	2	1	0	19	

661	76	13	1	3	3	3	760	
200	18	3	0	1	0	1	223	
175	15	3	1	2	1	0	197	
199	21	3	0	1	0	1	225	
212	28	5	1	3	1	0	250	
786	82	14	2	7	2	2	895	
170	22	1	0	1	0	0	194	
196	18	5	0	2	0	1	222	
190	16	3	1	3	1	0	214	
195	14	5	2	2	1	1	220	
751	70	14	3	8	2	2	850	
191	17	3	1	6	0	0	218	
204	17	2	1	3	0	1	228	
193	15	1	0	2	1	2	214	
183	11	3	0	4	1	0	202	
771	60	9	2	15	2	3	862	
176	20	3	1	0	0	0	200	
191	18	3	1	1	0	0	214	
207	23	3	0	1	1	2	237	
199	21	1	1	1	2	6	231	
773	82	10	3	3	3	8	882	
196	21	1	1	1	1	3	224	
211	18	4	0	3	2	1	239	
232	16	0	0	1	2	2	253	
242	20	0	0	1	1	1	265	
881	75	5	1	6	6	7	981	
211	22	1	0	2	0	3	239	
246	17	0	0	0	1	2	266	
248	15	0	0	2	5	4	274	
225	16	1	0	2	3	0	247	
930	70	2	0	6	9	9	1026	
229	13	0	0	3	0	4	249	
189	15	1	0	2	0	3	210	
179	13	0	0	3	1	0	196	
201	6	0	1	1	1	2	212	
798	47	1	1	9	2	9	867	
178	9	0	0	1	0	1	189	
151	14	1	0	1	0	1	168	
146	5	0	0	1	4	1	157	
121	9	0	0	1	0	1	132	
596	37	1	0	4	4	4	646	
153	4	1	1	0	3	1	163	
99	11	0	0	2	0	0	112	
109	6	0	0	3	1	1	120	
90	8	0	0	0	1	0	99	
451	29	1	1	5	5	2	494	
109	2	0	1	1	0	1	114	
85	6	0	0	1	1	2	95	
58	4	0	0	0	0	0	62	
56	2	0	1	1	0	1	61	
308	14	0	2	3	1	4	332	
55	3	0	0	0	0	0	58	
33	5	0	0	1	0	0	39	
37	2	0	1	1	1	1	43	
32	0	1	0	1	0	0	34	
157	10	1	1	3	1	1	174	
Total	11348	1055	164	32	123	59	69	12850

	Destination : Arm C R809(S)							Total
	Car	LGV	OGV1	OGV2	PSV	MC	PC	
25	4	0	0	1	0	0	30	

624	111	36	11	9	1	5	797
158	30	5	1	1	2	0	197
188	11	6	2	5	2	1	215
156	25	11	3	3	0	0	198
204	30	10	3	3	2	1	253
706	96	32	9	12	6	2	863
197	33	5	1	4	0	1	241
192	31	6	6	1	2	2	240
195	31	11	2	3	2	0	244
187	25	9	3	1	0	3	228
771	120	31	12	9	4	6	953
187	25	4	3	4	1	1	225
181	15	12	1	2	1	2	214
194	25	6	1	2	2	0	230
207	15	4	1	2	3		

00:15	23	1	0	0	0	0	0	0	24
00:30	12	0	0	0	0	0	0	0	12
00:45	21	0	0	0	0	0	0	0	21
1 Hr	76	1	0	0	0	0	0	0	77
01:00	9	1	1	0	0	0	0	0	11
01:15	11	0	0	0	0	0	0	0	11
01:30	6	0	0	0	0	0	0	0	6
01:45	8	0	0	0	0	0	0	0	8
1 Hr	34	1	1	0	0	0	0	0	36
02:00	6	0	0	0	0	0	0	0	6
02:15	3	0	0	0	0	0	0	0	3
02:30	3	0	0	0	0	0	0	0	3
02:45	3	0	0	0	0	0	0	0	3
1 Hr	15	0	0	0	0	0	0	0	15
03:00	2	1	0	0	0	0	0	0	3
03:15	3	0	0	0	0	0	0	0	3
03:30	4	0	0	0	0	0	0	0	4
03:45	2	0	0	0	0	0	0	0	2
1 Hr	11	1	0	0	0	0	0	0	12
04:00	6	0	0	0	0	0	0	0	6
04:15	10	0	0	0	0	0	0	0	10
04:30	3	0	0	0	0	0	0	0	3
04:45	7	0	0	0	0	0	0	0	7
1 Hr	26	0	0	0	0	0	0	0	26
05:00	1	1	0	0	0	0	0	0	2
05:15	6	1	0	0	0	0	0	0	7
05:30	8	0	0	0	0	0	0	0	8
05:45	10	0	0	0	2	0	0	0	12
1 Hr	25	2	0	0	2	0	0	0	29
06:00	13	2	0	0	1	0	0	0	16
06:15	27	4	1	0	3	0	1	0	36
06:30	19	3	1	0	2	1	0	0	26
06:45	41	7	0	0	2	0	0	0	50
1 Hr	100	16	2	0	8	1	1	1	128
07:00	37	7	0	0	3	0	0	0	47
07:15	48	5	2	0	4	0	0	0	59
07:30	76	3	5	1	2	0	0	0	87
07:45	68	8	2	0	3	0	0	0	81
1 Hr	229	23	9	1	12	0	0	0	274
08:00	106	9	1	0	2	0	0	0	118
08:15	108	4	0	1	2	1	0	0	116
08:30	80	9	0	0	0	0	0	0	89
08:45	94	7	0	2	3	0	0	0	106
1 Hr	388	29	1	3	7	1	0	0	429
09:00	112	5	1	0	2	0	0	0	120
09:15	118	13	1	0	1	0	0	0	133
09:30	84	4	2	0	2	1	0	0	93
09:45	59	9	1	0	2	0	0	0	71
1 Hr	373	31	5	0	7	1	0	0	417
10:00	65	13	0	1	2	0	0	0	81
10:15	63	13	2	0	1	0	0	0	79
10:30	68	3	3	1	2	0	0	0	77
10:45	68	3	3	0	1	0	0	0	75
1 Hr	264	32	8	2	6	0	0	0	312
11:00	63	12	0	0	0	0	0	0	75
11:15	84	8	2	0	1	1	0	0	96
11:30	83	11	2	0	1	1	1	0	99
11:45	73	9	2	0	2	1	1	0	88
1 Hr	303	40	6	0	4	3	2	0	358
12:00	78	13	3	0	0	1	0	0	95
12:15	84	13	1	1	1	0	1	0	101
12:30	97	11	1	0	2	0	1	0	112
12:45	100	5	3	0	3	0	1	0	112
1 Hr	359	42	8	1	6	1	3	0	420

13	1	0	0	0	0	1	15
17	2	0	0	0	0	0	19
10	0	1	0	0	0	1	12
55	3	2	0	2	1	2	65
12	2	0	0	0	0	0	14
7	1	0	0	0	0	0	8
3	0	0	0	0	0	0	3
5	1	0	0	0	0	0	6
27	4	0	0	0	0	0	31
6	0	0	0	0	0	0	6
3	0	0	0	0	0	0	3
1	1	1	0	0	0	0	3
0	2	0	0	0	0	0	2
10	3	1	0	0	0	0	14
2	1	0	0	0	0	0	3
2	2	0	0	0	0	0	4
1	0	1	0	0	0	0	2
4	0	0	0	0	0	0	4
9	3	1	0	0	0	0	13
5	1	1	0	0	0	0	7
5	2	0	0	0	0	0	7
9	2	1	0	0	0	0	12
6	3	0	0	0	0	0	9
25	8	2	0	0	0	0	35
10	2	0	0	0	0	1	13
6	1	0	0	0	0	1	8
22	3	0	2	0	0	1	28
33	7	2	1	0	1	0	44
71	13	2	3	0	1	3	93
37	4	1	0	1	1	1	45
59	5	1	0	1	1	2	69
116	9	2	2	1	2	1	133
114	10	0	1	0	0	0	125
326	28	4	3	3	4	4	372
53	25	3	1	1	0	0	83
121	37	1	1	2	1	2	165
140	35	1	1	2	4	2	185
162	37	8	1	1	0	1	210
476	134	13	4	6	5	5	643
164	33	2	2	2	2	3	208
187	30	4	1	2	1	4	229
167	20	3	1	2	0	2	195
178	27	3	1	1	2	2	214
696	110	12	5	7	5	11	846
140	27	4	2	0	0	0	173
128	33	7	4	1	0	1	174
91	25	7	2	1	0	0	126
112	33	9	2	1	1	2	160
471	118	27	10	3	1	3	633
103	26	3	0	2	1	0	135
117	26	4	2	3	0	1	153
102	28	3	4	0	0	0	137
96	22	8	1	1	1	1	130
418	102	18	7	6	2	2	555
108	50	5	4	1	0	0	168
111	24	7	2	3	1	0	148
104	21	13	6	0	0	0	144
128	21	5	2	1	0	0	157
451	116	30	14	5	1	0	617
124	25	8	4	1	0	0	162
158	22	9	2	1	1	2	195
123	26	3	2	2	0	0	156
154	28	7	2	0	1	2	194
559	101	27	10	4	2	4	707

11	2	0	0	1	0	0	14
16	1	1	0	0	0	0	18
15	0	0	0	0	0	0	15
67	7	1	0	2	0	0	77
9	0	0	0	0	0	0	9
13	3	0	0	0	0	0	16
9	0	0	0	0	0	0	9
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3	0	0	0	0	0	0	3
7	1	0	0	0	0	0	8
8	0	1	0	0	0	0	9
7	1	0	0	0	0	0	8
25	2	1	0	0	0	0	28
5	1	0	1	0	0	0	7
13	1	0	0	1	1	0	16
13	2	2	0	0	0	0	17
24	3	4	1	0	0	0	32
55	7	6	2	1	1	0	72
29	3	3	0	1	0	0	36
27	4	1	1	1	0	0	34
52	5	0	0	2	0	1	60
72	10	1	0	2	0	2	87
180	22	5	1	6	0	3	217
84	11	2	1	4	1	1	104
129	21	1	1	3	0	2	157
132	23	3	0	2	1	3	164
192	18	2	1	6	2	2	223
537	73	8	3	15	4	8	648
231	15	5	0	1	0	3	255
240	13	6	0	4	1	3	267
281	14	7	0	1	0	1	304
218	10	4	0	1	1	0	234
970	52	22	0	7	2	7	1060
171	27	2	1	1	0	1	203
163	19	6	4	1	1	1	195
123	17	3	0	2	1	1	147
156	23	2	0	4	0	3	188
613	86	13	5	8	2	6	733
135	13	4	1	2	0	1	156
127	23	2	0	1	0	0	153
133	19	5	0	1	0	0	158
141	14	4	0	3	0	0	162
536	69	15	1	7	0	1	629
140	11	4	0	3	1	0	159
131	12	2	0	1	0	0	146
155	12	2	0	0	1	0	170
159	21	4	0	3	1	0	188
585	56	12	0	7	3	0	663
138	14	1	1	1	0	2	157
166	21	3	0	1	0	0	191
161	24	5	0	1	0	0	191
181	27	3	0	1	0	0	212
646	86	12	1	4	0	2	751

36	1	0	0	1	0	0	38
25	2	1	0	0	0	0	28
13	1	0	0	0	0	0	14
132	5	1	0	2	1	0	141
16	2	1	0	0	0		

13:00	114	7	1	0	1	0	1	124
13:15	120	8	1	0	2	1	0	132
13:30	107	9	3	0	0	0	0	119
13:45	125	7	1	1	3	0	1	138
1 Hr	466	31	6	1	6	1	2	513
14:00	95	15	1	0	3	0	0	114
14:15	116	9	3	0	1	0	1	130
14:30	122	8	4	0	2	2	0	138
14:45	122	11	1	1	1	1	2	139
1 Hr	455	43	9	1	7	3	3	521
15:00	159	9	1	0	5	0	0	174
15:15	130	7	2	0	3	0	1	143
15:30	134	12	1	0	2	1	0	150
15:45	145	5	2	0	1	3	0	156
1 Hr	568	33	6	0	11	4	1	623
16:00	117	11	1	0	0	2	0	131
16:15	161	8	0	0	5	0	0	174
16:30	157	11	1	0	1	0	5	175
16:45	143	10	1	3	0	1	7	165
1 Hr	578	40	3	3	6	3	12	645
17:00	171	20	1	0	1	0	2	195
17:15	155	9	0	0	3	2	1	170
17:30	169	17	0	0	2	3	2	193
17:45	180	12	0	1	1	0	0	194
1 Hr	675	58	1	1	7	5	5	752
18:00	201	9	0	0	2	1	3	216
18:15	166	15	0	0	1	0	2	184
18:30	161	11	0	0	2	1	4	179
18:45	176	8	1	0	1	2	0	188
1 Hr	704	43	1	0	6	4	9	767
19:00	177	5	0	0	3	1	0	186
19:15	141	9	0	0	1	0	0	151
19:30	143	11	0	0	1	0	0	155
19:45	151	5	0	0	1	0	0	157
1 Hr	612	30	0	0	6	1	0	649
20:00	120	7	0	0	2	1	1	131
20:15	133	13	1	0	1	0	1	149
20:30	105	4	0	0	1	0	1	111
20:45	95	3	0	0	2	0	4	104
1 Hr	453	27	1	0	6	1	7	495
21:00	103	3	0	0	1	1	1	109
21:15	87	6	0	0	1	0	1	95
21:30	78	5	0	0	1	1	0	85
21:45	83	11	0	0	0	1	1	96
1 Hr	351	25	0	0	3	3	3	385
22:00	86	1	0	0	1	0	2	90
22:15	59	5	0	0	2	0	1	67
22:30	44	1	0	0	1	0	1	47
22:45	41	2	0	0	1	0	2	46
1 Hr	230	9	0	0	5	0	6	250
23:00	48	3	0	0	2	0	0	53
23:15	35	3	0	0	0	0	1	39
23:30	30	1	2	0	0	0	1	34
23:45	25	3	0	0	0	0	0	28
1 Hr	138	10	2	0	2	0	2	154
Total	7433	567	69	13	117	32	56	8287

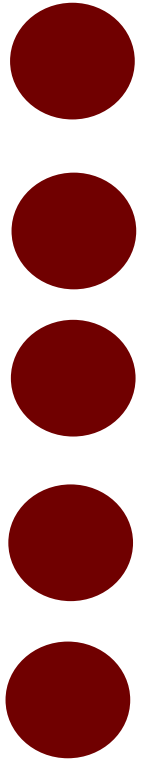
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156	14	3	1	3	1	1	179	
126	25	6	3	1	0	1	162	
183	35	8	1	1	2	0	230	
597	91	18	6	6	5	2	725	
157	30	4	1	2	0	1	195	
164	30	6	4	2	2	3	211	
156	24	4	3	2	1	0	190	
147	21	9	1	0	0	1	179	
624	105	23	9	6	3	5	775	
121	25	5	3	2	1	0	157	
139	20	8	1	2	1	2	173	
145	24	4	1	1	0	1	176	
138	18	3	0	1	1	0	161	
543	87	20	5	6	3	3	667	
123	14	4	0	0	0	0	141	
146	10	5	1	2	1	0	165	
143	25	5	0	1	2	1	177	
147	15	0	0	0	2	1	165	
559	64	14	1	3	5	2	648	
143	20	3	0	1	0	1	168	
167	12	7	1	1	1	0	189	
148	15	1	0	1	1	1	167	
184	15	2	2	0	4	2	209	
642	62	13	3	3	6	4	733	
163	15	0	0	3	0	3	184	
186	15	0	0	0	1	2	204	
175	10	0	0	2	5	2	194	
167	11	1	0	3	1	0	183	
691	51	1	0	8	7	7	765	
161	7	2	0	1	2	4	177	
144	13	1	0	1	0	5	164	
169	4	0	0	2	3	2	180	
153	12	0	0	1	0	2	168	
627	36	3	0	5	5	13	689	
164	10	0	0	2	0	1	177	
94	8	0	0	1	2	0	105	
97	1	0	0	0	3	0	101	
96	1	0	0	1	1	0	99	
451	20	0	0	4	6	1	482	
102	6	1	0	0	2	0	111	
86	7	0	0	1	0	1	95	
60	7	0	0	1	0	1	69	
72	7	0	0	0	0	0	79	
320	27	1	0	2	2	2	354	
78	1	0	0	1	0	1	81	
72	6	0	0	1	1	2	82	
39	2	0	0	0	1	0	42	
48	2	0	0	2	0	0	52	
237	11	0	0	4	2	3	257	
50	0	0	0	1	0	0	51	
40	4	0	0	1	0	0	45	
27	1	1	0	1	0	1	31	
26	1	1	0	1	0	0	29	
143	6	2	1	3	0	1	156	
Total	9028	1303	234	81	86	66	77	10875

178	26	4	0	1	0	0	209	
188	12	3	1	1	1	0	206	
180	15	4	0	4	0	0	203	
183	17	5	2	1	0	0	208	
729	70	16	3	7	1	0	826	
208	10	2	0	2	0	0	222	
185	12	2	2	2	0	0	203	
159	21	6	0	2	0	0	188	
171	13	0	1	2	0	1	188	
723	56	10	3	8	0	1	801	
161	12	0	0	0	1	1	175	
148	15	3	0	0	0	0	166	
181	14	3	0	1	2	0	201	
195	15	2	1	2	1	0	216	
685	56	8	1	3	4	1	758	
163	14	5	1	2	0	0	185	
157	14	3	0	2	2	0	178	
192	18	3	0	1	2	0	216	
211	12	1	0	1	1	0	226	
723	58	12	1	6	5	0	805	
208	14	2	0	2	1	0	227	
203	15	0	0	2	0	0	220	
185	8	0	0	1	1	0	195	
199	15	0	1	2	4	3	224	
795	52	2	1	7	6	3	866	
207	12	1	0	2	1	1	224	
225	14	0	0	1	1	0	241	
215	13	0	0	2	1	0	231	
198	13	1	1	3	0	1	217	
845	52	2	1	8	3	2	913	
205	18	1	1	3	0	0	228	
173	10	0	0	2	1	0	186	
150	9	0	0	1	1	0	161	
172	9	0	1	1	1	0	184	
700	46	1	2	7	3	0	759	
172	9	0	0	0	0	0	181	
161	9	1	0	1	1	2	175	
138	8	0	1	1	1	2	151	
146	13	0	0	0	0	2	161	
617	39	1	1	2	2	6	668	
121	9	0	0	0	2	0	132	
120	8	0	0	2	1	0	131	
99	6	0	1	1	0	0	107	
111	7	1	0	3	1	0	123	
451	30	1	1	6	4	0	493	
82	4	0	0	0	0	0	86	
85	3	0	0	1	0	1	90	
63	4	0	0	0	1	0	68	
52	1	1	0	1	0	0	55	
282	12	1	0	2	1	1	299	
36	2	0	0	0	1	0	39	
44	1	0	0	1	0	0	46	
44	2	0	0	0	0	0	46	
33	2	0	0	0	1	1	37	
157	7	0	0	1	2	1	168	
Total	10981	941	150	27	114	43	42	12298

195	39	4	5	2	1	1	247
175	24	5	3	4	1	2	214
217	29	5	2	1	0	0	254
189	21	8	3	5	2	1	229
776	113	22	13	12	4	4	944
165	27	3	2	1	0	0	198
191	30	9	2	1	2	0	235
196	33	6	1	3	0	0	239
218	26	12	4	5	1	0	266
770	116	30	9	10	3	0	938
224	40	6	2	4	2	0	278
205	28	9	4	4	2	1	253
237	27	8	2	5	1	2	282
207	27	2	2	7	1	0	246
873	122	25	10	20	6	3	1059
228	41	6	1	1	1	2	280
215	37	1	3	3	0	0	259
210	44	4	2	2	4	1	267
217	39	4	1	2	3	2	268
870	161	15	7	8	8	5	1074
201	29	4	2	2	3	2	243
180	26	4	0	3	0	1	214
209	23	3	0	2	0	1	238
204	17	0	0	3	0	0	224
794	95	11	2	10	3	4	919
180	26	2	0	3	0	1	212
207	23	0	0	1	2	2	235
207	14	0	0	2	2	0	225
221	17	0	0	2	1	0	241
815	80	2	0	8	5	3	913
218	13	0					

Appendix 14.1

Summary of Relevant Legislation
Archaeology



Summary of Relevant Legislation

National Monuments (Amendment) Act (1930-2014)

All archaeological sites have the full protection of the national monuments legislation (Principal Act 1930; Amendments 1954, 1987, 1994, 2004 and 2014). In the 1987 Amendment of Section 2 of the Principal Act (1930), the definition of a national monument is specified as:

any artificial or partly artificial building, structure or erection or group of such buildings, structures or erections;

any artificial cave, stone or natural product, whether forming part of the ground, that has been artificially carved, sculptured or worked upon or which (where it does not form part of the place where it is) appears to have been purposely put or arranged in position;

any, or any part of any, prehistoric or ancient tomb, grave or burial deposit, or

(ii) ritual, industrial or habitation site

and

any place comprising the remains or traces of any such building, structure or erection, any cave, stone or natural product or any such tomb, grave, burial deposit or ritual, industrial or habitation site...

Under Section 14 of the Principal Act (1930):

It shall be unlawful...

to demolish or remove wholly or in part or to disfigure, deface, alter, or in any manner injure or interfere with any such national monument without or otherwise than in accordance with the consent hereinafter mentioned (a licence issued by the Office of Public Works National Monuments Branch),

or

to excavate, dig, plough or otherwise disturb the ground within, around, or in the proximity to any such national monument without or otherwise than in accordance...

Under Amendment to Section 23 of the Principal Act (1930),

A person who finds an archaeological object shall, within four days after the finding, make a report of it to a member of the Garda Síochána...or the Director of the National Museum...

The latter is of relevance to any finds made during a watching brief.

In the 1994 Amendment of Section 12 of the Principal Act (1930), all the sites and 'places' recorded by the Sites and Monuments Record of the Office of Public Works are provided with a new status in law. This new status provides a level of protection to the listed sites that is equivalent to that accorded to 'registered' sites [Section 8(1), National Monuments Amendment Act 1954] as follows.

The Commissioners shall establish and maintain a record of monuments and places where they believe there are monuments and the record shall be comprised of a list of monuments and such places and a map or maps showing each monument and such place in respect of each county in the State.

The Commissioners shall cause to be exhibited in a prescribed manner in each county the list and map or maps of the county drawn up and publish in a prescribed manner information about when and where the lists and maps may be consulted.

In addition, when the owner or occupier (not being the Commissioners) of a monument or place which has been recorded, or any person proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such monument or place, he shall give notice in writing of his proposal to carry out the work to the Commissioners and shall not, except in the case of urgent necessity and with the consent of the Commissioners, commence the work for a period of two months after having given the notice.

Under the National Monuments Amendment Act (2004), the Minister of Environment, Heritage and Local Government will issue directions relating to archaeological works and will be advised by the National Monuments Section and the National Museum of Ireland. The Act sets out the circumstances whereby the Minister of Environment, Heritage and Local Government may grant consent (i.e. In respect of a national monument of which the Minister or a local authority are the owners or the guardians or in respect of which a preservation order is in force) or issue directions (i.e. in relation to approved road developments—being road development approved under either or both sections 49 and 51 of the Roads Act 1993).

14A. (1) The consent of the Minister under section 14 of this Act and any further consent or licence under any other provision of the National Monuments Acts 1930 to 2004 shall not be required where the works involved are connected with an approved road development.

14A. (2) Any works of an archaeological nature that are carried out in respect of an approved road development shall be carried out in accordance with the directions of the Minister, which directions shall be issued following consultation by the minister with the Director of the National Museum of Ireland.

14A (4) Where a national monument has been discovered to which subsection (3) of this section relates, then the road authority carrying out the road development shall report the discovery to the Minister subject to subsection (7) of this section, and pending any directions by the minister under paragraph (d) of this subsection, no works which would interfere with the monument shall be carried out, except works urgently required to secure its preservation carried out in accordance with such measures as may be specified by the Minister.

The Minister will consult with the Director of the National Museum of Ireland for a period not longer than 14 days before issuing further directions in relation to the national monument.

The Minister will not be restricted to archaeological considerations alone, but will also consider the wider public interest.

Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999

This Act provides for the establishment of a national inventory of architectural heritage and historic monuments.

Section 1 of the act defines “architectural heritage” as:-

- (a) all structures and buildings together with their settings and attendant grounds, fixtures and fittings,
- (b) groups of such structures and buildings, and,
- (c) sites

which are of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest.

Section 2 of the Act states that the Minister (for Arts, Heritage, Gaeltacht and the Islands) shall establish the NIAH, determining its form and content, defining the categories of architectural heritage, and specifying to which category each entry belongs. The information contained within the inventory will be made available to planning authorities, having regard to the security and privacy of both property and persons involved.

Section 3 of the Act states that the minister may appoint officers, who may in turn request access to premises listed in the inventory from the occupiers of these buildings. The officer is required to inform the occupier of the building why entry is necessary, and in the event of a refusal, can apply for a warrant to enter the premises.

Section 4 of the Act states that obstruction of an officer or a refusal to comply with requirements of entry will result in the owner or occupier being guilty of an offence.

Section 5 of the Act states that sanitary authorities who carry out works on a monument covered by this Act will as far as possible preserve the monument with the proviso that its condition is not a danger to any person or property, and that the sanitation authority will inform the Minister that the works have been carried out.

The provisions in the Act are in addition to and not a substitution for provisions of the National Monument Act (1930–94), and the protection of monuments in the National Monuments Act is extended to the monuments covered by the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act (1999).

Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 2000 and the Local Government (Planning and Development) Act 2000

The Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act provides for the establishment of a national inventory of architectural heritage and historic monuments.

Section 1 of the act defines “architectural heritage” as:

- (a) all structures and buildings together with their settings and attendant grounds, fixtures and fittings,
- (b) groups of such structures and buildings, and,
- (c) sites, which are of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest.

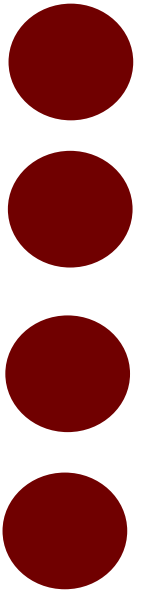
The Local Government (Planning and Development) Act, 1999, which came into force on 1st January 2000, provides for the inclusion of protected structures into the planning authorities' development plans and sets out statutory regulations regarding works affecting such structures, thereby giving greater statutory protection to buildings. All structures listed in the development plan are now referred to as Protected Structures and enjoy equal statutory protection. Under the 1999 Act the entire structure is protected, including a structures interior, exterior, the land lying within the curtilage of the protected structure and other structures within that curtilage. This Act was subsequently repealed and replaced by the Planning and Development Act, 2000, where the conditions relating to the protection of architectural heritage are set out in Part IV of the Act.

The main features of the 2000 Act are:

- a) planning authorities have a clear obligation to create a record of protected structures (RPS) which includes all structures or parts of structures in their functional areas which, in their opinion, are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. This record forms part of a planning authority's development plan.
- b) planning authorities are also obliged to preserve the character of places and townscapes which are of special architectural, historic, archaeological, artistic, cultural, scientific, social or technical interest or that contribute to the appreciation of protected structures, by designating them architectural conservation areas (ACAs) in their development plan.
- c) development plans must include objectives for the protection of such structures and the preservation of the character of such areas to ensure proper and sustainable planning and development.
- d) new responsibilities are given to the owners and occupiers of protected structures to maintain them and planning authorities have additional powers to ensure that buildings are not endangered either directly or through neglect.⁵ Financial assistance, in the form of conservation grants, is available from planning authorities to assist in this process.
- e) the owner or occupier of a protected structure may seek a declaration from the relevant planning authority to determine the works to the structure that would materially affect its character and therefore require planning permission, and those works which may be carried out as exempted development.
- f) where a structure is protected, the protection includes the structure, its interior and the land within its curtilage and other structures within that curtilage (including their interiors) and all fixtures and features which form part of the interior or exterior of all these structures. All works which would materially affect the character of a protected structure, or a proposed protected structure, will require planning permission.

Appendix 14.2

Glossary of Impact Assessment
Archaeology



Glossary of Impact Assessment

Significance Criteria (NRA Guidelines 2006)

The significance criteria can be used to evaluate the significance of an archaeological site, monument or complex. It should not, however, be regarded as definitive, rather it is an indicator which wider judgment based on the individual circumstances of a feature. Different archaeological heritage asset types contribute to a land themselves more easily to assessment and it should be borne in mind that this can create a bias in the record, for example an upstanding stone monument such as a fortified house is easier to examine with a view to significance than a degraded enclosure site.

Table 2: Significance Criteria, NRA Guidelines 2006 (Archaeological Heritage)

Criteria	Explanation
Existing Status	The level of protection associated with an archaeological site / monument is an important consideration.
Condition / Preservation	The survival of a monument's archaeological potential both above and below ground is an important consideration and should be assessed in relation to its present condition and surviving features. Well-preserved sites should be highlighted, this assessment can only be based on a field inspection.
Documentation / Historical Significance	The significance of a monument may be enhanced by the existence of records of previous investigations or contemporary documentation supported by written evidence or historic maps. Sites with a definite historical association or an example of a notable event or person should be highlighted.
Group Value	The value of a single monument may be greatly enhanced by its association with related contemporary monuments or with monuments from different periods indicating an extended time presence in any specific area. In some cases it may be preferable to protect the complete group, including associated and adjacent land, rather than to protect isolated monuments within that group.
Rarity	The rarity of some monument types can be a central factor affecting response strategies for development, whatever the condition of the individual feature. It is important to recognise sites that have a limited distribution.
Visibility in the Landscape	Monuments that are highly visible in the landscape have a heightened physical presence. The inter-visibility between monuments may also be explored in this category.
Fragility/ Vulnerability	It is important to assess the level of threat to archaeological monuments from erosion, natural degradation, agricultural activity, land clearance, neglect, careless treatment or development. The nature of the archaeological evidence cannot always be specified precisely but it may still be possible to document reasons to justify the significance of the feature. This category relates to the probability of

	monuments producing material of archaeological significance as a result of future investigative work.
Amenity Value	Regard should be taken of the existing and potential amenity value of a monument.

Determining Significance of Architectural Heritage Assets

The significance of perceived impact on structures and sites of architectural merit is determined by a combination of the architectural heritage importance of the structure and the degree of impact. In each case the structure is given a rating as to its importance and, if higher than “Record only”, the nature of its special interest is given. The rating definitions are in accordance with those given by the National Inventory of Architectural Heritage (NIAH):

- *International:* Structures or sites of sufficient architectural heritage importance to be considered in an international context. Examples include St Fin Barre's Cathedral, Cork. These are exceptional structures that can be compared to and contrasted with the finest architectural heritage in other countries.
- *National:* Structures or sites that make a significant contribution to the architectural heritage of Ireland. These are structures and sites that are considered to be of great architectural heritage significance in an Irish context. Examples include Ardnacrusha Power Station, Co. Clare; the Ford Factory, Cork; Carroll's Factory, Dundalk; Lismore Castle, Co. Waterford; Sligo Courthouse, Sligo; and Emo Court, Co. Laois.
- *Regional:* Structures or sites that make a significant contribution to the architectural heritage within their region or area. They also stand in comparison with similar structures or sites in other regions or areas within Ireland. Examples would include many Georgian terraces; Nenagh Courthouse, Co. Tipperary; or the Bailey Lighthouse, Howth. Increasingly, structures that need to be protected include structures or sites that make a significant contribution to the architectural heritage within their own locality. Examples of these would include modest terraces and timber shop fronts.
- *Local:* These are structures or sites of some vintage that make a contribution to the architectural heritage but may not merit being placed in the RPS separately. Such structures may have lost much of their original fabric.
- *Record only:* These are structures or sites that are not deemed to have sufficient presence or inherent architectural or other importance at the time of recording to warrant a higher rating. It is acknowledged, however, that they might be considered further at a future time.

Where the rating is deemed to be higher than “Record only” the category of special interest is noted. It should be noted that the term “special architectural interest” applies only in the context of this assessment of architectural heritage and does not imply that those buildings and other structures that are not considered to be of special architectural interest are in any way inferior or are of lower value.

The special interest is based on the categories set down in the Planning and Development Act, 2000. While that Act gives no criteria for assigning a special interest to a structure, the

National Inventory of Architectural Heritage (NIAH) offers guidelines to its field-workers. This offers guidance by example rather than by definition, and is the system adopted for the present assessment. There are eight categories set down in the Act, viz. archaeological, architectural, historical, technical, cultural, scientific, social and artistic, and the NIAH guidance for each is as follows:

Archaeological

It is to be noted that the NIAH is biased towards post-1700 structures. Structures that have archaeological features may be recorded, providing the archaeological features are incorporated within post-1700 elements. Industrial fabric is considered to have technical significance, and should only be attributed archaeological significance if the structure has pre-1700 features.

Architectural

A structure may be considered of special architectural interest under the following criteria:-

- An aspiration of aesthetic appeal to its design.
- Good quality or well executed architectural design
- The work of a known and distinguished architect, engineer, designer, craftsman
- Modest or vernacular structures may be considered to be of architectural interest, as they are part of the history of the built heritage of Ireland.
- Well-designed decorative features, externally and/or internally.

Historical

A structure may be considered of special historical interest under the following criteria:

- A significant historical event associated with the structure
- An association with a significant historical figure
- Has a known interesting and/or unusual change of use, e.g. a former workhouse now in use as a hotel
- A memorial to a historical event.

Technical

A structure may be considered of special technical interest under the following criteria:

- Incorporates building materials of particular interest, i.e. the materials or the technology used for construction
- Incorporates innovative engineering design, e.g. bridges, canals or mill weirs
- A structure which has an architectural interest may also merit a technical interest due to the structural techniques used in its construction, e.g. a curvilinear glasshouse, early use of concrete, cast-iron prefabrication.

- Mechanical fixtures relating to a structure may be considered of technical significance.

Cultural

A structure may be considered of special cultural interest where there is an association with a known fictitious character or event, e.g., Sandycove Martello Tower which featured in Ulysses.

Scientific

A structure may be considered of special scientific interest where it is considered to be an extraordinary or pioneering scientific or technical achievement in the Irish context, e.g., Mizen Head Bridge, Birr Telescope.

Social

A structure may be considered of special social interest under the following criteria:

- A focal point of spiritual, political, national or other cultural sentiment to a group of people, e.g. a place of worship, a meeting point, assembly rooms.
- Developed or constructed by a community or organisation, e.g. the construction of the railways or the building of a church through the patronage of the local community
- Illustrates a particular lifestyle, philosophy, or social condition of the past, e.g. the hierarchical accommodation in a country house, philanthropic housing, vernacular structures.

Artistic

A structure may be considered of special artistic interest under the following criteria:

- Work of a skilled craftsman or artist, e.g. plasterwork, wrought-iron work, carved elements or details, stained glass, stations of the cross.
- Well-designed mass produced structures or elements may also be considered of artistic interest.
- In the evaluation of the special interest of a structure it is possible for the structure to have a special interest under more than one of the above categories.

Assessment of Material Assets, as Defined by the EPA (2002)

Context Describe the location and extent of the asset. Does it extend beyond the site boundary?

Character Describe the nature and use of the asset. Is it exploited, used or accessible? Is it renewable or non-renewable and if so, over what period?

Significance Describe the significance of the asset. Is the material asset unique, scarce or common in the region? Is its use controlled by known plans, priorities or policies? What trends are evident or may reasonably be inferred?

Sensitivity Describe the changes in the existing environment which could limit the access to, or the use of, the material asset.

Glossary of Impacts as defined by the NRA Guidelines 2006, with reference to the EPA (2002 & 2017)

Impacts are generally categorised as either being a direct impact, an indirect impact or as having no predicted impact. A glossary of impacts as defined by the EPA are as follows: -

- A **direct impact** occurs when a cultural heritage asset is located within the proposed development area and entails the removal of part, or the entire asset.
- **Indirect impacts** may be caused due to the close proximity of a development to a cultural heritage asset. Mitigation strategies and knowledge of detail design can often ameliorate any adverse indirect impact. Indirect impacts may include severance of linked features, degradation of setting and amenity or provide a visual intrusion.
- **No predicted impact** occurs when the proposed development does not adversely or positively affect a cultural heritage asset.

The impacts of the proposed scheme on the cultural heritage environment are first assessed in terms of their quality i.e. positive, negative, neutral (or direct and indirect):

Negative Impact A change that will detract from or permanently remove a cultural heritage asset from the landscape.

Neutral Impact A change that does not affect the cultural heritage asset.

Positive Impact A change that improves or enhances the setting of a cultural heritage asset.

Duration of Impacts:

Temporary Impact Impact lasting for one year or less.

Short-term Impacts Impact lasting one to seven years.

Medium-term Impact Impact lasting seven to fifteen years.

Long-term Impact Impact lasting fifteen to sixty years.

Permanent Impact Impact lasting over sixty years.

Types of Impacts:

Cumulative Impact The addition of many small impacts to create one larger, more significant, impact.

Do Nothing Impact The environment as it would be in the future should no development of any kind be carried out.

Indeterminable Impact When the full consequences of a change in the environment cannot be described.

Irreversible Impact When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.

Residual Impact The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

'Worst case' Impact The impacts arising from a development in the case where mitigation measures substantially fail.

Magnitude of Impact

Extent – size, scale and spatial distributions of the effect

Duration – period of time over which the effect will occur

Frequency – how often the effect will occur

Context – how will the extent, duration and frequency contrast with the accepted baseline conditions.

Table 3: Magnitude Criteria

Magnitude of Impact	Criteria
Very High	Applies where mitigation would be unlikely to remove adverse effects. Reserved for adverse, negative effects only. These effects arise where a cultural heritage asset is completely and irreversibly destroyed by a proposed development.
High	An impact which, by its magnitude, duration or intensity alters an important aspect of the environment. An impact like this would be where part of a cultural heritage asset would be permanently impacted upon leading to a loss of character, integrity and data about the archaeological / cultural heritage feature/site.
Medium	A moderate direct impact arises where a change to the site is proposed which though noticeable is not such that the archaeological / cultural heritage integrity of the site is compromised and which is reversible. This arises where an archaeological / cultural heritage feature can be incorporated into a modern day development without damage and that all procedures used to facilitate this are reversible.
Low	An impact which causes changes in the character of the environment which are not significant or profound and do not directly impact or affect an archaeological / cultural heritage feature, site or monument.

Magnitude of Impact	Criteria
Negligible	An impact capable of measurement but without noticeable consequences.
No change	No change to the asset or setting

Sensitivity Criteria

An evaluation of the sensitivity / value of sites and features is based on the extent to which assets contribute to the archaeological or built heritage character, though their individual or group qualities, either directly or potentially and guided by legislation, national policies, acknowledged standards, designations and criteria. The table below presents the scale of sensitivity / value together with criteria.

Table 4: Sensitivity Criteria

Sensitivity / Value	Criteria
Very High	<p>Sites of international significance: World Heritage Sites</p> <p>National Monuments</p> <p>Protected Structures of international and national importance</p> <p>Designed landscapes and gardens of national importance</p> <p>Assets of acknowledged international importance or that can contribute significantly to international and national research objectives</p>
High	<p>RMP / SMR sites</p> <p>Designated assets that contribute to regional research objectives</p> <p>Protected Structures of regional importance</p> <p>Architectural Conservation Areas</p>
Medium	<p>Recently / newly identified archaeological sites (not yet included on the SMR / RMP; the importance of the resource has yet to be fully ascertained)</p> <p>Undesignated assets that contribute to regional research objectives</p> <p>NIAH Building Survey and Garden Survey Sites</p>

Sensitivity / Value	Criteria
Low	<p>Undesignated Sites of local importance (e.g. townland / field boundaries)</p> <p>Assets compromised by poor preservation and/or poor survival of contextual associations</p> <p>Assets of limited value but with the potential to contribute to local research objectives (e.g. potential buried foundations associated with features / structures shown the 1st edition OS six-inch mapping)</p> <p>Historic townscapes or built up areas of limited historic integrity in their building or their settings</p>
Negligible	<p>Assets with very little or no surviving archaeological interest.</p> <p>Buildings of no architectural or historic note</p>
Unknown	<p>The nature of the resource has yet to be fully ascertained, e.g. sites or areas of specific archaeological potential, greenfield areas or riverine / stream / coastal environs with inherent archaeological potential.</p> <p>Structures with potential historic significance (possibly hidden or inaccessible).</p>

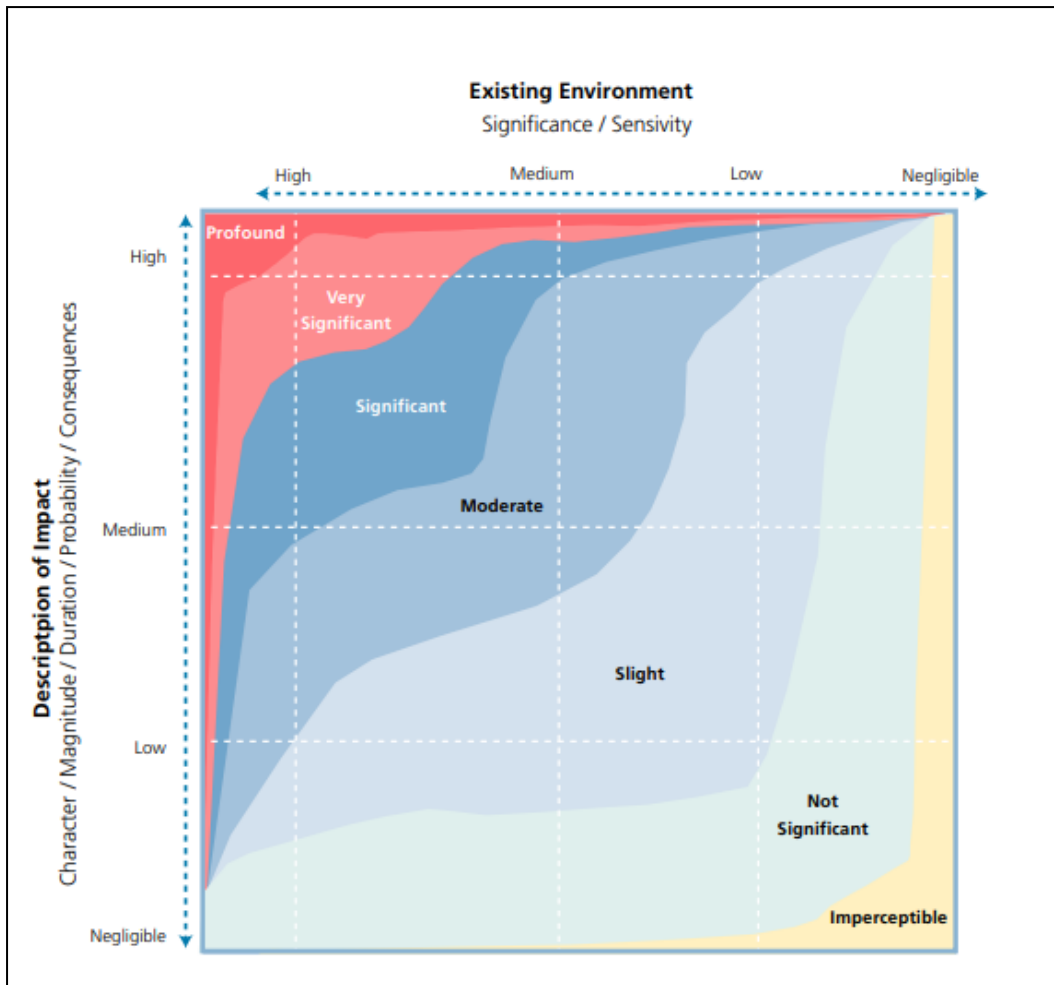
Criteria for Assessment of Impact Significance

Using both the sensitivity of the heritage asset and the magnitude of impact, the impact significance is established (Table 6).

The Draft EPA Revised Guidelines on Information to be contained within an EIS (September 2015) has also added the following levels of significance of effect (as per figure below):

Table 5 – Significance of Effects (EPA draft 2015)

Significance of Effect	Description
<i>Very Significant</i>	An impact which by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment, for example in this case a monument
<i>Not Significant</i>	An effect which causes noticeable changes in the character of the environment but without noticeable consequences.



Source: Draft EPA Revised Guidelines on Information to be contained within Environmental Impact Assessment Reports (August 2017), p.53