ENVIROMENTAL IMPACT ASSESSMENT REPORT

FOR A

Proposed Residential Development on Lands

AT

St Paul's College

Raheny

Dublin 5

ON BEHALF OF

Crekav Trading GP Limited

Volume 3 – Appendices

Appendix 1 – not used

Appendix 2 – Letter's from Department of Education and Skills

An Roinn Oideachais
agus Scileanna
Department of
Education and Skills

Bryan Ward
Dublin City Council
Planning & Property Development
Civic Offices
Wood Quay
Dublin 8

30 September 2019

Re: Lands at St Paul's College, Sybill Hill, Dublin 5

Dear Mr Ward,

The Department of Education & Skills has been contacted by Simon Clear & Associates in respect of lands at St Paul's College, Sybill Hill, Raheny, Dublin 5. The Department notes that these lands fall under the heading Zone Z15 "To protect and provide for Institutional & Community Uses".

This Department conducts nationwide demographic exercises into current and future need for primary and post-primary school places across the country and these are constantly monitored and update as further demographic information emerges.

As a result of such demographic exercises, this Department has identified an emerging need for a primary school in the relevant school planning area based on planned residential development, including at the subject site, and this new school formed part of the 2018 Ministerial announcement of new schools. Department officials are currently working to identify and acquire a suitable permanent site to meet this school requirement.

In addition, given projected population increases under the National Planning Framework, further upward pressure on school places may materialise and additional school site requirements may emerge from renewed demographic analyses.

This Department would, therefore, appreciate if the associated impact on current and future school place requirements were considered in the assessment of this and other residential planning applications.

Yours sincerely

Alan Hanlon
Site Acquisitions and Property Management Section

An Roinn Oideachais agus Scileanna
Bóthar Phort Laoise
An Tulach Mhór
Co. Uíbh Fhailí
R35 Y2N5

AN ROINN OIDEACHAIS AGUS SCILEANNA | DEPARTMENT OF EDUCATION AND SKILLS

Department of Education and Skills
Portlaoise Road
Tullamore
Co. Offaly
R35 Y2N5

2 August 2017

Mr Simon Clear
Planning and Development consultants
3 Terenure Road West
Terenure
Dublin 6W
D6W YY79

Dear Mr Clear

Ref: St Paul's College Boys Secondary School, Sybil Hill Road, Clontarf, Dublin 3 – school needs assessment

With reference to the development of lands at St Paul's Secondary School, the Department of Education and Skills has carried out an exercise of the future figures and in consultation with a number of sections in the Department we are satisfied that the development at St Paul's will not adversely affect our future projections. When considering the educational implications we included the increase demand due to the development at St Paul's, both at primary and post primary level.

Based on this the Department has no objections to this development and have previously conveyed this to Dublin City Council on 13 January 2016.

Yours sincerely

Liz Marriott
Forward Planning

Appendix 3 – not used

Appendix 4 – not used

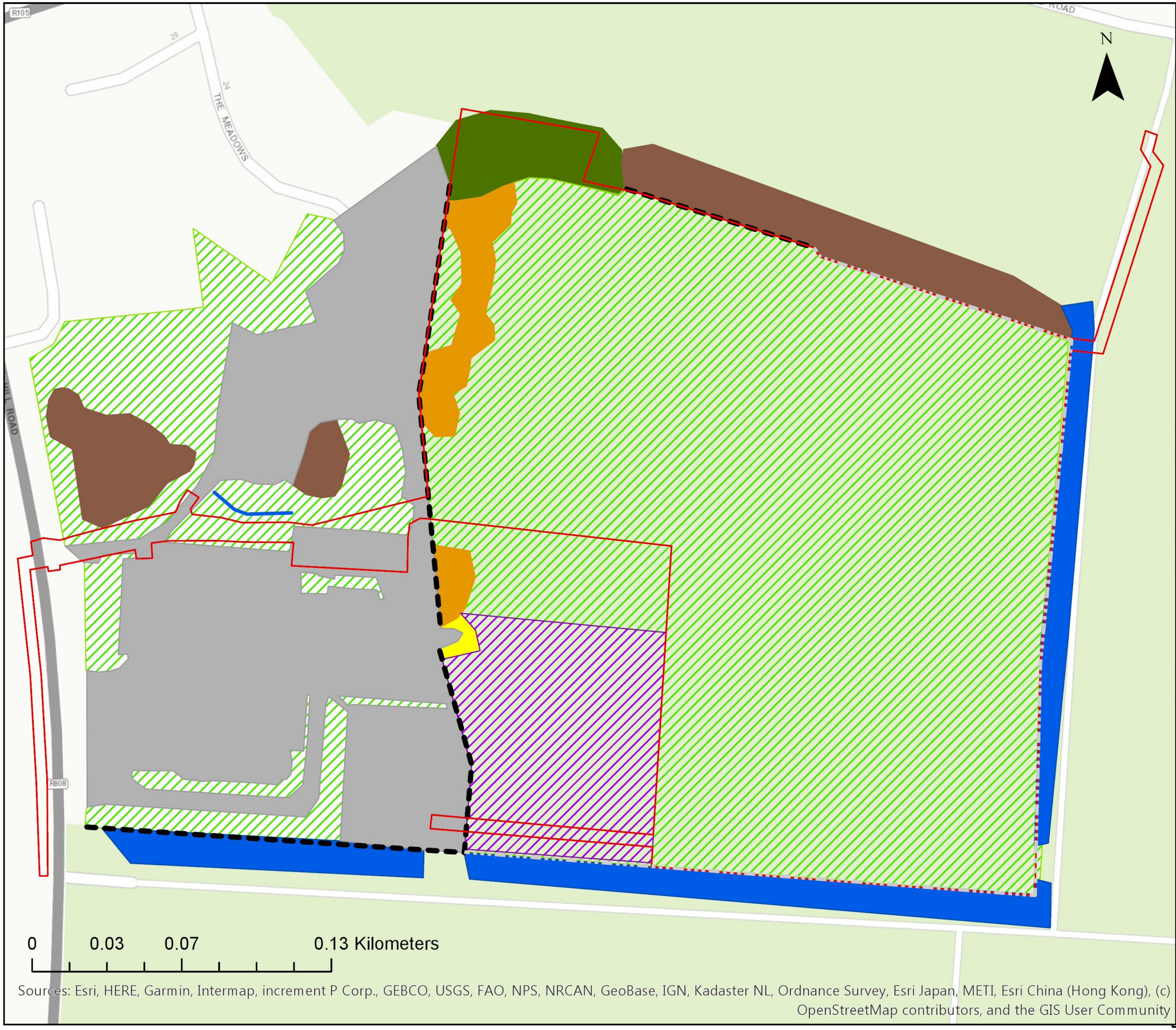
Appendix 5

5.1 - Habitat Mapping

5.2 – BTO Codes

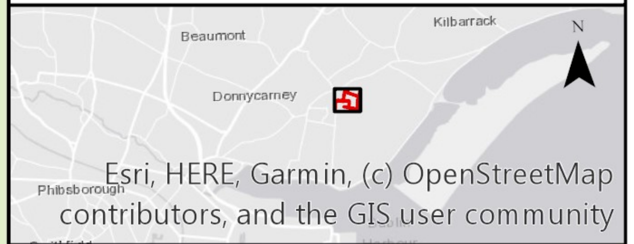
5.3 – Bat Survey Results

5.4 – Breeding Bird Surveys



Legend

- Site Outline
- BL1 -Stone Walls and other Stonework
- Wire Fence
- FW4 -Drainage Ditch
- GA2 -Amenity Grassland (Improved)
- BL3 -Buildings and Artificial Surfaces
- ED2 -Spoil and Bare Ground
- WL2 -Treelines
- WD5 -Scattered Trees and Parkland
- WD1 -Mixed Broadleaved Woodland
- GS2 -Dry Meadows and Grassy Verges
- WS1 -Scrub



Project

Proposed Residential Development at St. Paul's College, Sybil Hill, Raheny, Dublin 5

Client

CREKAV TRADING GP LIMITED

Title

Habitat Map

enviroguide consulting

a 3D Core C, Block 71, The Plaza Park West, Dublin 12 D12F9TN
w www.enviroguide.ie
e info@enviroguide.ie
t +353 (0)1 565 4730

Drawn by: LG	Projection: IRENET95 Irish Transverse Mercator
Checked : JD	
Date: 10/10/2019	Scale: 1:2,217 @A4

Notes:

Site boundaries shown are for illustration purposes only and do not represent legal or exact boundaries.


0 0.05 0.1 0.2 Kilometers
Bat Survey Results
N
bing
© 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS

Date	Time	Species Text	Calls [#]	Mean Peak Frequency	Mean Min Freque	Mean Max Freque	Mean Call Lengtl	Mean Call Distan	Temperature	Latitude [WGS84]	Longitude [WG
15/05/2019	21:20:42	Leisler's Bat	15	24.6	23.4	27	10	210	13	53.373105	-6.191627
15/05/2019	21:21:19	Leisler's Bat	4	19.7	18.8	20.4	6.2	893	13	53.373126	-6.191614
15/05/2019	21:21:25	Leisler's Bat	5	21.4	21	21.4	16.7	623	13	53.373131	-6.191612
15/05/2019	21:22:53	Leisler's Bat	4	18.7	18.4	18.9	18.4	409	13	53.373123	-6.191606
15/05/2019	21:22:59	Leisler's Bat	1	15.3	14.9	16.8	19	0	13	53.373128	-6.191608
15/05/2019	21:23:56	Leisler's Bat	1	18.9	14.9	19.2	2	0	13	53.372961	-6.191517
15/05/2019	21:24:03	Leisler's Bat	1	28.4	26.2	28.7	2	0	13	53.372907	-6.191479
15/05/2019	21:24:36	Leisler's Bat	1	18.3	17.7	18.9	5.2	0	12	53.372538	-6.191325
15/05/2019	21:25:12	Leisler's Bat	1	18	17.4	18.6	5.9	0	12	53.372299	-6.191017
15/05/2019	21:25:37	Leisler's Bat	2	15.3	14.9	16.3	6.2	45	12	53.37234	-6.190817
15/05/2019	21:25:46	Leisler's Bat	2	17.7	16.9	19.5	7.5	422	12	53.372346	-6.190733
15/05/2019	21:27:11	Leisler's Bat	8	24.2	24.1	24.5	21.6	123	12	53.372286	-6.190122
15/05/2019	21:34:35	Leisler's Bat	1	24.4	24.1	24.4	30.8	0	11	53.373895	-6.187902
15/05/2019	21:39:23	Leisler's Bat	1	19.5	18.9	19.8	6.6	0	11	53.374362	-6.190052
15/05/2019	21:42:27	Leisler's Bat	1	21.4	20.7	22	5.9	0	11	53.373576	-6.191187
15/05/2019	21:43:21	Leisler's Bat	6	26.2	25.4	26.6	16.6	531	11	53.373555	-6.191212
15/05/2019	21:44:35	Leisler's Bat	1	33.9	33.6	33.9	13.1	0	11	53.373561	-6.191194
15/05/2019	21:45:35	Leisler's Bat	2	28.4	28.1	28.7	4.6	0	11	53.373387	-6.191373
15/05/2019	21:46:43	Leisler's Bat	2	16.5	15.6	18.3	2	0	12	53.373439	-6.191456
15/05/2019	21:47:05	Leisler's Bat	1	33.6	33.6	34.5	11.8	0	12	53.373281	-6.191508
15/05/2019	21:47:26	Leisler's Bat	1	33.9	33.6	33.9	9.8	0	12	53.373168	-6.19158
15/05/2019	21:47:35	Leisler's Bat	1	17.1	16.8	17.4	5.9	0	12	53.373136	-6.191697
15/05/2019	21:47:50	Leisler's Bat	1	16.5	14.9	18.6	3.9	0	12	53.373243	-6.191838
15/05/2019	21:47:56	Leisler's Bat	1	33.9	33.6	33.9	4.6	0	12	53.373293	-6.191902
15/05/2019	21:48:04	Leisler's Bat	2	23.2	22.9	27.1	1.3	0	12	53.373346	-6.192005
15/05/2019	21:48:11	Leisler's Bat	2	16.9	16.3	17.8	3.3	851	12	53.373357	-6.1921
15/05/2019	21:48:30	Leisler's Bat	1	33.6	33.6	33.9	6.6	0	12	53.373395	-6.192396
15/05/2019	21:48:34	Leisler's Bat	1	15.6	14.9	15.9	12.5	0	12	53.37341	-6.19248
15/05/2019	21:48:45	Leisler's Bat	3	17.5	16.8	19.5	6.2	272	12	53.373434	-6.192553
15/05/2019	21:49:05	Leisler's Bat	1	17.4	17.1	17.7	4.6	0	12	53.373433	-6.192619
15/05/2019	21:49:45	Leisler's Bat	1	16.5	15.9	18	2	0	12	53.373467	-6.192588
15/05/2019	21:50:24	Leisler's Bat	2	16.2	15.9	16.5	7.2	411	12	53.373365	-6.192082
15/05/2019	21:51:03	Leisler's Bat	1	18.3	14.9	20.1	2	0	12	53.37336	-6.191792
15/05/2019	21:51:11	Leisler's Bat	1	16.5	16.2	17.1	5.2	0	12	53.373287	-6.191785
15/05/2019	21:51:19	Leisler's Bat	1	14.9	14.9	15.3	7.9	0	12	53.373219	-6.191795
15/05/2019	21:51:22	Brown Long Eared Bat	2	21	18	26.8	1.3	0	12	53.373188	-6.191789
15/05/2019	21:51:38	Leisler's Bat	2	16.2	14.9	18.5	7.2	701	12	53.373153	-6.191611
15/05/2019	21:51:44	Leisler's Bat	1	19.8	18.3	22.9	9.2	0	12	53.373125	-6.19154
15/05/2019	21:53:45	Leisler's Bat	1	27.1	26.2	28.1	7.9	0	11	53.372559	-6.190263
15/05/2019	22:00:58	Leisler's Bat	6	28.9	26.6	32.3	4.7	317	11	53.373668	-6.188027
15/05/2019	22:05:41	Leisler's Bat	1	21.7	21.4	22	5.9	0	12	53.374001	-6.190033
15/05/2019	22:05:48	Leisler's Bat	1	19.2	17.4	22	5.2	0	12	53.37399	-6.190095
15/05/2019	22:06:41	Leisler's Bat	1	19.8	19.5	21.7	2	0	11	53.373837	-6.190667
15/05/2019	22:08:37	Leisler's Bat	2	16.9	16	17.7	5.9	156	11	53.373278	-6.190979
15/05/2019	22:09:21	Leisler's Bat	2	16.5	16	16.8	5.6	286	11	53.37291	-6.190804
15/05/2019	22:09:55	Leisler's Bat	1	33.9	33.6	33.9	9.8	0	11	53.372669	-6.190601
15/05/2019	22:10:03	Leisler's Bat	2	16.5	16.2	17.4	6.6	136	11	53.372608	-6.190533
15/05/2019	22:10:16	Leisler's Bat	2	23.2	23.2	26.5	6.6	0	11	53.37253	-6.19039
15/05/2019	22:10:58	Leisler's Bat	1	34.2	33.6	37.8	2	0	11	53.372423	-6.190262
15/05/2019	22:11:31	Leisler's Bat	2	17.7	14.9	18.3	6.6	0	11	53.372545	-6.190238
15/05/2019	22:22:01	Leisler's Bat	1	19.8	19.8	20.1	9.2	0	11	53.372589	-6.190251
15/05/2019	22:23:33	Leisler's Bat	2	23.8	23.8	24.1	7.2	0	11	53.372565	-6.190226
15/05/2019	22:25:19	Leisler's Bat	1	21.7	19.8	23.2	2	0	11	53.373061	-6.191102
15/05/2019	22:27:16	Leisler's Bat	1	28.1	27.8	28.1	5.2	0	11	53.373472	-6.192842
15/05/2019	22:27:31	Leisler's Bat	1	16.8	15.9	18.6	10.5	0	11	53.373478	-6.19316
15/05/2019	22:27:52	Leisler's Bat	1	27.1	26.8	27.5	5.2	0	11	53.373378	-6.19352
16/05/2019	21:16:51	Leisler's Bat	1	15.6	14.9	15.9	10.5	0	14	53.373304	-6.192603
16/05/2019	21:20:58	Leisler's Bat	7	22.4	21.7	23	11.9	266	12	53.373863	-6.191468
16/05/2019	21:27:31	Leisler's Bat	6	23.3	22.8	24.7	12	268	12	53.374859	-6.190218
16/05/2019	21:27:48	Leisler's Bat	2	22	21.4	24.4	2	0	12	53.374816	-6.190081
16/05/2019	21:31:42	Leisler's Bat	3	21.4	19.4	22.1	5.2	455	11	53.374269	-6.187952
16/05/2019	21:32:40	Leisler's Bat	1	18.9	18.6	19.2	5.2	0	11	53.373935	-6.18764
16/05/2019	21:32:51	Leisler's Bat	1	17.7	17.1	17.7	4.6	0	11	53.373864	-6.18762
16/05/2019	21:34:25	Leisler's Bat	1	18.9	18.3	19.8	10.5	0	11	53.373224	-6.18768
16/05/2019	21:39:42	Leisler's Bat	1	16.8	15.9	17.4	4.6	0	10	53.372371	-6.189915
16/05/2019	21:42:10	Leisler's Bat	2	24.1	24.1	24.4	11.8	0	10	53.372824	-6.191063
16/05/2019	21:42:57	Leisler's Bat	2	25.6	18.3	32.3	2	0	10	53.373129	-6.191532
16/05/2019	21:44:51	Leisler's Bat	1	29.6	29.3	29.6	7.9	0	10	53.372514	-6.191221
16/05/2019	21:55:15	Leisler's Bat	1	24.4	23.8	24.4	9.8	0	10	53.37228	-6.18945
16/05/2019	21:55:53	Leisler's Bat	1	24.4	24.1	24.4	17	0	10	53.372237	-6.188997
16/05/2019	21:59:39	Leisler's Bat	1	18.3	14.9	22	1.3	0	10	53.373056	-6.187721
16/05/2019	21:59:52	Leisler's Bat	1	24.1	24.1	24.4	21.6	0	10	53.37315	-6.187712
16/05/2019	22:01:21	Leisler's Bat	1	23.8	14.9	29.6	2	0	10	53.373601	-6.187576
16/05/2019	22:01:40	Brown Long Eared Bat	3	18	14.9	24.7	1.3	0	10	53.373602	-6.187582
16/05/2019	22:02:02	Leisler's Bat	1	28.4	28.1	28.4	8.5	0	10	53.373613	-6.187593
16/05/2019	22:02:12	Common Pipistrelle	1	46.4	45.4	48.5	2	0	10	53.373613	-6.187593
16/05/2019	22:02:42	Leisler's Bat	2	22.3	20.7	23.8	17	0	11	53.373622	-6.187595
16/05/2019	22:05:38	Leisler's Bat	1	16.5	16.2	17.1	6.6	0	10	53.374379	-6.188398
16/05/2019	22:09:05	Leisler's Bat	1	35.4	35.4	36	19.7	0	10	53.374672	-6.190125
16/05/2019	22:09:13	Nathusis Pipistrelle	1	35.4	35.4	35.7	7.2	0	10	53.374584	-6.190163
16/05/2019	22:09:20	Leisler's Bat	1	24.4	24.1	24.4	4.6	0	10	53.374514	-6.190223
16/05/2019	22:09:24	Leisler's Bat	2	23.9	23.3	24.1	10.5	241	10	53.374489	-6.190249
16/05/2019	22:09:45	Nathusis Pipistrelle	1	35.4	35.4	35.7	9.8	0	10	53.374259	-6.190347
16/05/2019	22:09:54	Leisler's Bat	5	24.4	24.1	24.6	19.5	519	10	53.374164	-6.19039
16/05/2019	22:10:38	Leisler's Bat	1	24.1	24.1	24.4	6.6	0	10	53.373751	-6.190552
16/05/2019	22:11:17	Leisler's Bat	1	18.6	17.7	19.5	7.2	0	10	53.37355	-6.190684
16/05/2019	22:11:42	Leisler's Bat	1	24.4	24.1	24.4	5.2	0	10	53.37341	-6.190926
16/05/2019	22:11:49	Leisler's Bat	3	24.3	24.1	24.4	12.7	481	10	53.373357	-6.190992
16/05/2019	22:11:55	Leisler's Bat	1	24.1	24.1	24.4	13.8	0	10	53.373318	-6.191064
16/05/2019	22:12:01	Leisler's Bat	1	24.1	24.1	24.7	13.1	0	10	53.373285	-6.191157
16/05/2019	22:12:08	Leisler's Bat	1	24.4	24.1	24.4	13.8	0	10	53.373246	-6.191239
16/05/2019	22:13:15	Leisler's Bat	2	17.4	17.1	17.4	7.2	0	10	53.373399	-6.191478
16/05/2019	22:14:39	Leisler's Bat	2	24.4	24.1	24.4	11.8	0	11	53.373189	-6.191576
16/05/2019	22:14:48	Leisler's Bat	1	24.4	21	24.4	11.1	0	11	53.37317	-6.191685
16/05/2019	22:15:49	Leisler's Bat	1	28.7	28.4	29	6.6	0	11	53.373378	-6.192374
16/05/2019	22:15:56	Leisler's Bat	1	22.6	22	22.6	7.2	0	11	53.373385	-6.192451
16/05/2019	22:16:22	Leisler's Bat	2	20.1	18.6	26.2	2	0	11	53.373531	-6.192476
16/05/2019	22:17:13	Leisler's Bat	3	17.4	17.1	17.7	8.8	267	12	53.373483	-6.192575
16/05/2019	22:17:42	Leisler's Bat	1	28.7	28.1	29	5.9	0	12	53.373219	-6.192413
16/05/2019	22:18:31	Leisler's Bat	4	21.6	20.9	22.1	15.7	590	11	53.373148	-6.191624
16/05/2019	22:18:37	Leisler's Bat	3	21.5	20.7	22.2	19	300	11	53.373115	-6.191559
16/05/2019	22:23:05	Leisler's Bat	1	20.1	19.8	24.4	2	0	11	53.372324	-6.189871
16/05/2019	22:23:51	Natterer's Bat	1	15.3	14.9	19.5	1.3	0	10	53.372257	-6.189456
16/05/2019	22:26:24	Leisler's Bat	1	20.4	14.9	21.4	2	0	10	53.372154	-6.188241
16/05/2019	22:30:37	Brown Long Eared Bat	1	22	19.8	24.7	2	0	10	53.373539	-6.187654
16/05/2019	22:31:20	Leisler's Bat	1	25	24.7	25.3	8.5	0	10	53.373821	-6.187646
16/05/2019	22:32:08	Natterer's Bat	1	21.7	20.4	24.1	1.3	0	9	53.374094	-6.187688

16/05/2019	22:32:19	Natterer's Bat	1	24.7	24.1	30.8	1.3	0	9	53.374175	-6.18774
16/05/2019	22:32:27	Brown Long Eared Bat	1	32.3	30.2	33.9	2	0	9	53.37422	-6.187743
16/05/2019	22:33:44	Leisler's Bat	1	23.2	17.4	27.8	3.9	0	9	53.374424	-6.188511
16/05/2019	22:33:52	Nathusis Pipistrelle	1	37.8	36.9	38.1	5.2	0	9	53.374449	-6.188603
16/05/2019	22:34:49	Leisler's Bat	1	25	24.7	25.3	6.6	0	9	53.374542	-6.189232
16/05/2019	22:36:30	Leisler's Bat	1	24.4	24.1	26.5	2	0	9	53.374671	-6.190169
16/05/2019	22:37:47	Leisler's Bat	1	25	24.7	25	8.5	0	9	53.374357	-6.190678
16/05/2019	22:37:53	Leisler's Bat	3	19.5	17.1	20.4	4.6	0	9	53.374323	-6.190696
16/05/2019	22:37:56	Leisler's Bat	2	18.9	14.9	19.2	2	0	9	53.374313	-6.190685
16/05/2019	22:38:02	Leisler's Bat	2	25	24.7	25.6	7.2	0	9	53.374284	-6.190681
16/05/2019	22:38:32	Nathusis Pipistrelle	1	36.6	36.3	36.9	4.6	0	9	53.374119	-6.190819
16/05/2019	22:39:11	Leisler's Bat	1	25	24.7	25.3	4.6	0	10	53.373888	-6.191023
16/05/2019	22:40:16	Leisler's Bat	1	36.6	35.7	36.6	15.7	0	9	53.37355	-6.191199
16/05/2019	22:41:19	Leisler's Bat	4	17.5	17.2	18.3	6.9	735	10	53.373118	-6.191231
16/05/2019	22:44:27	Leisler's Bat	1	25	25	25.3	5.2	0	9	53.37269	-6.19023
16/05/2019	22:56:24	Leisler's Bat	1	20.4	19.8	21	17	0	9	53.372948	-6.191452
16/05/2019	22:56:41	Natterer's Bat	1	23.5	14.9	28.4	1.3	0	9	53.373114	-6.191576
16/05/2019	23:00:13	Leisler's Bat	1	16.8	14.9	17.1	7.9	0	11	53.373523	-6.192637
16/05/2019	23:00:22	Leisler's Bat	2	16.8	16.2	19.2	4.3	140	11	53.373504	-6.192756
16/05/2019	23:00:28	Leisler's Bat	2	24.4	24.1	24.4	21.6	0	11	53.373491	-6.192869
16/05/2019	23:00:36	Leisler's Bat	3	19.8	19.5	21.4	4.6	0	11	53.373497	-6.193018
16/05/2019	23:00:44	Leisler's Bat	1	29.9	29.6	29.9	5.9	0	11	53.373485	-6.193153
16/05/2019	23:00:53	Leisler's Bat	1	18	17.7	18.6	5.2	0	11	53.373486	-6.193341

Breeding Status Codes

Non-breeding	
F	**F**lying over
M	Species observed but suspected to be still on **M**igration
U	Species observed but suspected to be s**U**mmering non-breeder
Possible breeder	
H	Species observed in breeding season in suitable nesting **H**abitat
S	**S**inging male present (or breeding calls heard) in breeding season in suitable breeding habitat
Probable breeding	
P	**P**air observed in suitable nesting habitat in breeding season
T	Permanent **T**erritory presumed through registration of territorial behaviour (song etc) on at least two different days a week or more part at the same place or many individuals on one day
D	Courtship and **D**isplay (judged to be in or near potential breeding habitat; be cautious with wildfowl)
N	Visiting probable **N**est site
A	**A**gitated behaviour or anxiety calls from adults, suggesting probable presence of nest or young nearby
I	Brood patch on adult examined in the hand, suggesting **I**ncubation
B	Nest **B**uilding or excavating nest-hole
Confirmed breeding	
DD	**D**istraction-**D**isplay or injury feigning
UN	**U**sed **N**est or eggshells found (occupied or laid within period of survey)
FL	Recently **FL**edged young (nidicolous species) or downy young (nidifugous species). Careful consideration should be given to the likely provenance of any fledged juvenile capable of significant geographical movement. Evidence of dependency on adults (e.g. feeding) is helpful. Be cautious, even if the record comes from suitable habitat.
ON	Adults entering or leaving nest-site in circumstances indicating **O**ccupied **N**est (including high nests or nest holes, the contents of which can not be seem) or adults seen incubating
FF	Adult carrying **F**aecal sac or **F**ood for young
NE	**N**est containing **E**ggs
NY	**N**est with **Y**oung seen or heard

St Pauls Breeding Bird Survey - March - May 2019			
	BTO Code	**Bird Species**	**Breeding Status**
1	B.	BLACKBIRD	In Song/Suitable Habitat
2	BC	BLACKCAP	In Song/Suitable Habitat
3	BT	BLUE TIT	In Song/Suitable Habitat
4	CC	CHIFFCHAFF	In Song/Suitable Habitat
5	CH	CHAFFINCH	In Song/Suitable Habitat
6	CT	COAL TIT	In Song/Suitable Habitat
7	D.	DUNNOCK	In Song/Suitable Habitat
8	GC	GOLDCREST	In Song/Suitable Habitat
9	GO	GOLDFINCH	In Song/Suitable Habitat
10	GR	GREENFINCH	In Song/Suitable Habitat
11	GT	GREAT TIT	In Song/Suitable Habitat
12	HC	HOODED CROW	In Suitable Habitat
13	HG	HERRING GULL	Flying Over - not breeding on site
14	HM	HOUSE MARTIN	Flying Over - not breeding on site
15	JD	JACKDAW	In Suitable Habitat
16	LB	LESSER BLACK-BACKED GULL	Flying Over - not breeding on site
17	LT	LONG-TAILED TIT	In Song/Suitable Habitat
18	M.	MISTLE THRUSH	In Song/Suitable Habitat
19	MG	MAGPIE	In Suitable Habitat
20	R.	ROBIN	In Song/Suitable Habitat
21	RO	ROOK	In Suitable Habitat
22	SG	STARLING	In Suitable Habitat
23	SH	SPARROWHAWK	In Suitable Habitat
24	SI	SWIFT	Flying Over - not breeding on site
25	SK	SISKIN	In Song/Suitable Habitat
26	SL	SWALLOW	Flying Over - not breeding on site
27	ST	SONG THRUSH	In Song/Suitable Habitat
28	TC	TREECREEPER	In Song/Suitable Habitat
29	WP	WOOD PIGEON	In Song/Suitable Habitat
30	WR	WREN	In Song/Suitable Habitat

Legend

Bird Observation Points

Survey Area

Project

Proposed Residential Development at St. Paul's College, Sybil Hill, Raheny, Dublin 5

Client

CREKAV TRADING GP LIMITED

Title

Breeding Bird Survey
March 2019

enviroguide consulting

a 3D Core C, Block 71, The Plaza Park West, Dublin 12 D12F9TN
w www.enviroguide.ie
e info@enviroguide.ie
t +353 (0)1 565 4730

Drawn by: LG	**Projection:** IRENET95 Irish Transverse Mercator
Checked : JD	
Date: 10/09/2019	**Scale:** 1:1,783 @A4

Notes:
Site boundaries shown are for illustration purposes only and do not represent legal or exact boundaries.

Legend

- Bird Observation Points
- Survey Area

Project

Proposed Residential Development at St. Paul's College, Sybil Hill, Raheny, Dublin 5

Client

CREKAV TRADING GP LIMITED

Title

Breeding Bird Survey
April 2019

enviroguide consulting
a 3D Core C, Block 71, The Plaza Park West, Dublin 12 D12F9TN
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t +353 (0)1 565 4730

Drawn by: LG	**Projection:** IRENET95 Irish Transverse Mercator
Checked : JD	
Date: 10/09/2019	**Scale:** 1:1,914 @A4

Notes:
Site boundaries shown are for illustration purposes only and do not represent legal or exact boundaries.

Legend

Bird Observation Points

Survey Area

Project

Proposed Residential Development at St. Paul's College, Sybil Hill, Raheny, Dublin 5

Client

CREKAV TRADING GP LIMITED

Title

Breeding Bird Survey
May 2019

enviroguide consulting

a 3D Core C, Block 71, The Plaza Park West, Dublin 12 D12F9TN
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t +353 (0)1 565 4730

Drawn by: LG	**Projection:** IRENET95 Irish Transverse Mercator
Checked : JD	
Date: 11/09/2019	**Scale:** 1:2,098 @A4

Notes:

Site boundaries shown are for illustration purposes only and do not represent legal or exact boundaries.

Appendix 6

6.1 Ground Investigation Reports

Appendix 6.1

Ground Investigation Reports (2015 and 2018)

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

GROUND INVESTIGATIONS IRELAND LTD

DEVELOPMENT AT ST PAULS RAHENY

GROUND INVESTIGATION REPORT

DOCUMENT CONTROL SHEET

Engineer	OCSC
Project Title	St Paul's Raheny
Project No	5228-07-15
Document Title	Ground Investigation Report

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
B	Final	C Finnerty	F McNamara	F McNamara	Dublin	30th October 2015

St Paul's Raheny –Ground Investigation Report

Appendices

1.0 Preamble

On the instructions of OCSC Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., between September and October 2015 at the site at St Paul's College in Raheny in North Dublin.

2.0 Overview

2.1 Background

It is proposed to construct a residential development with associated access roads and car parking at the proposed site and develop some playing pitches. The site is currently in use as playing fields for St Paul's College. The proposed development consists of a mix of residential buildings with multi-storey over basement proposed over a portion of the site with the remaining area containing two/three storey residential dwellings.

2.2 Purpose and Scope

The purpose of the site investigation was to investigate subsurface soil conditions by means of cable percussion boreholes. The scope of the work undertaken for this project included the following:

- Visit project site to observe existing conditions
- Carry out 10 No. Cable Percussion boreholes to a maximum depth of 8.0m BGL
- Standpipe installations and groundwater monitoring
- Laboratory testing
- Report with recommendations

3.0 Subsurface Exploration

3.1 General

During the ground investigation a programme of cable percussion boring was undertaken to determine the sub surface conditions at the proposed site. Regular sampling and in-situ testing was undertaken in the exploratory holes to facilitate the geotechnical descriptions and to enable laboratory testing to be carried out on the soil samples recovered during drilling.

3.2 Cable Percussion Boreholes

Ten Cable Percussion Boreholes were drilled using a Dando 2000 drilling rig with regular insitu testing and sampling undertaken to facilitate the production of geotechnical logs and laboratory testing.

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

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

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

The Standard Penetration Test number referred to as the ‘N’ value is the number of blows required to drive the tube 300mm, after an initial penetration of 150mm. The number gives a guide to the consistency of the soil and can also be used to estimate the relative strength/density at the depth of the test and also to estimate the bearing capacity and compressibility of the soil.

The Cable Percussion borehole logs are provided in Appendix 2 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.

3.3 Laboratory Testing

Samples were selected from the boreholes for a range of geotechnical classification testing to provide information for the proposed design. The environmental testing, including Waste Acceptance Criteria (WAC) was carried out by OCSC and is discussed under the cover of a separate report.

The results of the geotechnical laboratory testing are included in Appendix 3 of this Report.

4.0 Ground Conditions

4.1 Ground Conditions

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

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

- Made Ground
- Cohesive Deposits

Made Ground Deposits: Made Ground deposits were encountered beneath the ground surface or Topsoil and were present to a depths of between 0.8 and 1.5m BGL in the boreholes. These deposits were described generally consisted of *brown/grey sandy gravelly CLAY.*

Cohesive Deposits: Stiff brown cohesive deposits were present below the Made Ground deposits in the boreholes and were typically described as brown *sandy gravelly CLAY with occasional cobbles.* This stratum was present to a depth of up to 2.3m BGL and was underlain by a *stiff to very stiff black slightly sandy gravelly CLAY with occasional cobbles and boulders* to a maximum depth of 8.0m BGL.

4.2 Groundwater

The groundwater strikes were generally not encountered during the investigation in the cohesive 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, tidal influence, rainfall, nearby construction and other factors. For this reason standpipes were installed in BH1, BH2, BH3, BH6 and BH9 to allow the equilibrium groundwater level to be determined. The groundwater monitoring is included in Appendix 6 of this Report.

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 exploratory hole records. Where an opinion is expressed on the material between exploratory hole locations, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for conditions which have not been revealed by the exploratory holes. Limited information has been provided on the proposed building, excavations and loading and assumptions have been made based on discussions on site and the nature of the development.

5.2 Foundations

An allowable bearing capacity of 150kN/m^2 is recommended for the stiff brown cohesive deposits below the made ground depths of 0.80 – 1.50m BGL. An allowable bearing capacity of 300kN/m^2 is recommended for deeper foundations based on the stiff black cohesive deposits in the vicinity of the proposed basement.

5.3 Excavations

Excavations in the areas where deeper Made Ground deposits were encountered may require to be appropriately battered or the sides supported due to the variable strength of these deposits. Reference should be made to the OCSC environmental report and the testing completed to inform the disposal of any material to be excavated.

5.4 External Pavement

The proposed access roads and car parking are proposed to be founded on the firm to stiff cohesive deposits or on compacted imported fill material depending on the final level of the proposed roads. CBR testing should be undertaken prior to or at the time of construction to verify the design assumptions and the proposed pavement make up. An average value of 2.0% would be recommended for outline design on the firm to stiff cohesive deposits with pavement options presented for less than 2%, 5.0% and 10.0% where verified during the construction phase.

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


HOWTH ROAD
BH1
BH2
BH3
BH4
BH5
BH6
BH7
BH8
BH9
BH10

Appendix 2: Cable Percussion Borehole Records

Project Name: St. Paul's Raheny

Hole ID: BH1

Client:	New Generation	Co-ordinates:	720366.38 737591.04
Consultant:	OCSC	Elevation:	24.852
Location:	Raheny	Project no.	5228-07-15
Start date: 28/09/2015	End date: 29/09/2015	Drilled by:	F McArdle
Type of drilling: CP	Hole diameter: 200 mm	Logged by:	James Dunn

Strata Description

Strata Description	Depth	Level (mOD)
TOPSOIL	0.10	24.75
MADE GROUND comprising brown sandy gravelly Clay FILL	1.00	23.85
Stiff brown sandy gravelly CLAY with occassional cobbles	2.30	22.55
Stiff black sandy gravelly CLAY with occassional cobbles and boulders	5.50	19.35
Obstruction: Presumed Boulder	5.60	19.25

End of Borehole at 5.60 m

Samples / tests

Type	Depth	Result
SPT-C B+T	0.50 0.50	N=21
SPT-C B+T	1.00 1.00	N=15
SPT-C B+T	2.00 2.00	N=20
SPT-C	2.50	N=29
SPT-C B+T	3.00 3.00	N=41
SPT-C B+T	4.00 4.00	50/300mm
SPT-C B+T	5.10 5.10	N=40

Water Depth	Date
5.00	
5.60	29/09/2015

Remarks:

Chiselling from 3.6m to 3.8m BGL for 30 mins, from 4.7m to 4.8m BGL for 60 mins from 4.8m to 5.1m BGL for 35mins and from 5.5m to 5.6m BGL for 30mins
50mm standpipe with flush cover installed. Slotted with gravel response zone from 1.0m to 5.6m BGL and sealed from 0.0m to 1.0m BGL

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.

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Project Name: St. Paul's Raheny

Hole ID: BH2

Client:	New Generation	Co-ordinates:	720501.93 737565.25
Consultant:	OCSC	Elevation:	22.489
Location:	Raheny	Project no.	5228-07-15
Start date: 30/09/2015	End date: 01/10/2015	Drilled by:	F McArdle
Type of drilling: CP	Hole diameter: 200 mm	Logged by:	James Dunn

Strata Description	Legend	Depth	Level (mOD)	Samples / tests Type	Samples / tests Depth	Samples / tests Result	Water Depth	Date
TOPSOIL		0.20	22.29					
MADE GROUND comprising brown sandy gravelly Clay FILL				SPT-C B+T	0.50 0.50	N=33		
		0.80	21.69					
Stiff brown sandy gravelly CLAY with occassional cobbles				SPT-C B+T	1.00 1.00	N=22		
				SPT-C B+T	2.00 2.00	N=36		
		2.20	20.29					
Stiff black sandy gravelly CLAY with occassional cobbles and rare boulders				SPT-C B+T	3.00 3.00	N=41		
				SPT-C B+T	4.00 4.00	N=43		
				SPT-C B+T	5.00 5.00	N=39		
				SPT-C B+T	6.00 6.00	50/300mm		
				SPT-C B+T	7.00 7.00	N=47		
		8.00	14.49	SPT-C B+T	8.00 8.00	N=46		
End of Borehole at 8.00 m								

Remarks:

50mm standpipe with flush cover installed. Slotted with gravel response zone from 2.0m to 5.0m BGL and sealed from 0.0m to 2.0m BGL

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.

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Project Name: St. Paul's Raheny

Hole ID: BH3

Client:	New Generation	Co-ordinates:	720600.88 737513.70
Consultant:	OCSC	Elevation:	21.943
Location:	Raheny	Project no.	5228-07-15
Start date: 30/09/2015	End date: 01/10/2015	Drilled by:	F McArdle
Type of drilling: CP	Hole diameter: 200 mm	Logged by:	James Dunn

Strata Description	Depth	Level (mOD)	Samples / tests Type	Samples / tests Depth	Samples / tests Result	Water Depth	Date
TOPSOIL	0.10	21.84					
MADE GROUND comprising brown/grey sandy gravelly Clay FILL			SPT-C B+T	0.50 0.50	N=23		
			SPT-C B+T	1.00 1.00	N=29		
Stiff brown sandy gravelly CLAY with occassional cobbles	1.50	20.44	SPT-C	1.50	N=18		
Stiff black sandy gravelly CLAY with occassional cobbles and rare boulders	2.00	19.94	SPT-C B+T	2.00 2.00	N=46		
			SPT-C B+T	3.00 3.00	N=37		
			SPT-C B+T	4.00 4.00	N=37		
			SPT-C B+T	5.00 5.00	N=42		
Stiff grey sandy slightly gravelly CLAY	6.00	15.94	SPT-C B+T	6.00 6.00	50/300mm		
			SPT-C B+T	7.00 7.00	50/300mm		
						7.80 8.00	02/10/2015
End of Borehole at 8.00 m	8.00	13.94	B+T	8.00			

Remarks:

50mm standpipe with flush cover installed. Slotted with gravel response zone from 2.0m to 5.0m BGL and sealed from 0.0m to 2.0m BGL

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.

GROUND INVESTIGATIONS IRELAND

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Project Name: St. Paul's Raheny

Hole ID: BH4

Client: New Generation
Consultant: OCSC
Location: Raheny
Start date: 29/09/2015 | End date: 30/09/2015
Type of drilling: CP | Hole diameter: 200 mm

Co-ordinates: 720484.56 737484.02
Elevation: 23.349
Project no. 5228-07-15
Drilled by: F McArdle
Logged by: James Dunn

Strata Description	Depth	Level (mOD)	Samples / tests Type	Depth	Result	Water Depth	Date
TOPSOIL	0.10	23.25					
MADE GROUND comprising brown/grey sandy gravelly Clay FILL with cobbles			SPT-C B+T	0.50 0.50	N=23		
			SPT-C B+T	1.00 1.00	N=17		
	1.40	21.95					
Stiff brown sandy gravelly CLAY with occassional cobbles			SPT-C B+T	2.00 2.00	N=33		
	2.20	21.15					
Stiff black sandy gravelly CLAY with occassional cobbles and rare boulders			SPT-C B+T	3.00 3.00	N=38		
			SPT-C B+T	4.00 4.00	N=38		
			SPT-C B+T	5.00 5.00	N=43		
			SPT-C B+T	6.00 6.00	N=45		
			SPT-C B+T	7.00 7.00	N=45		
	8.00	15.35	SPT-C B+T	8.00 8.00	N=48		
End of Borehole at 8.00 m							

Remarks:
Chiselling from 4.7m to 4.9m BGL for 30mins
Borehole backfilled on completion

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.

GROUND INVESTIGATIONS IRELAND
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Project Name: St. Paul's Raheny

Hole ID: BH5

Client:	New Generation	Co-ordinates:	720591.52 737402.83
Consultant:	OCSC	Elevation:	22.407
Location:	Raheny	Project no.	5228-07-15
Start date: 02/10/2015	End date: 05/10/2015	Drilled by:	F McArdle
Type of drilling: CP	Hole diameter: 200 mm	Logged by:	James Dunn

Strata Description	Legend	Depth	Level (mOD)	Samples / tests Type	Depth	Result	Water Depth	Date
TOPSOIL		0.20	22.21					
MADE GROUND comprising brown/grey sandy gravelly Clay FILL with cobbles				SPT-C B+T	0.50 0.50	N=20		
				SPT-C B+T	1.00 1.00	N=21		
Stiff grey/brown sandy gravelly CLAY with occassional cobbles		1.30	21.11					
				SPT-C B+T	2.00 2.00	N=24		
Stiff black sandy gravelly CLAY with occassional cobbles and rare boulders		2.20	20.21					
				SPT-C	2.50	N=46		
				SPT-C B+T	3.00 3.00	N=43		
				SPT-C B+T	4.00 4.00	N=49		
				SPT-C B+T	5.00 5.00	N=38		
				SPT-C B+T	6.00 6.00	N=37		
				SPT-C B+T	7.00 7.00	N=45		
End of Borehole at 8.00 m		8.00	14.41	SPT-C B+T	8.00 8.00	N=40		

Remarks:
Borehole backfilled on completion

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.

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Project Name: St. Paul's Raheny

Hole ID: BH6

Client:	New Generation	Co-ordinates:	720466.04 737407.03
Consultant:	OCSC	Elevation:	23.223
Location:	Raheny	Project no.	5228-07-15
Start date: 08/10/2015	End date: 08/10/2015	Drilled by:	F McArdle
Type of drilling: CP	Hole diameter: 200 mm	Logged by:	James Dunn

Strata Description	Depth	Level (mOD)
TOPSOIL	0.10	23.12
MADE GROUND comprising brown sandy gravelly Clay FILL with cobbles	1.30	21.92
Stiff brown sandy gravelly CLAY with occassional cobbles	2.30	20.92
Stiff black sandy gravelly CLAY with occassional cobbles and boulders	7.80	15.42
Obstruction: Presumbed Boulder	7.90	15.32

End of Borehole at 7.90 m

Samples / tests: Type	Depth	Result	Water Depth	Date
SPT-C B+T	0.50 0.50	N=21		
SPT-C B+T	1.00 1.00	N=17		
SPT-C B	1.50 1.50	N=21		
SPT-C B+T	2.00 2.00	N=32		
SPT-C	2.50	N=33		
SPT-C B+T	3.00 3.00	N=35		
SPT-C B+T	4.00 4.00	N=40		
SPT-C B+T	5.00 5.00	N=39		
SPT-C B+T	6.00 6.00	N=42		
SPT-C B+T	7.00 7.00	N=45		

Remarks:

Chiselling from 7.8m to 7.9m BGL for 60mins
50mm standpipe with flush cover installed. Slotted with gravel response zone from 2.0m to 5.6m BGL and sealed from 0.0m to 2.0m BGL

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.

GROUND INVESTIGATIONS IRELAND

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Project Name: St. Paul's Raheny | Hole ID: BH7

Client: New Generation
Consultant: OCSC
Location: Raheny
Start date: 09/10/2015 End date: 09/10/2015
Type of drilling: CP Hole diameter: 200 mm

Co-ordinates: 720347.86 737449.43
Elevation: 23.972
Project no. 5228-07-15
Drilled by: F McArdle
Logged by: James Dunn

Strata Description	Depth	Level (mOD)
TOPSOIL	0.20	23.77
MADE GROUND comprising brown/grey sandy gravelly Clay FILL with cobbles	0.90	23.07
Stiff brown sandy gravelly CLAY with occassional cobbles	2.20	21.77
Stiff black sandy gravelly CLAY with occassional cobbles and rare boulders	8.50	15.47
End of Borehole at 8.50 m		

Samples / tests Type	Depth	Result	Water Depth	Date
SPT-C B+T	0.50 0.50	N=20		
SPT-C B+T	1.00 1.00	N=17		
SPT-C B+T	2.00 2.00	N=30		
SPT-C B+T	3.00 3.00	N=36		
SPT-C B+T	4.00 4.00	N=38		
SPT-C B+T	5.00 5.00	N=37		
SPT-C B+T	6.00 6.00	N=41		
SPT-C B+T	7.00 7.00	50/180mm		
SPT-C B+T	8.00 8.00	N=45		

Remarks:
Chiselling from 7.4m to 7.6m BGL for 30mins
Borehole backfilled on completion

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.

GROUND INVESTIGATIONS IRELAND
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Project Name: St. Paul's Raheny

Hole ID: BH8

Client:	New Generation	Co-ordinates:	720443.89 737307.54
Consultant:	OCSC	Elevation:	22.279
Location:	Raheny	Project no.	5228-07-15
Start date: 06/10/2015	End date: 06/10/2015	Drilled by:	F McArdle
Type of drilling: CP	Hole diameter: 200 mm	Logged by:	James Dunn

Strata Description	Depth	Level (mOD)	Samples / tests Type	Samples / tests Depth	Samples / tests Result	Water Depth	Date
TOPSOIL	0.20	22.08					
MADE GROUND comprising brown/grey sandy gravelly Clay FILL with cobbles and fragments of plastic			SPT-C B+T	0.50 0.50	N=25		
			SPT-C B+T	1.00 1.00	N=20		
	1.20	21.08					
Stiff grey brown sandy gravelly CLAY with occassional cobbles			SPT-C B+T	2.00 2.00	N=18		
			SPT-C	2.50	N=23		
	3.00	19.28	SPT-C B+T	3.00 3.00	N=28		
Stiff black sandy gravelly CLAY with occassional cobbles and rare boulders			SPT-C B+T	4.00 4.00	N=37		
			SPT-C B+T	5.00 5.00	N=38		
			SPT-C B+T	6.00 6.00	N=38		
			SPT-C B+T	7.00 7.00	N=45		
	8.00	14.28	SPT-C B+T	8.00 8.00	50/300mm		
End of Borehole at 8.00 m							

Remarks:

Borehole backfilled on completion

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.

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Project Name: St. Paul's Raheny

Hole ID: BH9

Client:	New Generation	Co-ordinates:	720588.42 737295.98
Consultant:	OCSC	Elevation:	21.421
Location:	Raheny	Project no.	5228-07-15
Start date: 05/10/2015	End date: 06/10/2015	Drilled by:	F McArdle
Type of drilling: CP	Hole diameter: 200 mm	Logged by:	James Dunn

Strata Description	Depth	Level (mOD)
TOPSOIL	0.10	21.32
MADE GROUND comprising brown/grey sandy gravelly Clay FILL with cobbles	1.00	20.42
Stiff brown sandy gravelly CLAY with occassional cobbles	2.20	19.22
Firm to stiff black slightly silty gravelly CLAY with occassional cobbles	3.00	18.42
Stiff black sandy gravelly CLAY with occassional cobbles and rare boulders	8.00	13.42
End of Borehole at 8.00 m		

Samples / tests: Type	Depth	Result	Water Depth	Date
SPT-C B+T	0.50 0.50	N=19		
SPT-C B+T	1.00 1.00	N=18		
SPT-C B+T	2.00 2.00	N=15		
SPT-C B	2.50 2.50	N=14		
SPT-C B+T	3.00 3.00	N=28		
SPT-C B+T	4.00 4.00	N=37		
SPT-C B+T	5.00 5.00	N=41		
SPT-C B+T	6.00 6.00	N=37		
SPT-C B+T	7.00 7.00	N=38		
SPT-C B+T	8.00 8.00	N=38		

Remarks:
50mm standpipe with flush cover installed. Slotted with gravel response zone from 2.0m to 5.0m BGL and sealed from 0.0m to 2.0m BGL

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.

GROUND INVESTIGATIONS IRELAND
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Project Name: St. Paul's Raheny — Hole ID: BH10

Client:	New Generation	Co-ordinates:	720389.97 737509.16
Consultant:	OCSC	Elevation:	24.554
Location:	Raheny	Project no.	5228-07-15
Start date: 07/10/2015	End date: 07/10/2015	Drilled by:	F McArdle
Type of drilling: CP	Hole diameter: 200 mm	Logged by:	James Dunn

Strata Description	Legend	Depth	Level (mOD)
TOPSOIL		0.10	24.45
MADE GROUND comprising brown/grey sandy gravelly Clay FILL with cobbles		1.50	23.05
Stiff brown sandy gravelly CLAY with occassional cobbles		2.30	22.25
Stiff black sandy gravelly CLAY with occassional cobbles and rare boulders and gravell lenses from 8.0m to 8.1m BGL		8.10	16.45
Obstruction: Presumed Boulder		8.20	16.35
End of Borehole at 8.20 m			

Samples / tests: Type	Depth	Result	Water Depth	Date
SPT-C B+T	0.50 0.50	N=14		
SPT-C B+T	1.00 1.00	N=12		
SPT-C B	1.50 1.50	N=18		
SPT-C B+T	2.00 2.00	N=29		
SPT-C B	2.50 2.50	N=17		
SPT-C B+T	3.00 3.00	N=30		
SPT-C B+T	4.00 4.00	N=37		
SPT-C B+T	5.00 5.00	N=40		
SPT-C B+T	6.00 6.00	N=39		
SPT-C B+T	7.00 7.00	N=43		
			7.70	
SPT-C B+T	8.00 8.00	50/180mm	8.00	07/10/2015

Remarks:
Chiselling from 8.1m to 8.2m BGL for 30mins
Borehole backfilled on completion

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.

GROUND INVESTIGATIONS IRELAND
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Appendix 3: Laboratory Testing

National Materials Testing Laboratory Ltd.

SUMMARY OF TEST RESULTS

BH/TP No	Depth m	Moisture %	Particle Density Mg/m3	<425um %	LL %	Index Properties PL %	PI %	Bulk Density Mg/m3	Cell Presssure kPa	Undrained Triaxial Tests Compressive Stress kPa	Strain at Failure %	Shear Strength Cu kPa	Mode of Failure
BH5	2.50	12.3		59.8	30	15	15						
BH5	5.60	11.0		58.7	28	15	13						
BH5	8.00	8.6		57.5	28	14	14						
BH7	1.00	14.5		64.2	31	17	14						
BH7	4.00	13.3		57.3	28	15	13						
BH9	0.50	22.9		48.9	55	30	25						
BH9	1.00	14.5		58.8	34	18	16						
BH9	2.00	13.3		62.3	30	16	14						

NMTL

Notes :

1. All BS tests carried out using preferred (definitive) method unless otherwise stated.

Job ref No. NMTL 1489

Table

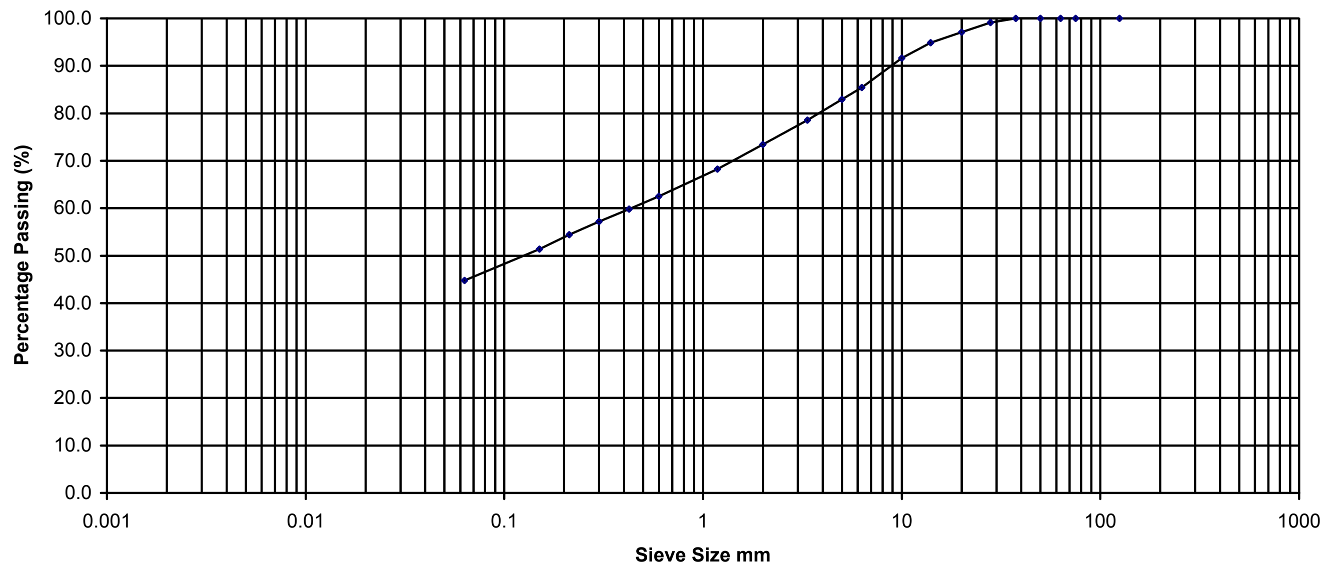
Location St Paul's Rahney

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	99.1
20.000	97.1
14.000	94.9
10.000	91.6
6.300	85.4
5.000	82.9
3.350	78.5
2.000	73.4
1.180	68.3
0.600	62.5
0.425	59.8
0.300	57.2
0.212	54.4
0.150	51.4
0.063	44.8

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel				
0.0	44.8			28.6			26.6			0.0	0.0

Sample Description: Dark grey slightly gravelly slightly sandy SILT/CLAY.

Project: St Paul's Rahney

Project No.	NMTL 1489
BH/TP No.	BH5
Sample No.	B
Depth	2.50m

NM TL Ltd

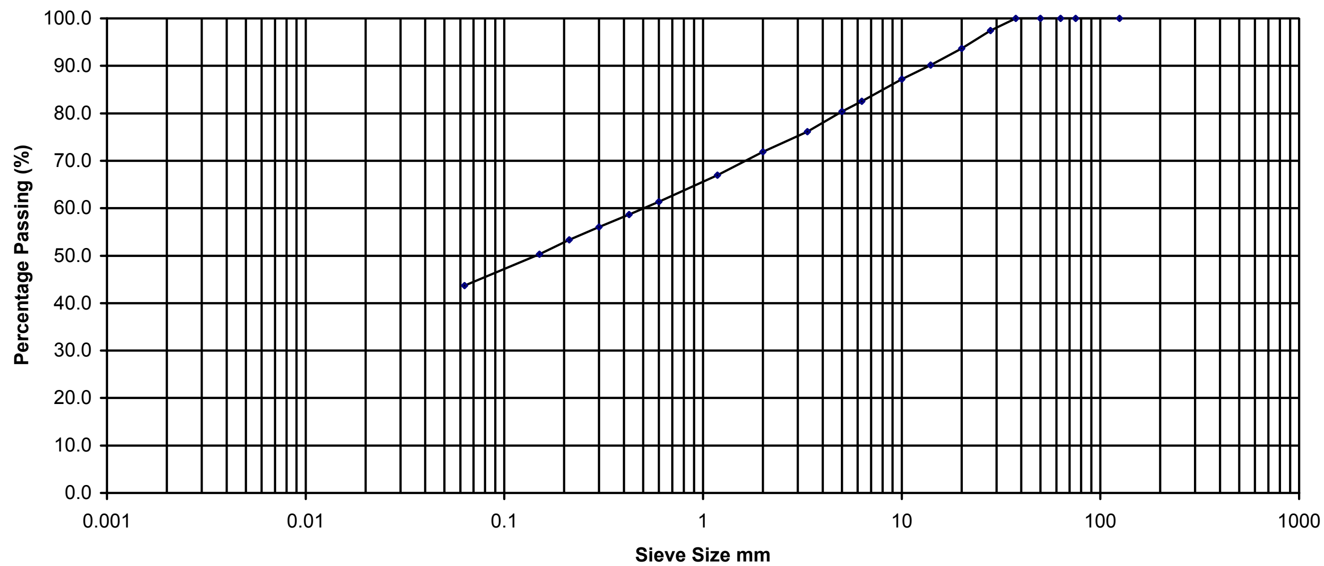
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	22/10/2015

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	97.5
20.000	93.7
14.000	90.1
10.000	87.2
6.300	82.5
5.000	80.4
3.350	76.1
2.000	71.8
1.180	67.0
0.600	61.3
0.425	58.7
0.300	56.1
0.212	53.3
0.150	50.3
0.063	43.7

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine Medium Coarse	Fine Medium Coarse	Fine Medium Coarse	Cobbles	Boulder
	Silt	Sand	Gravel		
0.0	43.7	28.2	28.2	0.0	0.0

Sample Description: Dark grey slightly gravelly slightly sandy SILT/CLAY.

Project: St Paul's Rahney

Project No.	NMTL 1489
BH/TP No.	BH5
Sample No.	B
Depth	5.60m

NM TL Ltd

Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	22/10/2015

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	97.8
28.000	94.9
20.000	93.5
14.000	88.1
10.000	85.5
6.300	80.9
5.000	78.4
3.350	75.1
2.000	70.7
1.180	65.7
0.600	60.1
0.425	57.5
0.300	54.9
0.212	52.2
0.150	49.2
0.063	42.8

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Percentage Particle Size

Clay	Fine Medium Coarse	Fine Medium Coarse	Fine Medium Coarse	Cobbles	Boulder
	Silt	Sand	Gravel		
0.0	42.8	28.0	29.3	0.0	0.0

Sample Description: Dark grey slightly gravelly slightly sandy SILT/CLAY.

Project: St Paul's Rahney

Project No.: NMTL 1489
BH/TP No.: BH5
Sample No.: B
Depth: 8.00m

NM TL Ltd

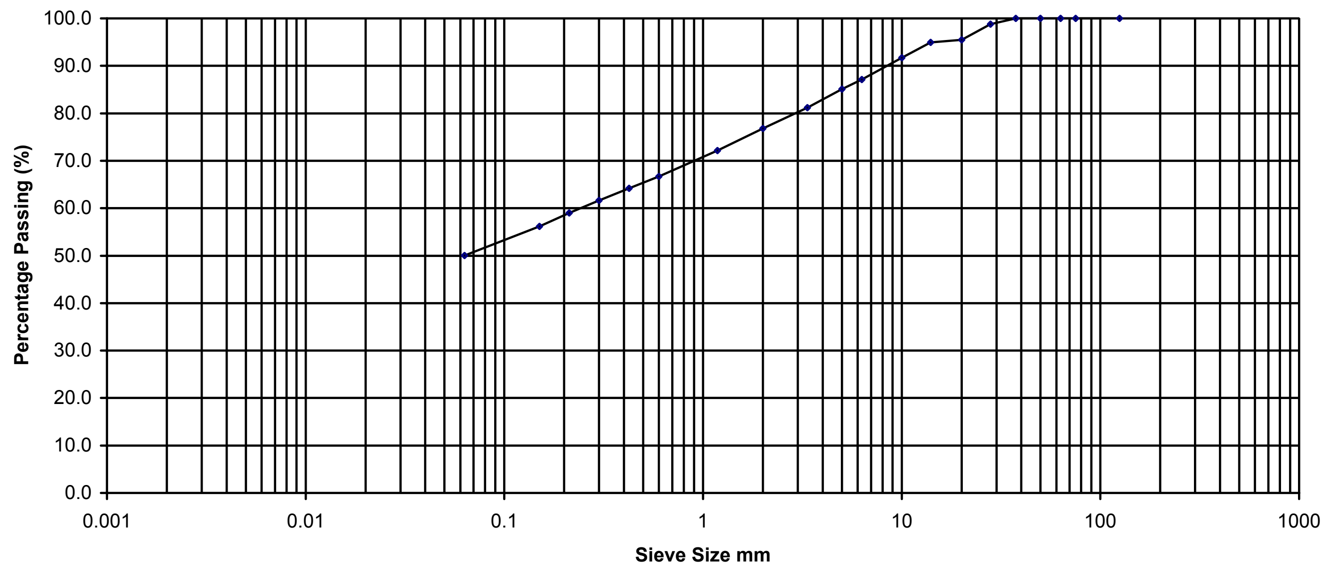
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	22/10/2015

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	98.8
20.000	95.5
14.000	95.0
10.000	91.7
6.300	87.2
5.000	85.1
3.350	81.2
2.000	76.8
1.180	72.1
0.600	66.7
0.425	64.2
0.300	61.6
0.212	59.0
0.150	56.2
0.063	50.1

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel				
0.0	50.1			26.7			23.2			0.0	0.0

Sample Description: Dark grey slightly gravelly slightly sandy SILT/CLAY.

Project: St Paul's Rahney

Project No.	NMTL 1489
BH/TP No.	BH7
Sample No.	B
Depth	1.00m

Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	22/10/2015

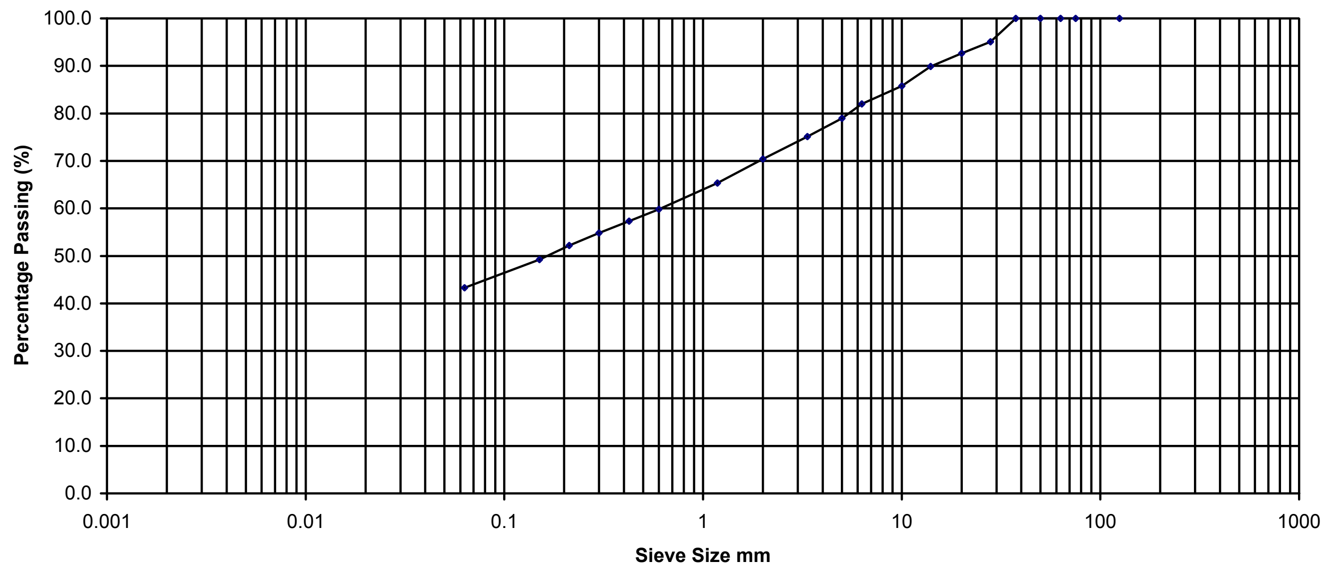
NM TL Ltd

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	95.1
20.000	92.7
14.000	89.9
10.000	85.8
6.300	82.0
5.000	78.9
3.350	75.1
2.000	70.4
1.180	65.3
0.600	59.8
0.425	57.3
0.300	54.8
0.212	52.2
0.150	49.2
0.063	43.3

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel				
0.0	43.3			27.1			29.6			0.0	0.0

Sample Description Dark grey slightly sandy slightly gravelly SILT/CLAY.

Project St Paul's Rahney

Project No.	NMTL 1489
BH/TP No.	BH7
Sample No.	B
Depth	4.00m

NM TL Ltd

Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	22/10/2015

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	77.3
28.000	70.8
20.000	69.2
14.000	66.3
10.000	64.7
6.300	61.7
5.000	60.6
3.350	58.4
2.000	56.1
1.180	53.5
0.600	50.5
0.425	48.9
0.300	46.9
0.212	44.9
0.150	42.5
0.063	37.6

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel				
0.0	37.6			18.5			43.9			0.0	0.0

Sample Description	Brown slightly sandy gravelly SILT/CLAY.	Project No.	NMTL 1489
		BH/TP No.	BH9
Project	St Paul's Rahney	Sample No.	B

NM TL Ltd

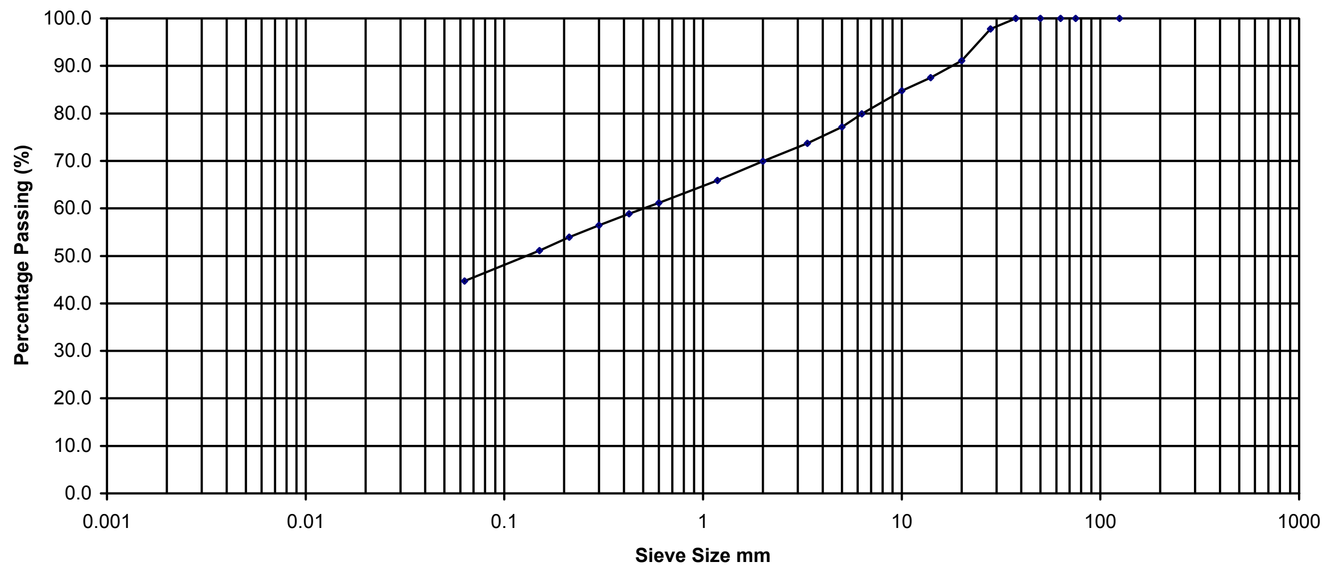
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	22/10/2015	Depth	0.50m

NMTL Ltd

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	97.8
20.000	91.1
14.000	87.5
10.000	84.7
6.300	79.9
5.000	77.1
3.350	73.7
2.000	69.9
1.180	65.9
0.600	61.1
0.425	58.8
0.300	56.5
0.212	54.0
0.150	51.1
0.063	44.7

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
	Silt			Sand			Gravel				
0.0	44.7			25.2			30.1			0.0	0.0

Sample Description: Brown slightly sandy slightly gravelly SILT/CLAY.

Project: St Paul's Rahney

Project No.	NMTL 1489
BH/TP No.	BH9
Sample No.	B
Depth	1.00m

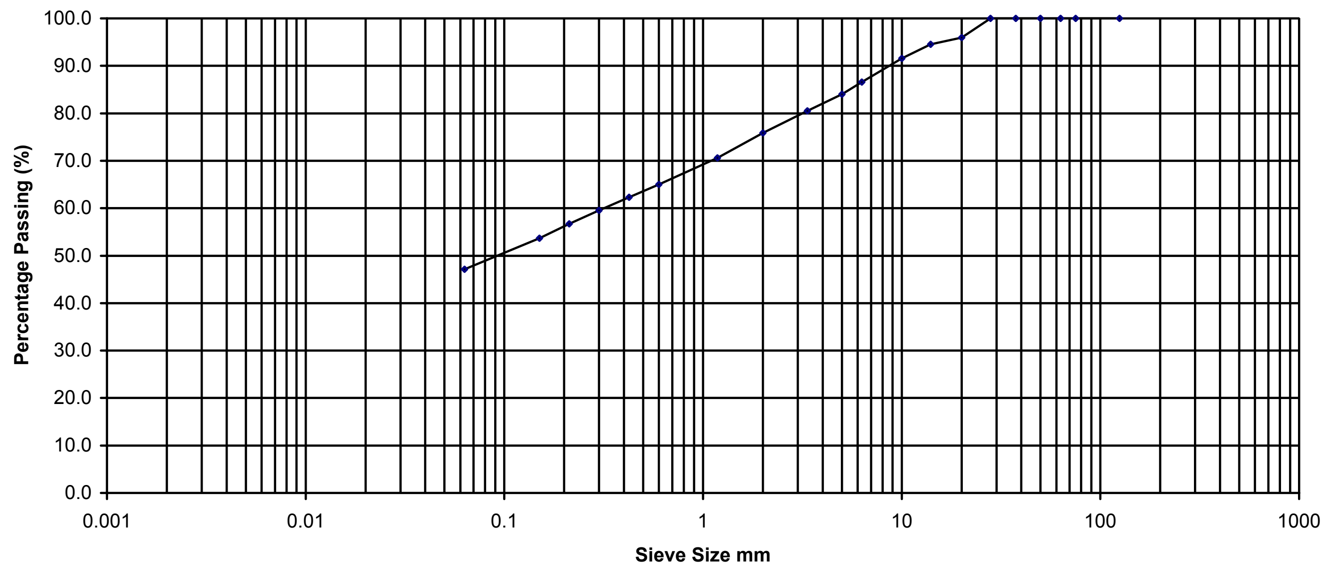
Operator: Tzr | Checked: Nc | Approved: Bc | Date sample tested: 23/10/2015

NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution
BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	100.0
20.000	96.0
14.000	94.5
10.000	91.6
6.300	86.6
5.000	84.0
3.350	80.5
2.000	75.8
1.180	70.6
0.600	65.0
0.425	62.3
0.300	59.6
0.212	56.7
0.150	53.7
0.063	47.1



Percentage Particle Size

Clay	Fine Medium Coarse	Fine Medium Coarse	Fine Medium Coarse	Cobbles	Boulder
	Silt	Sand	Gravel		
0.0	47.1	28.7	24.2	0.0	0.0

Sample Description	Brown/dark brown slightly gravelly slightly sandy SILT/CLAY.	Project No.	NMTL 1489
		BH/TP No.	BH9
Project	St Paul's Rahney	Sample No.	B

Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	23/10/2015	Depth	2.00m

NM TL Ltd

Jones Environmental Laboratory

Registered Address : Unit 3 Deeside Point, Zone 3, Deeside Industrial Park, Deeside, CH5 2UA. UK

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781

O'Connor Sutton Cronin & Assoc. Ltd
9 Prussia Street
Dublin 7
Ireland

4225

Attention :	Cian O'Hora
Date :	14th October, 2015
Your reference :	
Our reference :	Test Report 15/14318 Batch 1
Location :	St Pauls
Date samples received :	6th October, 2015
Status :	Final report
Issue :	1

Eleven samples were received for analysis on 6th October, 2015 of which eleven were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

Compiled By:

Bruce Leslie
Project Co-ordinator

Jones Environmental Laboratory

Client Name: O'Connor Sutton Cronin & Assoc. Ltd
Reference:
Location: St Pauls
Contact: Cian O'Hora
JE Job No.: 15/14318

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1	2	3	4	5	6	7	8	9	10			
Sample ID	BH1	BH1	BH2	BH2	BH2	BH2	BH3	BH4	BH4	BH4			
Depth	0.00-1.00	1.00-2.00	0.50	1.00	2.00	3.00	0.50	0.00-1.00	1.00-2.00	2.00-3.00			
COC No / misc													
Containers	T	T	T	T	T	T	T	T	T	T			
Sample Date	28/09/2015	28/09/2015	30/09/2015	30/09/2015	30/09/2015	30/09/2015	01/10/2015	03/10/2015	03/10/2015	03/10/2015			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015			
Antimony	<1	4	3	4	2	2	-	3	2	2	<1	mg/kg	TM30/PM15
Arsenic #	6.9	13.0	20.0	13.2	10.9	8.6	-	16.1	10.0	10.6	<0.5	mg/kg	TM30/PM15
Barium #	135	72	132	69	131	107	-	124	102	100	<1	mg/kg	TM30/PM15
Cadmium #	1.5	1.3	2.2	2.7	3.2	1.5	-	2.7	1.7	1.7	<0.1	mg/kg	TM30/PM15
Chromium #	28.0	33.2	60.6	31.4	34.0	34.0	-	58.0	30.0	28.4	<0.5	mg/kg	TM30/PM15
Copper #	20	25	33	22	27	22	-	36	23	24	<1	mg/kg	TM30/PM15
Lead #	15	19	48	18	18	22	-	59	19	19	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	2.6	6.1	4.9	7.7	4.5	2.9	-	3.7	3.7	4.1	<0.1	mg/kg	TM30/PM15
Nickel #	22.0	39.5	49.7	36.2	47.6	35.2	-	49.6	37.3	35.1	<0.7	mg/kg	TM30/PM15
Selenium #	<1	6	2	1	3	3	-	2	2	1	<1	mg/kg	TM30/PM15
Zinc #	49	62	109	67	91	63	-	101	75	70	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	0.05	<0.03	<0.03	0.04	0.16	0.06	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	0.02	<0.02	<0.02	0.03	0.07	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	99	106	95	101	99	102	106	103	95	101	<0	%	TM4/PM8
Mineral Oil >C8-C10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	mg/kg	TM5/PM16
Mineral Oil >C10-C12	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C12-C16	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C16-C21	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C21-C40	<10	87	<10	<10	<10	132	<10	<10	<10	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C8-C40	<45	87	<45	<45	<45	132	<45	<45	<45	<45	<45	mg/kg	TM5/PM16

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: O'Connor Sutton Cronin & Assoc. Ltd

Reference:

Location: St Pauls

Contact: Cian O'Hora

JE Job No.: 15/14318

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1	2	3	4	5	6	7	8	9	10			
Sample ID	BH1	BH1	BH2	BH2	BH2	BH2	BH3	BH4	BH4	BH4			
Depth	0.00-1.00	1.00-2.00	0.50	1.00	2.00	3.00	0.50	0.00-1.00	1.00-2.00	2.00-3.00			
COC No / misc													
Containers	T	T	T	T	T	T	T	T	T	T			
Sample Date	28/09/2015	28/09/2015	30/09/2015	30/09/2015	30/09/2015	30/09/2015	01/10/2015	03/10/2015	03/10/2015	03/10/2015			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015			
TPH CWG													
Aliphatics													
>C5-C6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12#	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM16
>C12-C16#	<4	<4	<4	<4	<4	<4	-	<4	<4	<4	<4	mg/kg	TM5/PM16
>C16-C21#	<7	<7	<7	<7	<7	<7	-	<7	<7	<7	<7	mg/kg	TM5/PM16
>C21-C35#	<7	87	<7	<7	8	132	-	<7	<7	<7	<7	mg/kg	TM5/PM16
>C35-C40#	<7	<7	<7	<7	<7	<7	-	<7	<7	<7	<7	mg/kg	TM5/PM16
Total aliphatics C5-40	<26	87	<26	<26	<26	132	-	<26	<26	<26	<26	mg/kg	TM5/TM36/PM12/PM16
>C6-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	<10	<10	17	-	<10	<10	<10	<10	mg/kg	TM5/PM16
>C25-C35	<10	76	<10	<10	<10	115	-	<10	<10	<10	<10	mg/kg	TM5/PM16
Aromatics													
>C5-EC7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM16
>EC12-EC16	<4	<4	<4	<4	<4	<4	-	<4	<4	<4	<4	mg/kg	TM5/PM16
>EC16-EC21	<7	<7	<7	<7	<7	<7	-	<7	<7	<7	<7	mg/kg	TM5/PM16
>EC21-EC35	<7	32	<7	<7	<7	55	-	<7	<7	<7	<7	mg/kg	TM5/PM16
>EC35-EC40	<7	<7	<7	<7	<7	<7	-	<7	<7	<7	<7	mg/kg	TM5/PM16
Total aromatics C5-40	<26	32	<26	<26	<26	55	-	<26	<26	<26	<26	mg/kg	TM5/TM36/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	119	<52	<52	<52	187	-	<52	<52	<52	<52	mg/kg	TM5/TM36/PM12/PM16
>EC6-EC10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	<10	<10	<10	-	<10	<10	<10	<10	mg/kg	TM5/PM16
>EC25-EC35	<10	32	<10	<10	<10	53	-	<10	<10	<10	<10	mg/kg	TM5/PM16
MTBE	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Benzene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Toluene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
m/p-Xylene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
o-Xylene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
PCB 28#	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52#	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101#	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118#	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138#	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153#	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180#	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs#	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8

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All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: O'Connor Sutton Cronin & Assoc. Ltd

Reference:

Location: St Pauls

Contact: Cian O'Hora

JE Job No.: 15/14318

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1	2	3	4	5	6	7	8	9	10			
Sample ID	BH1	BH1	BH2	BH2	BH2	BH2	BH3	BH4	BH4	BH4			
Depth	0.00-1.00	1.00-2.00	0.50	1.00	2.00	3.00	0.50	0.00-1.00	1.00-2.00	2.00-3.00			
COC No / misc													
Containers	T	T	T	T	T	T	T	T	T	T			
Sample Date	28/09/2015	28/09/2015	30/09/2015	30/09/2015	30/09/2015	30/09/2015	01/10/2015	03/10/2015	03/10/2015	03/10/2015			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015			
Natural Moisture Content	9.7	8.9	17.7	12.5	10.6	8.2	13.4	22.3	10.7	10.9	<0.1	%	PM4/PM0
% Dry Matter 105°C	85.9	86.9	85.4	89.6	88.8	89.6	85.5	79.7	88.9	87.7	<0.1	%	NONE/PM4
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0516	-	<0.0015	-	-	-	0.0027	0.0224	-	-	<0.0015	g/l	TM38/PM20
Chromium III	28.0	33.2	60.6	31.4	34.0	34.0	-	58.0	30.0	28.4	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.50	1.03	1.20	0.44	0.53	0.53	2.27	2.02	0.34	0.38	<0.02	%	TM21/PM24
pH #	8.65	-	8.50	-	-	-	8.36	8.56	-	-	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1051	0.1036	0.1056	0.1003	0.1011	0.1003	0.105	0.1133	0.1007	0.1022		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Client Name: O'Connor Sutton Cronin & Assoc. Ltd

Reference:

Location: St Pauls

Contact: Cian O'Hora

JE Job No.: 15/14318

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	11			
Sample ID	BH4			
Depth	3.00-4.00			
COC No / misc				
Containers	T			
Sample Date	03/10/2015			
Sample Type	Soil			
Batch Number	1			
Date of Receipt	06/10/2015	LOD/LOR	Units	Method No.
Antimony	2	<1	mg/kg	TM30/PM15
Arsenic #	10.0	<0.5	mg/kg	TM30/PM15
Barium #	121	<1	mg/kg	TM30/PM15
Cadmium #	2.0	<0.1	mg/kg	TM30/PM15
Chromium #	33.4	<0.5	mg/kg	TM30/PM15
Copper #	25	<1	mg/kg	TM30/PM15
Lead #	20	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	4.2	<0.1	mg/kg	TM30/PM15
Nickel #	39.8	<0.7	mg/kg	TM30/PM15
Selenium #	9	<1	mg/kg	TM30/PM15
Zinc #	86	<5	mg/kg	TM30/PM15
PAH MS				
Naphthalene #	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	99	<0	%	TM4/PM8
Mineral Oil >C8-C10	<5	<5	mg/kg	TM5/PM16
Mineral Oil >C10-C12	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C12-C16	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C16-C21	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C21-C40	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C8-C40	<45	<45	mg/kg	TM5/PM16

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All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: O'Connor Sutton Cronin & Assoc. Ltd
Reference:
Location: St Pauls
Contact: Cian O'Hora
JE Job No.: 15/14318

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	11												
Sample ID	BH4												
Depth	3.00-4.00												
COC No / misc													
Containers	T												
Sample Date	03/10/2015												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	06/10/2015										LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6	<0.1										<0.1	mg/kg	TM36/PM12
>C6-C8	<0.1										<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1										<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2										<0.2	mg/kg	TM5/PM16
>C12-C16 #	<4										<4	mg/kg	TM5/PM16
>C16-C21 #	<7										<7	mg/kg	TM5/PM16
>C21-C35 #	<7										<7	mg/kg	TM5/PM16
>C35-C40 #	<7										<7	mg/kg	TM5/PM16
Total aliphatics C5-40	<26										<26	mg/kg	TM5/TM36/PM12/PM16
>C6-C10	<0.1										<0.1	mg/kg	TM36/PM12
>C10-C25	<10										<10	mg/kg	TM5/PM16
>C25-C35	<10										<10	mg/kg	TM5/PM16
Aromatics													
>C5-EC7	<0.1										<0.1	mg/kg	TM36/PM12
>EC7-EC8	<0.1										<0.1	mg/kg	TM36/PM12
>EC8-EC10	<0.1										<0.1	mg/kg	TM36/PM12
>EC10-EC12	<0.2										<0.2	mg/kg	TM5/PM16
>EC12-EC16	<4										<4	mg/kg	TM5/PM16
>EC16-EC21	<7										<7	mg/kg	TM5/PM16
>EC21-EC35	<7										<7	mg/kg	TM5/PM16
>EC35-EC40	<7										<7	mg/kg	TM5/PM16
Total aromatics C5-40	<26										<26	mg/kg	TM5/TM36/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52										<52	mg/kg	TM5/TM36/PM12/PM16
>EC6-EC10	<0.1										<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10										<10	mg/kg	TM5/PM16
>EC25-EC35	<10										<10	mg/kg	TM5/PM16
MTBE	<5										<5	ug/kg	TM31/PM12
Benzene	<5										<5	ug/kg	TM31/PM12
Toluene	<5										<5	ug/kg	TM31/PM12
Ethylbenzene	<5										<5	ug/kg	TM31/PM12
m/p-Xylene	<5										<5	ug/kg	TM31/PM12
o-Xylene	<5										<5	ug/kg	TM31/PM12
PCB 28 #	<5										<5	ug/kg	TM17/PM8
PCB 52 #	<5										<5	ug/kg	TM17/PM8
PCB 101 #	<5										<5	ug/kg	TM17/PM8
PCB 118 #	<5										<5	ug/kg	TM17/PM8
PCB 138 #	<5										<5	ug/kg	TM17/PM8
PCB 153 #	<5										<5	ug/kg	TM17/PM8
PCB 180 #	<5										<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35										<35	ug/kg	TM17/PM8

All solid results are expressed on a dry weight basis unless stated otherwise.

Jones Environmental Laboratory

Client Name: O'Connor Sutton Cronin & Assoc. Ltd
Reference:
Location: St Pauls
Contact: Cian O'Hora
JE Job No.: 15/14318

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	11											
Sample ID	BH4											
Depth	3.00-4.00											
COC No / misc												
Containers	T											
Sample Date	03/10/2015											
Sample Type	Soil											
Batch Number	1											
Date of Receipt	06/10/2015										LOD/LOR	Units	Method No.
Natural Moisture Content	11.9										<0.1	%	PM4/PM0
% Dry Matter 105°C	89.0										<0.1	%	NONE/PM4
Hexavalent Chromium #	<0.3										<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	-										<0.0015	g/l	TM38/PM20
Chromium III	33.4										<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.65										<0.02	%	TM21/PM24
pH #	-										<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1008											kg	NONE/PM17
Mass of dried test portion	0.09											kg	NONE/PM17

Client Name: O'Connor Sutton Cronin & Assoc. Ltd
Reference:
Location: St Pauls
Contact: Cian O'Hora
JE Job No.: 15/14318

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1	2	3	4	5	6	7	8	9	10			
Sample ID	BH1	BH1	BH2	BH2	BH2	BH2	BH3	BH4	BH4	BH4			
Depth	0.00-1.00	1.00-2.00	0.50	1.00	2.00	3.00	0.50	0.00-1.00	1.00-2.00	2.00-3.00			
COC No / misc													
Containers	T	T	T	T	T	T	T	T	T	T			
Sample Date	28/09/2015	28/09/2015	30/09/2015	30/09/2015	30/09/2015	30/09/2015	01/10/2015	03/10/2015	03/10/2015	03/10/2015			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015			
Dissolved Antimony #	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.015	0.012	<0.003	<0.003	0.011	0.051	<0.003	<0.003	0.005	0.004	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.15	0.12	<0.03	<0.03	0.11	0.51	<0.03	<0.03	0.05	0.04	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.035	0.037	0.013	0.021	0.029	0.020	0.006	0.011	0.029	0.028	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.35	0.37	0.13	0.21	0.29	0.20	0.06	0.11	0.29	0.28	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	0.027	<0.003	<0.003	<0.003	0.028	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	0.27	<0.03	<0.03	<0.03	0.28	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003	0.004	0.004	<0.003	0.004	0.005	0.004	0.005	0.004	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	0.04	0.04	<0.03	0.04	0.05	0.04	0.05	0.04	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	0.00028	0.00006	<0.00001	0.00001	0.00029	0.00007	0.00003	0.00002	<0.00001	mg/l	TM61/PM38
Mercury Dissolved by CVAF #	<0.0001	<0.0001	0.0028	0.0006	<0.0001	<0.0001	0.0029	0.0007	0.0003	0.0002	<0.0001	mg/kg	TM61/PM38
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3	0.3	<0.3	<0.3	0.3	0.5	0.5	<0.3	<0.3	<0.3	mg/l	TM27/PM0
Fluoride	<3	<3	3	<3	<3	<3	5	5	<3	<3	<3	mg/kg	TM27/PM0
Chloride	1.1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	<0.3	mg/l	TM27/PM0
Chloride	11	<3	<3	<3	<3	<3	<3	4	<3	<3	<3	mg/kg	TM27/PM0
Sulphate	3.59	16.54	0.28	0.52	4.67	29.70	0.32	0.82	0.50	0.61	<0.05	mg/l	TM27/PM0
Sulphate	35.9	165.5	2.8	5.2	46.7	296.8	3.2	8.2	5.0	6.1	<0.5	mg/kg	TM27/PM0
Mass of raw test portion	0.1051	0.1036	0.1056	0.1003	0.1011	0.1003	0.105	0.1133	0.1007	0.1022		kg	NONE/PM17
Leachant Volume	0.885	0.887	0.885	0.89	0.889	0.889	0.885	0.877	0.889	0.887		l	NONE/PM17
Eluate Volume	0.65	0.75	0.83	0.83	0.85	0.6	0.8	0.75	0.85	0.83		l	NONE/PM17
Dissolved Organic Carbon	3	2	7	4	3	3	7	6	4	4	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	30	20	70	40	30	30	70	60	40	40	<20	mg/kg	TM60/PM0
Total Dissolved Solids #	75	119	71	97	80	149	56	180	107	98	<10	mg/l	TM20/PM0
Total Dissolved Solids #	750	1191	710	970	800	1489	560	1800	1070	980	<100	mg/kg	TM20/PM0

Jones Environmental Laboratory

Client Name: O'Connor Sutton Cronin & Assoc. Ltd
Reference:
Location: St Pauls
Contact: Cian O'Hora
JE Job No.: 15/14318

Report : **CEN 10:1 1 Batch**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	11												
Sample ID	BH4												
Depth	3.00-4.00												
COC No / misc													
Containers	T												
Sample Date	03/10/2015												
Sample Type	Soil												
Batch Number	1										LOD/LOR	Units	Method No.
Date of Receipt	06/10/2015												
Dissolved Antimony #	<0.002										<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02										<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025										<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025										<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.017										<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.17										<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005										<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005										<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015										<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015										<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007										<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07										<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005										<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05										<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.043										<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.43										<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002										<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02										<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003										<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03										<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	0.003										<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	0.03										<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001										<0.00001	mg/l	TM61/PM38
Mercury Dissolved by CVAF #	<0.0001										<0.0001	mg/kg	TM61/PM38
Phenol	<0.01										<0.01	mg/l	TM26/PM0
Phenol	<0.1										<0.1	mg/kg	TM26/PM0
Fluoride	0.3										<0.3	mg/l	TM27/PM0
Fluoride	3										<3	mg/kg	TM27/PM0
Chloride	<0.3										<0.3	mg/l	TM27/PM0
Chloride	<3										<3	mg/kg	TM27/PM0
Sulphate	3.38										<0.05	mg/l	TM27/PM0
Sulphate	33.8										<0.5	mg/kg	TM27/PM0
Mass of raw test portion	0.1008											kg	NONE/PM17
Leachant Volume	0.889											l	NONE/PM17
Eluate Volume	0.63											l	NONE/PM17
Dissolved Organic Carbon	3										<2	mg/l	TM60/PM0
Dissolved Organic Carbon	30										<20	mg/kg	TM60/PM0
Total Dissolved Solids #	94										<10	mg/l	TM20/PM0
Total Dissolved Solids #	940										<100	mg/kg	TM20/PM0

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Mass of sample taken (kg)	0.1051	Dry Matter Content Ratio (%) =	85.9
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.885
Particle Size <4mm =	>95%	Eluate Volume (l)	0.65

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**1**			
Client Sample No	**BH1**			
Depth/Other	**0.00-1.00**			
Sample Date	**28/09/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.50	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	0.15	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	<0.0001	0.01	0.2	2
Molybdenum	0.35	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	<0.03	4	50	200
Chloride	11	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	35.9	1000	20000	50000
Total Dissolved Solids	750	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	30	500	800	1000

Mass of sample taken (kg)	0.1036	Dry Matter Content Ratio (%) =	86.9
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.887
Particle Size <4mm =	>95%	Eluate Volume (l)	0.75

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**2**			
Client Sample No	**BH1**			
Depth/Other	**1.00-2.00**			
Sample Date	**28/09/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	1.03	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	87	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	0.12	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	<0.0001	0.01	0.2	2
Molybdenum	0.37	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	0.03	0.06	0.7	5
Selenium	0.27	0.1	0.5	7
Zinc	<0.03	4	50	200
Chloride	<3	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	165.5	1000	20000	50000
Total Dissolved Solids	1191	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	20	500	800	1000

Mass of sample taken (kg)	0.1056	Dry Matter Content Ratio (%) =	85.4
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.885
Particle Size <4mm =	>95%	Eluate Volume (l)	0.83

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**3**			
Client Sample No	**BH2**			
Depth/Other	**0.50**			
Sample Date	**30/09/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	1.20	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	<0.03	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	0.0028	0.01	0.2	2
Molybdenum	0.13	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.04	4	50	200
Chloride	<3	800	15000	25000
Fluoride	3	10	150	500
Sulphate as SO4	2.8	1000	20000	50000
Total Dissolved Solids	710	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	70	500	800	1000

Mass of sample taken (kg)	0.1003	Dry Matter Content Ratio (%) =	89.6
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.89
Particle Size <4mm =	>95%	Eluate Volume (l)	0.83

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**4**			
Client Sample No	**BH2**			
Depth/Other	**1.00**			
Sample Date	**30/09/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.44	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	<0.03	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	0.0006	0.01	0.2	2
Molybdenum	0.21	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.04	4	50	200
Chloride	<3	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	5.2	1000	20000	50000
Total Dissolved Solids	970	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	40	500	800	1000

Mass of sample taken (kg)	0.1011	Dry Matter Content Ratio (%) =	88.8
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.889
Particle Size <4mm =	>95%	Eluate Volume (l)	0.85

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**5**			
Client Sample No	**BH2**	**Inert**	**Stable Non-reactive**	**Hazardous**
Depth/Other	**2.00**			
Sample Date	**30/09/2015**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.53	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	0.11	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	<0.0001	0.01	0.2	2
Molybdenum	0.29	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	<0.03	4	50	200
Chloride	<3	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	46.7	1000	20000	50000
Total Dissolved Solids	800	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	30	500	800	1000

Mass of sample taken (kg)	0.1003	Dry Matter Content Ratio (%) =	89.6
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.889
Particle Size <4mm =	>95%	Eluate Volume (l)	0.6

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**6**			
Client Sample No	**BH2**			
Depth/Other	**3.00**			
Sample Date	**30/09/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.53	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	132	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	0.51	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	<0.0001	0.01	0.2	2
Molybdenum	0.20	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	0.28	0.1	0.5	7
Zinc	0.04	4	50	200
Chloride	<3	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	296.8	1000	20000	50000
Total Dissolved Solids	1489	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	30	500	800	1000

Mass of sample taken (kg)	0.105	Dry Matter Content Ratio (%) =	85.5
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.885
Particle Size <4mm =	>95%	Eluate Volume (l)	0.8

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**7**			
Client Sample No	**BH3**			
Depth/Other	**0.50**			
Sample Date	**01/10/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	2.27	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	<0.03	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	0.0029	0.01	0.2	2
Molybdenum	0.06	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.05	4	50	200
Chloride	<3	800	15000	25000
Fluoride	5	10	150	500
Sulphate as SO4	3.2	1000	20000	50000
Total Dissolved Solids	560	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	70	500	800	1000

Mass of sample taken (kg)	0.1133	Dry Matter Content Ratio (%) =	79.7
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.877
Particle Size <4mm =	>95%	Eluate Volume (l)	0.75

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**8**			
Client Sample No	**BH4**			
Depth/Other	**0.00-1.00**			
Sample Date	**03/10/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	2.02	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	<0.03	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	0.0007	0.01	0.2	2
Molybdenum	0.11	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.04	4	50	200
Chloride	4	800	15000	25000
Fluoride	5	10	150	500
Sulphate as SO4	8.2	1000	20000	50000
Total Dissolved Solids	1800	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	60	500	800	1000

Mass of sample taken (kg)	0.1007	Dry Matter Content Ratio (%) =	88.9
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.889
Particle Size <4mm =	>95%	Eluate Volume (l)	0.85

JEFL Job No	**15/14318**	**Landfill Waste Acceptance Criteria Limits**		
Sample No	**9**			
Client Sample No	**BH4**	**Inert**	**Stable Non-reactive**	**Hazardous**
Depth/Other	**1.00-2.00**			
Sample Date	**03/10/2015**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.34	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	0.05	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	0.0003	0.01	0.2	2
Molybdenum	0.29	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.05	4	50	200
Chloride	<3	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	5.0	1000	20000	50000
Total Dissolved Solids	1070	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	40	500	800	1000

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Mass of sample taken (kg)	0.1022	Dry Matter Content Ratio (%) =	87.7
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.887
Particle Size <4mm =	>95%	Eluate Volume (l)	0.83

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**10**			
Client Sample No	**BH4**			
Depth/Other	**2.00-3.00**			
Sample Date	**03/10/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.38	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	0.04	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	0.0002	0.01	0.2	2
Molybdenum	0.28	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.04	4	50	200
Chloride	<3	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	6.1	1000	20000	50000
Total Dissolved Solids	980	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	40	500	800	1000

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Mass of sample taken (kg)	0.1008	Dry Matter Content Ratio (%) =	89.0
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.889
Particle Size <4mm =	>95%	Eluate Volume (l)	0.63

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**11**			
Client Sample No	**BH4**			
Depth/Other	**3.00-4.00**	**Inert**	**Stable Non-reactive**	**Hazardous**
Sample Date	**03/10/2015**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.65	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	0.17	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	<0.0001	0.01	0.2	2
Molybdenum	0.43	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.03	4	50	200
Chloride	<3	800	15000	25000
Fluoride	3	10	150	500
Sulphate as SO4	33.8	1000	20000	50000
Total Dissolved Solids	940	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	30	500	800	1000

Jones Environmental Laboratory

Notification of Deviating Samples

Client Name: O'Connor Sutton Cronin & Assoc. Ltd

Matrix : Solid

Reference:

Location: St Pauls

Contact: Cian O'Hora

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
15/14318	1	BH1	0.00-1.00	1	EPH	Sample received in inappropriate container
15/14318	1	BH1	1.00-2.00	2	EPH	Sample received in inappropriate container
15/14318	1	BH2	0.50	3	EPH	Sample received in inappropriate container
15/14318	1	BH2	1.00	4	EPH	Sample received in inappropriate container
15/14318	1	BH2	2.00	5	EPH	Sample received in inappropriate container
15/14318	1	BH2	3.00	6	EPH	Sample received in inappropriate container
15/14318	1	BH4	0.00-1.00	8	EPH	Sample received in inappropriate container
15/14318	1	BH4	1.00-2.00	9	EPH	Sample received in inappropriate container
15/14318	1	BH4	2.00-3.00	10	EPH	Sample received in inappropriate container
15/14318	1	BH4	3.00-4.00	11	EPH	Sample received in inappropriate container

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/14318

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 (UKAS) accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 15/14318

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID.	PM12/PM16	CWG GC-FID			AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified USEPA 8163. Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes

JE Job No: 15/14318

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM27	Modified US EPA method 9056.Determination of water soluble anions using Dionex (Ion-Chromatography).	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM17	Modified method EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes		AR	Yes

JE Job No: 15/14318

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM60	Modified USEPA 9060. Determination of TOC by calculation from Total Carbon and Inorganic Carbon using a TOC analyser, the carbon in the sample is converted to CO2 and then passed through a non-dispersive infrared gas analyser (NDIR).	PM0	No preparation is required.			AR	Yes
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM38	Samples are brominated to reduce all mercury compounds to Mercury (II) which is analysed using method TM061.	Yes		AR	Yes
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
NONE	No Method Code	NONE	No Method Code			AR	Yes
NONE	No Method Code	PM17	Modified method EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	

Appendix - Methods used for WAC (2003/33/EC)

Leachate tests	
10l/kg; 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ba	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cd	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cr total	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cu	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Hg	I.S. EN 13370 rec. EN 1483 (CVAAS)
Mo	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ni	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Pb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Sb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Se	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Zn	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Chloride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Fluoride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Sulphate	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Phenol index	I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometic methods after distillation)* (BY HPLC - Jones Env)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional analysis	
TOC	I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion.
BTEX	GC-FID
PCB7**	I.S. EN 15308 analysis by GC-ECD.
Mineral oil	I.S. EN 14039 C10 to C40 analysis by GC-FID.
PAH17***	I.S. EN 15527 PAH17 analysis by GC-MS
Metals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 (ICP-OES)
Other	
Dry matter	I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
ANC	CEN/TS 15364 Determined by amouns of acid or base needed to cover the pH range

Notes:

*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS

**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180

***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.

Appendix 4: Groundwater Monitoring

GROUNDWATER MONITORING

St Pauls Raheny

BOREHOLE	DATE	GROUNDWATER		Comments
		m BGL	m OD	
BH1	19/10/2015	1.08	23.772	
BH2	19/10/2015	1.79	20.699	
BH3	19/10/2015	2.17	19.773	
BH6	19/10/2015	Dry	-	
BH9	19/10/2015	2.40	19.021	

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Ground Investigations Ireland

St Pauls Raheny - 2018

Ground Investigation Report

DOCUMENT CONTROL SHEET

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Engineer	OCSC
Client	Marlet
Project No	7476-01-18
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CONTENTS

APPENDICES

1.0 Preamble

On the instructions of OCSC Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., in February 2018 at the site of the existing playing pitches to the rear of St. Pauls in Raheny in Dublin 5.

2.0 Overview

2.1. Background

It is proposed to construct a new residential development with associated services, access roads and car parking at the proposed site. The site is currently occupied by playing pitches and is situated to the rear of the existing school buildings. The proposed construction is envisaged to consist of conventional foundations and pavement make up with some local excavations for services and plant. Cable Percussion boreholes completed in 2015 were also surveyed and monitored during these works.

2.2. Purpose and Scope

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

- Visit project site to observe existing conditions
- Carry out 4 No. Soakaways to determine a soil infiltration value to BRE digest 365
- Carry out 4 No. Cable Percussion boreholes to a maximum depth of 5.0m BGL
- Installation of 4 No. Groundwater monitoring wells
- Surveying and groundwater monitoring
- Report with recommendations

3.0 Subsurface Exploration

3.1. General

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

3.2. Soakaway Testing

The soakaway pits were excavated using a JCB 3CX excavator at the locations shown in the exploratory hole location plan in Appendix 1. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The trial pits were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. The soakaway testing was carried out in the trial pits which were carefully excavated and filled with water to assess the infiltration characteristics of the proposed site. The pits were allowed to drain and the drop in water level was recorded over time as required by BRE Digest 365. The pits were logged prior to completing the soakaway test and were backfilled with arising's upon completion. The soakaway test results are provided in Appendix 2 of this Report.

3.3. Cable Percussion Boreholes

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

3.4. Surveying

The exploratory hole locations have been recorded using a GPS GNSS System which records the coordinates and elevation of the locations to ITM or Irish National Grid as required by the project specification. The coordinates and elevations are provided on the exploratory hole logs in the appendices of this Report.

3.5. Groundwater/Gas Monitoring Installations

Groundwater and or Gas Monitoring Installation were installed upon the completion of the boreholes to enable sampling and the determination of the equilibrium groundwater level. The typical groundwater monitoring installation consists of a 50mm HDPE slotted pipe with a pea gravel response zone and bentonite seal installed to the Engineers specification. Where required the standpipe is sealed with a gas tap and finished with a durable steel cover fixed in place with a concrete surround. The installation details are provided on the exploratory hole logs in the appendices of this Report.

4.0 Ground Conditions

4.1. General

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

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

- Topsoil/Surfacing
- Made Ground
- Cohesive Deposits

TOPSOIL: Topsoil was encountered in all the exploratory holes and was present to a maximum depth of 0.3m BGL. Tarmac surfacing was present typically to a depth of 0.05m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the Topsoil/Surfacing and was present to a relatively consistent depth of between 0.6m and 1.0m BGL. These deposits were described generally as *brown sandy slightly gravelly CLAY with frequent cobbles and boulders and contained occasional fragments of concrete, red brick, glass and plastic.*

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

4.2. Groundwater

Groundwater strikes are noted on the exploratory hole logs where they occurred and where possible drilling was suspended for twenty minutes to allow the subsequent rise in groundwater to be recorded. 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 tide, time of year, rainfall, nearby construction and other factors. For this reason, standpipes were installed in BH1, BH2, BH3 and BH4 to allow the equilibrium groundwater level to be determined. In addition, boreholes completed in 2015 were also surveyed and monitored. The groundwater monitoring is included in Appendix 4 of this Report. OCSC deployed groundwater monitoring data loggers into selected boreholes and the results of this monitoring are presented under the cover of a separate report.

5.0 Recommendations & Conclusions

5.1. General

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

5.1. Groundwater Monitoring

The groundwater monitoring undertaken indicates the water level varied from 0.2m to 1.0m BGL across the site.

5.2. Soakaway Design

At the locations of SA01 to SA04 the water level dropped too slowly to allow calculation of ‘f’ the soil infiltration rate. These locations are therefore not recommended as suitable for soakaway design and construction.

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

APPENDIX 1 - Site Location Plan

NOTES

1. For setting out refer to Engineer's drawings.
2. This drawing to be read in conjunction with all other Engineering drawings and all other relevant drawings and Specifications.
3. DO NOT SCALE THIS DRAWING. Use figured dimensions only.
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Rev. No.	Date	REVISION NOTE	Drn. By	Chkd. By
A	13/02/2018	Additional Site Investigations	JB	AH

Rev. No.	Date	REVISION NOTE	Drn. By	Chkd. By

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ISO 9001:2008 QUALITY | OHSAS 18001:2007 HEALTH & SAFETY | ISO 14001:2004 ENVIRONMENTAL

Client	Crekav Landbank Investments Ltd.
Project	Residential Development St. Paul's College
Title	Site investigation - Borehole & Soakaway Locations

Drn by	Chkd by	Aprvd by	Dwg. No.	Revision
IK	JS	PC	N251 -SK05	A
Date 20/10/15	Scale NTS			

Office Locations | Dublin (Head Office) | London | Cork | Galway | Belfast | Warsaw | Bucharest | Moscow | Abu Dhabi | Libya |

APPENDIX 2 – Soakaway Records

Ground Investigations Ireland Ltd www.gii.ie			Site: St Pauls Raheny	Trial Pit Number: **SA01**
Excavation Method: Trial Pit	**Dimensions** L x W x D: 3.50 x 0.60 x 1.70m	**Ground Level (mOD)**: 23.29	**Client**: Marlet	**Job Number**: 7476-02-18
	Location: 720473.9 E 737416.1 N	**Dates**: 14/02/2018	**Engineer**: OCSC	**Sheet**: 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL: Dark brown sandy gravelly Clay		
				22.99	0.30 (0.20)	MADE GROUND consistign of brown sandy gravelly Clay with fragments of red brick. Gravel is fine to coarse and rounded to sub-rounded		
				22.79	0.50 (0.60)	Soft brown mottled grey gravelly CLAY with occasional sub-rounded to sub-angular cobbles. Gravel is fine to coarse and sub-rounded to sub-angular		
				22.19	1.10 (0.60)	Soft grey mottled brown gravelly CLAY with occasional rounded to sub-rounded cobbles. Gravel is fine to coarse rounded to sub-rounded		
			Slow seepage(1) at 1.70m.	21.59	1.70	Complete at 1.70m		∇1

Plan

Remarks

Trial pit stable
Groundwater encountered at 1.70mBGL as slow seepage
Soakaway completed in pit

Scale (approx)	Logged By	Figure No.
1:25	R'OT	7476-02-18.SA01

Ground Investigations Ireland Ltd www.gii.ie	Site: St Pauls Raheny	Trial Pit Number: SA02

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit	L x W x D 3.20 x 0.60 x 1.70m	22.78	Marlet	7476-02-18
	Location 720543.9 E 737408.1 N	**Dates** 14/02/2018	**Engineer** OCSC	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL: Dark brown sandy gravelly Clay with rootlets		
				22.48	0.30 (0.30)	MADE GROUND consisting of brown sandy gravelly Clay with rare sub-rounded cobbles and fragments of red brick. Gravel is fine to coarse and rounded to sub-rounded		
				22.18	0.60 (0.20)	Soft brown slightly sandy gravelly CLAY with occasional sub-rounded to sub-angular cobbles. Gravel is fine to coarse and sub-rounded to sub-angular		
				21.98	0.80 (0.90)	Soft to firm grey mottled brown gravelly CLAY with occasional sub-rounded to sub-angular cobbles. Gravel is fine to coarse sub-rounded to sub-angular		
				21.08	1.70	Complete at 1.70m		

Plan

Remarks

Trial pit stable
No groundwater encountered
Soakaway completed in pit
Land drain encountered in TP between 0.1m and 0.5m BGL

Scale (approx)	Logged By	Figure No.
1:25	R'OT	7476-02-18.SA02

Ground Investigations Ireland Ltd www.gii.ie		Site: St Pauls Raheny	Trial Pit Number: SA03
Excavation Method: Trial Pit	**Dimensions** L x W x D: 3.30 x 0.60 x 1.70m	**Ground Level (mOD)**: 22.35	**Client**: Marlet	**Job Number**: 7476-02-18
	Location: 720471.9 E 737352.9 N	**Dates**: 14/02/2018	**Engineer**: OCSC	**Sheet**: 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL: Brown sandy gravelly Clay		
				22.05	0.30	Firm brown mottled grey slightly sandy gravelly CLAY with occasional sub-rounded to sub-angular cobbles. Gravel is fine to coarse and rounded to sub-rounded		
					(1.20)			
				20.85	1.50 (0.20)	Medium dense grey gravelly fine to coarse SAND. Gravel is fine to coarse sub-rounded to sub-angular		∇1
			Slow trickle(1) at 1.70m.	20.65	1.70	Complete at 1.70m		

Plan

Remarks

Trial pit stable
Groundwater encountered at 1.70mBGL as slow-medium flow
Soakaway completed in pit

Scale (approx)	Logged By	Figure No.
1:25	R'OT	7476-02-18.SA03

Ground Investigations Ireland Ltd www.gii.ie	Site St Pauls Raheny	Trial Pit Number **SA04**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit	L x W x D 3.50 x 0.60 x 1.70m	21.79	Marlet	7476-02-18
	Location 720538.6 E 737346.7 N	**Dates** 14/02/2018	**Engineer** OCSC	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				21.49	0.30 (0.30)	TOPSOIL: Brown sandy gravelly Clay		
				21.29	0.50 (0.20)	MADE GROUND consisting of grey slightly sandy gravelly Clay with fragments of red brick. Gravel is fine to coarse and sub-angular to sub-rounded		
				20.59	1.20 (0.70)	Firm brown mottled grey slightly sandy gravelly CLAY with occasional sub-rounded cobbles. Gravel is fine to coarse and sub-rounded to sub-angular		
				20.09	1.70 (0.50)	Firm to stiff grey mottled brown sandy gravelly CLAY with occasional sub-rounded to sub-angular cobbles. Gravel is fine to coarse sub-rounded to sub-angular		
						Complete at 1.70m		

Plan

Remarks

Trial pit stable
No groundwater encountered
Soakaway completed in pit

Scale (approx)	Logged By	Figure No.
1:25	R'OT	7476-02-18.SA04

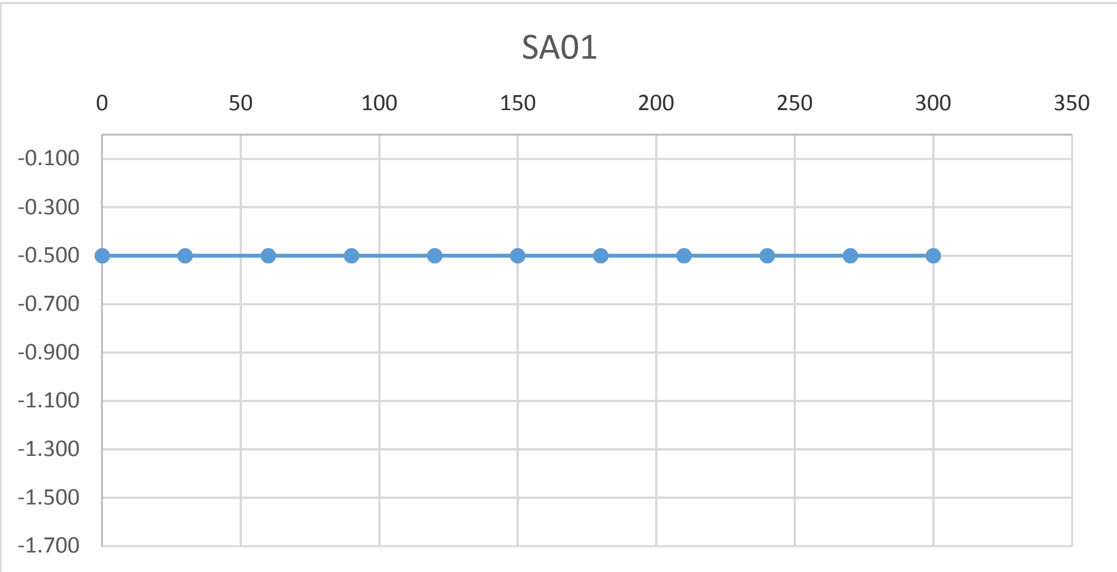
SA01

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 3.50m x 0.60m x 1.70m (L x W x D)

Date	Time	Water level (m bgl)
14/02/2018	0	-0.500
14/02/2018	30	-0.500
14/02/2018	60	-0.500
14/02/2018	90	-0.500
14/02/2018	120	-0.500
14/02/2018	150	-0.500
14/02/2018	180	-0.500
14/02/2018	210	-0.500
14/02/2018	240	-0.500
14/02/2018	270	-0.500
14/02/2018	300	-0.500

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
0.50	**1.700**	**1.200**	**0.8**	**1.4**



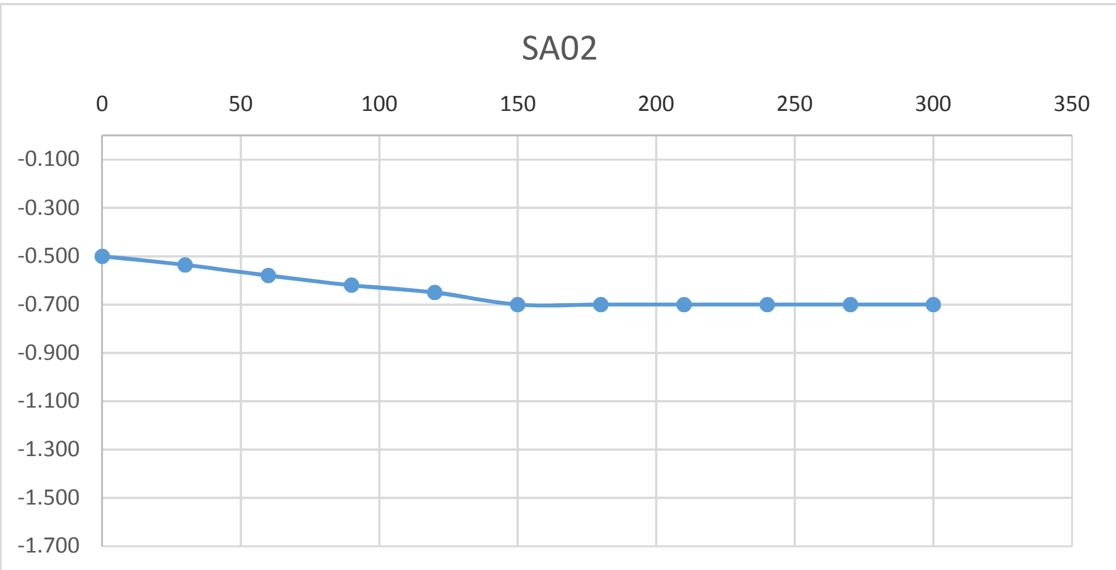
SA02

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 3.20m x 0.60m x 1.70m (L x W x D)

Date	Time	Water level (m bgl)
14/02/2018	0	-0.500
14/02/2018	30	-0.536
14/02/2018	60	-0.580
14/02/2018	90	-0.620
14/02/2018	120	-0.650
14/02/2018	150	-0.700
14/02/2018	180	-0.700
14/02/2018	210	-0.700
14/02/2018	240	-0.700
14/02/2018	270	-0.700
14/02/2018	300	-0.700

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
0.50	1.700	1.200	0.8	1.4



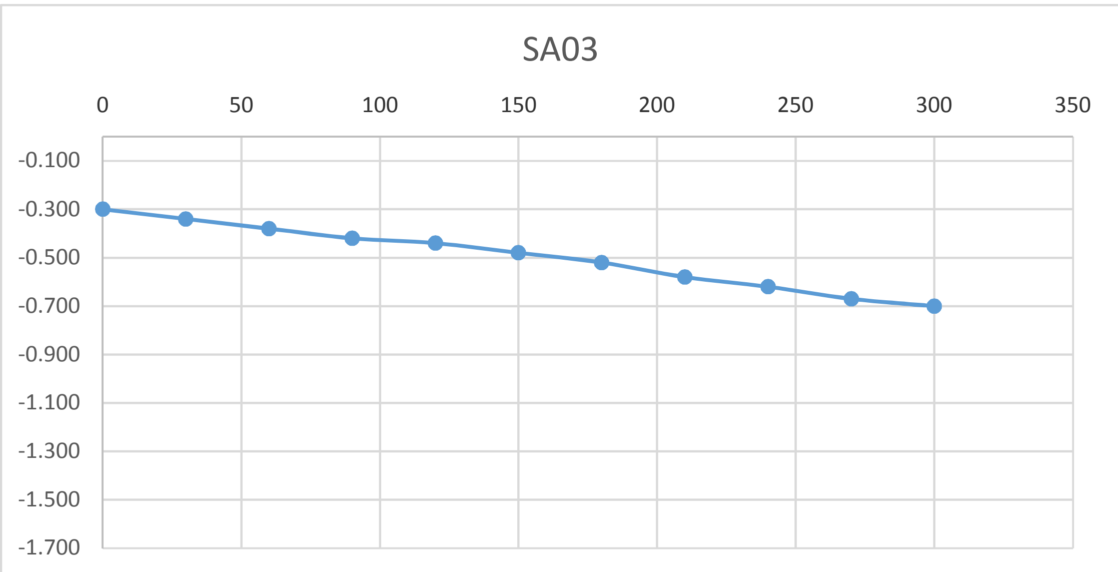
SA03

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 3.30m x 0.60m x 1.70m (L x W x D)

Date	Time	Water level (m bgl)
14/02/2018	0	-0.300
14/02/2018	30	-0.340
14/02/2018	60	-0.380
14/02/2018	90	-0.420
14/02/2018	120	-0.440
14/02/2018	150	-0.480
14/02/2018	180	-0.520
14/02/2018	210	-0.580
14/02/2018	240	-0.620
14/02/2018	270	-0.670
14/02/2018	300	-0.700

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
0.30	1.700	1.400	0.65	1.35



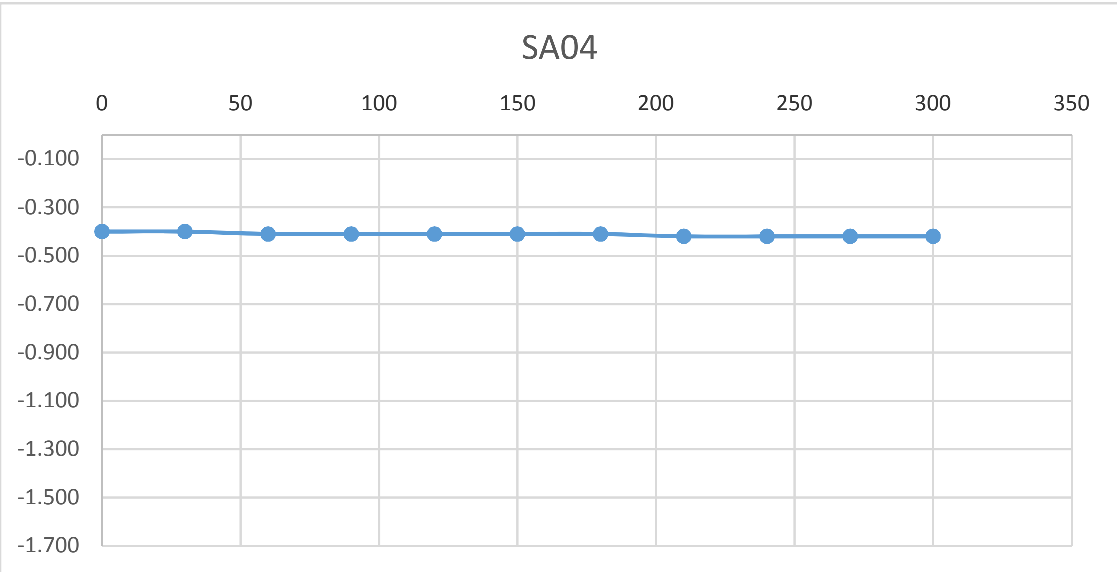
SA04

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 3.50m x 0.60m x 1.70m (L x W x D)

Date	Time	Water level (m bgl)
14/02/2018	0	-0.400
14/02/2018	30	-0.400
14/02/2018	60	-0.410
14/02/2018	90	-0.410
14/02/2018	120	-0.410
14/02/2018	150	-0.410
14/02/2018	180	-0.410
14/02/2018	210	-0.420
14/02/2018	240	-0.420
14/02/2018	270	-0.420
14/02/2018	300	-0.420

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
0.40	1.700	1.300	0.725	1.375



APPENDIX 3 – Cable Percussion Borehole Records

Ground Investigations Ireland Ltd www.gii.ie			Site St Pauls Raheny	Borehole Number BH1 2018
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 5.00m	**Ground Level (mOD)** 23.15	**Client** Marlet	**Job Number** 7476-02-18
	Location 720443.5 E 737379.8 N	**Dates** 15/02/2018	**Engineer** OCSC	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					22.85	(0.30) 0.30	TOPSOIL			
					22.65	(0.20) 0.50	MADE GROUND: Brown sandy gravelly Clay with occasioal fragments of red brick			
0.50	B						Brown sandy gravelly CLAY with occasional cobbles. Gravel is sub angular to sub rounded fine to coarse.			
1.00	B								▼1 ∇1	
2.00	B			Water strike(1) at 1.60m, rose to 1.30m in 20 mins, sealed at 2.30m.	20.75	(1.90) 2.40				
					20.55	(0.20) 2.60	Brown slightly gravelly fine to coarse SAND			
3.00	B						Black silghtly sandy gravelly CLAY with occasional cobbles. Gravel is sub angular to sub rounded fine to coarse.			
4.00	B									
5.00	B				18.15	(2.40) 5.00				
							Complete at 5.00m			

Remarks
Borehole to install standpipe - No SPT's undertaken.
Slotted standpipe installed with gravel response zone and geosock from 5.0m to 1.0m BGL with bentonite seal and flush cover from 1.0m to ground level.
Borehole terminated at scheduled depth

Scale (approx)	Logged By
1:50	C Finnerty

Figure No.
7476-02-18.BH1

Ground Investigations Ireland Ltd
www.gii.ie

Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 5.00m	**Ground Level (mOD)** 23.70	**Site** St Pauls Raheny	**Borehole Number** BH2 2018
	Location 720449.9 E 737437.3 N	**Dates** 15/02/2018	**Client** Marlet	**Job Number** 7476-02-18
			Engineer OCSC	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					23.40	(0.30) 0.30	TOPSOIL			
1.00	B					(1.90)	Brown sandy gravelly CLAY with occasional cobbles. Gravel is sub angular to sub rounded fine to coarse.		▼1 ▽1	
2.00	B			Water strike(1) at 1.90m, rose to 1.70m in 20 mins, sealed at 2.40m.	21.50	2.20				
3.00	B					(2.80)	Black silghtly sandy gravelly CLAY with occasional cobbles. Gravel is sub angular to sub rounded fine to coarse.			
4.00	B									
5.00	B				18.70	5.00	Complete at 5.00m			

Remarks
Borehole to install standpipe - No SPT's undertaken.
Slotted standpipe installed with gravel response zone and geosock from 5.0m to 1.0m BGL with bentonite seal and flush cover from 1.0m to ground level.
Borehole terminated at scheduled depth

Scale (approx)	Logged By
1:50	C Finnerty

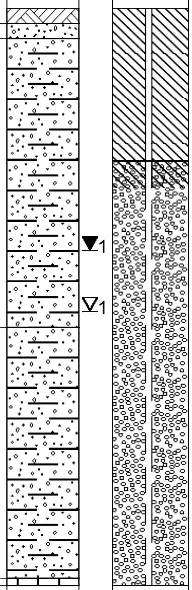
Figure No. 7476-02-18.BH1

Ground Investigations Ireland Ltd www.gii.ie	Site St Pauls Raheny	Borehole Number BH3 2018

Machine : Dando 2000 Method : Cable Percussion	Casing Diameter 200mm cased to 3.80m	Ground Level (mOD) 22.29	Client Marlet	Job Number 7476-02-18
	Location 720513.7 E 737392.4 N	Dates 14/02/2018	Engineer OCSC	Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description
					22.19	0.10	TOPSOIL
					22.09	0.20	Brown slightly gravelly fine to coarse SAND
							Brown sandy gravelly CLAY with occasional cobbles. Gravel is sub angular to sub rounded fine to coarse.
1.00	B					(1.90)	
2.00	B			Water strike(1) at 2.00m, rose to 1.60m in 20 mins.	20.19	2.10	Black silghtly sandy gravelly CLAY with occasional cobbles. Gravel is sub angular to sub rounded fine to coarse.
						(1.65)	
3.00	B						
3.80	B				18.54	3.75	OBSTRUCTION: Presumed Boulder or Rock
					18.49	3.80	Complete at 3.80m

Legend / Water / Instr



Remarks
Borehole to install standpipe - No SPT's undertaken.
Slotted standpipe installed with gravel response zone and geosock from 3.8m to 1.0m BGL with bentonite seal and flush cover from 1.0m to ground level.
Borehole terminated at scheduled depth
Chiselling from 3.75m to 3.80m for 2 hours.

Scale (approx)	Logged By
1:50	C Finnerty

Figure No.
7476-02-18.BH1

Ground Investigations Ireland Ltd www.gii.ie			Site: St Pauls Raheny	Borehole Number: BH4 2018
Machine : Dando 2000 Method : Cable Percussion	Casing Diameter: 200mm cased to 3.80m	Ground Level (mOD): 21.30	Client: Marlet	Job Number: 7476-02-18
	Location: 720571.9 E 737305.4 N	Dates: 14/02/2018	Engineer: OCSC	Sheet: 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					21.20	0.10	TOPSOIL			
					21.10	0.20	Brown slightly gravelly fine to coarse SAND			
						(1.60)	Brown sandy gravelly CLAY with occasional cobbles. Gravel is sub angular to sub rounded fine to coarse.			
1.00	B									
									1	
2.00	B			Water strike(1) at 1.70m, rose to 1.50m in 20 mins.	19.50	1.80	Black silghtly sandy gravelly CLAY with occasional cobbles. Gravel is sub angular to sub rounded fine to coarse.			
						(1.20)				
3.00	B				18.30	3.00	Complete at 3.00m			

Remarks
Borehole to install standpipe - No SPT's undertaken.
Slotted standpipe installed with gravel response zone and geosock from 3.0m to 1.0m BGL with bentonite seal and flush cover from 1.0m to ground level.
Borehole terminated at scheduled depth

Scale (approx)	Logged By
1:50	C Finnerty

Figure No. 7476-02-18.BH1

APPENDIX 4 – Groundwater Monitoring

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

GROUNDWATER MONITORING

St Pauls Raheny

BOREHOLE	DATE	TIME	GROUNDWATER (mBGL)	Comments
BH1 2015	14/02/2018	13.00	0.70	
BH3 2015	14/02/2018	13.00	1.00	
BH09 2015	14/02/2018	13.00	0.20	
BH1 2015	19/02/2018	15.00		Data logger
BH3 2015	19/02/2018	15.00	1.00	
BH09 2015	19/02/2018	15.00		Data logger
BH1 2018	19/02/2018	15.00		Data logger
BH2 2018	19/02/2018	15.00		Unable to open
BH3 2018	19/02/2018	15.00	0.55	
BH4 2018	19/02/2018	15.00	0.55	

Appendix 6.2

Environmental Analysis Data and Assessment

WASTE CATEGORY	Title	CLASSIFICATION CATEGORY	Potential Outlet
Category A1	Inert Natural	Reported concentrations less than inert waste guidelines, which are based on waste acceptance criteria set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002). Also results found to be non-hazardous using the HazWasteOnline application.	Reuse or recovery subject to Planning and/or Waste Permissions. Murphy Gormanston. Suitable more for natural material rather than MADE
Category A2	Inert	MEHL Acceptance Criteria as laid out in their Waste Licence W0129-02. Reported concentrations less than inert waste guidelines, which are based on waste acceptance criteria set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002) **with the exception of PAHs (Total 17 <100mg/kg)**. Also results found to be non-hazardous using the HazWasteOnline application.	Disposal/Recovery subject to Planning and/or Waste Permissions. Material is made ground - gravelly fill with some minor waste elements (red brick, concrete, hardcore fill, cinders, other mixed C&D)
Category B	Non-Haz	Analytical results greater than Category A criteria but less than non- hazardous waste guidelines, which are based on waste acceptance criteria set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002) **no limit for TOC**. Also results found to be non-hazardous using the HazWasteOnline application.	Disposal/Recovery at licensed Landfill (Ballynagran, Knockharley, Drehid). Rilta involved in first two. Recovery may be possible if material can be classified as "natural" rather than "mixed made".
Category C1	Stable non-reactive Haz for disposal in Non-Haz Landfill	Analytical results greater than Category A criteria but less than hazardous waste guidelines, which are based on waste acceptance criteria set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002). Also results found to be hazardous using the HazWasteOnline application.	None in Ireland (export)
Category C2	Hazardous	Analytical results found to be hazardous using the HazWasteOnline application.	None in Ireland (export)

NOTE: HazWasteOnline acced through http://www.hazwasteonline.com. Application developed by One Touch Data Limited based on Regulation (EC) No.
NOTE: Where material is sent for RECOVERY it does not incur the landfill tax (currently €75/tonne)
NOTE: Categories C1 and C2 have been combined and will be confirmed by the waste facility

Determinant	LOD/LOR	Unit	A1 Inert Reuse	A2 Inert Landfill	B Non-Haz	C1 Stable Non-reactive	C2 Hazardous												
								Job No.	15/14318	15/14318	15/14318	15/14318	15/14318	15/14318	15/14318	15/14318	15/14318	15/14318	15/14318
								Sample Identity	BH1	BH1	BH2	BH2	BH2	BH2	BH3	BH4	BH4	BH4	BH4
								Depth	0.00-1.00	1.00-2.00	0.50	1.00	2.00	3.00	0.50	0.00-1.00	1.00-2.00	2.00-3.00	3.00-4.00
								Sampled Date	28/09/2015	28/09/2015	30/09/2015	30/09/2015	30/09/2015	30/09/2015	01/10/2015	03/10/2015	03/10/2015	03/10/2015	03/10/2015
								Sample Nos.	1	2	3	4	5	6	7	8	9	10	11
								Method No.											
Total Organic Carbon #	<0.02	%	3	3	NA	5	6	TM21/PM24	0.5	1.03	1.2	0.44	0.53	0.53	2.27	2.02	0.34	0.38	0.65
Sum of BTEX	<0.025	mg/kg	6	6	see Haz Tool	see Haz Tool	see Haz Tool	TM31/PM12	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sum of 7 PCBs #	<0.035	mg/kg	1	1	see Haz Tool	see Haz Tool	see Haz Tool	TM17/PM8	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035
PAH Sum of 6 #	<0.22	mg/kg	-	-	see Haz Tool	see Haz Tool	see Haz Tool	TM4/PM8	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22
PAH Sum of 17	<0.64	mg/kg	6	100	see Haz Tool	see Haz Tool	see Haz Tool	TM4/PM8	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64
Mineral Oil C10-C40		mg/kg	500	Not defined	Not defined	Not defined	Not defined	TM5/PM8	<45	87	<45	<45	<45	132	<45	<45	<45	<45	<45
CEN 10:1 Leachate																			
Dissolved Antimony (A10)	<0.02	mg/kg	0.06	0.06	0.7	0.7	5	TM30/PM17	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.02	<0.02	<0.02
Dissolved Arsenic (A10)	<0.025	mg/kg	0.5	0.5	2	2	25	TM30/PM17	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Dissolved Barium (A10)	<0.03	mg/kg	20	20	100	100	300	TM30/PM17	0.15	0.12	<0.03	<0.03	0.11	0.51	<0.03	<0.03	0.05	0.04	0.17
Dissolved Cadmium (A10)	<0.005	mg/kg	0.04	0.04	1	1	5	TM30/PM17	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Chromium (A10)	<0.015	mg/kg	0.5	0.5	10	10	70	TM30/PM17	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Dissolved Copper (A10)	<0.07	mg/kg	2	2	50	50	100	TM30/PM17	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Dissolved Lead (A10)	<0.05	mg/kg	0.5	0.5	10	10	50	TM30/PM17	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Molybdenum (A10)	<0.02	mg/kg	0.5	0.5	10	10	30	TM30/PM17	0.35	0.37	0.13	0.21	0.29	0.2	0.06	0.11	0.29	0.28	0.43
Dissolved Nickel (A10)	<0.02	mg/kg	0.4	0.4	10	10	40	TM30/PM17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dissolved Selenium (A10)	<0.03	mg/kg	0.1	0.1	0.5	0.5	7	TM30/PM17	<0.03	0.27	<0.03	<0.03	<0.03	0.28	<0.03	<0.03	<0.03	<0.03	<0.03
Dissolved Zinc (A10)	<0.03	mg/kg	4	4	50	50	200	TM30/PM17	<0.03	<0.03	0.04	0.04	<0.03	0.04	0.05	0.04	0.05	0.04	0.03
Mercury Dissolved by CVAF	<0.0001	mg/kg	0.01	0.01	0.2	0.2	2	TM61/PM38	<0.0001	<0.0001	0.0028	0.0006	<0.0001	<0.0001	0.0029	0.0007	0.0003	0.0002	<0.0001
Phenol	<0.1	mg/kg	1	nd	nd	nd	nd	TM26/PM0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoride	<3	mg/kg	10	10	150	150	500	TM27/PM0	<3	<3	3	<3	<3	<3	5	5	<3	<3	3
Chloride	<3	mg/kg	800	800	15000	15000	25000	TM27/PM0	11	<3	<3	<3	<3	<3	<3	4	<3	<3	<3
Sulphate	<0.5	mg/kg	1000	1000	20000	20000	50000	TM27/PM0	35.9	165.5	2.8	5.2	46.7	296.8	3.2	8.2	5	6.1	33.8
Mass of raw test portion	-	kg	-	-	-	-	-	NONE/PM17	0.1051	0.1036	0.1056	0.1003	0.1011	0.1003	0.105	0.1133	0.1007	0.1022	0.1008
Leachate Volume	-	l	-	-	-	-	-	NONE/PM17	0.885	0.887	0.885	0.89	0.889	0.889	0.885	0.877	0.889	0.887	0.889
Eluate Volume	-	l	-	-	-	-	-	NONE/PM17	0.65	0.75	0.83	0.83	0.85	0.6	0.8	0.75	0.85	0.83	0.63
Dissolved Organic Carbon	<20	mg/kg	500	500	800	800	1000	TM60/PM0	30	20	70	40	30	30	70	60	40	40	30
pH	<0.01	pH units	nd	nd	nd	nd	nd	TM73/PM0	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	<100	mg/kg	4000	4000	60000	60000	100000	TM20/PM0	750	1191	710	970	800	1489	560	1800	1070	980	940

NOTES:

Categories explained in OCSC Waste Categories Table

Hazardous classes subject to confirmation with waste facility

Where TOC is slightly elevated above inert landfill it is possible that it may still be acceptable when material is excavated

Elevated Selenium level is likely to be naturally occurring and is likely that it can be accepted at a inert facility (eg. Behan's W0247-01)

Jones Environmental Laboratory

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O'Connor Sutton Cronin & Assoc. Ltd
9 Prussia Street
Dublin 7
Ireland

4225

Attention :	Cian O'Hora
Date :	16th October, 2015
Your reference :	
Our reference :	Test Report 15/14318 Batch 1
Location :	St Pauls
Date samples received :	6th October, 2015
Status :	Final report
Issue :	3

Eleven samples were received for analysis on 6th October, 2015 of which eleven were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

Compiled By:

Bruce Leslie
Project Co-ordinator

Jones Environmental Laboratory

Client Name:	O'Connor Sutton Cronin & Assoc. Ltd	**Report :**	**Solid**
Reference:			
Location:	St Pauls	**Solids:**	V=60g VOC jar, J=250g glass jar, T=plastic tub
Contact:	Cian O'Hora		
JE Job No.:	15/14318		

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1	2	3	4	5	6	7	8	9	10			
Sample ID	BH1	BH1	BH2	BH2	BH2	BH2	BH3	BH4	BH4	BH4			
Depth	0.00-1.00	1.00-2.00	0.50	1.00	2.00	3.00	0.50	0.00-1.00	1.00-2.00	2.00-3.00			
COC No / misc													
Containers	T	T	T	T	T	T	T	T	T	T			
Sample Date	28/09/2015	28/09/2015	30/09/2015	30/09/2015	30/09/2015	30/09/2015	01/10/2015	03/10/2015	03/10/2015	03/10/2015			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015			
Antimony	<1	4	3	4	2	2	-	3	2	2	<1	mg/kg	TM30/PM15
Arsenic #	6.9	13.0	20.0	13.2	10.9	8.6	-	16.1	10.0	10.6	<0.5	mg/kg	TM30/PM15
Barium #	135	72	132	69	131	107	-	124	102	100	<1	mg/kg	TM30/PM15
Cadmium #	1.5	1.3	2.2	2.7	3.2	1.5	-	2.7	1.7	1.7	<0.1	mg/kg	TM30/PM15
Chromium #	28.0	33.2	60.6	31.4	34.0	34.0	-	58.0	30.0	28.4	<0.5	mg/kg	TM30/PM15
Copper #	20	25	33	22	27	22	-	36	23	24	<1	mg/kg	TM30/PM15
Lead #	15	19	48	18	18	22	-	59	19	19	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	2.6	6.1	4.9	7.7	4.5	2.9	-	3.7	3.7	4.1	<0.1	mg/kg	TM30/PM15
Nickel #	22.0	39.5	49.7	36.2	47.6	35.2	-	49.6	37.3	35.1	<0.7	mg/kg	TM30/PM15
Selenium #	<1	6	2	1	3	3	-	2	2	1	<1	mg/kg	TM30/PM15
Zinc #	49	62	109	67	91	63	-	101	75	70	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	0.05	<0.03	<0.03	0.04	0.16	0.06	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	0.02	<0.02	<0.02	0.03	0.07	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	99	106	95	101	99	102	106	103	95	101	<0	%	TM4/PM8
Mineral Oil >C8-C10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	mg/kg	TM5/PM16
Mineral Oil >C10-C12	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C12-C16	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C16-C21	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C21-C40	<10	87	<10	<10	<10	132	<10	<10	<10	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C8-C40	<45	87	<45	<45	<45	132	<45	<45	<45	<45	<45	mg/kg	TM5/PM16

Jones Environmental Laboratory

Client Name: O'Connor Sutton Cronin & Assoc. Ltd
Reference:
Location: St Pauls
Contact: Cian O'Hora
JE Job No.: 15/14318

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1	2	3	4	5	6	7	8	9	10	LOD/LOR	Units	Method No.
Sample ID	BH1	BH1	BH2	BH2	BH2	BH2	BH3	BH4	BH4	BH4			
Depth	0.00-1.00	1.00-2.00	0.50	1.00	2.00	3.00	0.50	0.00-1.00	1.00-2.00	2.00-3.00			
COC No / misc													
Containers	T	T	T	T	T	T	T	T	T	T			
Sample Date	28/09/2015	28/09/2015	30/09/2015	30/09/2015	30/09/2015	30/09/2015	01/10/2015	03/10/2015	03/10/2015	03/10/2015			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015			
TPH CWG													
Aliphatics													
>C5-C6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4	-	<4	<4	<4	<4	mg/kg	TM5/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7	-	<7	<7	<7	<7	mg/kg	TM5/PM16
>C21-C35 #	<7	87	<7	<7	8	132	-	<7	<7	<7	<7	mg/kg	TM5/PM16
>C35-C40 #	<7	<7	<7	<7	<7	<7	-	<7	<7	<7	<7	mg/kg	TM5/PM16
Total aliphatics C5-40	<26	87	<26	<26	<26	132	-	<26	<26	<26	<26	mg/kg	TM5/TM36/PM12/PM16
>C6-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	<10	<10	17	-	<10	<10	<10	<10	mg/kg	TM5/PM16
>C25-C35	<10	76	<10	<10	<10	115	-	<10	<10	<10	<10	mg/kg	TM5/PM16
Aromatics													
>C5-EC7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM16
>EC12-EC16	<4	<4	<4	<4	<4	<4	-	<4	<4	<4	<4	mg/kg	TM5/PM16
>EC16-EC21	<7	<7	<7	<7	<7	<7	-	<7	<7	<7	<7	mg/kg	TM5/PM16
>EC21-EC35	<7	32	<7	<7	<7	55	-	<7	<7	<7	<7	mg/kg	TM5/PM16
>EC35-EC40	<7	<7	<7	<7	<7	<7	-	<7	<7	<7	<7	mg/kg	TM5/PM16
Total aromatics C5-40	<26	32	<26	<26	<26	55	-	<26	<26	<26	<26	mg/kg	TM5/TM36/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	119	<52	<52	<52	187	-	<52	<52	<52	<52	mg/kg	TM5/TM36/PM12/PM16
>EC6-EC10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	<10	<10	<10	-	<10	<10	<10	<10	mg/kg	TM5/PM16
>EC25-EC35	<10	32	<10	<10	<10	53	-	<10	<10	<10	<10	mg/kg	TM5/PM16
MTBE	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Benzene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Toluene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
m/p-Xylene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
o-Xylene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8

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All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: O'Connor Sutton Cronin & Assoc. Ltd
Reference:
Location: St Pauls
Contact: Cian O'Hora
JE Job No.: 15/14318

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1	2	3	4	5	6	7	8	9	10			
Sample ID	BH1	BH1	BH2	BH2	BH2	BH2	BH3	BH4	BH4	BH4			
Depth	0.00-1.00	1.00-2.00	0.50	1.00	2.00	3.00	0.50	0.00-1.00	1.00-2.00	2.00-3.00			
COC No / misc													
Containers	T	T	T	T	T	T	T	T	T	T			
Sample Date	28/09/2015	28/09/2015	30/09/2015	30/09/2015	30/09/2015	30/09/2015	01/10/2015	03/10/2015	03/10/2015	03/10/2015			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015			
Natural Moisture Content	9.7	8.9	17.7	12.5	10.6	8.2	13.4	22.3	10.7	10.9	<0.1	%	PM4/PM0
% Dry Matter 105°C	85.9	86.9	85.4	89.6	88.8	89.6	85.5	79.7	88.9	87.7	<0.1	%	NONE/PM4
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0516	-	<0.0015	-	-	-	0.0027	0.0224	-	-	<0.0015	g/l	TM38/PM20
Chromium III	28.0	33.2	60.6	31.4	34.0	34.0	-	58.0	30.0	28.4	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.50	1.03	1.20	0.44	0.53	0.53	2.27	2.02	0.34	0.38	<0.02	%	TM21/PM24
pH #	8.65	-	8.50	-	-	-	8.36	8.56	-	-	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1051	0.1036	0.1056	0.1003	0.1011	0.1003	0.105	0.1133	0.1007	0.1022		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

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Jones Environmental Laboratory

Client Name:	O'Connor Sutton Cronin & Assoc. Ltd	**Report :**	**Solid**
Reference:			
Location:	St Pauls	**Solids:**	V=60g VOC jar, J=250g glass jar, T=plastic tub
Contact:	Cian O'Hora		
JE Job No.:	15/14318		

Please see attached notes for all abbreviations and acronyms

J E Sample No.	11			
Sample ID	BH4			
Depth	3.00-4.00			
COC No / misc				
Containers	T			
Sample Date	03/10/2015			
Sample Type	Soil			
Batch Number	1			
Date of Receipt	06/10/2015	LOD/LOR	Units	Method No.
Antimony	2	<1	mg/kg	TM30/PM15
Arsenic#	10.0	<0.5	mg/kg	TM30/PM15
Barium#	121	<1	mg/kg	TM30/PM15
Cadmium#	2.0	<0.1	mg/kg	TM30/PM15
Chromium#	33.4	<0.5	mg/kg	TM30/PM15
Copper#	25	<1	mg/kg	TM30/PM15
Lead#	20	<5	mg/kg	TM30/PM15
Mercury#	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum#	4.2	<0.1	mg/kg	TM30/PM15
Nickel#	39.8	<0.7	mg/kg	TM30/PM15
Selenium#	9	<1	mg/kg	TM30/PM15
Zinc#	86	<5	mg/kg	TM30/PM15
PAH MS				
Naphthalene#	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene#	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene#	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene#	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene#	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene#	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene#	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene#	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene#	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene#	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene#	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene#	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene#	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene#	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total#	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	99	<0	%	TM4/PM8
Mineral Oil >C8-C10	<5	<5	mg/kg	TM5/PM16
Mineral Oil >C10-C12	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C12-C16	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C16-C21	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C21-C40	<10	<10	mg/kg	TM5/PM16
Mineral Oil >C8-C40	<45	<45	mg/kg	TM5/PM16

Jones Environmental Laboratory

Client Name: O'Connor Sutton Cronin & Assoc. Ltd

Reference:

Location: St Pauls

Contact: Cian O'Hora

JE Job No.: 15/14318

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	11												
Sample ID	BH4												
Depth	3.00-4.00												
COC No / misc													
Containers	T												
Sample Date	03/10/2015												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	06/10/2015										LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6	<0.1										<0.1	mg/kg	TM36/PM12
>C6-C8	<0.1										<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1										<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2										<0.2	mg/kg	TM5/PM16
>C12-C16 #	<4										<4	mg/kg	TM5/PM16
>C16-C21 #	<7										<7	mg/kg	TM5/PM16
>C21-C35 #	<7										<7	mg/kg	TM5/PM16
>C35-C40 #	<7										<7	mg/kg	TM5/PM16
Total aliphatics C5-40	<26										<26	mg/kg	TM5/TM36/PM12/PM16
>C6-C10	<0.1										<0.1	mg/kg	TM36/PM12
>C10-C25	<10										<10	mg/kg	TM5/PM16
>C25-C35	<10										<10	mg/kg	TM5/PM16
Aromatics													
>C5-EC7	<0.1										<0.1	mg/kg	TM36/PM12
>EC7-EC8	<0.1										<0.1	mg/kg	TM36/PM12
>EC8-EC10	<0.1										<0.1	mg/kg	TM36/PM12
>EC10-EC12	<0.2										<0.2	mg/kg	TM5/PM16
>EC12-EC16	<4										<4	mg/kg	TM5/PM16
>EC16-EC21	<7										<7	mg/kg	TM5/PM16
>EC21-EC35	<7										<7	mg/kg	TM5/PM16
>EC35-EC40	<7										<7	mg/kg	TM5/PM16
Total aromatics C5-40	<26										<26	mg/kg	TM5/TM36/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52										<52	mg/kg	TM5/TM36/PM12/PM16
>EC6-EC10	<0.1										<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10										<10	mg/kg	TM5/PM16
>EC25-EC35	<10										<10	mg/kg	TM5/PM16
MTBE	<5										<5	ug/kg	TM31/PM12
Benzene	<5										<5	ug/kg	TM31/PM12
Toluene	<5										<5	ug/kg	TM31/PM12
Ethylbenzene	<5										<5	ug/kg	TM31/PM12
m/p-Xylene	<5										<5	ug/kg	TM31/PM12
o-Xylene	<5										<5	ug/kg	TM31/PM12
PCB 28 #	<5										<5	ug/kg	TM17/PM8
PCB 52 #	<5										<5	ug/kg	TM17/PM8
PCB 101 #	<5										<5	ug/kg	TM17/PM8
PCB 118 #	<5										<5	ug/kg	TM17/PM8
PCB 138 #	<5										<5	ug/kg	TM17/PM8
PCB 153 #	<5										<5	ug/kg	TM17/PM8
PCB 180 #	<5										<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35										<35	ug/kg	TM17/PM8

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All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: O'Connor Sutton Cronin & Assoc. Ltd
Reference:
Location: St Pauls
Contact: Cian O'Hora
JE Job No.: 15/14318

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	11												
Sample ID	BH4												
Depth	3.00-4.00												
COC No / misc													
Containers	T												
Sample Date	03/10/2015												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	06/10/2015										LOD/LOR	Units	Method No.
Natural Moisture Content	11.9										<0.1	%	PM4/PM0
% Dry Matter 105°C	89.0										<0.1	%	NONE/PM4
Hexavalent Chromium #	<0.3										<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	-										<0.0015	g/l	TM38/PM20
Chromium III	33.4										<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.65										<0.02	%	TM21/PM24
pH #	-										<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1008											kg	NONE/PM17
Mass of dried test portion	0.09											kg	NONE/PM17

Client Name: O'Connor Sutton Cronin & Assoc. Ltd
Reference:
Location: St Pauls
Contact: Cian O'Hora
JE Job No.: 15/14318

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1	2	3	4	5	6	7	8	9	10			
Sample ID	BH1	BH1	BH2	BH2	BH2	BH2	BH3	BH4	BH4	BH4			
Depth	0.00-1.00	1.00-2.00	0.50	1.00	2.00	3.00	0.50	0.00-1.00	1.00-2.00	2.00-3.00			
COC No / misc													
Containers	T	T	T	T	T	T	T	T	T	T			
Sample Date	28/09/2015	28/09/2015	30/09/2015	30/09/2015	30/09/2015	30/09/2015	01/10/2015	03/10/2015	03/10/2015	03/10/2015			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015	06/10/2015			
Dissolved Antimony #	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.015	0.012	<0.003	<0.003	0.011	0.051	<0.003	<0.003	0.005	0.004	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.15	0.12	<0.03	<0.03	0.11	0.51	<0.03	<0.03	0.05	0.04	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.035	0.037	0.013	0.021	0.029	0.020	0.006	0.011	0.029	0.028	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.35	0.37	0.13	0.21	0.29	0.20	0.06	0.11	0.29	0.28	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	0.027	<0.003	<0.003	<0.003	0.028	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	0.27	<0.03	<0.03	<0.03	0.28	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003	0.004	0.004	<0.003	0.004	0.005	0.004	0.005	0.004	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	0.04	0.04	<0.03	0.04	0.05	0.04	0.05	0.04	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	0.00028	0.00006	<0.00001	0.00001	0.00029	0.00007	0.00003	0.00002	<0.00001	mg/l	TM61/PM38
Mercury Dissolved by CVAF #	<0.0001	<0.0001	0.0028	0.0006	<0.0001	<0.0001	0.0029	0.0007	0.0003	0.0002	<0.0001	mg/kg	TM61/PM38
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3	0.3	<0.3	<0.3	0.3	0.5	0.5	<0.3	<0.3	<0.3	mg/l	TM27/PM0
Fluoride	<3	<3	3	<3	<3	<3	5	5	<3	<3	<3	mg/kg	TM27/PM0
Chloride	1.1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	<0.3	mg/l	TM27/PM0
Chloride	11	<3	<3	<3	<3	<3	<3	4	<3	<3	<3	mg/kg	TM27/PM0
Sulphate	3.59	16.54	0.28	0.52	4.67	29.70	0.32	0.82	0.50	0.61	<0.05	mg/l	TM27/PM0
Sulphate	35.9	165.5	2.8	5.2	46.7	296.8	3.2	8.2	5.0	6.1	<0.5	mg/kg	TM27/PM0
Mass of raw test portion	0.1051	0.1036	0.1056	0.1003	0.1011	0.1003	0.105	0.1133	0.1007	0.1022		kg	NONE/PM17
Leachant Volume	0.885	0.887	0.885	0.89	0.889	0.889	0.885	0.877	0.889	0.887		l	NONE/PM17
Eluate Volume	0.65	0.75	0.83	0.83	0.85	0.6	0.8	0.75	0.85	0.83		l	NONE/PM17
Dissolved Organic Carbon	3	2	7	4	3	3	7	6	4	4	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	30	20	70	40	30	30	70	60	40	40	<20	mg/kg	TM60/PM0
Total Dissolved Solids #	75	119	71	97	80	149	56	180	107	98	<10	mg/l	TM20/PM0
Total Dissolved Solids #	750	1191	710	970	800	1489	560	1800	1070	980	<100	mg/kg	TM20/PM0

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Client Name:	O'Connor Sutton Cronin & Assoc. Ltd	**Report :**	**CEN 10:1 1 Batch**
Reference:			
Location:	St Pauls	**Solids:**	V=60g VOC jar, J=250g glass jar, T=plastic tub
Contact:	Cian O'Hora		
JE Job No.:	15/14318		

Please see attached notes for all abbreviations and acronyms

J E Sample No.	11										LOD/LOR	Units	Method No.
Sample ID	BH4												
Depth	3.00-4.00												
COC No / misc													
Containers	T												
Sample Date	03/10/2015												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	06/10/2015												
Dissolved Antimony #	<0.002										<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02										<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025										<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025										<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.017										<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.17										<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005										<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005										<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015										<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015										<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007										<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07										<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005										<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05										<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.043										<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.43										<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002										<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02										<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003										<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03										<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	0.003										<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	0.03										<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001										<0.00001	mg/l	TM61/PM38
Mercury Dissolved by CVAF #	<0.0001										<0.0001	mg/kg	TM61/PM38
Phenol	<0.01										<0.01	mg/l	TM26/PM0
Phenol	<0.1										<0.1	mg/kg	TM26/PM0
Fluoride	0.3										<0.3	mg/l	TM27/PM0
Fluoride	3										<3	mg/kg	TM27/PM0
Chloride	<0.3										<0.3	mg/l	TM27/PM0
Chloride	<3										<3	mg/kg	TM27/PM0
Sulphate	3.38										<0.05	mg/l	TM27/PM0
Sulphate	33.8										<0.5	mg/kg	TM27/PM0
Mass of raw test portion	0.1008											kg	NONE/PM17
Leachant Volume	0.889											l	NONE/PM17
Eluate Volume	0.63											l	NONE/PM17
Dissolved Organic Carbon	3										<2	mg/l	TM60/PM0
Dissolved Organic Carbon	30										<20	mg/kg	TM60/PM0
Total Dissolved Solids #	94										<10	mg/l	TM20/PM0
Total Dissolved Solids #	940										<100	mg/kg	TM20/PM0

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Mass of sample taken (kg)	0.1051	Dry Matter Content Ratio (%) =	85.9
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.885
Particle Size <4mm =	>95%	Eluate Volume (l)	0.65

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**1**			
Client Sample No	**BH1**			
Depth/Other	**0.00-1.00**			
Sample Date	**28/09/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.50	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	0.15	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	<0.0001	0.01	0.2	2
Molybdenum	0.35	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	<0.03	4	50	200
Chloride	11	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	35.9	1000	20000	50000
Total Dissolved Solids	750	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	30	500	800	1000

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Mass of sample taken (kg)	0.1036	Dry Matter Content Ratio (%) =	86.9
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.887
Particle Size <4mm =	>95%	Eluate Volume (l)	0.75

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**2**			
Client Sample No	**BH1**			
Depth/Other	**1.00-2.00**			
Sample Date	**28/09/2015**			
Batch No	**1**	**Inert**	**Stable Non-reactive**	**Hazardous**
Solid Waste Analysis				
Total Organic Carbon (%)	1.03	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	87	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	0.12	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	<0.0001	0.01	0.2	2
Molybdenum	0.37	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	0.03	0.06	0.7	5
Selenium	0.27	0.1	0.5	7
Zinc	<0.03	4	50	200
Chloride	<3	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	165.5	1000	20000	50000
Total Dissolved Solids	1191	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	20	500	800	1000

Mass of sample taken (kg)	0.1056	Dry Matter Content Ratio (%) =	85.4
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.885
Particle Size <4mm =	>95%	Eluate Volume (l)	0.83

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**3**			
Client Sample No	**BH2**			
Depth/Other	**0.50**			
Sample Date	**30/09/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	1.20	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-
Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	<0.03	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	0.0028	0.01	0.2	2
Molybdenum	0.13	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.04	4	50	200
Chloride	<3	800	15000	25000
Fluoride	3	10	150	500
Sulphate as SO4	2.8	1000	20000	50000
Total Dissolved Solids	710	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	70	500	800	1000

Mass of sample taken (kg)	0.1003	Dry Matter Content Ratio (%) =	89.6
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.89
Particle Size <4mm =	>95%	Eluate Volume (l)	0.83

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**4**			
Client Sample No	**BH2**			
Depth/Other	**1.00**			
Sample Date	**30/09/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.44	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	<0.03	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	0.0006	0.01	0.2	2
Molybdenum	0.21	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.04	4	50	200
Chloride	<3	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	5.2	1000	20000	50000
Total Dissolved Solids	970	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	40	500	800	1000

Mass of sample taken (kg)	0.1011	Dry Matter Content Ratio (%) =	88.8
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.889
Particle Size <4mm =	>95%	Eluate Volume (l)	0.85

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**5**			
Client Sample No	**BH2**			
Depth/Other	**2.00**			
Sample Date	**30/09/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.53	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	0.11	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	<0.0001	0.01	0.2	2
Molybdenum	0.29	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	<0.03	4	50	200
Chloride	<3	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	46.7	1000	20000	50000
Total Dissolved Solids	800	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	30	500	800	1000

Mass of sample taken (kg)	0.1003	Dry Matter Content Ratio (%) =	89.6
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.889
Particle Size <4mm =	>95%	Eluate Volume (l)	0.6

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**6**			
Client Sample No	**BH2**	**Inert**	**Stable Non-reactive**	**Hazardous**
Depth/Other	**3.00**			
Sample Date	**30/09/2015**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.53	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	132	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	0.51	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	<0.0001	0.01	0.2	2
Molybdenum	0.20	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	0.28	0.1	0.5	7
Zinc	0.04	4	50	200
Chloride	<3	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	296.8	1000	20000	50000
Total Dissolved Solids	1489	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	30	500	800	1000

Mass of sample taken (kg)	0.105	Dry Matter Content Ratio (%) =	85.5
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.885
Particle Size <4mm =	>95%	Eluate Volume (l)	0.8

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**7**			
Client Sample No	**BH3**			
Depth/Other	**0.50**			
Sample Date	**01/10/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	2.27	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	<0.03	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	0.0029	0.01	0.2	2
Molybdenum	0.06	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.05	4	50	200
Chloride	<3	800	15000	25000
Fluoride	5	10	150	500
Sulphate as SO4	3.2	1000	20000	50000
Total Dissolved Solids	560	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	70	500	800	1000

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Mass of sample taken (kg)	0.1133	Dry Matter Content Ratio (%) =	79.7
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.877
Particle Size <4mm =	>95%	Eluate Volume (l)	0.75

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**8**			
Client Sample No	**BH4**			
Depth/Other	**0.00-1.00**			
Sample Date	**03/10/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	2.02	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	<0.03	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	0.0007	0.01	0.2	2
Molybdenum	0.11	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.04	4	50	200
Chloride	4	800	15000	25000
Fluoride	5	10	150	500
Sulphate as SO4	8.2	1000	20000	50000
Total Dissolved Solids	1800	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	60	500	800	1000

Mass of sample taken (kg)	0.1007	Dry Matter Content Ratio (%) =	88.9
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.889
Particle Size <4mm =	>95%	Eluate Volume (l)	0.85

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**9**			
Client Sample No	**BH4**			
Depth/Other	**1.00-2.00**			
Sample Date	**03/10/2015**	**Inert**	**Stable Non-reactive**	**Hazardous**
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.34	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	0.05	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	0.0003	0.01	0.2	2
Molybdenum	0.29	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.05	4	50	200
Chloride	<3	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	5.0	1000	20000	50000
Total Dissolved Solids	1070	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	40	500	800	1000

Mass of sample taken (kg)	0.1022	Dry Matter Content Ratio (%) =	87.7
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.887
Particle Size <4mm =	>95%	Eluate Volume (l)	0.83

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**10**			
Client Sample No	**BH4**	**Inert**	**Stable Non-reactive**	**Hazardous**
Depth/Other	**2.00-3.00**			
Sample Date	**03/10/2015**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.38	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	0.04	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	0.0002	0.01	0.2	2
Molybdenum	0.28	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.04	4	50	200
Chloride	<3	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	6.1	1000	20000	50000
Total Dissolved Solids	980	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	40	500	800	1000

Mass of sample taken (kg)	0.1008	Dry Matter Content Ratio (%) =	89.0
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	0.889
Particle Size <4mm =	>95%	Eluate Volume (l)	0.63

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**15/14318**			
Sample No	**11**			
Client Sample No	**BH4**	**Inert**	**Stable Non-reactive**	**Hazardous**
Depth/Other	**3.00-4.00**			
Sample Date	**03/10/2015**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.65	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<45	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	<0.025	0.5	2	25
Barium	0.17	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	<0.0001	0.01	0.2	2
Molybdenum	0.43	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.03	4	50	200
Chloride	<3	800	15000	25000
Fluoride	3	10	150	500
Sulphate as SO4	33.8	1000	20000	50000
Total Dissolved Solids	940	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	30	500	800	1000

Client Name: O'Connor Sutton Cronin & Assoc. Ltd **Matrix : Solid**
Reference:
Location: St Pauls
Contact: Cian O'Hora

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	EPH Interpretation
15/14318	1	BH1	1.00-2.00	2	Lubricating oil
15/14318	1	BH2	3.00	6	Lubricating oil

JE Job No.: 15/14318

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 (UKAS) accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 15/14318

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID.	PM12/PM16	CWG GC-FID			AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified USEPA 8163. Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

JE Job No: 15/14318

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM27	Modified US EPA method 9056.Determination of water soluble anions using Dionex (Ion-Chromatography).	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM17	Modified method EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes		AD	Yes

JE Job No: 15/14318

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes		AR	Yes
TM60	Modified USEPA 9060. Determination of TOC by calculation from Total Carbon and Inorganic Carbon using a TOC analyser, the carbon in the sample is converted to CO2 and then passed through a non-dispersive infrared gas analyser (NDIR).	PM0	No preparation is required.			AR	Yes
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM38	Samples are brominated to reduce all mercury compounds to Mercury (II) which is analysed using method TM061.	Yes		AR	Yes
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
NONE	No Method Code	NONE	No Method Code			AR	Yes
NONE	No Method Code	PM17	Modified method EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	

Appendix - Methods used for WAC (2003/33/EC)

Leachate tests	
10l/kg; 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ba	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cd	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cr total	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cu	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Hg	I.S. EN 13370 rec. EN 1483 (CVAAS)
Mo	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ni	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Pb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Sb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Se	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Zn	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Chloride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Fluoride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Sulphate	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Phenol index	I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometic methods after distillation)* (BY HPLC - Jones Env)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional analysis	
TOC	I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion.
BTEX	GC-FID
PCB7**	I.S. EN 15308 analysis by GC-ECD.
Mineral oil	I.S. EN 14039 C10 to C40 analysis by GC-FID.
PAH17***	I.S. EN 15527 PAH17 analysis by GC-MS
Metals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 (ICP-OES)
Other	
Dry matter	I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
ANC	CEN/TS 15364 Determined by amouns of acid or base needed to cover the pH range

Notes:

*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS

**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180

***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.

OCSC O'CONNOR | SUTTON | CRONIN

HazWasteOnline™

Waste Classification Report

K6QQY-9LF92-8SAL4

Job name

N288

Waste Stream

OCSC WM3 v1.1

Comments

Classification report for samples obtained at the St Paul's site on the 28/09/2015, 29/09/2015, 30/09/2015, 1/10/2015 & 03/10/2015. Samples were obtained by GII during cable tool drilling and were sent to Jones Environmental for analysis.

Project

N288

Site

St Pauls, Raheny, Dublin 5

Classified by

Name:
O'Hora, Cian
Date:
19/10/2015 14:34 UTC
Telephone:
+353 (0)1 868 2000

Company:
OCSC
9 Prussia Street
Dublin 7

Report

Created by: O'Hora, Cian
Created date: 19/10/2015 14:34 UTC

Job summary

Classification of sample: BH1

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH1
Sample Depth:
0 - 1 m
Moisture content: **9.7%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 9.7%, dry weight correction)

antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined): (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.595 mg/kg or <0.00016%) IGNORED Because: "<LOD"
arsenic trioxide: (Cation conc. entered: 6.9 mg/kg, converted to compound conc.:8.305 mg/kg or 0.00083%)
barium sulfate: (Cation conc. entered: 135 mg/kg, converted to compound conc.:209.148 mg/kg or 0.0209%)
cadmium sulfide: (Cation conc. entered: 1.5 mg/kg, converted to compound conc.:1.757 mg/kg or 0.000176%, Note 1 conc.: 0.000137%)
chromium(III) oxide: (Cation conc. entered: 28 mg/kg, converted to compound conc.:37.305 mg/kg or 0.00373%)
chromium(VI) oxide: (Cation conc. entered: <0.3 mg/kg, converted to compound conc.:<0.526 mg/kg or <0.0000526%) IGNORED Because: "<LOD"
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 15 mg/kg, converted to compound conc.:20.647 mg/kg or 0.00206%, Note 1 conc.: 0.00137%)
mercury dichloride: (Cation conc. entered: <0.1 mg/kg, converted to compound conc.:<0.123 mg/kg or <0.0000123%) IGNORED Because: "<LOD"
molybdenum(VI) oxide: (Cation conc. entered: 2.6 mg/kg, converted to compound conc.:3.556 mg/kg or 0.000356%)
nickel dihydroxide: (Cation conc. entered: 22 mg/kg, converted to compound conc.:31.676 mg/kg or 0.00317%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.367 mg/kg or <0.000137%) IGNORED Because: "<LOD"
zinc oxide: (Cation conc. entered: 49 mg/kg, converted to compound conc.:55.598 mg/kg or 0.00556%)
naphthalene: (Whole conc. entered as: <0.04 mg/kg or <0.00000365%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.03 mg/kg or <0.00000273%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000456%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.04 mg/kg or <0.00000365%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000273%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000365%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.03 mg/kg or <0.00000273%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000273%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.06 mg/kg or <0.00000547%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.02 mg/kg or <0.00000182%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.04 mg/kg or <0.00000365%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.04 mg/kg or <0.00000365%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000365%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.04 mg/kg or <0.00000365%) IGNORED Because: "<LOD"
coronene: (Whole conc. entered as: <0.04 mg/kg or <0.00000365%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000456%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.02 mg/kg or <0.00000182%) IGNORED Because: "<LOD"

benzene: (Whole conc. entered as: <5 mg/kg or <0.000456%) IGNORED Because: "<LOD"
toluene: (Whole conc. entered as: <5 mg/kg or <0.000456%) IGNORED Because: "<LOD"
xylene: (Whole conc. entered as: <5 mg/kg or <0.000456%) IGNORED Because: "<LOD"
ethylbenzene: (Whole conc. entered as: <5 mg/kg or <0.000456%) IGNORED Because: "<LOD"
PCBs/PCTs: (Whole conc. entered as: <0.035 mg/kg or <0.00000319%) IGNORED Because: "<LOD"
pH: (Whole conc. entered as: 8.65 pH, converted to conc.:8.65 pH or 8.65 pH)
TPH (C6 to C40) petroleum group: (Whole conc. entered as: <52 mg/kg or <0.00474%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5

"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "cadmium sulfide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "chromium(III) oxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "zinc oxide"

Note 1 , used on:

Test: "HP 5 on STOT SE 1; H370, STOT RE 1; H372" for determinand: "cadmium sulfide"
Test: "HP 5 on STOT SE 2; H371, STOT RE 2; H373" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H302" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H332" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 7 on Carc. 1B; H350, Carc. 1A; H350, Carc. 1B; H350i, Carc. 1A; H350i" for determinand: "cadmium sulfide"
Test: "HP 7 on Carc. 2; H351" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 1A; H360, Repr. 1B; H360, Repr. 1B; H360F, Repr. 1A; H360F, Repr. 1A; H360D, Repr. 1B; H360D, Repr. 1B; H360FD, Repr. 1A; H360FD, Repr. 1A; H360Fd, Repr. 1B; H360Fd, Repr. 1B; H360Df, Repr. 1A; H360Df" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 2; H361, Repr. 2; H361f, Repr. 2; H361d, Repr. 2; H361fd" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 11 on Muta. 2; H341" for determinand: "cadmium sulfide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "cadmium sulfide"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Classification of sample: BH1[1]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH1[1]
Sample Depth:
1 - 2 m
Moisture content: **8.9%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 8.9%, dry weight correction)

antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined): (Cation conc. entered: 4 mg/kg, converted to compound conc.:6.428 mg/kg or 0.000643%)
arsenic trioxide: (Cation conc. entered: 13 mg/kg, converted to compound conc.:15.761 mg/kg or 0.00158%)
barium sulfate: (Cation conc. entered: 72 mg/kg, converted to compound conc.:112.365 mg/kg or 0.0112%)
cadmium sulfide: (Cation conc. entered: 1.3 mg/kg, converted to compound conc.:1.534 mg/kg or 0.000153%, Note 1 conc.: 0.000119%)
chromium(III) oxide: (Cation conc. entered: 33.2 mg/kg, converted to compound conc.:44.558 mg/kg or 0.00446%)
chromium(VI) oxide: (Cation conc. entered: <0.3 mg/kg, converted to compound conc.:<0.53 mg/kg or <0.000053%) IGNORED Because: "<LOD"
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 19 mg/kg, converted to compound conc.:26.345 mg/kg or 0.00263%, Note 1 conc.: 0.00174%)
mercury dichloride: (Cation conc. entered: <0.1 mg/kg, converted to compound conc.:<0.124 mg/kg or <0.0000124%) IGNORED Because: "<LOD"
molybdenum(VI) oxide: (Cation conc. entered: 6.1 mg/kg, converted to compound conc.:8.403 mg/kg or 0.00084%)
nickel dihydroxide: (Cation conc. entered: 39.5 mg/kg, converted to compound conc.:57.291 mg/kg or 0.00573%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: 6 mg/kg, converted to compound conc.:8.264 mg/kg or 0.000826%)
zinc oxide: (Cation conc. entered: 62 mg/kg, converted to compound conc.:70.865 mg/kg or 0.00709%)
naphthalene: (Whole conc. entered as: <0.04 mg/kg or <0.00000367%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.03 mg/kg or <0.00000275%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000459%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.04 mg/kg or <0.00000367%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000275%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000367%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.03 mg/kg or <0.00000275%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000275%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.06 mg/kg or <0.00000551%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.02 mg/kg or <0.00000184%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.04 mg/kg or <0.00000367%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.04 mg/kg or <0.00000367%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000367%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.04 mg/kg or <0.00000367%) IGNORED Because: "<LOD"
coronene: (Whole conc. entered as: <0.04 mg/kg or <0.00000367%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000459%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.02 mg/kg or <0.00000184%) IGNORED Because: "<LOD"

benzene: (Whole conc. entered as: <5 mg/kg or <0.000459%) IGNORED Because: "<LOD"
toluene: (Whole conc. entered as: <5 mg/kg or <0.000459%) IGNORED Because: "<LOD"
xylene: (Whole conc. entered as: <5 mg/kg or <0.000459%) IGNORED Because: "<LOD"
ethylbenzene: (Whole conc. entered as: <5 mg/kg or <0.000459%) IGNORED Because: "<LOD"
PCBs/PCTs: (Whole conc. entered as: <0.035 mg/kg or <0.00000321%) IGNORED Because: "<LOD"
confirm TPH has NOT arisen from diesel or petrol: (Confirmed)
TPH (C6 to C40) petroleum group: (Whole conc. entered as: 119 mg/kg or 0.0109%)

Test Settings

HP 3(i) on Flam. Liq. 1; H224, Flam. Liq. 2; H225, Flam. Liq. 3; H226: Force this test to non hazardous because: "No free phase liquid observed. Lab has confirmed that fuel is lube oil from the drilling rig. Site can be considered to be green field"

Notes utilised in assessment

C14: Step 5

"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "cadmium sulfide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "chromium(III) oxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "zinc oxide"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined)"
Test: "HP 14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) petroleum group"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"
determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"

WM3: Unknown oil , used on:

determinand: "TPH (C6 to C40) petroleum group"

Classification of sample: BH2

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH2
Sample Depth:
0.5 m
Moisture content: **17.7%**
(dry weight correction)

LoW Code:

Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 17.7%, dry weight correction)

antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined): (Cation conc. entered: 3 mg/kg, converted to compound conc.:4.46 mg/kg or 0.000446%)
arsenic trioxide: (Cation conc. entered: 20 mg/kg, converted to compound conc.:22.435 mg/kg or 0.00224%)
barium sulfate: (Cation conc. entered: 132 mg/kg, converted to compound conc.:190.6 mg/kg or 0.0191%)
cadmium sulfide: (Cation conc. entered: 2.2 mg/kg, converted to compound conc.:2.402 mg/kg or 0.00024%, Note 1 conc.: 0.000187%)
chromium(III) oxide: (Cation conc. entered: 60.6 mg/kg, converted to compound conc.:75.251 mg/kg or 0.00753%)
chromium(VI) oxide: (Cation conc. entered: <0.3 mg/kg, converted to compound conc.:<0.49 mg/kg or <0.000049%) IGNORED Because: "<LOD"
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 48 mg/kg, converted to compound conc.:61.58 mg/kg or 0.00616%, Note 1 conc.: 0.00408%)
mercury dichloride: (Cation conc. entered: <0.1 mg/kg, converted to compound conc.:<0.115 mg/kg or <0.0000115%) IGNORED Because: "<LOD"
molybdenum(VI) oxide: (Cation conc. entered: 4.9 mg/kg, converted to compound conc.:6.245 mg/kg or 0.000625%)
nickel dihydroxide: (Cation conc. entered: 49.7 mg/kg, converted to compound conc.:66.696 mg/kg or 0.00667%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: 2 mg/kg, converted to compound conc.:2.549 mg/kg or 0.000255%)
zinc oxide: (Cation conc. entered: 109 mg/kg, converted to compound conc.:115.271 mg/kg or 0.0115%)
naphthalene: (Whole conc. entered as: <0.04 mg/kg or <0.0000034%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.03 mg/kg or <0.00000255%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000425%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.04 mg/kg or <0.0000034%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: 0.05 mg/kg or 0.00000425%)
anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.0000034%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.03 mg/kg or <0.00000255%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000255%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.06 mg/kg or <0.0000051%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: 0.02 mg/kg or 0.0000017%)
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.04 mg/kg or <0.0000034%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.04 mg/kg or <0.0000034%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.0000034%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.04 mg/kg or <0.0000034%) IGNORED Because: "<LOD"
coronene: (Whole conc. entered as: <0.04 mg/kg or <0.0000034%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000425%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.02 mg/kg or <0.0000017%) IGNORED Because: "<LOD"

benzene: (Whole conc. entered as: <5 mg/kg or <0.000425%) IGNORED Because: "<LOD"
toluene: (Whole conc. entered as: <5 mg/kg or <0.000425%) IGNORED Because: "<LOD"
xylene: (Whole conc. entered as: <5 mg/kg or <0.000425%) IGNORED Because: "<LOD"
ethylbenzene: (Whole conc. entered as: <5 mg/kg or <0.000425%) IGNORED Because: "<LOD"
PCBs/PCTs: (Whole conc. entered as: <0.035 mg/kg or <0.00000297%) IGNORED Because: "<LOD"
pH: (Whole conc. entered as: 8.5 pH, converted to conc.:8.5 pH or 8.5 pH)
TPH (C6 to C40) petroleum group: (Whole conc. entered as: <52 mg/kg or <0.00442%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5
"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "chromium(III) oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "zinc oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "phenanthrene"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "chrysene"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "cadmium sulfide"

Note 1 , used on:

Test: "HP 5 on STOT SE 1; H370, STOT RE 1; H372" for determinand: "cadmium sulfide"
Test: "HP 5 on STOT SE 2; H371, STOT RE 2; H373" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H302" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H332" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 7 on Carc. 1A; H350, Carc. 1A; H350i, Carc. 1B; H350, Carc. 1B; H350i" for determinand: "cadmium sulfide"
Test: "HP 7 on Carc. 2; H351" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 1A; H360, Repr. 1A; H360F, Repr. 1A; H360D, Repr. 1A; H360FD, Repr. 1A; H360Fd, Repr. 1A; H360Df, Repr. 1B; H360, Repr. 1B; H360F, Repr. 1B; H360D, Repr. 1B; H360FD, Repr. 1B; H360Fd, Repr. 1B; H360Df" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 2; H361, Repr. 2; H361f, Repr. 2; H361d, Repr. 2; H361fd" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 11 on Muta. 2; H341" for determinand: "cadmium sulfide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"
determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"

Classification of sample: BH2[1]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH2[1]
Sample Depth:
1 m
Moisture content: **12.5%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 12.5%, dry weight correction)

antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined): (Cation conc. entered: 4 mg/kg, converted to compound conc.:6.222 mg/kg or 0.000622%)
arsenic trioxide: (Cation conc. entered: 13.2 mg/kg, converted to compound conc.:15.492 mg/kg or 0.00155%)
barium sulfate: (Cation conc. entered: 69 mg/kg, converted to compound conc.:104.237 mg/kg or 0.0104%)
cadmium sulfide: (Cation conc. entered: 2.7 mg/kg, converted to compound conc.:3.085 mg/kg or 0.000308%, Note 1 conc.: 0.00024%)
chromium(III) oxide: (Cation conc. entered: 31.4 mg/kg, converted to compound conc.:40.794 mg/kg or 0.00408%)
chromium(VI) oxide: (Cation conc. entered: <0.3 mg/kg, converted to compound conc.:<0.513 mg/kg or <0.0000513%) IGNORED Because: "<LOD"
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 18 mg/kg, converted to compound conc.:24.16 mg/kg or 0.00242%, Note 1 conc.: 0.0016%)
mercury dichloride: (Cation conc. entered: <0.1 mg/kg, converted to compound conc.:<0.12 mg/kg or <0.000012%) IGNORED Because: "<LOD"
molybdenum(VI) oxide: (Cation conc. entered: 7.7 mg/kg, converted to compound conc.:10.268 mg/kg or 0.00103%)
nickel dihydroxide: (Cation conc. entered: 36.2 mg/kg, converted to compound conc.:50.825 mg/kg or 0.00508%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: 1 mg/kg, converted to compound conc.:1.333 mg/kg or 0.000133%)
zinc oxide: (Cation conc. entered: 67 mg/kg, converted to compound conc.:74.13 mg/kg or 0.00741%)
naphthalene: (Whole conc. entered as: <0.04 mg/kg or <0.00000356%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.03 mg/kg or <0.00000267%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000444%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.04 mg/kg or <0.00000356%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000267%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000356%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.03 mg/kg or <0.00000267%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000267%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.06 mg/kg or <0.00000533%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.02 mg/kg or <0.00000178%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.04 mg/kg or <0.00000356%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.04 mg/kg or <0.00000356%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000356%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.04 mg/kg or <0.00000356%) IGNORED Because: "<LOD"
coronene: (Whole conc. entered as: <0.04 mg/kg or <0.00000356%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000444%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.02 mg/kg or <0.00000178%) IGNORED Because: "<LOD"

benzene: (Whole conc. entered as: <5 mg/kg or <0.000444%) IGNORED Because: "<LOD"
toluene: (Whole conc. entered as: <5 mg/kg or <0.000444%) IGNORED Because: "<LOD"
xylene: (Whole conc. entered as: <5 mg/kg or <0.000444%) IGNORED Because: "<LOD"
ethylbenzene: (Whole conc. entered as: <5 mg/kg or <0.000444%) IGNORED Because: "<LOD"
PCBs/PCTs: (Whole conc. entered as: <0.035 mg/kg or <0.00000311%) IGNORED Because: "<LOD"
TPH (C6 to C40) petroleum group: (Whole conc. entered as: <52 mg/kg or <0.00462%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5

"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "chromium(III) oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "zinc oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "cadmium sulfide"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"
determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"

Classification of sample: BH2[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH2[2]
Sample Depth:
2 m
Moisture content: **10.6%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 10.6%, dry weight correction)

antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined): (Cation conc. entered: 2 mg/kg, converted to compound conc.:3.165 mg/kg or 0.000316%)
arsenic trioxide: (Cation conc. entered: 10.9 mg/kg, converted to compound conc.:13.012 mg/kg or 0.0013%)
barium sulfate: (Cation conc. entered: 131 mg/kg, converted to compound conc.:201.299 mg/kg or 0.0201%)
cadmium sulfide: (Cation conc. entered: 3.2 mg/kg, converted to compound conc.:3.719 mg/kg or 0.000372%, Note 1 conc.: 0.000289%)
chromium(III) oxide: (Cation conc. entered: 34 mg/kg, converted to compound conc.:44.93 mg/kg or 0.00449%)
chromium(VI) oxide: (Cation conc. entered: <0.3 mg/kg, converted to compound conc.:<0.522 mg/kg or <0.0000522%) IGNORED Because: "<LOD"
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 18 mg/kg, converted to compound conc.:24.575 mg/kg or 0.00246%, Note 1 conc.: 0.00163%)
mercury dichloride: (Cation conc. entered: <0.1 mg/kg, converted to compound conc.:<0.122 mg/kg or <0.0000122%) IGNORED Because: "<LOD"
molybdenum(VI) oxide: (Cation conc. entered: 4.5 mg/kg, converted to compound conc.:6.104 mg/kg or 0.00061%)
nickel dihydroxide: (Cation conc. entered: 47.6 mg/kg, converted to compound conc.:67.978 mg/kg or 0.0068%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: 3 mg/kg, converted to compound conc.:4.069 mg/kg or 0.000407%)
zinc oxide: (Cation conc. entered: 91 mg/kg, converted to compound conc.:102.413 mg/kg or 0.0102%)
naphthalene: (Whole conc. entered as: <0.04 mg/kg or <0.00000362%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.03 mg/kg or <0.00000271%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000452%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.04 mg/kg or <0.00000362%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000271%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000362%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.03 mg/kg or <0.00000271%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000271%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.06 mg/kg or <0.00000542%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.02 mg/kg or <0.00000181%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.04 mg/kg or <0.00000362%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.04 mg/kg or <0.00000362%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000362%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.04 mg/kg or <0.00000362%) IGNORED Because: "<LOD"
coronene: (Whole conc. entered as: <0.04 mg/kg or <0.00000362%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000452%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.02 mg/kg or <0.00000181%) IGNORED Because: "<LOD"

benzene: (Whole conc. entered as: <5 mg/kg or <0.000452%) IGNORED Because: "<LOD"
toluene: (Whole conc. entered as: <5 mg/kg or <0.000452%) IGNORED Because: "<LOD"
xylene: (Whole conc. entered as: <5 mg/kg or <0.000452%) IGNORED Because: "<LOD"
ethylbenzene: (Whole conc. entered as: <5 mg/kg or <0.000452%) IGNORED Because: "<LOD"
PCBs/PCTs: (Whole conc. entered as: <0.035 mg/kg or <0.00000316%) IGNORED Because: "<LOD"
TPH (C6 to C40) petroleum group: (Whole conc. entered as: <52 mg/kg or <0.0047%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5
"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "chromium(III) oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "zinc oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "cadmium sulfide"

Note 1 , used on:

Test: "HP 5 on STOT SE 1; H370, STOT RE 1; H372" for determinand: "cadmium sulfide"
Test: "HP 5 on STOT SE 2; H371, STOT RE 2; H373" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H302" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H332" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 7 on Carc. 1A; H350, Carc. 1A; H350i, Carc. 1B; H350, Carc. 1B; H350i" for determinand: "cadmium sulfide"
Test: "HP 7 on Carc. 2; H351" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 1A; H360, Repr. 1A; H360F, Repr. 1A; H360D, Repr. 1A; H360FD, Repr. 1A; H360Fd, Repr. 1A; H360Df, Repr. 1B; H360, Repr. 1B; H360F, Repr. 1B; H360D, Repr. 1B; H360FD, Repr. 1B; H360Fd, Repr. 1B; H360Df" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 2; H361, Repr. 2; H361f, Repr. 2; H361d, Repr. 2; H361fd" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 11 on Muta. 2; H341" for determinand: "cadmium sulfide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"
determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"

Classification of sample: BH2[3]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH2[3]
Sample Depth:
3 m
Moisture content: **8.2%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 8.2%, dry weight correction)

antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined): (Cation conc. entered: 2 mg/kg, converted to compound conc.:3.235 mg/kg or 0.000323%)
arsenic trioxide: (Cation conc. entered: 8.6 mg/kg, converted to compound conc.:10.494 mg/kg or 0.00105%)
barium sulfate: (Cation conc. entered: 107 mg/kg, converted to compound conc.:168.067 mg/kg or 0.0168%)
cadmium sulfide: (Cation conc. entered: 1.5 mg/kg, converted to compound conc.:1.782 mg/kg or 0.000178%, Note 1 conc.: 0.000139%)
chromium(III) oxide: (Cation conc. entered: 34 mg/kg, converted to compound conc.:45.927 mg/kg or 0.00459%)
chromium(VI) oxide: (Cation conc. entered: <0.3 mg/kg, converted to compound conc.:<0.533 mg/kg or <0.0000533%) IGNORED Because: "<LOD"
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 22 mg/kg, converted to compound conc.:30.702 mg/kg or 0.00307%, Note 1 conc.: 0.00203%)
mercury dichloride: (Cation conc. entered: <0.1 mg/kg, converted to compound conc.:<0.125 mg/kg or <0.0000125%) IGNORED Because: "<LOD"
molybdenum(VI) oxide: (Cation conc. entered: 2.9 mg/kg, converted to compound conc.:4.021 mg/kg or 0.000402%)
nickel dihydroxide: (Cation conc. entered: 35.2 mg/kg, converted to compound conc.:51.385 mg/kg or 0.00514%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: 3 mg/kg, converted to compound conc.:4.159 mg/kg or 0.000416%)
zinc oxide: (Cation conc. entered: 63 mg/kg, converted to compound conc.:72.474 mg/kg or 0.00725%)
naphthalene: (Whole conc. entered as: <0.04 mg/kg or <0.0000037%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.03 mg/kg or <0.00000277%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000462%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.04 mg/kg or <0.0000037%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: 0.04 mg/kg or 0.0000037%)
anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.0000037%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.03 mg/kg or <0.00000277%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000277%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.06 mg/kg or <0.00000555%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: 0.03 mg/kg or 0.00000277%)
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.04 mg/kg or <0.0000037%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.04 mg/kg or <0.0000037%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.0000037%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.04 mg/kg or <0.0000037%) IGNORED Because: "<LOD"
coronene: (Whole conc. entered as: <0.04 mg/kg or <0.0000037%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000462%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.02 mg/kg or <0.00000185%) IGNORED Because: "<LOD"

benzene: (Whole conc. entered as: <5 mg/kg or <0.000462%) IGNORED Because: "<LOD"
toluene: (Whole conc. entered as: <5 mg/kg or <0.000462%) IGNORED Because: "<LOD"
xylene: (Whole conc. entered as: <5 mg/kg or <0.000462%) IGNORED Because: "<LOD"
ethylbenzene: (Whole conc. entered as: <5 mg/kg or <0.000462%) IGNORED Because: "<LOD"
PCBs/PCTs: (Whole conc. entered as: <0.035 mg/kg or <0.00000323%) IGNORED Because: "<LOD"
confirm TPH has NOT arisen from diesel or petrol: (Confirmed)
TPH (C6 to C40) petroleum group: (Whole conc. entered as: 187 mg/kg or 0.0173%)

Test Settings

HP 3(i) on Flam. Liq. 1; H224, Flam. Liq. 2; H225, Flam. Liq. 3; H226: Force this test to non hazardous because: "No free phase liquid observed. Lab has confirmed that fuel is lube oil from the drilling rig. Site can be considered to be green field"

Notes utilised in assessment

C14: Step 5
"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "chromium(III) oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "zinc oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "phenanthrene"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "chrysene"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "TPH (C6 to C40) petroleum group"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "cadmium sulfide"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"
determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"

WM3: Unknown oil , used on:

determinand: "TPH (C6 to C40) petroleum group"

Classification of sample: BH3

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH3
Sample Depth:
0.5 m
Moisture content: **17%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 17%, dry weight correction)

naphthalene: (Whole conc. entered as: <0.04 mg/kg or <0.00000342%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.03 mg/kg or <0.00000256%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000427%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.04 mg/kg or <0.00000342%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: 0.16 mg/kg or 0.0000137%)
anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000342%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: 0.05 mg/kg or 0.00000427%)
pyrene: (Whole conc. entered as: 0.05 mg/kg or 0.00000427%)
benzo[a]anthracene: (Whole conc. entered as: <0.06 mg/kg or <0.00000513%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: 0.07 mg/kg or 0.00000598%)
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.04 mg/kg or <0.00000342%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.04 mg/kg or <0.00000342%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000342%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.04 mg/kg or <0.00000342%) IGNORED Because: "<LOD"
coronene: (Whole conc. entered as: <0.04 mg/kg or <0.00000342%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000427%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.02 mg/kg or <0.00000171%) IGNORED Because: "<LOD"
benzene: (Whole conc. entered as: <5 mg/kg or <0.000427%) IGNORED Because: "<LOD"
toluene: (Whole conc. entered as: <5 mg/kg or <0.000427%) IGNORED Because: "<LOD"
xylene: (Whole conc. entered as: <5 mg/kg or <0.000427%) IGNORED Because: "<LOD"
ethylbenzene: (Whole conc. entered as: <5 mg/kg or <0.000427%) IGNORED Because: "<LOD"
PCBs/PCTs: (Whole conc. entered as: <0.035 mg/kg or <0.00000299%) IGNORED Because: "<LOD"
pH: (Whole conc. entered as: 8.36 pH, converted to conc.:8.36 pH or 8.36 pH)

Notes utilised in assessment

C14: Step 5

"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "phenanthrene"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "fluoranthene"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "pyrene"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "chrysene"

Classification of sample: BH4

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH4
Sample Depth:
0 - 1 m
Moisture content: **22.3%**
(dry weight correction)

LoW Code:

Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 22.3%, dry weight correction)

antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined): (Cation conc. entered: 3 mg/kg, converted to compound conc.:4.293 mg/kg or 0.000429%)
arsenic trioxide: (Cation conc. entered: 16.1 mg/kg, converted to compound conc.:17.381 mg/kg or 0.00174%)
barium sulfate: (Cation conc. entered: 124 mg/kg, converted to compound conc.:172.314 mg/kg or 0.0172%)
cadmium sulfide: (Cation conc. entered: 2.7 mg/kg, converted to compound conc.:2.837 mg/kg or 0.000284%, Note 1 conc.: 0.000221%)
chromium(III) oxide: (Cation conc. entered: 58 mg/kg, converted to compound conc.:69.313 mg/kg or 0.00693%)
chromium(VI) oxide: (Cation conc. entered: <0.3 mg/kg, converted to compound conc.:<0.472 mg/kg or <0.0000472%) IGNORED Because: "<LOD"
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 59 mg/kg, converted to compound conc.:72.845 mg/kg or 0.00728%, Note 1 conc.: 0.00482%)
mercury dichloride: (Cation conc. entered: <0.1 mg/kg, converted to compound conc.:<0.111 mg/kg or <0.0000111%) IGNORED Because: "<LOD"
molybdenum(VI) oxide: (Cation conc. entered: 3.7 mg/kg, converted to compound conc.:4.539 mg/kg or 0.000454%)
nickel dihydroxide: (Cation conc. entered: 49.6 mg/kg, converted to compound conc.:64.058 mg/kg or 0.00641%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: 2 mg/kg, converted to compound conc.:2.453 mg/kg or 0.000245%)
zinc oxide: (Cation conc. entered: 101 mg/kg, converted to compound conc.:102.793 mg/kg or 0.0103%)
naphthalene: (Whole conc. entered as: <0.04 mg/kg or <0.00000327%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.03 mg/kg or <0.00000245%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000409%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.04 mg/kg or <0.00000327%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: 0.06 mg/kg or 0.00000491%)
anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000327%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.03 mg/kg or <0.00000245%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000245%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.06 mg/kg or <0.00000491%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.02 mg/kg or <0.00000164%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.04 mg/kg or <0.00000327%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.04 mg/kg or <0.00000327%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000327%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.04 mg/kg or <0.00000327%) IGNORED Because: "<LOD"
coronene: (Whole conc. entered as: <0.04 mg/kg or <0.00000327%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000409%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.02 mg/kg or <0.00000164%) IGNORED Because: "<LOD"

benzene: (Whole conc. entered as: <5 mg/kg or <0.000409%) IGNORED Because: "<LOD"
toluene: (Whole conc. entered as: <5 mg/kg or <0.000409%) IGNORED Because: "<LOD"
xylene: (Whole conc. entered as: <5 mg/kg or <0.000409%) IGNORED Because: "<LOD"
ethylbenzene: (Whole conc. entered as: <5 mg/kg or <0.000409%) IGNORED Because: "<LOD"
PCBs/PCTs: (Whole conc. entered as: <0.035 mg/kg or <0.00000286%) IGNORED Because: "<LOD"
pH: (Whole conc. entered as: 8.56 pH, converted to conc.:8.56 pH or 8.56 pH)
TPH (C6 to C40) petroleum group: (Whole conc. entered as: <52 mg/kg or <0.00425%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5
"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "chromium(III) oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "zinc oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "phenanthrene"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "cadmium sulfide"

Note 1 , used on:

Test: "HP 5 on STOT SE 1; H370, STOT RE 1; H372" for determinand: "cadmium sulfide"
Test: "HP 5 on STOT SE 2; H371, STOT RE 2; H373" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H302" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H332" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 7 on Carc. 1A; H350, Carc. 1A; H350i, Carc. 1B; H350, Carc. 1B; H350i" for determinand: "cadmium sulfide"
Test: "HP 7 on Carc. 2; H351" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 1A; H360, Repr. 1A; H360F, Repr. 1A; H360D, Repr. 1A; H360FD, Repr. 1A; H360Fd, Repr. 1A; H360Df, Repr. 1B; H360, Repr. 1B; H360F, Repr. 1B; H360D, Repr. 1B; H360FD, Repr. 1B; H360Fd, Repr. 1B; H360Df" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 2; H361, Repr. 2; H361f, Repr. 2; H361d, Repr. 2; H361fd" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 11 on Muta. 2; H341" for determinand: "cadmium sulfide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"
determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"

Classification of sample: BH4[1]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH4[1]
Sample Depth:
1 - 2 m
Moisture content: **10.7%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 10.7%, dry weight correction)

antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined): (Cation conc. entered: 2 mg/kg, converted to compound conc.:3.162 mg/kg or 0.000316%)
arsenic trioxide: (Cation conc. entered: 10 mg/kg, converted to compound conc.:11.927 mg/kg or 0.00119%)
barium sulfate: (Cation conc. entered: 102 mg/kg, converted to compound conc.:156.595 mg/kg or 0.0157%)
cadmium sulfide: (Cation conc. entered: 1.7 mg/kg, converted to compound conc.:1.974 mg/kg or 0.000197%, Note 1 conc.: 0.000154%)
chromium(III) oxide: (Cation conc. entered: 30 mg/kg, converted to compound conc.:39.609 mg/kg or 0.00396%)
chromium(VI) oxide: (Cation conc. entered: <0.3 mg/kg, converted to compound conc.:<0.521 mg/kg or <0.0000521%) IGNORED Because: "<LOD"
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 19 mg/kg, converted to compound conc.:25.917 mg/kg or 0.00259%, Note 1 conc.: 0.00172%)
mercury dichloride: (Cation conc. entered: <0.1 mg/kg, converted to compound conc.:<0.122 mg/kg or <0.0000122%) IGNORED Because: "<LOD"
molybdenum(VI) oxide: (Cation conc. entered: 3.7 mg/kg, converted to compound conc.:5.014 mg/kg or 0.000501%)
nickel dihydroxide: (Cation conc. entered: 37.3 mg/kg, converted to compound conc.:53.221 mg/kg or 0.00532%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: 2 mg/kg, converted to compound conc.:2.71 mg/kg or 0.000271%)
zinc oxide: (Cation conc. entered: 75 mg/kg, converted to compound conc.:84.33 mg/kg or 0.00843%)
naphthalene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.03 mg/kg or <0.00000271%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000452%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000271%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.03 mg/kg or <0.00000271%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000271%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.06 mg/kg or <0.00000542%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.02 mg/kg or <0.00000181%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
coronene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000452%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.02 mg/kg or <0.00000181%) IGNORED Because: "<LOD"

benzene: (Whole conc. entered as: <5 mg/kg or <0.000452%) IGNORED Because: "<LOD"
toluene: (Whole conc. entered as: <5 mg/kg or <0.000452%) IGNORED Because: "<LOD"
xylene: (Whole conc. entered as: <5 mg/kg or <0.000452%) IGNORED Because: "<LOD"
ethylbenzene: (Whole conc. entered as: <5 mg/kg or <0.000452%) IGNORED Because: "<LOD"
PCBs/PCTs: (Whole conc. entered as: <0.035 mg/kg or <0.00000316%) IGNORED Because: "<LOD"
TPH (C6 to C40) petroleum group: (Whole conc. entered as: <52 mg/kg or <0.0047%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5

"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "chromium(III) oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "zinc oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "cadmium sulfide"

Note 1 , used on:

Test: "HP 5 on STOT SE 1; H370, STOT RE 1; H372" for determinand: "cadmium sulfide"
Test: "HP 5 on STOT SE 2; H371, STOT RE 2; H373" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H302" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H332" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 7 on Carc. 1A; H350, Carc. 1A; H350i, Carc. 1B; H350, Carc. 1B; H350i" for determinand: "cadmium sulfide"
Test: "HP 7 on Carc. 2; H351" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 1A; H360, Repr. 1A; H360F, Repr. 1A; H360D, Repr. 1A; H360FD, Repr. 1A; H360Fd, Repr. 1A; H360Df, Repr. 1B; H360, Repr. 1B; H360F, Repr. 1B; H360D, Repr. 1B; H360FD, Repr. 1B; H360Fd, Repr. 1B; H360Df" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 2; H361, Repr. 2; H361f, Repr. 2; H361d, Repr. 2; H361fd" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 11 on Muta. 2; H341" for determinand: "cadmium sulfide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"
determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"

Classification of sample: BH4[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH4[2]
Sample Depth:
2 - 3 m
Moisture content: **10.9%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 10.9%, dry weight correction)

antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined): (Cation conc. entered: 2 mg/kg, converted to compound conc.:3.156 mg/kg or 0.000316%)
arsenic trioxide: (Cation conc. entered: 10.6 mg/kg, converted to compound conc.:12.62 mg/kg or 0.00126%)
barium sulfate: (Cation conc. entered: 100 mg/kg, converted to compound conc.:153.248 mg/kg or 0.0153%)
cadmium sulfide: (Cation conc. entered: 1.7 mg/kg, converted to compound conc.:1.97 mg/kg or 0.000197%, Note 1 conc.: 0.000153%)
chromium(III) oxide: (Cation conc. entered: 28.4 mg/kg, converted to compound conc.:37.428 mg/kg or 0.00374%)
chromium(VI) oxide: (Cation conc. entered: <0.3 mg/kg, converted to compound conc.:<0.52 mg/kg or <0.000052%) IGNORED Because: "<LOD"
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 19 mg/kg, converted to compound conc.:25.87 mg/kg or 0.00259%, Note 1 conc.: 0.00171%)
mercury dichloride: (Cation conc. entered: <0.1 mg/kg, converted to compound conc.:<0.122 mg/kg or <0.0000122%) IGNORED Because: "<LOD"
molybdenum(VI) oxide: (Cation conc. entered: 4.1 mg/kg, converted to compound conc.:5.546 mg/kg or 0.000555%)
nickel dihydroxide: (Cation conc. entered: 35.1 mg/kg, converted to compound conc.:49.991 mg/kg or 0.005%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: 1 mg/kg, converted to compound conc.:1.353 mg/kg or 0.000135%)
zinc oxide: (Cation conc. entered: 70 mg/kg, converted to compound conc.:78.566 mg/kg or 0.00786%)
naphthalene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.03 mg/kg or <0.00000271%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000451%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000271%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.03 mg/kg or <0.00000271%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000271%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.06 mg/kg or <0.00000541%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.02 mg/kg or <0.0000018%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
coronene: (Whole conc. entered as: <0.04 mg/kg or <0.00000361%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000451%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.02 mg/kg or <0.0000018%) IGNORED Because: "<LOD"

benzene: (Whole conc. entered as: <5 mg/kg or <0.000451%) IGNORED Because: "<LOD"
toluene: (Whole conc. entered as: <5 mg/kg or <0.000451%) IGNORED Because: "<LOD"
xylene: (Whole conc. entered as: <5 mg/kg or <0.000451%) IGNORED Because: "<LOD"
ethylbenzene: (Whole conc. entered as: <5 mg/kg or <0.000451%) IGNORED Because: "<LOD"
PCBs/PCTs: (Whole conc. entered as: <0.035 mg/kg or <0.00000316%) IGNORED Because: "<LOD"
TPH (C6 to C40) petroleum group: (Whole conc. entered as: <52 mg/kg or <0.00469%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5

"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "chromium(III) oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "zinc oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "cadmium sulfide"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"
determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"

Classification of sample: BH4[3]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH4[3]
Sample Depth:
3 - 4 m
Moisture content: **11.9%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands (Moisture content: 11.9%, dry weight correction)

antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined): (Cation conc. entered: 2 mg/kg, converted to compound conc.:3.128 mg/kg or 0.000313%)
arsenic trioxide: (Cation conc. entered: 10 mg/kg, converted to compound conc.:11.799 mg/kg or 0.00118%)
barium sulfate: (Cation conc. entered: 121 mg/kg, converted to compound conc.:183.773 mg/kg or 0.0184%)
cadmium sulfide: (Cation conc. entered: 2 mg/kg, converted to compound conc.:2.297 mg/kg or 0.00023%, Note 1 conc.: 0.000179%)
chromium(III) oxide: (Cation conc. entered: 33.4 mg/kg, converted to compound conc.:43.625 mg/kg or 0.00436%)
chromium(VI) oxide: (Cation conc. entered: <0.3 mg/kg, converted to compound conc.:<0.516 mg/kg or <0.0000516%) IGNORED Because: "<LOD"
lead compounds (with the exception of those listed separately in this Annex): (Cation conc. entered: 20 mg/kg, converted to compound conc.:26.988 mg/kg or 0.0027%, Note 1 conc.: 0.00179%)
mercury dichloride: (Cation conc. entered: <0.1 mg/kg, converted to compound conc.:<0.121 mg/kg or <0.0000121%) IGNORED Because: "<LOD"
molybdenum(VI) oxide: (Cation conc. entered: 4.2 mg/kg, converted to compound conc.:5.631 mg/kg or 0.000563%)
nickel dihydroxide: (Cation conc. entered: 39.8 mg/kg, converted to compound conc.:56.179 mg/kg or 0.00562%)
selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite): (Cation conc. entered: 9 mg/kg, converted to compound conc.:12.064 mg/kg or 0.00121%)
zinc oxide: (Cation conc. entered: 86 mg/kg, converted to compound conc.:95.662 mg/kg or 0.00957%)
naphthalene: (Whole conc. entered as: <0.04 mg/kg or <0.00000357%) IGNORED Because: "<LOD"
acenaphthylene: (Whole conc. entered as: <0.03 mg/kg or <0.00000268%) IGNORED Because: "<LOD"
acenaphthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000447%) IGNORED Because: "<LOD"
fluorene: (Whole conc. entered as: <0.04 mg/kg or <0.00000357%) IGNORED Because: "<LOD"
phenanthrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000268%) IGNORED Because: "<LOD"
anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000357%) IGNORED Because: "<LOD"
fluoranthene: (Whole conc. entered as: <0.03 mg/kg or <0.00000268%) IGNORED Because: "<LOD"
pyrene: (Whole conc. entered as: <0.03 mg/kg or <0.00000268%) IGNORED Because: "<LOD"
benzo[a]anthracene: (Whole conc. entered as: <0.06 mg/kg or <0.00000536%) IGNORED Because: "<LOD"
chrysene: (Whole conc. entered as: <0.02 mg/kg or <0.00000179%) IGNORED Because: "<LOD"
benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.04 mg/kg or <0.00000357%) IGNORED Because: "<LOD"
indeno[123-cd]pyrene: (Whole conc. entered as: <0.04 mg/kg or <0.00000357%) IGNORED Because: "<LOD"
dibenz[a,h]anthracene: (Whole conc. entered as: <0.04 mg/kg or <0.00000357%) IGNORED Because: "<LOD"
benzo[ghi]perylene: (Whole conc. entered as: <0.04 mg/kg or <0.00000357%) IGNORED Because: "<LOD"
coronene: (Whole conc. entered as: <0.04 mg/kg or <0.00000357%) IGNORED Because: "<LOD"
benzo[b]fluoranthene: (Whole conc. entered as: <0.05 mg/kg or <0.00000447%) IGNORED Because: "<LOD"
benzo[k]fluoranthene: (Whole conc. entered as: <0.02 mg/kg or <0.00000179%) IGNORED Because: "<LOD"

benzene: (Whole conc. entered as: <5 mg/kg or <0.000447%) IGNORED Because: "<LOD"
toluene: (Whole conc. entered as: <5 mg/kg or <0.000447%) IGNORED Because: "<LOD"
xylene: (Whole conc. entered as: <5 mg/kg or <0.000447%) IGNORED Because: "<LOD"
ethylbenzene: (Whole conc. entered as: <5 mg/kg or <0.000447%) IGNORED Because: "<LOD"
PCBs/PCTs: (Whole conc. entered as: <0.035 mg/kg or <0.00000313%) IGNORED Because: "<LOD"
TPH (C6 to C40) petroleum group: (Whole conc. entered as: <52 mg/kg or <0.00465%) IGNORED Because: "<LOD"

Notes utilised in assessment

C14: Step 5
"identify whether any individual ecotoxic substance is present at or above a cut-off value ..." , used on:

Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "arsenic trioxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "chromium(III) oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "nickel dihydroxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "zinc oxide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined)"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "cadmium sulfide"

Note 1 , used on:

Test: "HP 5 on STOT SE 1; H370, STOT RE 1; H372" for determinand: "cadmium sulfide"
Test: "HP 5 on STOT SE 2; H371, STOT RE 2; H373" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H302" for determinand: "cadmium sulfide"
Test: "HP 6 on Acute Tox. 4; H332" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 7 on Carc. 1A; H350, Carc. 1A; H350i, Carc. 1B; H350, Carc. 1B; H350i" for determinand: "cadmium sulfide"
Test: "HP 7 on Carc. 2; H351" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 1A; H360, Repr. 1A; H360F, Repr. 1A; H360D, Repr. 1A; H360FD, Repr. 1A; H360Fd, Repr. 1A; H360Df, Repr. 1B; H360, Repr. 1B; H360F, Repr. 1B; H360D, Repr. 1B; H360FD, Repr. 1B; H360Fd, Repr. 1B; H360Df" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 10 on Repr. 2; H361, Repr. 2; H361f, Repr. 2; H361d, Repr. 2; H361fd" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"
Test: "HP 11 on Muta. 2; H341" for determinand: "cadmium sulfide"
Test: "HP 14 on R50, R52, R50/53, R51/53, R53, R52/53" for determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Determinand notes

Note 1 , used on:

determinand: "cadmium sulfide"
determinand: "lead compounds (with the exception of those listed separately in this Annex)"

Note A , used on:

determinand: "lead compounds (with the exception of those listed separately in this Annex)"
determinand: "selenium compounds (with the exception of cadmium sulfoselenide and sodium selenite)"

Appendix A: Classifier defined and non CLP determinands

antimony compounds, with the exception of tetroxide, pentoxide, trisulphide and pentasulphide (combined)

Conversion factor: 1.75
Comments: Combines the risk phrases and the average of the conversion factors for Antimony pentachloride, Antimony trichloride, Antimony trifluoride and Antimony trioxide
Data source: N/A
Data source date: 10/01/2011
Risk Phrases: Xn; R20/22, T; R23/24/25, C; R34, Carc Cat 3; R40, N; R51/53
Hazard Statements: Acute Tox. 4; H332, Acute Tox. 4; H302, Acute Tox. 3; H331, Acute Tox. 3; H311, Acute Tox. 3; H301, Skin Corr. 1B; H314, Carc. 2; H351, Aquatic Chronic 2; H411

barium sulfate (CAS Number: 7727-43-7)

Conversion factor: 1.7
Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=89983
Data source date: 11/03/2013
Risk Phrases: R20/22, R33, R36/37/38
Hazard Statements: Acute Tox. 4; H332, Acute Tox. 4; H302, STOT RE 2; H373, Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315

chromium(III) oxide (CAS Number: 1308-38-9)

Conversion factor: 1.462
Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=33806&HarmOnly=no?fc=true&lang=en
Data source date: 26/11/2012
Risk Phrases: R20, R22, R36, R37, R38, R42, R43, R50/53, R60, R61
Hazard Statements: Acute Tox. 4; H332, Acute Tox. 4; H302, Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Resp. Sens. 1; H334, Skin Sens. 1; H317, Repr. 1B; H360FD, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

lead compounds (with the exception of those listed separately in this Annex)

CLP index number: 082-001-00-6
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Risk Phrases: None.
Additional Hazard Statements: Carc. 2; H351
Reason:
03/06/2015 - Carc. 2; H351 hazard statement sourced from: Larsen et al., 2014; Survey of lead and lead compounds, Environmental Project No. 1539, The Danish Environmental Protection Agency

acenaphthylene (CAS Number: 208-96-8)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=59285&HarmOnly=no
Data source date: 16/07/2012
Risk Phrases: R22, R26, R27, R36, R37, R38
Hazard Statements: Acute Tox. 4; H302, Acute Tox. 1; H330, Acute Tox. 1; H310, Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315

acenaphthene (CAS Number: 83-32-9)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=133563&HarmOnly=no
Data source date: 16/07/2012
Risk Phrases: R36, R37, R38, N; R50/53, N; R51/53
Hazard Statements: Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Aquatic Acute 1; H400, Aquatic Chronic 1; H410, Aquatic Chronic 2; H411

fluorene (CAS Number: 86-73-7)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=81845&HarmOnly=no
Data source date: 16/07/2012
Risk Phrases: N; R50/53, R53
Hazard Statements: Aquatic Acute 1; H400, Aquatic Chronic 1; H410, Aquatic Chronic 4; H413

phenanthrene (CAS Number: 85-01-8)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=109754&HarmOnly=no
Data source date: 16/07/2012
Risk Phrases: R22, R36, R37, R38, R40, R43, N; R50/53
Hazard Statements: Acute Tox. 4; H302, Eye Irrit. 2; H319, STOT SE 3; H335, Carc. 2; H351, Skin Sens. 1; H317, Aquatic Acute 1; H400, Aquatic Chronic 1; H410, Skin Irrit. 2; H315

anthracene (CAS Number: 120-12-7)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=101102&HarmOnly=no
Data source date: 08/03/2013
Risk Phrases: R36, R37, R38, R43, N; R50/53
Hazard Statements: Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Skin Sens. 1; H317, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

fluoranthene (CAS Number: 206-44-0)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=56375&HarmOnly=no
Data source date: 16/07/2012
Risk Phrases: R20, R22, R36, N; R50/53
Hazard Statements: Acute Tox. 4; H302, Acute Tox. 4; H332, Eye Irrit. 2; H319, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

pyrene (CAS Number: 129-00-0)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=87484&HarmOnly=no
Data source date: 16/07/2012
Risk Phrases: R23, N; R50/53
Hazard Statements: Acute Tox. 3; H331, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

indeno[123-cd]pyrene (CAS Number: 193-39-5)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=128806&HarmOnly=no
Data source date: 08/03/2013
Risk Phrases: R40
Hazard Statements: Carc. 2; H351

benzo[ghi]perylene (CAS Number: 191-24-2)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=15793&HarmOnly=no
Data source date: 16/07/2012
Risk Phrases: N; R50/53
Hazard Statements: Aquatic Acute 1; H400, Aquatic Chronic 1; H410

coronene (CAS Number: 191-07-1)

Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16/06/2014
Risk Phrases: R68/20
Hazard Statements: STOT SE 2; H371

ethylbenzene (CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Risk Phrases: None.
Additional Hazard Statements: Carc. 2; H351
Reason:
03/06/2015 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

pH

Comments: Appendix C, C4.5
Data source: WM2 - Interpretation of the definition and classification of hazardous waste (Second Edition, version2.2), Environment Agency
Data source date: 30/05/2008
Risk Phrases: None.
Hazard Statements: None.

TPH (C6 to C40) petroleum group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Risk Phrases: R10, R45, R46, R51/53, R63, R65
Hazard Statements: Flam. Liq. 3; H226, Asp. Tox. 1; H304, STOT RE 2; H373, Muta. 1B; H340, Carc. 1B; H350, Repr. 2; H361d, Aquatic Chronic 2; H411

confirm TPH has NOT arisen from diesel or petrol

Comments: Section 3.4.2 requires a positive confirmation for benzo[a]pyrene (BaP) to be allowed as a marker in evaluating R45(H7) and R46(H11)
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Risk Phrases: None.
Hazard Statements: None.

Appendix B: Notes

C14: Step 5

from section: WM3: C14 in the document: "WM3 - Waste Classification"

"identify whether any individual ecotoxic substance is present at or above a cut-off value ..."

Note 1

from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"

"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note A

from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"

"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

WM3: Unknown oil

from section: Chapter 3: 4. Waste oils and other wastes containing or contaminated with oil in the document: "WM3 - Waste Classification"

"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:
- the waste contains **benzo[a]pyrene (BaP)** at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Appendix C: Version

Classification utilises the following:

- CLP Regulations - Regulation 1272/2008/EC of 16 December 2008
- 1st ATP - Regulation 790/2009/EC of 10 August 2009
- 2nd ATP - Regulation 286/2011/EC of 10 March 2011
- 3rd ATP - Regulation 618/2012/EU of 10 July 2012
- 4th ATP - Regulation 487/2013/EU of 8 May 2013
- Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
- 5th ATP - Regulation 944/2013/EU of 2 October 2013
- 6th ATP - Regulation 605/2014/EU of 5 June 2014
- WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
- Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
- WM3 - Waste Classification - May 2015
- 7th ATP - Regulation 2015/1221/EU of 24 July 2015
- POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
- 1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
- 2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

HazWasteOnline Engine: WM3 1st Edition, May 2015
HazWasteOnline Engine Version: 2015.265.2962.5957 (22 Sep 2015)
HazWasteOnline Database: 2015.265.2962.5957 (22 Sep 2015)

NOTES

1. For setting out refer to Engineer's drawings.
2. This drawing to be read in conjunction with all other Engineering drawings and all other relevant drawings and Specifications.
3. DO NOT SCALE THIS DRAWING. Use figured dimensions only.
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Rev. No.	Date	REVISION NOTE	Drn. By	Chkd. By

Rev. No.	Date	REVISION NOTE	Drn. By	Chkd. By

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ISO 9001:2008 QUALITY | OHSAS 18001:2007 HEALTH & SAFETY | ISO 14001:2004 ENVIRONMENTAL

Client	Crekav Landbank Investments Ltd.
Project	Residential Development St. Paul's College
Title	Site investigation - Borehole Location

Drn by	Chkd by	Aprvd by	Dwg. No.	Revision
IK	JS	PC	N251 -SK05	
Date 20/10/15	Scale NTS			

Appendix 7:

7.1 Water Sampling Results Naniken River.

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Customer

Muriel Ennis

Enviroguide Consulting
Unit 3D, Block 71c
The Plaza
Parkwest
Dublin 8

Certificate Of Analysis

Job Number: 19-53505

Issue Number: 1

Report Date: 5 April 2019

Site: Not Applicable

PO Number: Not Supplied

Date Samples Received: 07/03/2019

Please find attached the results for the samples received at our laboratory on 07/03/2019.

Should you have any queries regarding the report or require any further services, we would be happy to discuss your requirements. For additional information about the company please log-on to our website at the above address.

Thank you for choosing City Analysts Limited. We look forward to assisting you again.

Authorised By: **Authorised Date:** 5 April 2019

Shane Reynolds
Laboratory Manager

Notes:

Results relate only to the items tested.
Information on methods of analysis and performance characteristics is available on request.
Any opinions or interpretations indicated are outside the scope of our INAB accreditation.
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Certificate Of Analysis

Customer

Muriel Ennis

Enviroguide Consulting
Unit 3D, Block 71c
The Plaza
Parkwest
Dublin 8

Report Reference: 19-53505

Report Version: 1

Site: Not Applicable

Sample Description: SW1

Date of Sampling: 07/03/2019

Sample Type: Surface

Date Sample Received: 07/03/2019

Lab Reference Number: 431227

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D3000#	08/03/2019	Ammonia as N	0.256	mg/l	-
D/D1003#	07/03/2019	CBOD5	3	mg/l O2	-
D/D3001#	13/03/2019	Cadmium	< 0.2	ug/l	-
D/D3006	07/03/2019	Chlorine, Free	< 0.010	mg/l	-
D/D3000#	08/03/2019	Chloride	42.744	mg/l	-
D/D3001#	13/03/2019	Chromium	1.2	ug/l	-
*U	-	Chromium VI	< 0.020	mg/l	-
*U	-	Chromium III	< 0.020	mg/l	-
D/D1009#	08/03/2019	COD	9	mg/l O2	-
D/D3011#	07/03/2019	Conductivity @ 20℃	600.0	uS/cm @20℃	-
D/D3001#	13/03/2019	Copper	3.1	ug/l	-
D/D3015#	08/03/2019	Fluoride	0.3	mg/l	-
D/D3001#	13/03/2019	Hardness as CaCO3	341.135	mg/l	-
D/D3001#	13/03/2019	Lead	2.2	ug/l	-
D/D3001#	13/03/2019	Nickel	1.6	ug/l	-
EW188#*	-	Arsenic - Total	0.9	ug/L	-
DEAFULT*U	-	Total Cyanide Low	< 10.0000	ug/L	-
D/D3000#	08/03/2019	Orthophosphate as P	0.115	mg/l	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.
For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.
NAC & ATC - No abnormal change and acceptable to customers.
TVC - Total viable count
Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

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The Plaza
Parkwest
Dublin 8

Report Reference: 19-53505

Report Version: 1

Site: Not Applicable

Sample Description: SW1

Date of Sampling: 07/03/2019

Sample Type: Surface

Date Sample Received: 07/03/2019

Lab Reference Number: 431227

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1041#	07/03/2019	PH	7.84	pH Unit	-
D/D1049#	08/03/2019	Total Suspended Solids	< 2	mg/l	-
D/D3001#	13/03/2019	Zinc	10.2	ug/l	-

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Note:
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.
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ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.138T

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Customer

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The Plaza
Parkwest
Dublin 8

Report Reference: 19-53505

Report Version: 1

Site: Not Applicable

Sample Description: SW2

Date of Sampling: 07/03/2019

Sample Type: Surface

Date Sample Received: 07/03/2019

Lab Reference Number: 431228

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D3000#	08/03/2019	Ammonia as N	0.163	mg/l	-
D/D1003#	07/03/2019	CBOD5	2	mg/l O2	-
D/D3001#	13/03/2019	Cadmium	< 0.2	ug/l	-
D/D3006	07/03/2019	Chlorine, Free	< 0.010	mg/l	-
D/D3000#	08/03/2019	Chloride	48.961	mg/l	-
D/D3001#	13/03/2019	Chromium	1.1	ug/l	-
*U	-	Chromium VI	< 0.020	mg/l	-
*U	-	Chromium III	< 0.020	mg/l	-
D/D1009#	12/03/2019	COD	10	mg/l O2	-
D/D3011#	07/03/2019	Conductivity @ 20℃	620.0	uS/cm @20℃	-
D/D3001#	13/03/2019	Copper	5.6	ug/l	-
D/D3015#	08/03/2019	Fluoride	0.3	mg/l	-
D/D3001#	13/03/2019	Hardness as CaCO3	349.416	mg/l	-
D/D3001#	13/03/2019	Lead	2.1	ug/l	-
D/D3001#	13/03/2019	Nickel	1.1	ug/l	-
EW188#*	-	Arsenic - Total	1.0	ug/L	-
DEAFULT*U	-	Total Cyanide Low	< 10.0000	ug/L	-
D/D3000#	08/03/2019	Orthophosphate as P	0.048	mg/l	-

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Note:
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.
For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.
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Dublin 8

Report Reference: 19-53505

Report Version: 1

Site: Not Applicable

Sample Description: SW2

Date of Sampling: 07/03/2019

Sample Type: Surface

Date Sample Received: 07/03/2019

Lab Reference Number: 431228

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1041#	07/03/2019	PH	7.95	pH Unit	-
D/D1049#	08/03/2019	Total Suspended Solids	< 2	mg/l	-
D/D3001#	13/03/2019	Zinc	11.6	ug/l	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.
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Certificate Of Analysis

Job Number: 19-54627

Issue Number: 1

Report Date: 29 April 2019

Site: Not Applicable

PO Number: Not Supplied

Date Samples Received: 04/04/2019

Please find attached the results for the samples received at our laboratory on 04/04/2019.

Should you have any queries regarding the report or require any further services, we would be happy to discuss your requirements. For additional information about the company please log-on to our website at the above address.

Thank you for choosing City Analysts Limited. We look forward to assisting you again.

Authorised By: S. Reynolds **Authorised Date:** 29 April 2019

Shane Reynolds
Laboratory Manager

Notes:

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Information on methods of analysis and performance characteristics is available on request.
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Dublin 8

Report Reference: 19-54627

Report Version: 1

Site: Not Applicable

Sample Description: SW1

Date of Sampling: 04/04/2019

Sample Type: Surface

Date Sample Received: 04/04/2019

Lab Reference Number: 434422

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D3000#	05/04/2019	Ammonia as N	0.288	mg/l	-
D/D1003#	04/04/2019	CBOD5	< 2	mg/l O2	-
D/D3001#	17/04/2019	Cadmium	< 0.2	ug/l	-
D/D3006	05/04/2019	Chlorine, Free	< 0.010	mg/l	-
D/D3000#	05/04/2019	Chloride	34.099	mg/l	-
D/D3001#	17/04/2019	Chromium	< 0.9	ug/l	-
*U	-	Chromium VI	< 0.020	mg/l	-
*U	-	Chromium III	< 0.020	mg/l	-
D/D1009#	05/04/2019	COD	8	mg/l O2	-
D/D3011#	04/04/2019	Conductivity @ 20℃	495.0	uS/cm @20℃	-
D/D3001#	17/04/2019	Copper	7.2	ug/l	-
D/D3015#	05/04/2019	Fluoride	0.4	mg/l	-
D/D3001#	17/04/2019	Hardness as CaCO3	230.386	mg/l	-
D/D3001#	17/04/2019	Lead	4.4	ug/l	-
D/D3001#	17/04/2019	Nickel	1.3	ug/l	-
EW188#*	-	Arsenic - Total	< 1.0	ug/L	-
DEAFULT*U	-	Total Cyanide Low	< 0.7000	ug/L	-
D/D3000#	05/04/2019	Orthophosphate as P	0.146	mg/l	-

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Note:
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Customer

Muriel Ennis

Enviroguide Consulting
Unit 3D, Block 71c
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Parkwest
Dublin 8

Report Reference: 19-54627

Report Version: 1

Site: Not Applicable

Sample Description: SW1

Date of Sampling: 04/04/2019

Sample Type: Surface

Date Sample Received: 04/04/2019

Lab Reference Number: 434422

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1041#	04/04/2019	PH	7.91	pH Unit	-
D/D1049#	05/04/2019	Total Suspended Solids	< 2	mg/l	-
D/D3001#	17/04/2019	Zinc	15.2	ug/l	-

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Dublin 8

Report Reference: 19-54627

Report Version: 1

Site: Not Applicable

Sample Description: SW2

Date of Sampling: 04/04/2019

Sample Type: Surface

Date Sample Received: 04/04/2019

Lab Reference Number: 434423

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D3000#	05/04/2019	Ammonia as N	0.144	mg/l	-
D/D1003#	04/04/2019	CBOD5	< 2	mg/l O2	-
D/D3001#	17/04/2019	Cadmium	< 0.2	ug/l	-
D/D3006	05/04/2019	Chlorine, Free	< 0.010	mg/l	-
D/D3000#	05/04/2019	Chloride	35.624	mg/l	-
D/D3001#	17/04/2019	Chromium	< 0.9	ug/l	-
*U	-	Chromium VI	< 0.020	mg/l	-
*U	-	Chromium III	< 0.020	mg/l	-
D/D1009#	05/04/2019	COD	10	mg/l O2	-
D/D3011#	04/04/2019	Conductivity @ 20℃	506.0	uS/cm @20℃	-
D/D3001#	17/04/2019	Copper	3.4	ug/l	-
D/D3015#	05/04/2019	Fluoride	0.4	mg/l	-
D/D3001#	17/04/2019	Hardness as CaCO3	230.136	mg/l	-
D/D3001#	17/04/2019	Lead	4.6	ug/l	-
D/D3001#	17/04/2019	Nickel	1.8	ug/l	-
EW188#*	-	Arsenic - Total	1.1	ug/L	-
DEAFULT*U	-	Total Cyanide Low	< 0.7000	ug/L	-
D/D3000#	05/04/2019	Orthophosphate as P	0.075	mg/l	-

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Report Reference: 19-54627

Report Version: 1

Site: Not Applicable

Sample Description: SW2

Date of Sampling: 04/04/2019

Sample Type: Surface

Date Sample Received: 04/04/2019

Lab Reference Number: 434423

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1041#	04/04/2019	PH	8.14	pH Unit	-
D/D1049#	05/04/2019	Total Suspended Solids	< 2	mg/l	-
D/D3001#	17/04/2019	Zinc	11.5	ug/l	-

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Muriel Ennis

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Certificate Of Analysis

Job Number: 19-56085

Issue Number: 1

Report Date: 11 June 2019

Site: Not Applicable

PO Number: Not Supplied

Date Samples Received: 14/05/2019

Please find attached the results for the samples received at our laboratory on 14/05/2019.

Should you have any queries regarding the report or require any further services, we would be happy to discuss your requirements. For additional information about the company please log-on to our website at the above address.

Thank you for choosing City Analysts Limited. We look forward to assisting you again.

Authorised By: S. Reynolds **Authorised Date:** 11 June 2019

Shane Reynolds
Laboratory Manager

Notes:

Results relate only to the items tested.
Information on methods of analysis and performance characteristics is available on request.
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Report Reference: 19-56085

Report Version: 1

Site: Not Applicable

Sample Description: SW1

Date of Sampling: 14/05/2019

Sample Type: Surface

Date Sample Received: 14/05/2019

Lab Reference Number: 438617

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D3000#	15/05/2019	Ammonia as N	1.270	mg/l	-
D/D1003#	15/05/2019	CBOD5	2	mg/l O2	-
D/D3001#	16/05/2019	Cadmium	0.3	ug/l	-
D/D3006	14/05/2019	Chlorine, Free	0.020	mg/l	-
D/D3000#	15/05/2019	Chloride	36.478	mg/l	-
D/D3001#	16/05/2019	Chromium	1.1	ug/l	-
*U	-	Chromium VI	< 0.020	mg/l	-
*U	-	Chromium III	< 0.020	mg/l	-
D/D1009#	14/05/2019	COD	11	mg/l O2	-
D/D3011#	14/05/2019	Conductivity @ 20℃	526.0	uS/cm @20℃	-
D/D3001#	16/05/2019	Copper	3.8	ug/l	-
D/D3015#	17/05/2019	Fluoride	0.4	mg/l	-
D/D3001#	16/05/2019	Hardness as CaCO3	249.329	mg/l	-
D/D3001#	16/05/2019	Lead	2.2	ug/l	-
D/D3001#	16/05/2019	Nickel	1.6	ug/l	-
DEAFULT*U	-	Total Cyanide Low	< 9.0000	ug/L	-
EW188#*	-	Arsenic - Total	< 1.0	ug/L	-
D/D3000#	15/05/2019	Orthophosphate as P	0.096	mg/l	-

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Report Reference: 19-56085

Report Version: 1

Site: Not Applicable

Sample Description: SW1

Date of Sampling: 14/05/2019

Sample Type: Surface

Date Sample Received: 14/05/2019

Lab Reference Number: 438617

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1041#	14/05/2019	PH	7.64	pH Unit	-
D/D1049#	15/05/2019	Total Suspended Solids	2	mg/l	-
D/D3001#	16/05/2019	Zinc	13.1	ug/l	-

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Report Reference: 19-56085

Report Version: 1

Site: Not Applicable

Sample Description: SW2

Date of Sampling: 14/05/2019

Sample Type: Surface

Date Sample Received: 14/05/2019

Lab Reference Number: 438618

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D3000#	15/05/2019	Ammonia as N	0.618	mg/l	-
D/D1003#	15/05/2019	CBOD5	< 2	mg/l O2	-
D/D3001#	16/05/2019	Cadmium	0.4	ug/l	-
D/D3006	14/05/2019	Chlorine, Free	< 0.010	mg/l	-
D/D3000#	15/05/2019	Chloride	35.882	mg/l	-
D/D3001#	16/05/2019	Chromium	< 0.9	ug/l	-
*U	-	Chromium VI	< 0.020	mg/l	-
*U	-	Chromium III	< 0.020	mg/l	-
D/D1009#	14/05/2019	COD	10	mg/l O2	-
D/D3011#	14/05/2019	Conductivity @ 20℃	632.0	uS/cm @20℃	-
D/D3001#	16/05/2019	Copper	3.5	ug/l	-
D/D3015#	17/05/2019	Fluoride	0.4	mg/l	-
D/D3001#	16/05/2019	Hardness as CaCO3	247.782	mg/l	-
D/D3001#	16/05/2019	Lead	2.7	ug/l	-
D/D3001#	16/05/2019	Nickel	< 0.5	ug/l	-
EW188#*	-	Arsenic - Total	1.2	ug/L	-
DEAFULT*U	-	Total Cyanide Low	< 9.0000	ug/L	-
D/D3000#	15/05/2019	Orthophosphate as P	0.066	mg/l	-

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Dublin 8

Report Reference: 19-56085

Report Version: 1

Site: Not Applicable

Sample Description: SW2

Date of Sampling: 14/05/2019

Sample Type: Surface

Date Sample Received: 14/05/2019

Lab Reference Number: 438618

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1041#	14/05/2019	PH	7.65	pH Unit	-
D/D1049#	15/05/2019	Total Suspended Solids	< 2	mg/l	-
D/D3001#	16/05/2019	Zinc	8.5	ug/l	-

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Customer

Muriel Ennis

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Certificate Of Analysis

Job Number: 19-58097

Issue Number: 1

Report Date: 22 July 2019

Site: Not Applicable

PO Number: Not Supplied

Date Samples Received: 27/06/2019

Please find attached the results for the samples received at our laboratory on 27/06/2019.

Should you have any queries regarding the report or require any further services, we would be happy to discuss your requirements. For additional information about the company please log-on to our website at the above address.

Thank you for choosing City Analysts Limited. We look forward to assisting you again.

Authorised By: S. Reynolds **Authorised Date:** 22 July 2019

Shane Reynolds
Laboratory Manager

Notes:

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Report Reference: 19-58097

Report Version: 1

Site: Not Applicable

Sample Description: SW1

Date of Sampling: 27/06/2019

Sample Type: Surface

Date Sample Received: 27/06/2019

Lab Reference Number: 444595

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D3000#	02/07/2019	Ammonia as N	0.102	mg/l	-
D/D1003#	27/06/2019	CBOD5	4	mg/l O2	-
D/D3001#	01/07/2019	Cadmium	< 0.2	ug/l	-
D/D3006	28/06/2019	Chlorine, Free	< 0.010	mg/l	-
D/D3000#	02/07/2019	Chloride	32.097	mg/l	-
D/D3001#	01/07/2019	Chromium	< 0.9	ug/l	-
*U	-	Chromium VI	< 0.020	mg/l	-
*U	-	Chromium III	< 0.020	mg/l	-
D/D1009#	28/06/2019	COD	28	mg/l O2	-
D/D3011#	28/06/2019	Conductivity @ 20℃	575.0	uS/cm @20℃	-
D/D3001#	01/07/2019	Copper	< 2.0	ug/l	-
D/D3015#	29/06/2019	Fluoride	0.5	mg/l	-
D/D3001#	01/07/2019	Hardness as CaCO3	291.779	mg/l	-
D/D3001#	04/07/2019	Lead	< 1.7	ug/l	-
D/D3001#	01/07/2019	Nickel	0.8	ug/l	-
EW188#*	-	Arsenic - Total	< 1.0	ug/L	-
DEAFULT*U	-	Total Cyanide Low	< 0.7000	ug/L	-
D/D3000#	02/07/2019	Orthophosphate as P	< 0.025	mg/l	-

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Dublin 8

Report Reference: 19-58097

Report Version: 1

Site: Not Applicable

Sample Description: SW1

Date of Sampling: 27/06/2019

Sample Type: Surface

Date Sample Received: 27/06/2019

Lab Reference Number: 444595

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1041#	28/06/2019	PH	8.11	pH Unit	-
D/D1049#	01/07/2019	Total Suspended Solids	2	mg/l	-
D/D3001#	01/07/2019	Zinc	6.6	ug/l	-

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Report Reference: 19-58097

Report Version: 1

Site: Not Applicable

Sample Description: SW2

Date of Sampling: 27/06/2019

Sample Type: Surface

Date Sample Received: 27/06/2019

Lab Reference Number: 444596

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D3000#	02/07/2019	Ammonia as N	0.083	mg/l	-
D/D1003#	27/06/2019	CBOD5	< 2	mg/l O2	-
D/D3001#	01/07/2019	Cadmium	0.3	ug/l	-
D/D3006	28/06/2019	Chlorine, Free	< 0.010	mg/l	-
D/D3000#	02/07/2019	Chloride	30.953	mg/l	-
D/D3001#	01/07/2019	Chromium	< 0.9	ug/l	-
*U	-	Chromium VI	< 0.020	mg/l	-
*U	-	Chromium III	< 0.020	mg/l	-
D/D1009#	28/06/2019	COD	26	mg/l O2	-
D/D3011#	28/06/2019	Conductivity @ 20℃	570.0	uS/cm @20℃	-
D/D3001#	01/07/2019	Copper	< 2.0	ug/l	-
D/D3015#	29/06/2019	Fluoride	0.4	mg/l	-
D/D3001#	01/07/2019	Hardness as CaCO3	289.799	mg/l	-
D/D3001#	04/07/2019	Lead	< 1.7	ug/l	-
D/D3001#	01/07/2019	Nickel	1.1	ug/l	-
EW188#*	-	Arsenic - Total	< 1.0	ug/L	-
DEAFULT*U	-	Total Cyanide Low	< 0.7000	ug/L	-
D/D3000#	02/07/2019	Orthophosphate as P	0.068	mg/l	-

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Parkwest
Dublin 8

Report Reference: 19-58097

Report Version: 1

Site: Not Applicable

Sample Description: SW2

Date of Sampling: 27/06/2019

Sample Type: Surface

Date Sample Received: 27/06/2019

Lab Reference Number: 444596

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1041#	28/06/2019	PH	8.11	pH Unit	-
D/D1049#	01/07/2019	Total Suspended Solids	< 2	mg/l	-
D/D3001#	01/07/2019	Zinc	5.6	ug/l	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.
For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.
NAC & ATC - No abnormal change and acceptable to customers.
TVC - Total viable count
Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

Appendix 8

8.1 Air Quality Standards and Dust Minimisation Plan

Appendix 8.1 - Ambient Air Quality Standards

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

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

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

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

Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions. The Alert

Threshold is defined in Council Directive 96/62/EC as “a level beyond which there is a risk to human health from brief exposure and at which immediate steps shall be taken as laid down in Directive 96/62/EC”. These steps include undertaking to ensure that the necessary steps are taken to inform the public (e.g. by means of radio, television and the press).

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

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

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

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

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

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

Air Dispersion Modelling

The inputs to the DMRB model consist of information on road layouts, receptor locations, annual average daily traffic movements, annual average traffic speeds and background concentrations(15). Using this input data the model predicts ambient ground level concentrations at the worst-case sensitive receptor using generic meteorological data.

The DMRB has recently undergone an extensive validation exercise(16) as part of the UK’s Review and Assessment Process to designate areas as Air Quality Management Areas (AQMAs). The validation exercise was carried out at 12 monitoring sites within the UK

DEFRAs national air quality monitoring network. The validation exercise was carried out for NO_X, NO_2 and PM_{10}, and included urban background and kerbside/roadside locations, “open” and “confined” settings and a variety of geographical locations[16].

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

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

Thus, the validation exercise has confirmed that the model is a useful screening tool for the Second Stage Review and Assessment, for which a conservative approach is applicable[16].

Appendix 8.2 - Transport Infrastructure Ireland Significance Criteria

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

Table A8.1 Definition of Impact Magnitude for Changes in Ambient Pollutant Concentrations

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

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

Table A8.2 Air Quality Impact Significance Criteria For Annual Mean NO_2 and PM_{10} and $PM_{2.5}$ Concentrations at a Receptor

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

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

Table A8.3 Air Quality Impact Significance Criteria For Changes to Number of Days with PM_{10} Concentration Greater than 50 μg/m^3 at a Receptor

Appendix 8.3 - Dust Minimisation Plan

A dust minimisation plan will be formulated for the construction phase of the project, as construction activities are likely to generate some dust emissions. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of any dust produced will be deposited close to the potential source and any impacts from dust deposition will typically be within 200m of the construction area. The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK (BRE 2003), (The Scottish Office 1996) (UK Office of Deputy Prime Minister 2002) and the USA (USEPA 1997), (USEPA 1986).

Site Management

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

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 8.1 for the windrose for Dublin Airport). As the prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

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

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

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

Site Roads / Haulage Routes

Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (USEPA 1997).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads;
- Access gates to the site shall be located at least 10m from sensitive receptors where possible;
- Bowsers or suitable watering equipment will be available during periods of dry weather throughout the construction period. Research has found that watering can reduce dust emissions by 50% (USEPA, 1986). Watering shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use;
- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

Land Clearing / Earth Moving

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

- During dry and windy periods, and when there is a likelihood of dust nuisance, watering shall be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust;
- During periods of very high winds (gales), activities likely to generate significant dust emissions should be postponed until the gale has subsided.

Storage Piles

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

- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles should be located downwind of sensitive receptors;
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. The regular watering of stockpiles has been found to have an 80% control efficiency (USEPA, 1997);
- Where feasible, hoarding will be erected around site boundaries to reduce visual impact. This will also have an added benefit of preventing larger particles from impacting on nearby sensitive receptors.

Site Traffic on Public Roads

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

- Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust;
- At the main site traffic exits, a wheel wash facility shall be installed if feasible. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary.

Summary of Dust Mitigation Measures

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

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.

Appendix 9 - not used

Appendix 10 – Photomontages – See separate booklet

Appendix 11

11.1 Conservation Report

11.2 Geophysical Survey Report

ST PAUL'S
SYBIL HILL ROAD
RAHENY

CONSERVATION IMPACT ASSESSMENT

9th September 2019

Historic Building Consultants
Old Bawn
Old Connaught
Bray

905/06

Contents

Summary

This report has been produced as a historical and historic building survey of lands to the east of Sybil Hill Road, Raheny, with an assessment of the potential impact of a proposed residential development on architectural heritage in the vicinity.

The application site consists of a substantial area of land that is approximately L-shaped, together with a narrower strip that runs westward to provide for access to Sybil Hill Road. The site is adjacent to the grounds of Sybil Hill House, which is a protected structure. The main part of the site is bounded on three sides by St Anne’s Park, which is a conservation area – though not an architectural conservation area.

It is proposed to provide 661 apartments on the site, comprised of nine blocks of five to nine storeys.

The proposed access will run adjacent to the buildings at St Paul’s College, to the south of Sybil Hill House and will be separated from Sybil Hill House by the grounds to the front of the house. It is not anticipated that the access road would have any significant impact on the house or its setting.

The area proposed for housing is to the rear of Sybil Hill House and separated from it by trees and outbuildings. The nearest building would be about eighty metres from the rear of Sybil Hill House. It is not anticipated that the proposed development would have any significant impact on the character of the house.

The application site is bounded by St Anne’s Park on the northern, eastern and southern sides. The margin of the park is marked by a belt of trees that runs along all three sides adjacent to the application site. On the southern side a long, broad avenue runs through the park, from a gateway on Sybil Hill Road towards the east and this is bounded by substantial trees. It is proposed to locate open space on the site near to this boundary. The part of the park to the east of the site is partly taken up with playing pitches and partly with the Millennium Arboretum. To the north of the site there are more playing pitches in the park. The upper part of the proposed apartments will be visible from the playing pitches, but not to the extent that they would have a significant impact on the character of the park.

Background

This report has been prepared for Crekav Trading GP Limited as part of the documentation to be submitted with a planning application.

The site was inspected for the purposes of preparing this report on 11th November 2016, 24th May 2017 and 21st August 2019 on which occasions the photographs incorporated in the report were taken and the site examined to prepare the descriptions contained therein.

Historical research was carried out on the background history of the property and the results are set down below.

While this report contains comment on aspects of the condition of the buildings it is not a condition report or a structural report and must not be read as such.

This report has been prepared by Rob Goodbody BA(mod), DipEnvPlanning, DipABRC, MA, MUBC, MIPI.

Historical background

During the eighteenth century the land around Clontarf and Raheny became popular as the location for villas belonging to the gentry and professional classes. Houses such as Sybil Hill, Furry Park, Bay View and Verville were built during the eighteenth century and this trend continued into the opening decades of the nineteenth century with the construction of Bedford Lodge, Baymount Castle, Sea View and Mount Prospect. Some of these, including Sybil Hill House, were altered and extended in the nineteenth century, while others, such as St Anne's, were demolished and new houses built on the site.

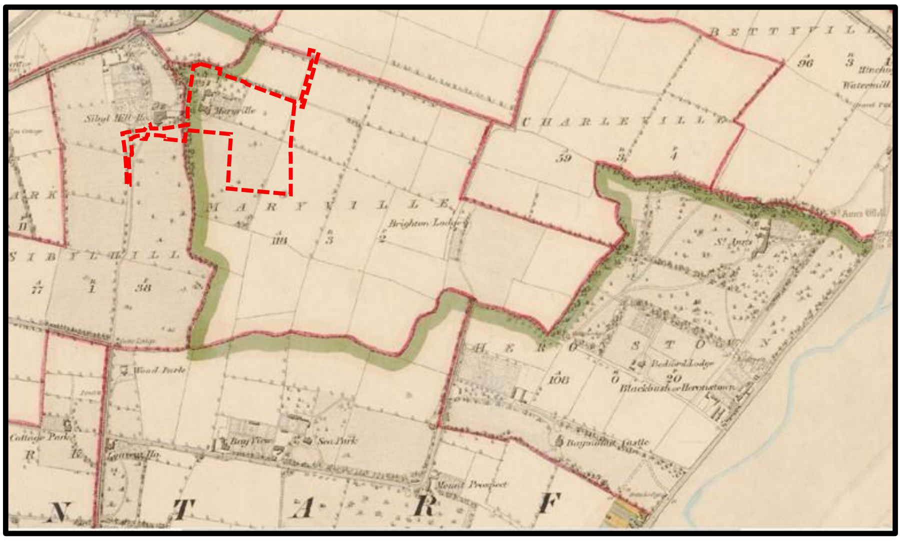

Figure 1: Detail of Ordnance Survey map of 1843, with site boundary overlaid

Source: OSI

The first edition Ordnance Survey map of this area, published in 1843, shows the villas dotted around the district. In the extract from the map that is reproduced above, which covers a relatively small area, no less than thirteen villas are included, each with the extent of its grounds shown with a grey stipple, while others are just outside the area shown. The extent of the present application site is marked with a broken red line, which shows that in the mid-nineteenth century this land was partly within the grounds of Sybil Hill House, though mostly within the grounds of Maryville. In this map extract St Anne's is towards the right-hand side of the map, a little above centre; the grounds of St Anne's are shown as running westwards to the green line, which depicts the boundary between the civil parishes of Clontarf and Raheny.

At the time that the map was published St Anne's had recently been demolished and rebuilt by the Guinness family. St Anne's was inherited by Arthur Edward Guinness in 1868 and in 1874-76 he enlarged the property significantly, acquiring extensive lands to the north and west in the parish of Raheny. In 1876 he acquired the house at Sybil Hill, with its grounds, and two years later he added Maryville, which stood close to Sybil Hill House, to the east.

Having acquired a substantial area of land to add to his estate at St Anne's, Arthur E Guinness, with his wife, Olivia, laid out an extensive estate, with allées and parkland, and with extensive belts of holm oaks to give shelter from the salt-laden sea breezes. The principal avenue, 1300 metres long, ran westwards from the front of the house to the edge of the grounds of Sybil Hill House. However, he was not able to acquire the lands beyond Sybil Hill House and the entrance to St Anne's turned northwards through the grounds of Sybil Hill House to meet the Howth Road. The Guinnesses did not incorporate either Sybil Hill House or Maryville into the landscaped grounds of St Anne's and they continued to be occupied separately.

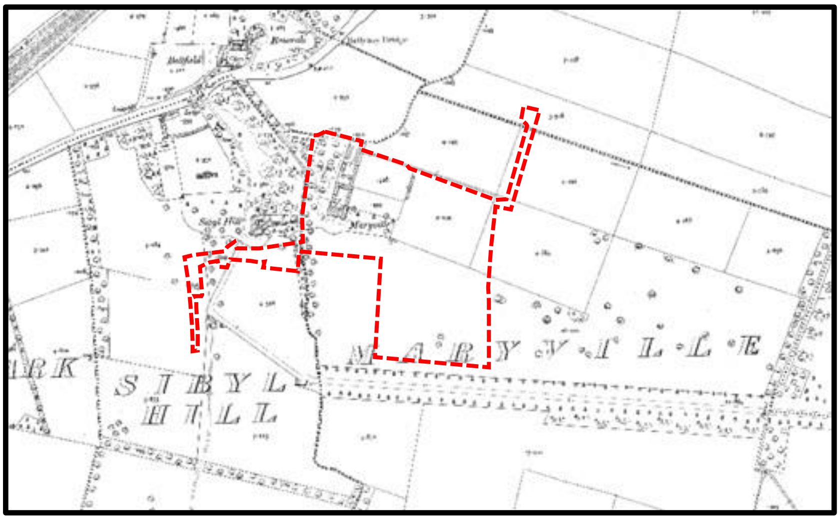

Figure 2: Detail of Ordnance Survey map of 1907 with site boundary overlaid

Source: OSI

The map extract above shows the approximate outline of the application site superimposed on the Ordnance Survey map of 1907. Maryville may be seen in the north-western corner of the site.

Arthur Edward Guinness was elevated to the peerage as Lord Ardilaun in 1880. After his death in 1910 Lady Ardilaun continued to live in the house until her death in 1925, though the estate was no longer kept up to its previous high standard. As the Ardilaun's were childless, the property was inherited by Lord Ardilaun's nephew, Bishop Benjamin Plunket.

In 1932, Bishop Plunket put the St Anne's estate on the market, though he found it difficult to find a buyer. In 1936 Dublin Corporation expressed an interest in acquiring it as housing land and this was pursued through the St Anne's Compulsory Purchase Order (CPO), 1938, the public inquiry for which was held in September of that year. The order was initially made for 444¾ acres (180 hectares), the greater part of which was to be used for housing, while 176 acres (71.23 hectares) was to be used as a public park. The property belonging to Bishop Plunket was initially included in this total area of land covered by the compulsory purchase order, though it was acquired by agreement with Dublin Corporation and subsequently excluded from the order. Sybil Hill House was not included in the CPO as Bishop Plunket retained it as his residence. Maryville was included in the CPO, but as the Corporation's plans for the estate were put on hold due to the outbreak of the

Second World War the property was not acquired at that time. Maryville continued to be occupied by Cecil Milne, under a lease granted in 1932. Cecil Milne had run a dairy farm on the property, though during the war years he cultivated the land as a market garden and this use continued after the end of the war. Maryville was sold to Dublin Corporation in 1956.

In 1948 the Vincentian Fathers acquired 12.5 hectares of the St Anne's estate from Dublin Corporation for the purpose of building a school. The school, which they named St Paul's College, opened in 1952. A number of land transactions followed, as Bishop Plunket had died in 1947 and the Vincentian Fathers had been able to purchase Sybil Hill House from his family in 1950. In 1952 Corporation acquired part of the lands from the Vincentian Fathers along the western side of their property, so that they could lay out a new road to form a northward extension from Vernon Avenue – now Sybil Hill Road. To compensate for the loss of land, the fathers acquired land to the east of the school from the Corporation and this forms the southern part of the lands now the subject of the present application. The house at Maryville, with its grounds, were sold to the Vincentian Fathers in 1959. The Vincentian Fathers demolished Maryville and laid out the site and its grounds as part of the school playing fields.

The land transferred to the Vincentian Fathers in 1952 extended into what is now the Millennium Arboretum area within the park and did not allow for an efficient layout for playing fields. A further transaction was entered into with the Corporation in 1953 to swap that eastern part of the lands transferred in 1952 with an area to the north. This is clarified in the map below.

The spur of land within the present site that provides the access from Sybil Hill Road was formerly part of the grounds of Sybil Hill House.

St Anne's Park now extends to approximately 110 hectares, as compared with the 71.23 hectares originally envisaged when the lands were acquired.

Figure 3: Summary of land acquisition

The map above summarises the various land transactions relating to the present site.

A. Land acquired from Dublin Corporation in 1952 to compensate for land sold to the Corporation for the laying out of Sybil Hill Road. This acquisition included land now occupied by the Millennium Arboretum.

B. Land acquired from Dublin Corporation in 1953 in a land swap, with the Corporation receiving the land now occupied by the Millennium Arboretum, to the east of the present site, and shown as the green area at bottom right in the map above

C. Lands acquired in 1959 with Maryville.

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Leases relating to the property

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Sharkey, Joan Ussher, *St Anne's – the story of a Guinness Estate*, Woodfield Press, Dublin, 2002

St Anne's Park website, http://www.dublincity.ie/main-menu-services-recreation-culture-dublin-city-parks-visit-park/st-annes-park

Conservation context

Record of Protected Structures

Sybil Hill is a protected structure and is included in the Record of Protected Structures, within the Dublin City Development Plan 2016-2022, under reference 7910. This building is marked with a red asterisk on the extract from the development plan map B, which is reproduced below.

Conservation areas

Sybil Hill is not located within an architectural conservation area and neither is the application site. The adjacent lands within St Anne’s Park are designated as a conservation area on the development plan maps, indicated by red hatching; however, this is not an architectural conservation area.

Figure 4: Detail of development plan map with application site outlined in red

National Inventory of Architectural Heritage

The National Inventory of Architectural Heritage has not yet included the Raheny area.

Building survey

Plate 1: Gateway and railings at access from Sybil Hill Road

The site that is the subject of this assessment consists of a sub-rectangular area of ground to the east of St Paul's College and Sybil Hill House, with a narrow strip of ground that joins it westwards to Sybil Hill Road. The narrow strip at the western end of the site runs to the north of St Paul's College and to the south of the protected structure at Sybil Hill House. The present driveway leads in from Sybil Hill Road and turns a little northwards to run to the house at Sybil Hill. The gateway is flanked by brick piers that support steel gates, while the front boundary runs in each direction, marked by a steel fence rising from a concrete plinth wall (plate 1). The gates, piers and railings date from the time that Sybil Hill Road was laid out in the early 1950s.

Plate 2: Site for proposed access, with St Paul's School to right and Sybil Hill House to left

Where the driveway turns northward there is an area of grass directly ahead, to the east, interrupted by a number of trees (plate 2).

Plate 3: Site of proposed access road, with ha-ha at left

To the north of this strip there is a ha-ha that separates the grass strip from the parking area to the front of Sybil Hill House (plate 3). To the south of this access strip is St Paul's College, which dates from the 1950s (plate 4). The ha-ha delineates the setting of Sybil Hill House, which is on an elevated site on extensive landscaped grounds, and separates the grounds from the adjacent school complex.

Plate 4: St Paul's College

Plate 5: Sybil Hill House, with southern elevation at right and western elevation at left

Sybil Hill House, which lies to the north of the proposed access to the site, is an eighteenth-century, two-storey villa, which was substantially altered and extended in the nineteenth century to give it its present appearance. The house is rendered externally and has its main entrance facing southwards, towards the proposed access and St Paul's College (plate 5). The western elevation is also significant and looks over a small area of parkland towards a grove of trees. The northern elevation is of somewhat lesser significance, but was nonetheless intended to be seen from with the grounds of the house, particularly as the original driveway ran southwards past the front of the house from Howth Road (plate 6).

Plate 6: Northern elevation of Sybil Hill House

Plate 7: Eastern elevation of Sybil Hill House

The eastern side of the house is more utilitarian and there are several outbuildings and additions to the house on that side, beyond which are trees within the grounds (plates 7 and 8).

Plate 8: Eastern side of Sybil Hill House, seen from application site

Plate 9: Prefabricated classrooms

There is a block of prefabricated classrooms on the site of the proposed access route and these are depicted in plate 9.

Plate 10: Brick-faced wall near northern boundary

The application site, other than the strip proposed as the access, was formerly laid out as playing fields. This is a substantial flat area of land measuring approximately 300 metres from north to south and 260 metres from east to west. This area is surrounded on the northern, eastern and southern sides by trees within the grounds of the adjacent St Anne's Park. On the western boundary there are trees along much of the boundary, particularly the northern section, which adjoins a housing estate and the central section, which adjoins Sybil Hill House and its outbuildings. The southern part of this boundary runs to the rear of St Paul's College.

Just beyond the northern boundary of the application site is a high wall that is faced with brick on the southern side and with brick and stone on the northern side (plate 10). This is the surviving northern wall of the walled garden associated with Maryville and is the only extant remnant associated with Maryville. The mode of construction is typical of garden walls of the period, with the wall built in stone, which was relatively cheap, but faced with brick on the side facing the garden, as brick is good for heat retention and its use to face the wall, particularly a south-facing wall, enabled the growth of plants that would not otherwise have survived in our climate.

Plate 11: Gates to St Anne's Park

To the south of the application site is the entrance to St Anne's Park from Sybil Hill Road. This is marked by a set of gates, piers and railings that are of late twentieth century date. The gateway opens to the avenue, which was laid out in the 1880s, originally leading to the mansion house at St Anne's, though not forming a direct connection to a road at the western end. This avenue is lined with evergreen oaks.

Plate 12: Eastward view along avenue

Plate 13: Boundary of park with application site at south-eastern corner

The application site is separated from St Anne's Park by a metal fence, though the extensive tree cover along the boundary minimises the extent to which this is visible from the park. The fence is seen in the lower part of the photograph above, with the higher netting at the end of the sports pitches projecting above the trees.

None of the boundaries of the application site are of historical significance.

Proposed development

It is proposed to develop the larger area of land at the eastern end of the site for residential purposes, to include nine apartment buildings of five to nine storeys each in the northern part of the site. This would provide a total of 661 residential units. The development will also include a crèche. The narrow strip connecting to Sybil Hill Road would provide for the access road leading in to the site.

The proposal will involve the demolition of the single-storey disused classroom block in the area adjacent to where the access road meets the greater part of the site.

An access road will be provided from Sybil Hill Road, running to the north of the main St Paul's College building to reach the main part of the site. This access road would include new accesses to Sybil Hill House and to the college and it would consist of a carriageway with footpath and cycleway, bounded by walls and railings, with pedestrian and vehicular gates at the entrances to Sybil Hill House and St Paul's College.

Potential impact of the development

From a built heritage perspective there are two issues that need to be examined in assessing the potential impact of the proposal – the protected structure and the conservation area within St Anne's Park, adjacent to the site. In examining these issues, the principal issue relates to the operational element of the proposal. The impacts during the construction phase are not considered to have any specific impact in relation to built heritage.

Potential impact of access road on Sybil Hill House

The house at Sybil Hill is set in its own grounds, separated from St Paul's College by a driveway, a parking area and an area of lawn, with groves of trees. To the front of the house there is a ha-ha that separates the grounds of the house from the college grounds to the south. While this was constructed at a late date, when the college was built, it nonetheless forms a definite demarcation between the grounds of the protected structure and the twentieth-century college buildings and grounds. The proposed access road would run between the ha-ha and the college building, at a distance of almost forty metres from the house. As such, the access roadway would have little impact on the character of the protected structure or its setting. The gateway is of mid-twentieth century origin and is not of heritage significance and its removal in order to provide for a wider access would not be a conservation issue.

Potential impact of residential development on Sybil Hill House

The nearest proposed building to Sybil Hill House would be apartment block 1, which would run north-south directly to the east of the rear of Sybil Hill House and at a distance of approximately 80 metres and a height of five storeys at this location. The eastern side of Sybil Hill House is the least significant side; the other three sides are designed to be seen from the parkland that runs around the house, while the eastern side faces into the courtyard of utilitarian structures and was clearly never meant to be a significant side of the house. Conversely, the principal views from inside the house are to the south, west and, to a lesser extent, the north, while the east does not feature significant views. It is also noted that there are trees planted to the east of the house and these provide screening.

It is not anticipated that the presence of Block 1 would have any significant impact on the character of the protected structure, given the nature of the house and the distance that would separate the new building from the protected structure.

Potential impact of development on St Anne's Park conservation area

St Anne's Park is an important park and provides amenities for a substantial area in the north-eastern part of Dublin City. The park includes extensive parkland, with walkways and lawns, it has a significant rose garden and the Millennium Arboretum. Sections of the park are also given over to use as playing fields.

To the south of the application site there is a broad avenue that runs roughly east-west, from a gateway fronting Sybil Hill Road at the western end, towards the site of St Anne's House to the east. This avenue is flanked by lines of substantial holm oaks that provide a high evergreen wall on either side of the avenue or allée. The proposal would locate open space in the area adjacent to this avenue.

To the north of the application site there are playing pitches in the park, with a belt of trees along the boundary line. On the eastern side the application site has more playing pitches adjacent to the northern end of the eastern boundary, while the southern part of the site abounds the Millennium Arboretum, which is a substantial area covered with young trees.

The open space within the proposed development will be in an area that is well screened by the high holm oaks to the south and the Millennium Arboretum to the east and will not be visible to any significant extent from the park. The apartments would be higher and their location, on the northern side of the site, is not as comprehensively screened at the margin of the park. While all areas of the park are used for walking, those areas used for pitches are not as sensitive as the parkland, the rose garden and other high-quality elements of the park and it is not considered that the proposed development would have a significant impact on the character of the park.

Appendix 11.3 Report on Geophysical Survey

Detection Licence 15E0095

October 2015

Prepared by:

Seán Shanahan and Robert Hanbidge

Contents

Figures

Plates

1. Introduction

Shanarc Archaeology has been engaged by Crekav Landbank Investments Limited, 4 Inver Mews, Old Chapel Ground, Arklow, Co. Wicklow Y14 E973, to carry out a detailed geophysical survey of a specified area for a proposed residential development at St. Paul's College, Raheny, Dublin 5. The proposed development of the site is described below and this detailed geophysical survey is in addition to a comprehensive Cultural Heritage section of an EIS document being submitted as part of a planning application to Dublin City Council.

The following report has been compiled through evidence from documentary sources in conjunction with a site survey conducted from 14th – 16th September 2015. In addition to the site inspection/survey, a full geophysical survey (License No. 15R0095) was carried out as instructed from the 14th September to 16th September 2015. The initial outcome of this highlighted partial evidence for the buried remains of Maryville Houses and the associated boundary features in the surrounding hinterland. For the purposes of this report, it is only the revised site layout which is under consideration here. The results outline the potential impacts the development is likely to have on the archaeological landscape and provides recommendations towards the mitigation of negative impacts in relation to the present design of the development.

2. Location

The remains of Maryville House are situated in the townland of Maryville, which forms part of the lands that make up St. Paul's College, Sybil Hill Road, Raheny, Dublin 5 **(Figure 1)**. The proposed development area comprises 8.73 hectares, predominantly set out as grass sports fields and is bounded by St. Anne's Park to the north, east and south. Vehicular and pedestrian access will be gained from Sybil Hill Road to the west, via an access road through the grounds of the Vincentian's Residence (Sibyl Hill House) and St. Paul's College.

The site of Maryville House, an Architectural Heritage site occupies much of the north-western extent of the proposed development area. No surface trace of Maryville House and garden was evident during field inspection with the exception of one length of the original boundary wall and some mature trees; relict parts of the Maryville demesne landscape. An approximately 70m length of wall stands along the northern boundary of the proposed development area. Built of red brick with a limestone rubble core, and bonded with lime mortar, the wall stands approximately 3.5m high.

The area proposed for development is enclosed by metal fencing to the east and south, and partially along the north. There is no surface expression to indicate whether Maryville was previously enclosed by boundary walls. A modern concrete wall forms the western site boundary; no surface trace of an older boundary wall was observed.

The geological composition of the townland comprises visean argillaceous & cherty limestone, shale. This is the predominant bedrock in the Dublin region. The overlying subsoil comprises of limestone till within Maryville townland. The site is currently used for recreational purposes associated with St. Paul's College who use the green fields as playing pitches.

3. Proposed Development

The proposed development area comprises 8.73 hectares, predominantly set out as grass sports fields (**Figure 2**). Bounded by St. Anne's Park to the north, east and south, vehicular and pedestrian access will be gained from Sybil Hill Road to the west, via an access road through the grounds of the Vincentian's Residence (Sibyl Hill House) and St. Paul's College. The development will provide for 381 no. residential units, a sports hall *c.*1450sqm, 20 no. ancillary car parking spaces, 3 no. coach parking spaces, and a 4G playing pitch. These facilities will be for the use of the school and the local community. The main pitch will be flood lit, fenced and netted. A high quality landscaped open space will be provided to the north-west of the scheme, while a children's playground area will be centrally located between the apartment and housing elements to the east. Access to the residential element of the scheme will be via the existing entrance road to the north of the school, while access to the sports hall, pitches and ancillary car parking will be via a smaller access road to the south of the landholding **(Figure 3)**.

The planning application site excludes the Vincentian Order parochial house and associated lands (1.076ha) to the north-west of the landholding, in addition to the St. Paul's College building and parking to the west.

Schedule of Accommodation

The proposed development will consist of a total of 381 no. apartments in 5 no. separate residential blocks:

- *Block A - 88 no. apartments (20 no. 1-bed, 56 no. 2-bed, and 12 no. 3-bed apartments)*
- *Block B - 37 no. apartments (8 no. 1-bed, 24 no. 2-bed, and 5 no. 3-bed apartments)*
- *Block C -18 no. apartments (12 no. 2-bed and 6 no. 3-bed apartments*
- *Block D - 18 no. apartments (12 no. 2-bed and 6 no. 3-bed apartments)*
- *Block E - 23 no. apartments (8 no. 1-bed, 12 no. 2-bed, and 3 no. 3-bed apartments)*
- *Block F - 90 no. apartments (14 no. 1-bed, 59 no. 2-bed, and 17 no. 3-bed apartments).*

The height of each apartment block will be 4 storeys, with a set-back penthouse, and there will also be 284 no. basement car parking spaces.

The proposed development will incorporate 107 no. housing units as follows:

- *Type A - 48 no. 3-storey 4-bed units*
- *Type B - 27 no. 3-storey 3-bed units*
- *Type C - 30 no. 3-storey 4-bed units*
- *Type C1 – 2 no. 2-storey 3-bed units*

Together, the houses and apartments will lead to the provision of 381 no. residential units on the St. Paul's lands.

4. Archaeological and Historical Background

The extent of prehistoric and historic activity within the wider study area is attested to by the number and range of known archaeological monuments within the surrounding landscape. This part of Dublin was attractive for settlement due to its location near the coast, proximity to rivers and streams - including the Naniken and Santry rivers - and fertile land.

Prehistoric Period

Mesolithic *c.* 7000-4000BC

Wooden fish traps dating to 6100 – 5760 cal BC were found on the Mesolithic shoreline at Spencer Dock, Dublin 1 (McQuade 2008, 8-11). A number of shell middens and flint scatters – the most common evidence of Mesolithic activity - are located along the coast from Sutton and Malahide to Balbriggan, most notably on Lambay Island (Baker 2010, 8), and at Howth and Dalkey (Waddell 1998, 19).

Neolithic *c.* 4000-2500BC

A Late Neolithic single cist burial was excavated at Drimnagh (Kilbride-Jones 1939). It was covered with a mound, into which Bronze Age cremation burials were later inserted. Neolithic stone axe production has been recorded at Lambay Island (Cooney 2001).

Bronze Age *c.* 2500-800BC

An Early Bronze Age burnt mound dated to *c.* 1938-1744 cal BC was excavated at a multi-period site (Bronze Age, Viking, medieval and post-medieval) at Hammond Lane, Dublin 7 (Cryerhall 2006).

Iron Age *c.* 800BC-AD500

Evidence of Iron Age settlement in the form of waterfront structures (*c.*160 – 60 BC), including carved wooden vessels, has been excavated at Ormond Quay, Dublin 1 (Bolger 2011).

Historic Period

Early Medieval Period *c.* AD500-1100

Placenames incorporating ‘rath’ (otherwise known as ringforts, the circular fortified settlements of the period) such as Raheny (from *Ráth Éanna* or *Ráth Eanaigh*) indicate early medieval settlement.

The proposed development site lies between the early medieval churches of Raheny and Clontarf. Raheny (DU015-082001) was dedicated to St. Assam, and was also associated with St. Nessan’s foundation on Ireland’s Eye (the name Assam may be a corruption of

Nessan). *Circa* AD550 St. Comgall of Bangor established a church in Clontarf (DU019-015001).

The proposed development site is situated in Maryville townland, which forms the southwest extent of the civil parish of Raheny. The proposed development site shares a boundary with Sibylhill townland to the west; which belongs to the civil parish of Clontarf. Civil parishes were based on the medieval church parish, which preserved the Gaelic *tuath* territorial boundary. Following the Anglo-Norman invasion, the tuath were retained for administrative purposes, and later re-named as parishes or manors.

Roadworks in Raheny village in 1970 uncovered a ditch interpreted by Leo Swan as the outer enclosure of the medieval ecclesiastical site (DU015-082003) of Raheny. Archaeological investigations in 1996 at Cahill Motors, Raheny revealed a similar feature. Carroll (1996) concluded that 'the area in which the ditch was found was important historically throughout the medieval period, and there are other boundary and defence features of which such a ditch could form a part'.

Two holy wells are located at St. Anne's Park (DU019-012) and The Stiles Road, Clontarf (DU019-013, site of), respectively. While such wells are frequently associated with early ecclesiastical sites, their ritual use may stem from the prehistoric pre-Christian period.

The Vikings settled at Dublin in AD 841. While some debate surrounds the exact location of the Battle of Clontarf (DU019-020) in 1014, it is generally considered to have been fought from Phibsborough to the sea, on both sides of the Tolka River. The Vikings summoned by Sitric Silkbeard, the Hiberno-Norse King of Dublin, beached their boats on the strand at Clontarf and set up camp there. It would appear that many Vikings remained settled in Fingal after 1014 (McIntyre 1987, 83).

In the early 11th century, land in the area was held by Sitric, King of Dublin. *Circa*1030, Sitric gave Dúnán, first Bishop of Dublin, land to build the Church of the Blessed Trinity (Christchurch Cathedral) in Dublin, along with the lands of 'Beal-dulek [Baldoyle], Rechen [Raheny] and Portrahern [Portrane] with towns, cattle and corn' (Ware 1705, 134).

Medieval Period *c.* AD1100-1600

In 1169, the Cambro-Norman Richard FitzGilbert de Clare (also known as 'Strongbow') seized Dublin. Shortly after, in 1171, Henry II arrived to establish Dublin as the capital of the Norman territory in Ireland.

In 1171 Gill Mololmoa, a Dane otherwise known as Gilcolm, held lands in Raheny. Strongbow seized Raheny in 1172 and granted it to Vivien de Cursun (Murphy and Potterton 2010, 91). His son John succeeded as 'Lord of Rathenny and Kilbarrock' but was murdered by the de Lacy's (the lords of Meath) in 1208. Raheny church came under the control of St. Mary's Abbey, Dublin, who also acquired grange lands in Raheny in 1172-3 (Murphy and Potterton 2010, 75). Raheny was among the principal medieval manors of the Dublin region (Murphy and Potterton 2010, 170).

In 1172 the lands of Clontarf were granted to Adam de Pheope by Hugh de Lacy, the Norman Lord of Meath. Henry II subsequently granted Clontarf manor to the Knights Templar, as part of his penance for the murder of Thomas a Beckett, confirmed by the monarch in 1226 (McIntyre 1987, 26). Upon the suppression of the Knights Templar in 1307, the property passed to the Knights Hospitallers (also known as the Knights of St. John of Jerusalem), who were headquartered at Kilmainham.

In 1317 the invading army of Edward Bruce, brother of Scottish king Robert Bruce, reached the villages on the northern side of Dublin city.

According to Friar John Clyn[1], the Black Death reached Ireland in 1348 through the port of either Howth or Dalkey. It devastated the population of Dublin city, and re-occurred in 1362, late in the 14th century (Foley 2013, 177-8) and again in 1605 (Ball 1917, 92).

Following the dissolution of the monasteries in 1540-41, the St. Lawrences of Howth acquired lands in Raheny and Baldoyle (Murphy and Potterton 2010, 109). The Crown took possession of the Clontarf estate in 1541, and the Order of the Knights Hospitallers was disbanded in 1542. Under the 'surrender and regrant policy', the last Prior of the Knights, Sir John Rawson, was granted a peerage, created Viscount Clontarf, granted an annual pension of 500 marks and a seat in Parliament (McIntyre 1987, 27).

Post-Medieval Period *c.* AD1600-1800

By 1600 the St. Lawrences of Howth controlled most of the Raheny area. In that same year the 'Manor, territory, tithes, town and lordships' of Clontarf were granted by Elizabeth I to Sir Geoffrey Fenton, principal secretary of state for Ireland. Feton's son, Sir William, inherited the property in 1608. It subsequently passed to the King family through marriage (McIntyre 1987, 86).

In the 1640s, property and parish boundaries on the northern edge of Dublin city, at Raheny, Clontarf, Coolock, Killester and Glasnevin, were in a state of flux (Smyth 1992, 153). The 1641 Rebellion received widespread support in Raheny and Clontarf. To suppress this, Sir Charles Coote led his forces from Dublin city, burning the village of Clontarf and attacking Clontarf Castle. In 1649 Cromwell granted the confiscated Clontarf estate to Captain John Blackwell, who assigned it to John Vernon, quartermaster general of Cromwell's army in Ireland. Vernon relinquished the lands upon the restoration of Charles II to the throne in 1660. However, they were returned to another member of the Vernon family. The castle remained in their possession until Edward Kingston Vernon died in 1967.

The Down Survey map of 1655 indicates the extent of the St. Lawrence, Lords of Howth, holdings in the area (Figure 1).

By the 1660s, Raheny, Clontarf and Drumcondra entered a new phase, becoming centres for gentry settlement outside of the city (Smyth 1992, 174).

[1] A 14th century Franciscan friar and annalist who lived in Kilkenny during the Black Death.

In 1732 John Vernon of Clontarf Castle leased Sibyl Hill house and 36 acres of land to James Barlow for a term of 999 years (Gogarty 2013, 27). In the same year, Joseph Fade, a banker from Thomas Street, Dublin, leased Furry Park from Vernon (Gogarty 2013, 23).

Nineteenth & Twentieth Centuries

The population of Dublin city is estimated to have reached 200,000 by 1800 (Casey 2005, 44). It was now one quarter the size of London, and twice the size of any other city in the British Isles. The rapid growth in population brought with it great poverty and disease. With the seat of government moving to Westminster in 1800 under the Act of Union, Dublin city entered a steep political and economic decline.

During this period, Raheny remained a quiet country village with most of the population engaged in agriculture. Lewis (1837) noted, 'The land is in general of good quality, the greater portion is meadow and pasture, and the arable land produces excellent crops of wheat; the system of agriculture is in a very improved state, and there is neither waste land nor bog. Limestone of good quality is abundant and is quarried for building and for agricultural purposes'. Lewis (1837) also listed Sybil Hill among the 'many handsome seats and villas' of Clontarf.

D'Alton (1838, 55) records that the population of the parish and village of 'Ratheny'[2] in 1821 was 505, rising to 608 by 1831. Lord Howth remained the chief proprietor. The opening of the Dublin and Drogheda Railway in 1844 drew an influx of new residents to the area.

In 1835 Benjamin Lee Guinness and Arthur Guinness Jr., sons of Sir Arthur (of brewing fame) of Beaumont, Drumcondra, purchased the Thornhill estate in Raheny. In 1837 Thornhill House was demolished and St. Ann's House, named after a holy well (DU019-012) within the estate, was constructed for Benjamin Lee and his new wife, his cousin Elizabeth (Harris 2009, 2). Benjamin, an MP for Dublin in 1865, was an antiquarian with an interest in ancient monuments in Ireland and the Classical world, which strongly influenced the design of the gardens. Benjamin's son Arthur, later Lord Ardilaun, inherited the estate in 1868 and rebuilt the house in 1873-5. Arthur and his wife Olive Hedges-White, a descendant of the Whites of Bantry House, shared a love of horticulture and further developed the estate and gardens. In the late 1870s a number of neighbouring properties, including Maryville, Sibyl Hill, Bettyville, Charleville and Bedford Lodge, were added to the St. Ann's estate. These were kept as homes for their stewards (Gogarty 2013, 16).

Upon her death in 1925, Lady Ardilaun left the estate to her husband's nephew, the Right Rev. Benjamin Plunket, Church of Ireland Bishop of Meath. This was an estate of approximately 440 acres. In 1938, Dublin Corporation issued a Compulsory Purchase Order for the St. Ann's area. Bishop Plunket sold the St. Ann's estate to Dublin Corporation in 1940 for approximately £55,000, retaining Sibyl Hill House as a private residence and 30 acres of parkland (present day St. Paul's College and the Vincentian Order parochial house). The Corporation used the lands for public housing developments (approximately 200 acres), nurseries and recreational parkland and playfields (approximately 240 acres). St. Ann's House was destroyed by fire in 1943, and the ruins were demolished in 1968.

[2] Until the mid 20th century, many local residents pronounced the placename as 'Rahenny' or 'Ratheny'.

In 1948 Dublin Corporation sold 31 acres of the St. Ann's estate to the Vincentian Fathers to build a boys secondary school. Following Bishop Plunket's death in 1947, his son Benjamin sold Sibyl Hill House to the Vincentians in 1950 (McIntyre 1987, 149), who opened a secondary school in the house. Sybil Hill Road[3] was laid out in the 1950s, and the original entrance avenues to Maryville and Sibyl Hill on the Howth Road were replaced with a residential development. In 1952, Dublin Corporation sold part of the St. Ann's estate behind Sibyl Hill House to the Vincentian fathers for £4,200. The following year, in 1953, the Corporation sold another tranche of land to the Vincentians for £256.

The lease of Maryville House was assigned to Dublin Corporation in 1956. St. Paul's College secondary school was located in the house until the present school building, designed by Downes and Meehan, was completed in 1957 (Gogarty 2013, 28). Sibyl Hill became home to retired Vincentian Fathers, and continues to fulfil that function. In 1959 Maryville was sold to the Vincentian Fathers for £3,500. They later demolished the house and used its four acres as additional playing fields (Gogarty 2013, 28).

5. Site Inspection

A site visit was conducted in order to assess the proposed development with a view to potential impacts on the archaeological heritage of the area. There are no recorded, extant archaeological remains in the immediate area of the development. However, the site of the former Maryville House is the main focus of the site investigation.

The main area of the development site is concentrated in the east and north-east of the college playing fields **(Plate 1)**. The site is bounded by the Sybil Hill Road to the west which is also where access is gained to the site through St. Paul's College. The secondary school college buildings, St. Paul's College, and the Vincentian's residence buildings are situated immediately west of the green field site and are separated by a high concrete wall with metal fencing across the top. A number of mature trees occupy the north-west fringe of the site **(Plate 2)**. To the north the site is bounded by a mature hedgerow interspersed with mature trees and a red brick wall associated with Maryville House and gardens. To the south the site is separated by a high metal fence that runs parallel with the avenue leading into St. Anne's Park.

The surface of the site is generally flat, dry and well drained. No surface traces of the structures depicted on Ordnance Survey maps and aerial photographs (1842 – 2000) are visible. Maryville House, associated buildings, garden and demesne lands are depicted in detail on the 1837-43 first edition OS map **(Figure 4).** The entrance avenue extended northwest to a gate house at the Howth Road and the gardens were laid out on the eastern side of the house. The footprint of Maryville House, as depicted on the 1837-43 first edition map, suggests a southwest-facing, possibly five-bay house and probably two storey, with bowed flanking end bays. A second structure, possibly indicated on an earlier Rocque map, was located to the rear, within the south-southwest/north-northeast alignment, in addition to two other outbuildings. A long narrow southwest-facing structure (probably a greenhouse)

[3] The spelling of 'Sibyl Hill' had changed to 'Sybil Hill' by this time.

was depicted within the garden. A photo of Maryville (undated) survives **(Plate 6)**. The house was demolished *c.*1959.

The extent of demesne landscapes within the vicinity (indicated as shaded portions of land) in the 1830s is evident on **Figure 4**. These include Sibyl Hill, Furry Park, Rosevale, Brighton Lodge and Thornhill (later known as St. Ann's).

6. Geophysical Survey

Geophysical survey is a systematic measurement of some physical property related to the earth. There are numerous sources of disturbance of this property, some due to built heritage features, some due to the measuring method, and others that relate to the environment in which the measurement is made. No disturbance, or 'anomaly', is capable of providing an unambiguous and comprehensive description of a feature, in particular in archaeological contexts where there are a myriad of factors involved.

The measured anomaly is generated by the presence or absence of certain materials within a feature, not by the feature itself. Not all archaeological features produce disturbances that can be detected by a particular instrument or methodology. For this reason, the absence of an anomaly must never be taken to mean the absence of an archaeological feature. The best surveys are those which use a variety of techniques over the same ground at resolutions adequate for the detection of a range of different features.

In general, topsoil is more magnetic than subsoil which can be slightly more magnetic than parent geology, whether sands, gravels or clays, however, there are exceptions to this. The reasons for this are natural and are due to biological processes in the topsoil that change iron between various oxidation states, each differently magnetic. Where there is an accumulation of topsoil or where topsoil has been incorporated into other features, a greater magnetic susceptibility will result.

Within landscapes soil tends to accumulate in negative features like pits and ditches and will include soil particles with thermo-remanent magnetization (TRM) through exposure to heat if there is settlement or industry nearby. In addition, particles slowly settling out of stationary water will attempt to align with the ambient magnetic field at the time, creating a deposit with depositional remanent magnetization (DRM).

As a consequence, magnetic survey is nearly always more a case of mapping accumulated magnetic soils than structures which would not be detected unless magnetic in their own right, e.g. built of brick or tile. As a prospecting tool it is thus indirect. Fortunately, the mechanisms outlined above are commonplace and favoured by human activity and it is nearly always the case that cut features will alter in some way the local magnetic field.

A geophysical survey was undertaken within Maryville townland, ITM 720372, 737563, to investigate if structural remains could be identified for Maryville House and associated buildings **(Figure 5)**. The proposed development site is located within the grounds of St. Paul's College, south of Raheny village. The ground condition are very good, with level, well drained land that is currently used as playing pitches for the nearby secondary school **(Plate**

3). The focus of the geophysical survey is within the area of the former estate house that has subsequently been levelled. There is no surface expression for the former dwelling on the ground. Therefore, it was necessary to undertake a geophysical survey in order to confirm the presence of any features associated with the structure, and to identify other anomalies of potential archaeological or built heritage significance.

The proposed survey extent is roughly highlighted in Figure 3, incorporating the proposed limits of the former dwelling. High resolution magnetic gradiometry survey (1m x 0.125m) was undertaken within the area, in order to ascertain the potential location of a levelled estate house and other features of archaeological significance. An area of 1.18 Ha was surveyed, using a series of 20m x 20m grids that were accurately surveyed using a Trimble GeoXH 6000 logger with VRS Now real-time corrections giving 0.10m accuracy in the field.

7. Geophysical methodology

Grids are the essential recording framework for any geophysical survey (Clark, 1990, 158). The acquisition of geophysical data relies heavily on the presence of an accurately set out network of control points and grids. These grids are often 20m x 20m in size and are subsequently geo-referenced into the national grid by total station or D-GPS survey. Essentially, these 20m x 20m grids are further sub-divided, by passing lines across the edges of the grids, which are marked at intervals, usually 1m apart. Such spacing directly affects the resolution of the recorded data, resolution being defined here as ‘the ability of an instrument to distinguish two closely spaced archaeological features as separate entities’ (Aspinall *et al.* 2009, 76).

Thirty sets of 20 x 20m grids were set out at the known location for Maryville House using a Trimble GeoXH 6000 with real-time H star technology. The accuracy of grids is an essential part of gathering quality data that can be easily identified again in the field. The accuracy of the grids at Maryville has a 0.10m tolerance. This potential inaccuracy is augmented by the type of survey employed. Generally, gradiometry data can have a displacement of up to 25cm due, in part, to the strength of the readings and/or the depth of the recorded response.

In recording data using geophysical instruments, two traverse techniques can be applied: zig-zag or parallel. Parallel traverses offer more security from possible errors. Zig-zag traverses are quicker, giving rapid ground coverage, however this traverse type has a tendency for response of alternate traverses during gradiometery surveys, which is generated by the mistiming of a surveyors walking speed. This can be treated during the processing stage; however, it can never be fully removed. Zig-zag traverses can also produce a stripping effect on the data. This is identified as alternating dark and light bands, but is only seen in gradiometer and GPR data. It is caused by the misalignment of the two magnetometers in gradiometery data, and is an effect of tilting and lifting of the antennae over differentiating ground cover within GPR results (Ernenwein and Kvamme 2008, 143). These however, can be removed during data processing. The similarities between this type of error, and that of the geophysical representation of cultivation marks, means such responses can be inadvertently processed out. Linear earthworks positioned parallel to traverses can also be mistaken as stripping. Zig-zag traverses were employed exclusively at Maryville. The application was considered with respect to resolution, sloping and expected archaeological activity.

A Bartington 601-2 fluxgate gradiometer was employed throughout geophysical survey at Maryville **(Plate 5)**. This machine consists of a highly susceptible core, usually made of mu-metal. The fluxgate gradiometer employs two magnetometers, separated 0.5m or 1m vertically apart (the distance between the two sensors determines the depth of penetration of the instrument) (See Appendix A for further information).

The Maryville survey was undertaken upon visean argillaceous & cherty limestone, shale. Shale is a 'magnetically quite' formation, meaning the natural process which formed this rock type has not affected, to a large degree, its magnetic signature. More importantly, this process has not magnetically enhanced the material, allowing for a relatively normalized magnetic background. In contrast, igneous formation such as basalt, tuffs, granite etc., have such high magnetic signatures, it is impossible to undertake a magnetic survey over them. Bedrock height can also greatly affect geophysical survey of any type, although, it is unlikely to have had an effect on the collected data at Maryville.

The topography of the area facilitated the setting out of the grid system and the collection of the data. The survey area was upon flat land with no physical obstructions (other than a metal railing surrounding a playing field), allowing for good quality data collection. Ferrous bodies such as the metal railing surrounding the playing field within the survey could not have been avoided and this unfortunately affected some of the acquired data.

Bright, calm and warm temperatures throughout the survey period resulted in optimal operating conditions for the instrument with good data acquisition. The instrument was balanced at the start of each day's survey. Magnetic gradiometers are sensitive to internal and external temperature fluctuations and sometimes require the need to be balanced more often during the day. This data was then ready to be processed (see Appendix B for further information).

8. Interpretive classes

Introduction

Key to interpretation is separation of each anomaly into broad classes, namely whether caused by agricultural processes (e.g. ploughing, composting, drainage etc.), geological factors or whether a structure of archaeological interest is likely. Within these, anomalies are in turn classified by whether they most likely represent a fill or a drain, or a region of differing data texture etc. More detailed descriptions are included below.

The actual means of classification is based upon geophysical understanding of anomaly formation, the behaviour of soils, landscape context and structural form. For example, to consider just one form of anomaly: weakly dipolar discrete magnetic anomalies of small size are likely to have shallow non-ferrous sources and are therefore likely to be pits. Larger ones of the same class could also be pits or locally-deeper topsoil but if strongly magnetic could also be hearths. Strongly dipolar discrete anomalies are in all cases likely to be ferrous or similarly magnetic debris, although small repeatedly heated and in-situ hearths can produce similar anomalies.

Agriculture – boundaries

Coherent linear dipolar enhancement of magnetic field strength marking ditch fills, narrow bands of more variable magnetic field or changes in apparent magnetic susceptibility, are all included within this category if they correlate with boundaries depicted on the Ordnance Survey maps. If there is no correlation then these anomaly types are not categorised as field boundaries.

Agriculture – cultivation

Banded variations in apparent magnetic susceptibility caused by a variable thickness of topsoil, depositional remanent magnetisation of sediments in furrows or susceptibility enhancement through heating (a by-product of burning organic matter like seaweed) tend to indicate past cultivation, whether ridge-based techniques, medieval ridge and furrow or post medieval 'lazy beds'. Modern cultivation, e.g. recent ploughing, is not included.

Agriculture – drains

In some cases it is possible to identify drainage networks either as ditch-fill type anomalies (typically 'Roman' drains), noisy or repeating dipolar anomalies from terracotta pipes or reduced magnetic field strength anomalies from culverts, plastic or non-reinforced concrete pipes. In all cases identification of a herring bone pattern to these is sufficient for inclusion within this category.

Archaeology – fills

Any linear or discrete enhancement of magnetic field strength, usually with a dipolar character of variable strength that cannot be categorised as a field boundary, cultivation or as having a geological origin is classified as a fill potentially being of archaeological interest. Fills are normally earthen and include an often invisible proportion of heated soil or topsoil that augments local magnetic field strength. Inverted anomalies are possible over non-earthen fills, e.g. those that comprise peat, sand or gravel within soil. This category is subject to the 'habitation effect' where, in the absence of other sources of magnetic material, anomaly strength will decrease away from sources of heated soil and sometimes to the extent of non-detectability.

Former enclosure ditches that contained standing water can promote enhanced volumetric magnetic susceptibility through depositional remanence and remain detectable regardless of the presence of other sources of magnetic material.

Archaeology – other discrete

This category is secondary to fills and includes anomalies that by virtue of their character are likely to be of archaeological interest but cannot be adequately described as fills. Examples include strongly magnetic bodies lacking ferrous character that might indicate hearths or kilns. In some cases anomalies of ferrous character may be included.

Archaeology – structures

On some sites the combination of plan form and anomaly character, e.g. rectilinear reduced magnetic field strength anomalies, might indicate the likely presence of masonry, robber trenches or rubble foundations. Other types of structure are only included if the evidence is unequivocal, e.g. small ring ditches with doorways and hearths. In some circumstances a less definite category may be assigned to the individual anomalies instead.

Archaeology – zones

On some sites it is possible to define different areas of activity on the basis of magnetic character, e.g. texture and anomaly strength. These might indicate the presence of middens or foci within larger complexes. This category does not indicate a presence or absence of anomalies possibly of archaeological interest.

Geology – discrete

On some sites, e.g. some gravels and alluvial contexts, there will be anomalies that can obscure those potentially of archaeological interest. They may have a strength equal to or greater than that associated with more relevant sources, e.g. ditch fills, but can normally be differentiated on the basis of anomaly form coupled with geological understanding. Where there is ambiguity, or relevance to the study, these anomalies will be included in this category.

Geology – zones

Not all changes in geology can be detected at the surface, directly or indirectly, but sometimes there will be a difference evident in the geological data that can be attributed to a change, e.g. from alluvium to tidal flat deposits, or bedrock to alluvium. It some cases the geophysical difference will not exactly coincide with the geological contact and this is especially the case across transitions in soil type.

Services

All overhead (OH) and underground (UG) services are depicted where these are detectable in the data or may influence aspects of the interpretation.

Texture

Geophysical data varies in character across areas, due to a range of factors including soil chemistry, near surface geology, hydrology and land use past and present. Where these variations are of interest or relevance to the study they are included in this category.

9. Geophysical Survey Results

The most prominent and identifiable element of this survey is the arcing boundary feature which is notably associated with the front (southern end) of Maryville House **(Figure 7)**. It is depicted within the survey data as a curving linear anomaly lying within the southernmost girds of the survey (**G 1**). This feature is clearly depicted on both the first and second edition OS maps.

The western extent of the survey area contains a considerable amount of noise. This is interpreted as a result of possible debris associated with the structural elements of Maryville House **(G 2).** Modern rubbish or infill material may also be the cause for this erratic pattern of anomalies. The high readings suggest possible anomalies of ferrous character. Further investigative work in the form of test excavation will need to be done within this area to establish if there are any structural elements remaining for Maryville House.

The anomaly **(G 3)** may represent some structural element associated with the western wall of the house. There is a considerable level of noise along the location of the west wall which may indicate demolition or robbing out of structural elements associated with the former structure.

Within the south-west corner of the survey area, a linear anomaly **(G 4)** extending in a north-east by south-west direction towards the side of Maryville House may represent more features associated with structural elements. It does not appear to tie in with any features that can be identified on either the first or second edition OS maps. It may also be a naturally occurring phenomenon.

The last feature that is identifiable from the survey **(G 5)** can be seen extending across the lower section of the geophysical survey area. This linear feature would appear to be a drain or ditch situated just to the south of the curving boundary (G 1). It does not appear to be marked as a field boundary or agricultural feature on either of the OS maps. However, this would not necessarily discount the anomaly. The nature of the shape and dimension would indicate that it is either agricultural or geological.

10. Discussion

The primary outcome of this geophysical survey is the identification and location of possible structural elements associated with Maryville House. The results, whilst not offering definitive regular anomalies that could easily be identified as the foundation elements associated with the house, do indicate anthropogenic activity in the known location of the house. The areas identified in the survey as (G 2) and in particular (G 3) (**Figure 7**) offer the most substantial evidence for remains associated with the house. Dipolar spots are found throughout this area of the site and might represent actual buried metal objects / refuse. The location of a metal railing situated along the eastern side of the house area is unfortunate and hampers the detection of residual elements associated with Maryville House.

Possibly the most definitive evidence from the survey is found with (G 1). This very distinctive arcing boundary is easily identified on both the first edition and second edition OS maps. In **Figure 8**, we overlaid an extract from the second edition map onto the survey results and this arcing boundary matches quiet well with the same anomaly that we picked up in the survey. It also gives us a very good locational position for Maryville House in terms of the area we surveyed.

The remaining anomalies identified in the survey, (G 4) & (G 5), suggest possible geological or agricultural features. These were identified within the south-west and south-east areas of the geophysical survey. Anomaly (G 4) is represented by a rectangular feature in close proximity to the south-west corner of Maryville house. It does not tie in with any landscape elements that are highlighted in the second edition OS map, i.e. road, avenue, field boundary etc. This is also true for the (G 5) anomaly which is found extending east – west across the southern end of the survey area. When comparisons are drawn between the first or second edition OS maps, no identifiably features can be matched. This would strongly suggest a possible geological anomaly.

11. Evaluation of Potential Impacts

The main elements of the proposed development are located in the eastern and north western areas of the development site. The features of the proposed development that will have the largest impact on the remains of Maryville House are the access road and the proposed dwellings to the east (**Figure 3**).

The proposed development does negatively impact on the buried structural elements associated with Maryville House. The instances of this have been described above and certain strategies must be applied to mitigate against the destruction of these features.

It is worth noting that the development so far has added to the understanding of the proposed development area's heritage, especially in the confirmation of the position of Maryville House and associated features.

12. Recommendations

The following recommendations are subject to the decisions/permissions of the Department of Culture, Heritage and the Gaeltacht and Local Authority Archaeologist.

It is proposed that the development at Maryville proceed with the following recommendations in place to mitigate against negative impacts on archaeological remains:

1. That the development works be archaeologically monitored.

2. That the potential built heritage remains within the 'driveway' area be fully archaeologically excavated.

3. That a series test-trenches be inserted at the location of Maryville House and the surrounding development site to ascertain the nature of this monument and any other potential archaeological sites.

13. Project Metadata

Project Name	Maryville, Raheny, Dublin 7.
Detection license	15R0095
Client	Shanarc Archaeology for Crekav Landbank Investments Limited
Fieldwork Dates	14th - 16th September 2015
Field Personnel	S Shanahan & R Hanbidge
Data Processing Personnel	S Shanahan
Reporting Personnel	S Shanahan
Draft Report Date	6th October 2015
Final Report Date	14th October 2015

14. Figures

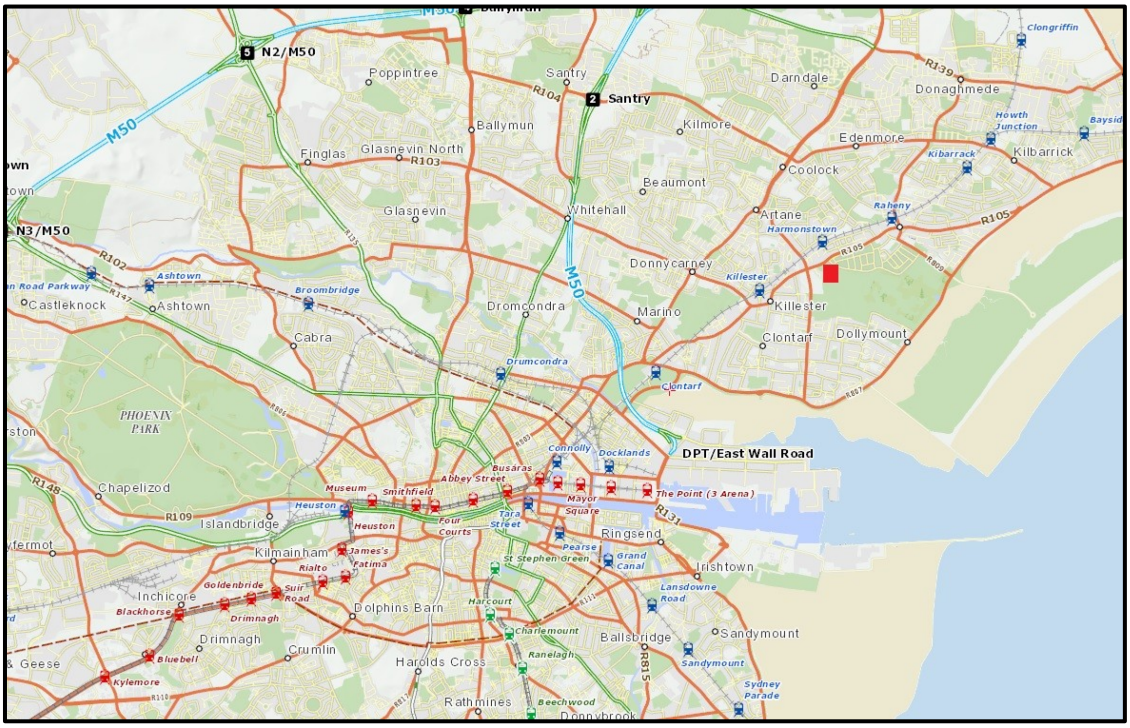

Figure 1 – Extract from OSI map indicating the survey area, Maryville, Raheny, Dublin 5 (OSI Licence EN 0077915)

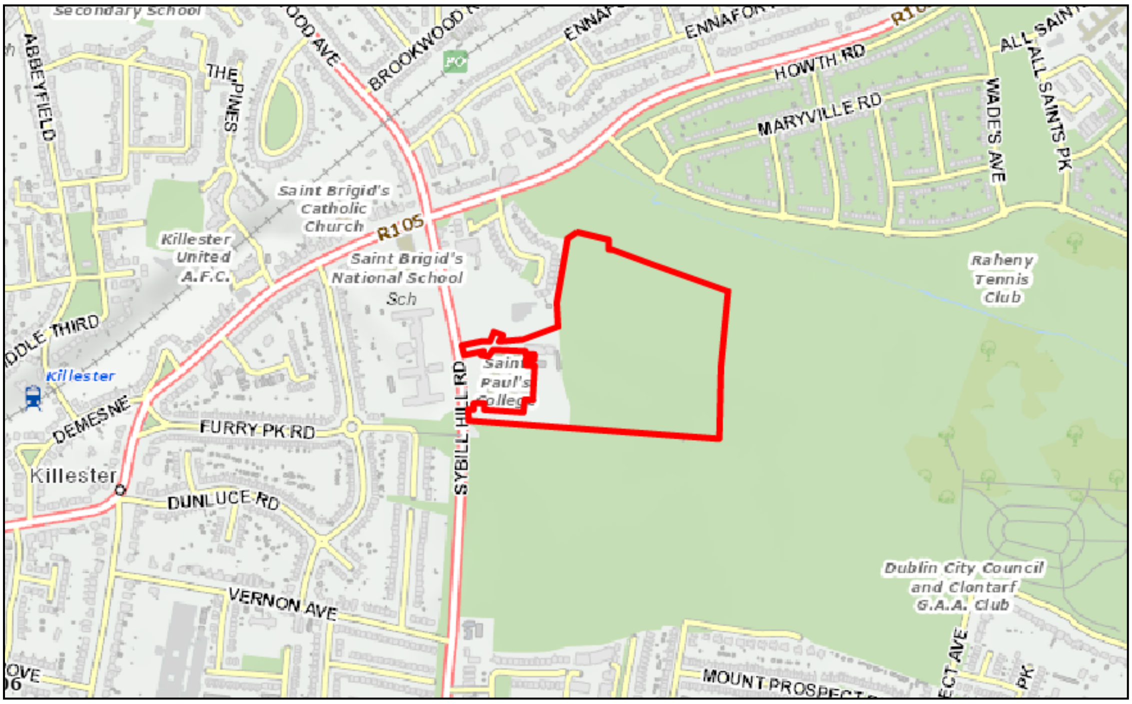

Figure 2 – Detailed extract from OSI Map showing the proposed development area, Maryville, Raheny, Dublin 5 (OSI Licence EN 0077915)

Figure 3 - Detailed site layout plan for the proposed development, Maryville, Raheny, Dublin 5

Figure 4 – Extract from the first edition OS map of the development area at Maryville, Raheny, Dublin 5

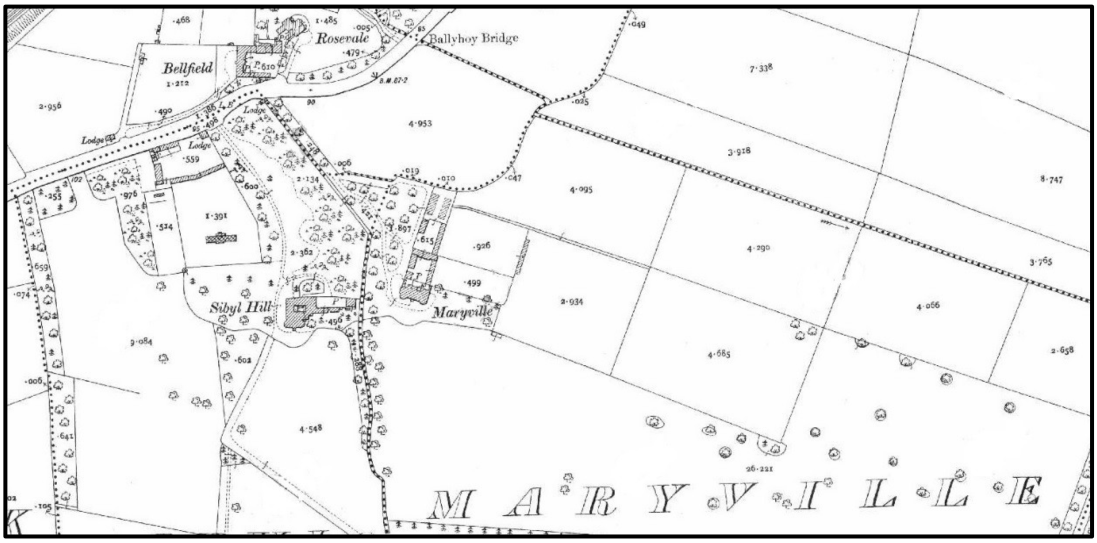

Figure 5 – Extract from the 25'' historic map showing the proposed development site at Maryville, Raheny, Dublin 5

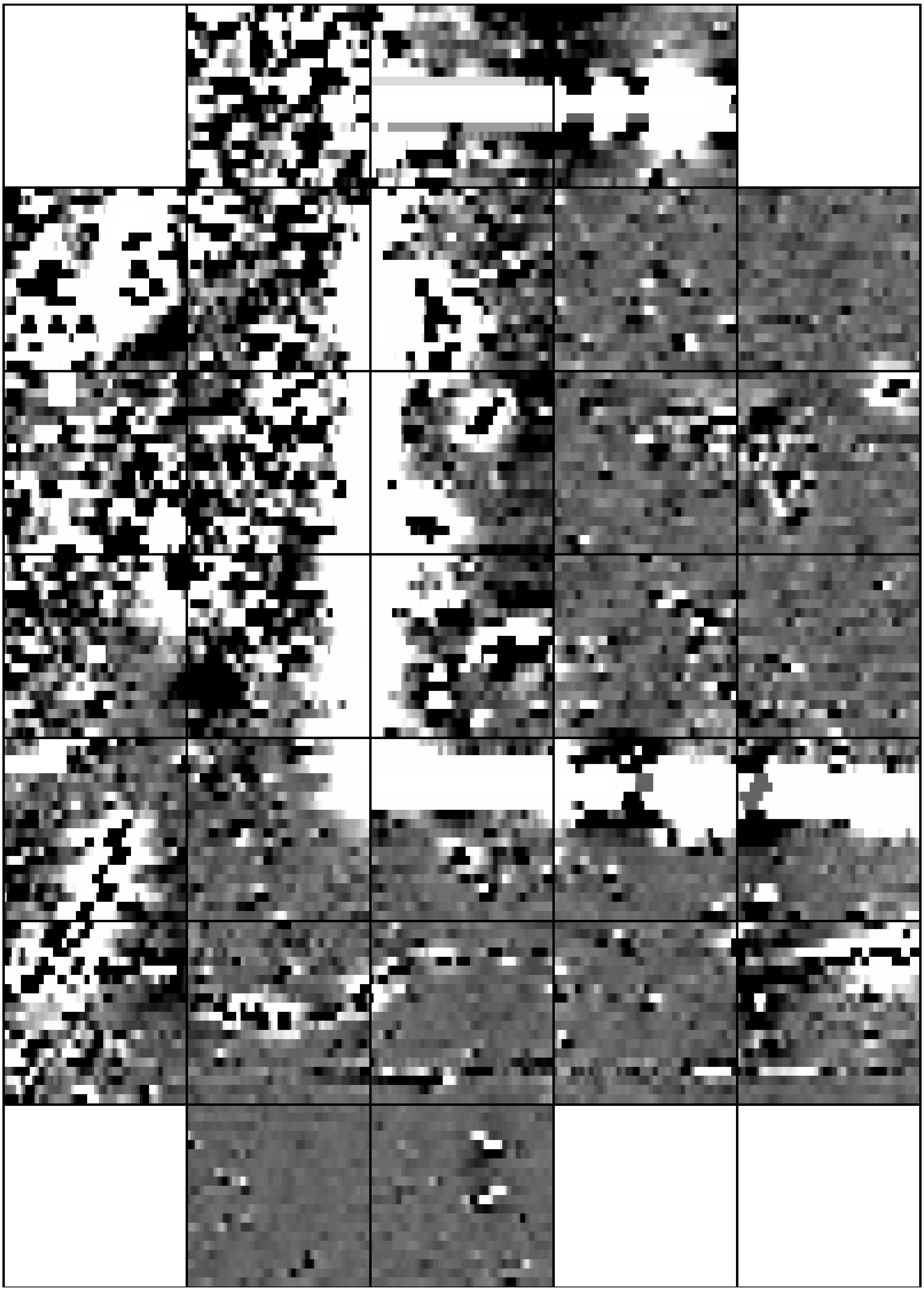

Figure 6 – Detail of the magnetic survey undertaken at Maryville, Raheny, Dublin 5

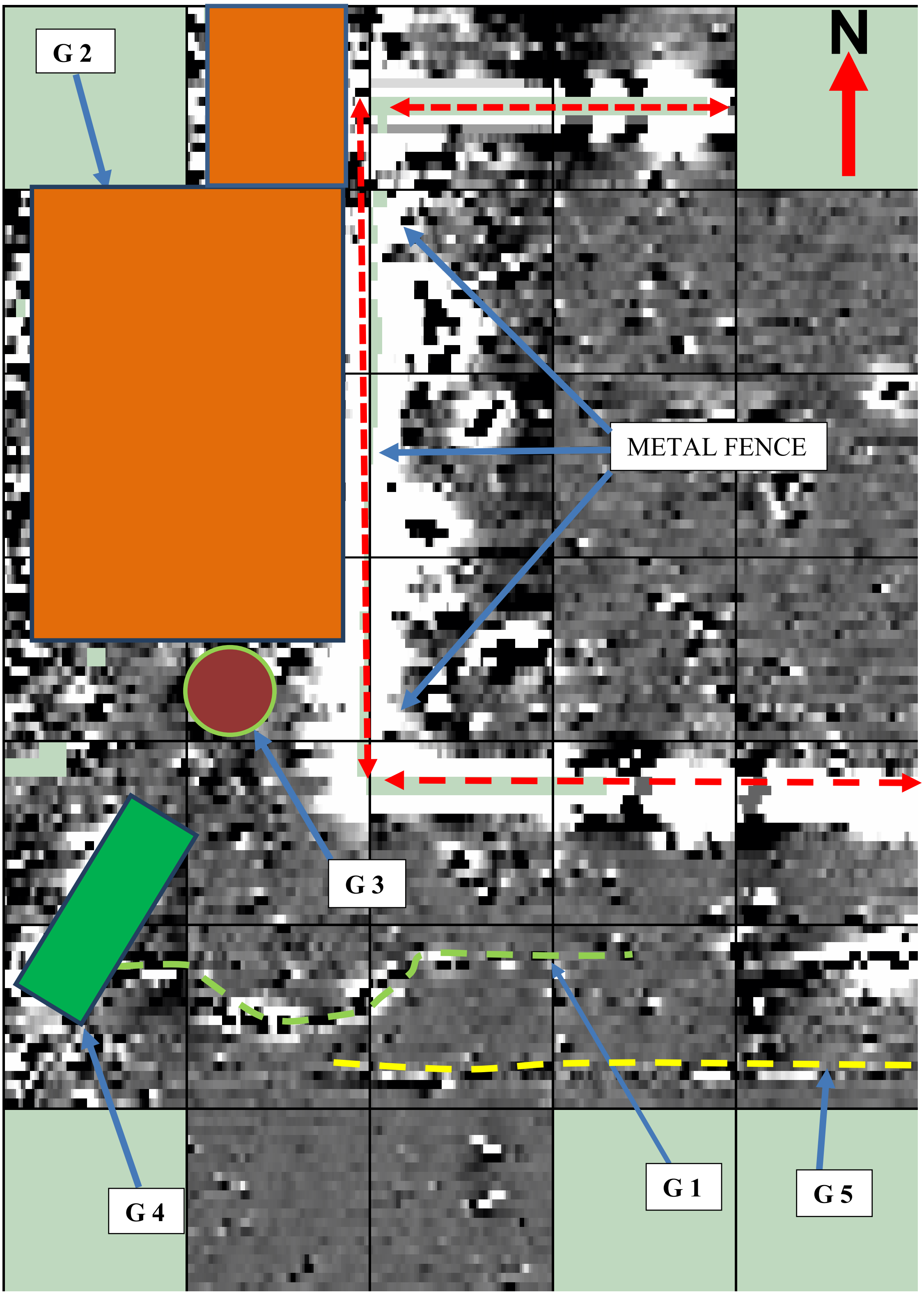

Figure 7 – Geophysical survey interpretation, Maryville, Raheny, Dublin 5

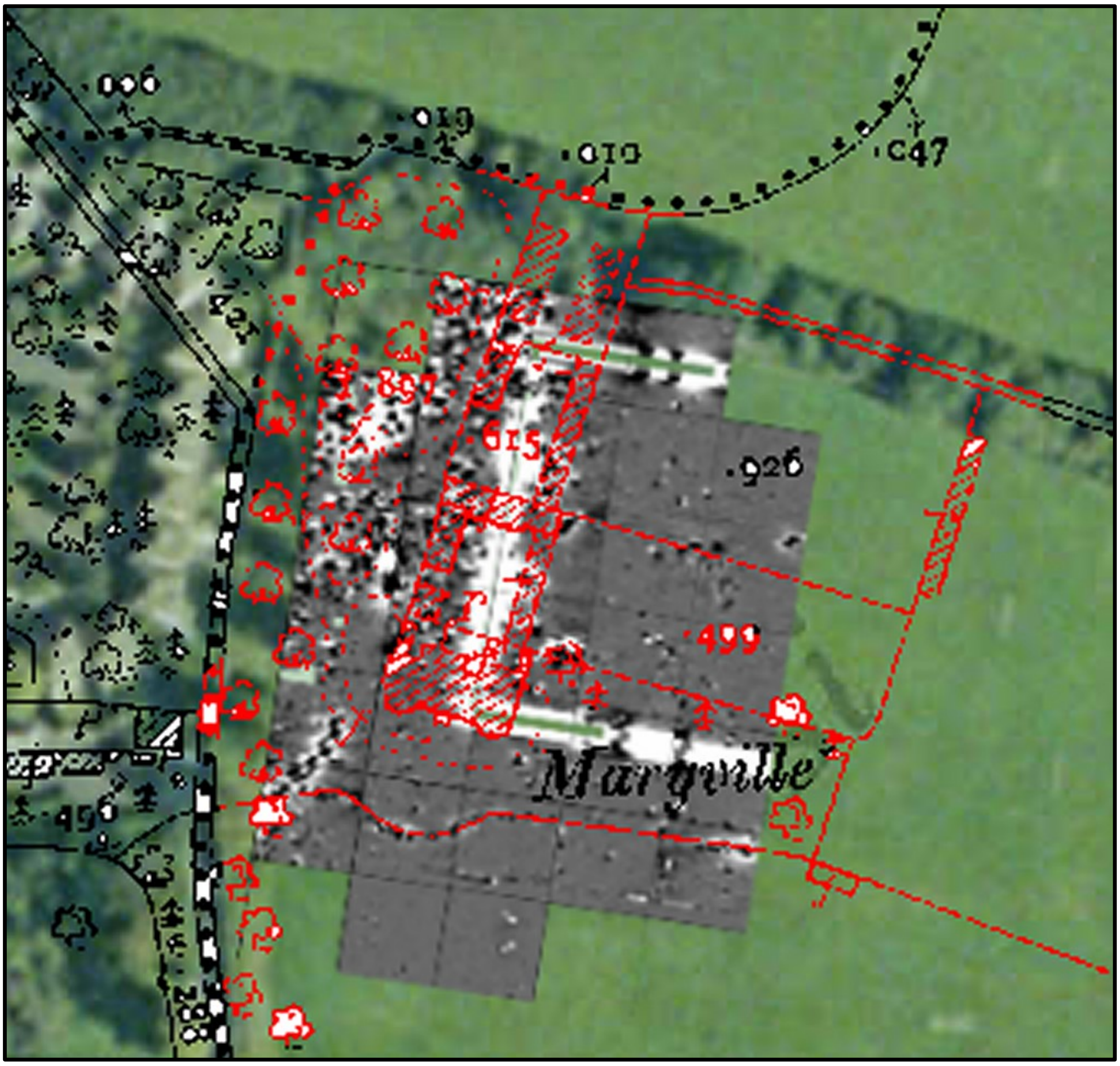

Figure 8 – Composite image of an aerial photograph with the geophysics survey results overlaid on an extract from the 25'' historic map indicating Maryville House and boundaries, Raheny, Dublin 5

15. Plates

Plate 1 – View of the proposed development area looking north-west, Maryville, Raheny, Dublin 5

Plate 2 – View towards the former location of Maryville House, looking north

Plate 3 – View westwards across the survey area towards the direction of Maryville House, Raheny, Dublin 5

Plate 4 – View of the northern side of the metal fence extending through the survey area

Plate 5 – View of the geophysical survey in progress using the Bartington 601-2 Gradiometer

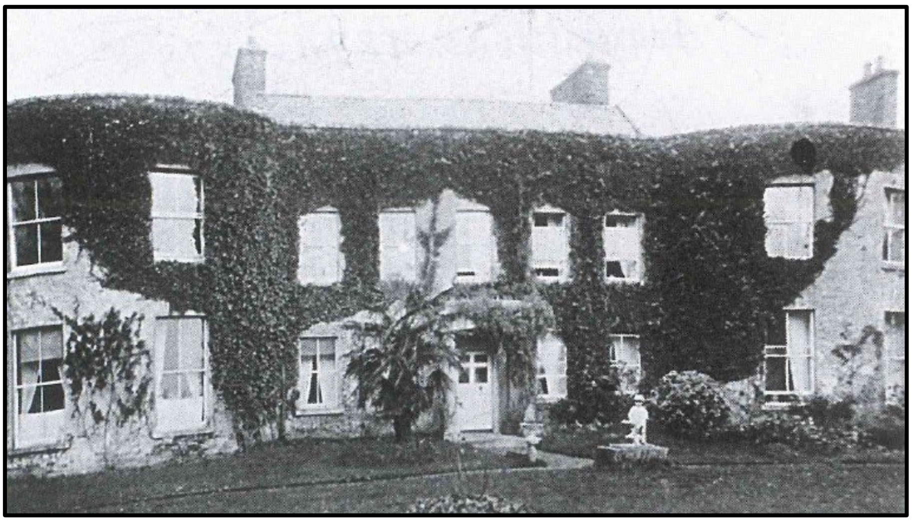

Plate 6 – Photo of Maryville House taken c.1878 after Sharkey 2002.

16. Appendix A

Magnetic Gradiometry

Iron constitutes 6 per-cent of the Earth's crust, dispersed throughout soils, clays, rocks and chemical compounds, all of which are partially magnetic (Clark 1990, 64). Human activity in the past has redistributed and changed this iron, creating predictable discontinuities that are detectable using geophysical instruments (*ibid*, 64). Such features are detected using the phenomenon known as magnetic susceptibility. The more magnetised a feature becomes when placed in a magnetic field, the more magnetic susceptibility it is said to have. This magnetic susceptibility can be measured using a magnetic susceptibility meter, which induces a magnetic field when placed in contact with the topsoil, or a magnetometer, which measures minute variations within the Earth's naturally occurring magnetic field.

Assuming a non-igneous parent (i.e. magma, cooled from such a high temperature, that very large magnetism is induced, giving extremely high magnetic responses, masking the archaeological features present) such as granites, basalts, or glacial erratic, it can be assumed that topsoil's have a higher magnetic susceptibility than sub-soils. This assumption is based on a number of processes, the most important of which rely upon the *Le Borgne* effect (Gaffney and Gater 2003, 38; Aspinall *et al.* 2009 24–25). One of the most common iron oxides contained within the soil is a weakly magnetic material known as hematite (Gaffeny and Gater 2003, 38; Aspinall *et al.* 2009 24–25). This iron oxide can become magnetically enhanced through a process of heating/burning (to a temperature of a least 200 degrees Celsius) and subsequent re-cooling. Upon heating/burning, an atmosphere of reduction is created in which oxygen is excluded, creating a new, more magnetically enhanced material, known as magnetite (Aspinall *et al.* 2009 24). Once the heating/burning process has been completed, oxygen again becomes available, allowing magnetite to re- oxidize as maghemite, a material which is of a far greater magnetic susceptibility than the initial hematite (*ibid,* 24). This process is also termed 'thermo-remanent magnetism', and is responsible for our ability to detect kilns, ovens, hearths and anything burnt to a sufficient degree. Due to the ability to detect such features, magnetic surveys, are the most frequently applied techniques on prehistoric sites, due to the likelihood that only features that were burnt or made from organic material can be identified (*ibid*, 141).

Areas where organic waste material is allowed to decay can also lead to magnetic enhancement, through a process known as fermentation. Bacteria which propagate the breakdown and decay of this waste, do so by creating an atmosphere of reduction in which magnetic minerals present may be magnetically enhanced (*ibid* 24–25). Certain bacteria are also able to create micron-sized magnetite crystals within their bodies by use of iron oxides distributed within the soil (Fassbinder *et al.* 1990, 163; Aspinall *et al.* 2009, 25). All of these processes rely on the presence of organic matter, which is more frequently available within the top-soil (*ibid*, 25). Hence, for example, once a ditch has become in-filled with topsoil, a magnetic contrast is created, with the surrounding soil having a low magnetic response in contrast to the greater magnetic signal given off by the topsoil within the cut.

Therefore, it can be said, the greater level of human activity on site the greater ability of magnetic instruments to detect archaeological deposits. It is clear that magnetic techniques only show a limited amount of information. The detection of archaeological features, such as subsurface voids and building remains (that have not been burnt or made of brick), are far better suited to earth resistance.

The most frequently employed types of gradiometer are the fluxgate gradiometer and caesium-vapour magnetometer, with the former being the most widely applied. The fluxgate gradiometer has a sensitivity of 0.1nT, while the caesium-vapour magnetometer has a maximum sensitivity of 0.01nT. While an increase in the use of caesium-vapour magnetometers is apparent (Linford 2008, 2), more notable advances lay in the adoption of the Cryogenic SQUID (Superconducting Quantum Interference Device) magnetometer. With a possible sensitivity of 0.00001nT, the instrument can take several thousand measurements per second enabling for an unprecedented jump in both possible sampling density and sensitivity (Aspinall *et al.* 2009, 56).

A Bartington 601-2 fluxgate gradiometer was employed throughout geophysical survey at Maryville. This machine consists of a highly susceptible core, usually made of mu-metal. Two coils are wound around the core, the primary and secondary, with an alternating current being passed through the primary. The core is then driven in and out of 'saturation', due to the changing current being passed through the primary. The moving core induces a current in the secondary coil. When the earth's magnetic field is applied to a sensor, magnetism will occur unevenly, keeping the core saturated for longer at one side. As the core moves, the external field can induce an electrical pulse in the secondary coil. This pulse is directly related to the strength of the external field, therefore, magnetic features can be detected and measured (Gaffney and Gater, 2003, 40). This, however, means that inaccuracies can occur in the detection of these features. Sub-surface deposits are not always detected directly beneath the instrument, causing inaccuracies in the positioning of the detected deposit. Both Clark (1990, 77) and Gaffney and Gater (2003, 39) suggest that this displacement is usually no more than 25cm.

The fluxgate gradiometer employs two magnetometers; separated 0.5m or 1m vertically apart (the distance between the two sensors determines the depth of penetration of the instrument). The top sensor measures the Earth's magnetic field, which is measured in nanoTesla (nT), while the bottom measures the same field, but is affected by any buried feature closer to it (*ibid*, 40–41). The Earth's magnetic field never stabilises at a fixed reading due to diurnal variations caused by solar winds (Aspinall *et al.* 2009, 33; Waddell *et al*. 2009, 21). These winds can also cause dramatic variations in this field over short periods of time. This is largely overcome by the use gradiometers. The use of two magnetometers forms an inherent spatial high-pass filter which largely cancels out these diurnal variations (Aspinall *et al.* 2009, 33). However, this resistance depletes as the distance between the two sensors grow (*ibid* 33).

The fluxgate gradiometer is a vector based instrument, meaning that it measures a component of the Earth's magnetic field in a particular direction (*ibid*, 29). As such, it is a very directionally sensitive instrument along the axis of the sensor core (Gaffney and Gater 2003, 40). Therefore, the instrument is usually held with the axis vertical, resulting in the measurement of the vertical component of the magnetic field (*ibid*, 40). It can be configured to take readings automatically, meaning the surveyor merely has to walk at a constant pace in time with the instrument. Current fluxgate instruments are capable of recording 8–16 readings per second (*ibid*, 40-41; David *et al.*, 2004). Due to this automatic data capture system, surveys can be undertaken at a far greater pace than any other type of geophysical survey. However, due to the ever-changing variations in the earth's magnetic field, gradiometers have to compensate for instrument drift (Waddell *et al.* 2009, 21–22). Drift is defined by Waddell as 'a spurious shift in the instrument readings due, in part, to the heating or cooling of the instrument and/or the effects of diurnal variations in the earth's magnetic field during the course of the survey' (*ibid.*, 22). The removal of this 'drift' involves zeroing the instrument, usually after a set number of grids are completed, at a fixed position, or over an area of uniform local magnetic strength.

Data Processing

The collected geophysical data has to undergo a number of different processing procedures, depending on the type of geophysical technique used. Whilst both areas of collected data presented different processing challenges, a series of commonly applied procedures were undertaken. Atypical results may have necessitated the need for further manipulation. It is good practice to do as little processing as possible, as this effectively produces a 'truer' representation of geophysical anomalies. All processing was undertaken within Terrasurveyor V 3.0.27.

Initially, the data set was 'destriped', this process was formerly known as Zero Mean Traverse / Grid. However, with the introduction of the Mean/Median/Mode & Horizontal/Vertical options the name was no longer appropriate. DeStripe calculates the Mean or Mode or Median of each Grid, Traverse or Sensor within a grid. The mean/mode/median is then subtracted from the grid/ traverse/sensor.

The final stage of processing involved "clipping", this process involves replacing all values in the current layer outside a specified minimum and maximum with those values. Min and Max can be specified in absolute values or +/- SDs.

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Appendix 12

12.1 – Road Safety Audit

12.2 - Traffic & Transport Assessment and Mobility Management Plan

12.3 – Energy and Sustainability Report

Proposed St. Paul's Residential Development, Raheny, Dublin 5

Client: Crekav Trading GP Ltd

Stage 1 Road Safety Audit (for Planning)

RSA ST PAULS S1 KS 299 August 2019

PROPOSED ST. PAUL'S RESIDENTIAL DEVELOPMENT, RAHENY, DUBLIN 5

Description:

Stage 1 Road Safety Audit (for Planning)

Author:

Ken Swaby

Mark Andrews

Audit Brief Submitted By:

O'Connor Sutton Cronin Consulting Engineers

Distribution:

O'Connor Sutton Cronin Consulting Engineers

1 AUDIT INFORMATION

1.1 Title **RSA ST PAULS S1**

1.2 Audit Reference Number **RSA ST PAULS S1 KS 299**

1.3 Project Code **STPAULS**

1.4 Date Audit Completed **26th August 2019**

1.5 Audit Attended By **Ken Swaby**

Mark Andrews

1.6 Audit Team

Team Leader **Ken Swaby, ILTP**

Team Member **Mark Andrews, ILTP**

1.7 Information Received

ITEM		Supplied	Comments
A	Plans	Yes	Received from O'Connor Sutton Cronin Consulting Engineers O'Connor Sutton Cronin Consulting Engineers Drawings: 1. *Proposed Road Layout Sheet 1 of 2*, ref. N251-C01, rev. P7 2. *Proposed Road Layout Sheet 2 of 2*, ref. N251-C01, rev. P7 3. Proposed Road Longsections, ref. N251-C03, rev. P6 4. *Typical Cross Sections*, ref. N251-D01, rev. P6 5. *Road Markings & Traffic Signs Sheet 1 of 2*, ref. N251-F01, rev. P6 6. *Road Markings & Traffic Signs Sheet 2 of 2*, ref. N251-F01, rev. P6 Brady Shipman Martin Landscape Drawings: *7. Landscape Masterplan,* ref. N251-F01, rev. P6
B	Traffic Count Data	No	
C	Speed Count Data	No	
D	Accident Data	No	
E	Design Standards	No	
F	Design Brief	No	
G	Other Data	No	

2 INTRODUCTION

2.1.1 This is a Stage 1 Road Safety Audit undertaken at planning application stage which examines the road safety implications of the proposed St. Paul's residential development, Raheny, Dublin 5, and its connection to the existing road network.

2.1.2 The extent of this Stage 1 Road Safety Audit is the proposed main access road to the development, the proposed access junction with Sybil Hill Road, and along Sybil Hill Road approaching the proposed access. This Stage 1 RSA does not include the basement level access ramp or basement level proposals.

2.1.3 This Stage 1 Road Safety Audit is based upon drawings provided to the design team, as included above under paragraph 1.7.

2.1.4 The Feedback Form for this Stage 1 Road Safety Audit is included in **Appendix A** of this report.

2.1.5 This Stage 1 Road Safety Audit has been conducted in accordance with the Transport Infrastructure Ireland publication entitled *Road Safety Audit*, ref. GE-STY-01024, March 2015.

2.1.6 A site visit was carried out on 30th July 2015 in daylight conditions, at approximately 16:00hrs. The weather was dry. A repeat site visit was carried out on 12th March 2019 in daylight conditions, at approximately 10:30hrs. The weather was dry and overcast.

2.1.7 This Stage 1 Road Safety Audit specifically examines the road safety aspects of the proposed development. It is not an appraisal of policy or strategic issues associated with the planning of the development and it does not examine or verify the compliance of the design to any other design criteria or guidelines. The designer and all concerned stakeholders must therefore defend all actions taken on the basis that such care was taken, as was in all circumstances reasonably required, to ensure that the roadway was not unsafe for road users. It is important, therefore that where possible the recommendations in this report are acted upon.

3 ITEMS RESULTING FROM PREVIOUS ROAD SAFETY AUDITS

3.1.1 The ILTP audit team completed a Road Safety Audit in October 2015 of the proposed access arrangements to a previously proposed residential development on the subject lands.

3.1.2 The audit team are not aware of the currently proposed residential development having been previously audited.

4 ITEMS RESULTING FROM STAGE 1 ROAD SAFETY AUDIT

4.1 General

Problem 4.1.1

The site inspection has shown that there are a number of trees lining Sybil Hill Road immediately adjacent to the proposed vehicular access point. Should these trees encroach into visibility areas road users may emerge from the junction heedless of on-coming traffic resulting in side impacts, or approach the junction unaware of its presence and be forced to brake at the last minute resulting in shunt type collisions.

Recommendation 4.1.1

It is recommended that the design team ensures that adequate visibility can be attained both from and to the proposed access arrangements. Should appropriate visibility not be attainable from the proposed alignment it is recommended that the design team amends the layout of the junction or adjusts the nature of the vegetation.

Problem 4.1.2

The information provided for audit does not indicate pedestrian crossing facilities of the main access road to the development in the vicinity of the basement access junction and to the west of Block 7 (refer to Figure 4.1). This area may be likely to have a number of pedestrian desire lines to and from the proposed development. Without appropriate pedestrian crossing facilities vulnerable road users may enter the carriageway in inappropriate locations, coming into conflict with other road users.

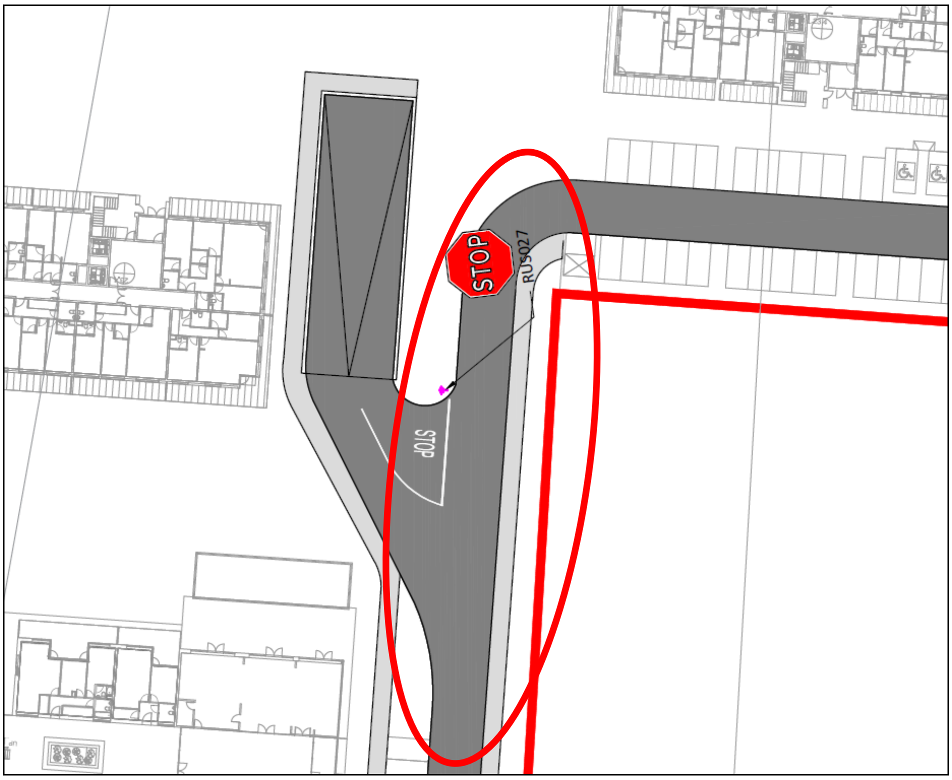


Figure 4.1: Pedestrian Crossing Facilities of Main Access road to Development not indicated in vicinity of Basement Access Junction and to West of Block 7

Recommendation 4.1.2

It is recommended that the design team ensures appropriate pedestrian crossing facilities are provided along pedestrian desire lines.

Problem 4.1.3

It is unclear from the information provided for audit it there is appropriate space for delivery, service and emergency vehicles to safely navigate the relevant areas of the site and perform turnabout manoeuvres within the confines of the carriageway or other designated areas. Inappropriate carriageway facilities present a potential risk of such vehicles coming into conflict with non-motorised users.

Recommendation 4.1.3

It is recommended that the design team ensures that the facilities provided are appropriate for all relevant vehicles to safely manoeuvre within the site.

Problem 4.1.4

The information provided for audit shows carriageway cross-sections and long-sections, however this does not indicate how the site will be drained of surface water. Without appropriate drainage the site may pond cause slip and skid hazards to all road users.

Recommendation 4.1.4

It is recommended that the design team ensures that appropriate drainage is provided throughout the site and its connections to the existing highway network.

5 COMMENTS

It is recommended that the proposals for the site are considered in terms of this Stage 1 audit, and measures, where appropriate are designed to mitigate the risks considered. The scheme proposals should be subject to a Stage 2 Road Safety Audit at Detailed Design Stage and prior to commencement of construction works on site.

6 CONCLUSIONS

It is recommended that the specific issues raised in this report be taken into account and that appropriate measures be put in place where practicable to mitigate the concerns raised.

This Stage 1 Road Safety Audit Report recommends various actions, which should be considered for inclusion in the detailed design process. Where recommendations are not incorporated into the design this should be documented in an Exception Report and forwarded to the ILTP Road Safety Audit Team. The Design Team should document and provide the rationale for incidences where the audit recommendations have not been incorporated or where alternatives are put forward.

The Design Team should respond to all issues raised in this Stage 1 Road Safety Audit Report through returning a signed copy of the Road Safety Audit Feedback Form.

7 ROAD SAFETY AUDIT TEAM STATEMENT

7.1 Statement

We certify that the drawings and documents provided with the Audit Brief have been examined. The examination has been carried out with the sole purpose of identifying any features of the scheme that could be improved or modified in order to improve the safety of the scheme. The problems that we have identified have been noted in the report, together with suggestions for improvement, which we recommend should be considered for implementation.

7.2 Signatures

7.2.1 Audit Team Leader Signature

Name: Ken Swaby

Position: Transport Engineer

Date: 23 / 08 / 2019

Organisation: ILTP Consulting

Signed:

7.2.2 Audit Team Member Signature

Name: Mark Andrews

Position: Transport Engineer

Date: 23 / 08 / 2019

Organisation: ILTP Consulting

Signed:

APPENDIX A ROAD SAFETY AUDIT FEEDBACK FORM

Road Safety Audit Reference RSA ST PAULS S1 KS 299

Audit Stage Stage 1

Date Road Safety Audit Completed 23rd August 2019

Para No. in Report	Problem Accepted (Y/N)	Recommendation Accepted (Y/N)	Comments / Alternative Measures (Describe)	Alternative Measures Accepted by Auditor? (Y/N)
4.1.1	Y	Y	The Visibility Splay analysis performed shows that existing trees lining Sybil Hill Road are not fully inside the visibility envelope. According to DMURS, objects that would not be large enough to wholly obscure a vehicle, pedestrian or cyclist may be acceptable providing their impact on the overall visibility is not significant. Refer to drawing N251-C8 attached.	Y See Note 1 below.
4.1.2	Y	Y	Uncontrolled Pedestrian crossing will be provided with appropriate tactile paving in the area in question. For crossing details refer to drawing N251-F02 attached.	Y See Note 1 below.
4.1.3	Y	Y	Swept Path Analysis for Rigid Truck has been performed to ensure vehicles to navigate safely. For Rigid Truck Swept Path Analysis refer to drawing N251-C07 attached.	Y See Note 1 below.
4.1.4	N	N	Drainage details are provided in the drawing N251-H5.	Y See Notes 1 and 2 below.

Note 1: The additional drawings submitted by the Design Team with the Feedback Form response are attached. These have not been subject to a Stage 1 Road Safety Audit and have only been considered in relation to the original highlighted problem.

Note 2: The referenced drawing shows Drainage SUDS details, but does not show locations of gullies along the proposed access road and associated levels. This information must be submitted for Stage 2 Road Safety Audit.

Signed

Patrick R [signature]

Design Team Leader

Date 30/8/2019

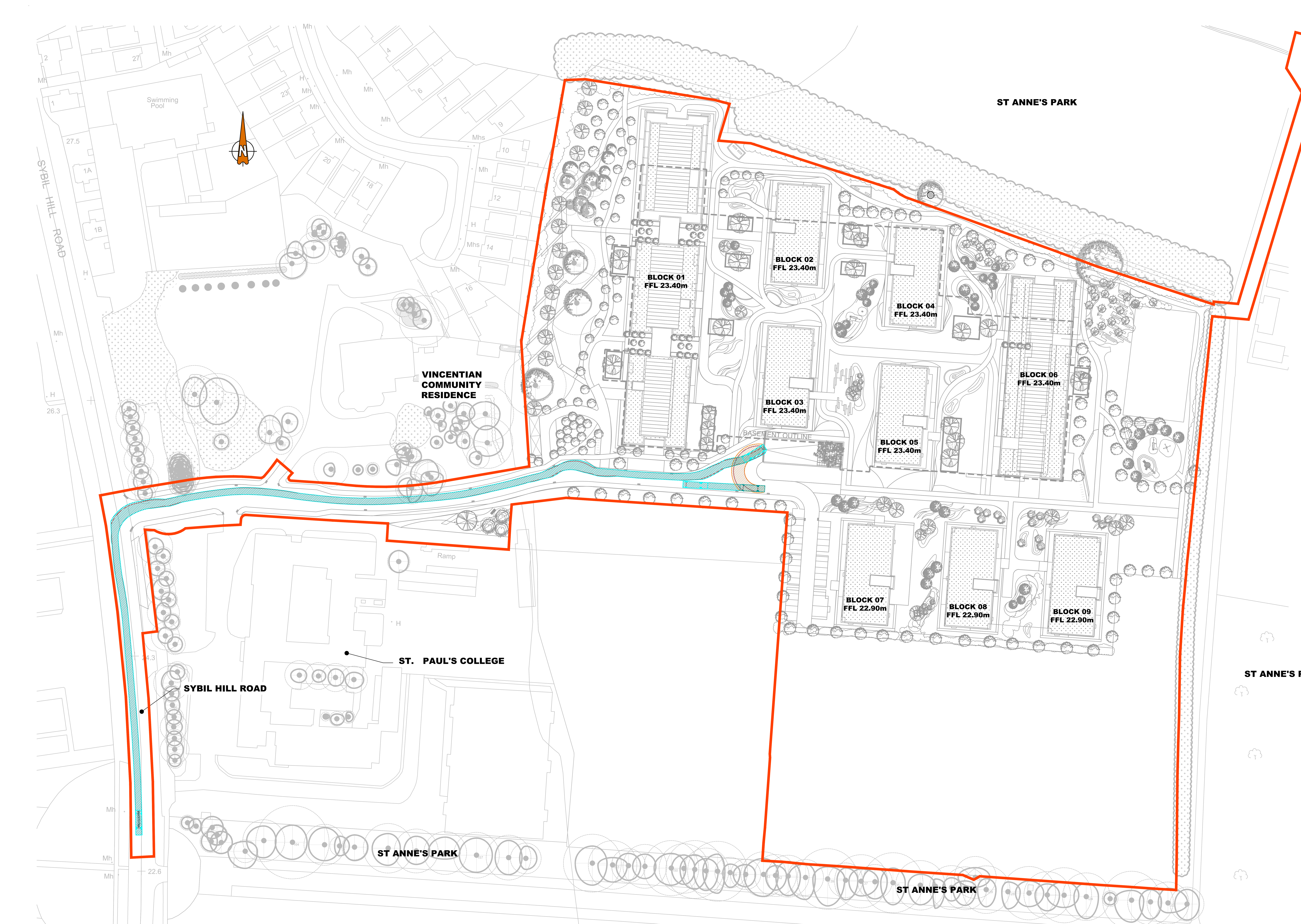
(Please Complete and return to the Auditor)

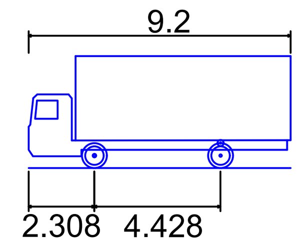
Safety Audit Signed Off;

Ken Swaby

Road Safety Audit Team Leader

Date 30/08/2019





Rigid Truck 9.2 m

Overall Length	9.200m
Overall Width	2.500m
Overall Body Height	3.933m
Min Body Ground Clearance	0.417m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	11.900m

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P1	30/08/2019	ISSUED FOR INFORMATION	RB	MC

Rev. No.	Date	REVISION NOTE	Drn. By	Chkd. By

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Client	Crekav Trading GP Limited.
Project	St. Paul's Residential Development.
Title	SWEPT PATH ANALYSIS RIGID VEHICLE

Drn by	Chkd by	Aprvd by	Dwg. No.	Revision
RB	MC	AH	N251 -C07	P1
Date 30/08/19	Scale N.T.S. @ A1			

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Client	Crekav Trading GP Limited.
Project	St. Paul's Residential Development.
Title	VISIBILITY SPLAY

Drn by	Chkd by	Aprvd by	Dwg. No.	Revision
MC	JB	AH	N251 -C08	P1
Date 23/08/19	Scale N.T.S. @ A1			

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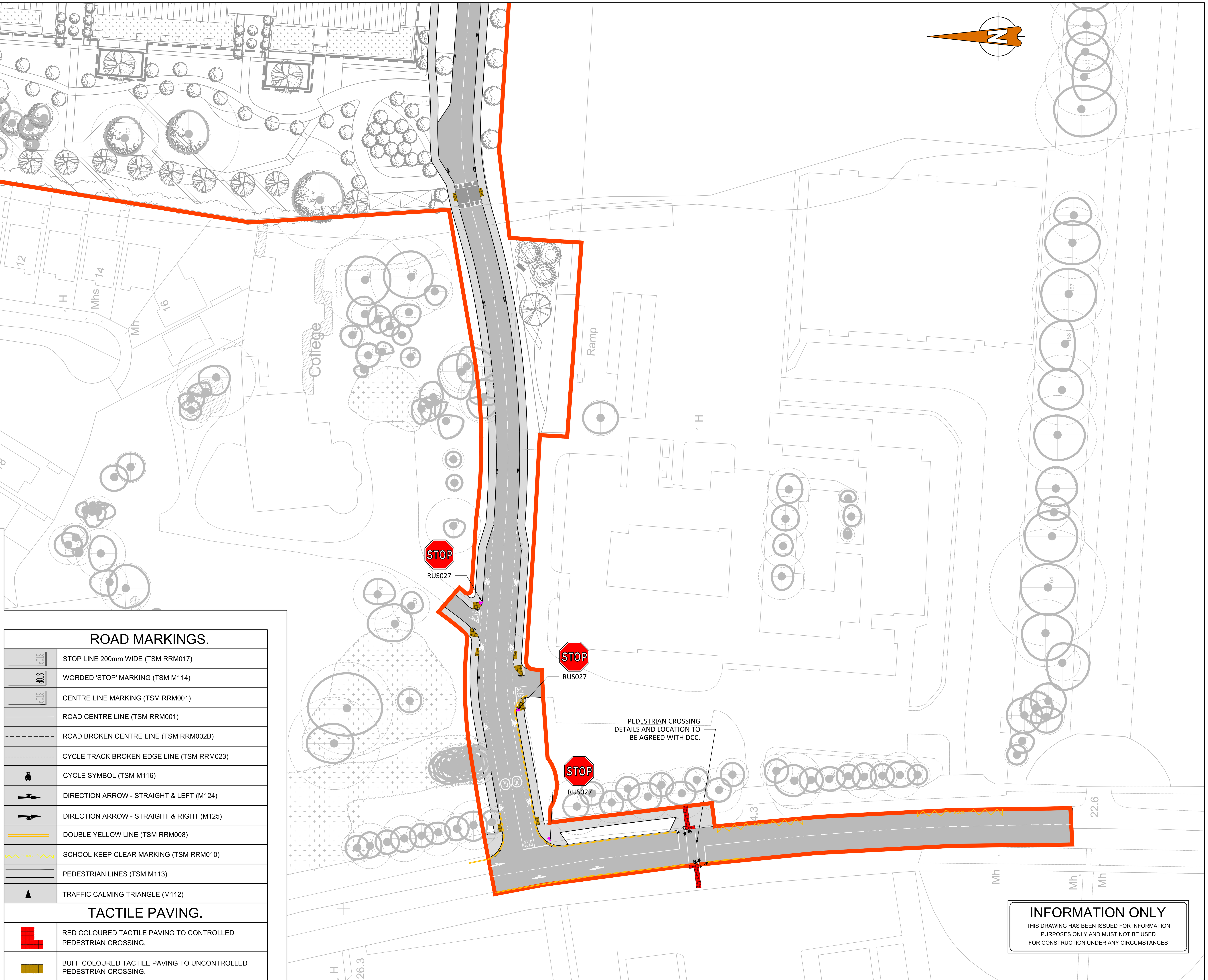


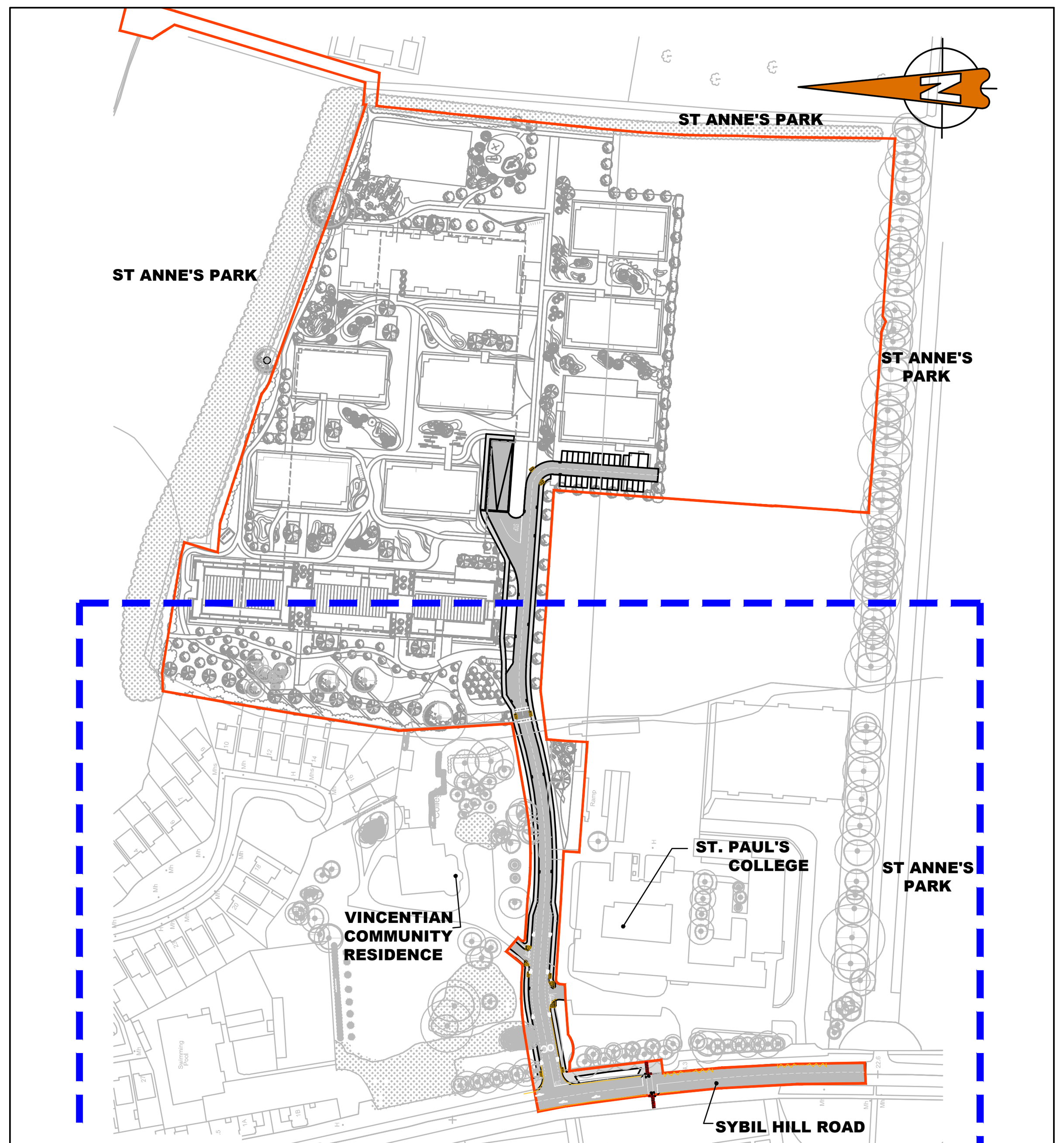
TRAFFIC SIGNS.

SIGNS.	TSM REF.	SIZE.
STOP	STOP SIGN (RUS027)	600mm

TRAFFIC SIGNALS.

	PUSH-BUTTON UNIT
	PRIMARY THREE-ASPECT TRAFFIC SIGNAL (RTS 001)
	SECONDARY THREE-ASPECT TRAFFIC SIGNAL (RTS 001)
	PEDESTRIAN SIGNAL HEAD (RPC 003)

NOTE:
REFER TO TSM-2010 CHAPTER 7 FOR ROAD MARKINGS DETAILS & POSITIONING AND CHAPTER 9 FOR TRAFFIC SIGNALS.



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ROAD MARKINGS.

	STOP LINE 200mm WIDE (TSM RRM017)
	WORDED 'STOP' MARKING (TSM M114)
	CENTRE LINE MARKING (TSM RRM001)
	ROAD CENTRE LINE (TSM RRM001)
	ROAD BROKEN CENTRE LINE (TSM RRM002B)
	CYCLE TRACK BROKEN EDGE LINE (TSM RRM023)
	CYCLE SYMBOL (TSM M116)
	DIRECTION ARROW - STRAIGHT & LEFT (M124)
	DIRECTION ARROW - STRAIGHT & RIGHT (M125)
	DOUBLE YELLOW LINE (TSM RRM008)
	SCHOOL KEEP CLEAR MARKING (TSM RRM010)
	PEDESTRIAN LINES (TSM M113)
	TRAFFIC CALMING TRIANGLE (M112)

TACTILE PAVING.

	RED COLOURED TACTILE PAVING TO CONTROLLED PEDESTRIAN CROSSING.
	BUFF COLOURED TACTILE PAVING TO UNCONTROLLED PEDESTRIAN CROSSING.

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P4	12/04/2019	ISSUED FOR COMPLIANCE	AF	JS
P5	23/05/2019	ISSUED FOR PLANNING	AF	JB
P6	16/08/2019	WORKING IN PROGRESS	MC	JB
P7	30/08/2019	ISSUED FOR INFORMATION	MC	JB

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Client	Crekav Trading GP Limited.
Project	St. Paul's Residential Development.
Title	ROAD MARKINGS & TRAFFIC SIGNS SHEET 1 OF 2

Drn by	Chkd by	Aprvd by	Dwg. No.	Revision
JS	AL	TH	N251 -F01	P7
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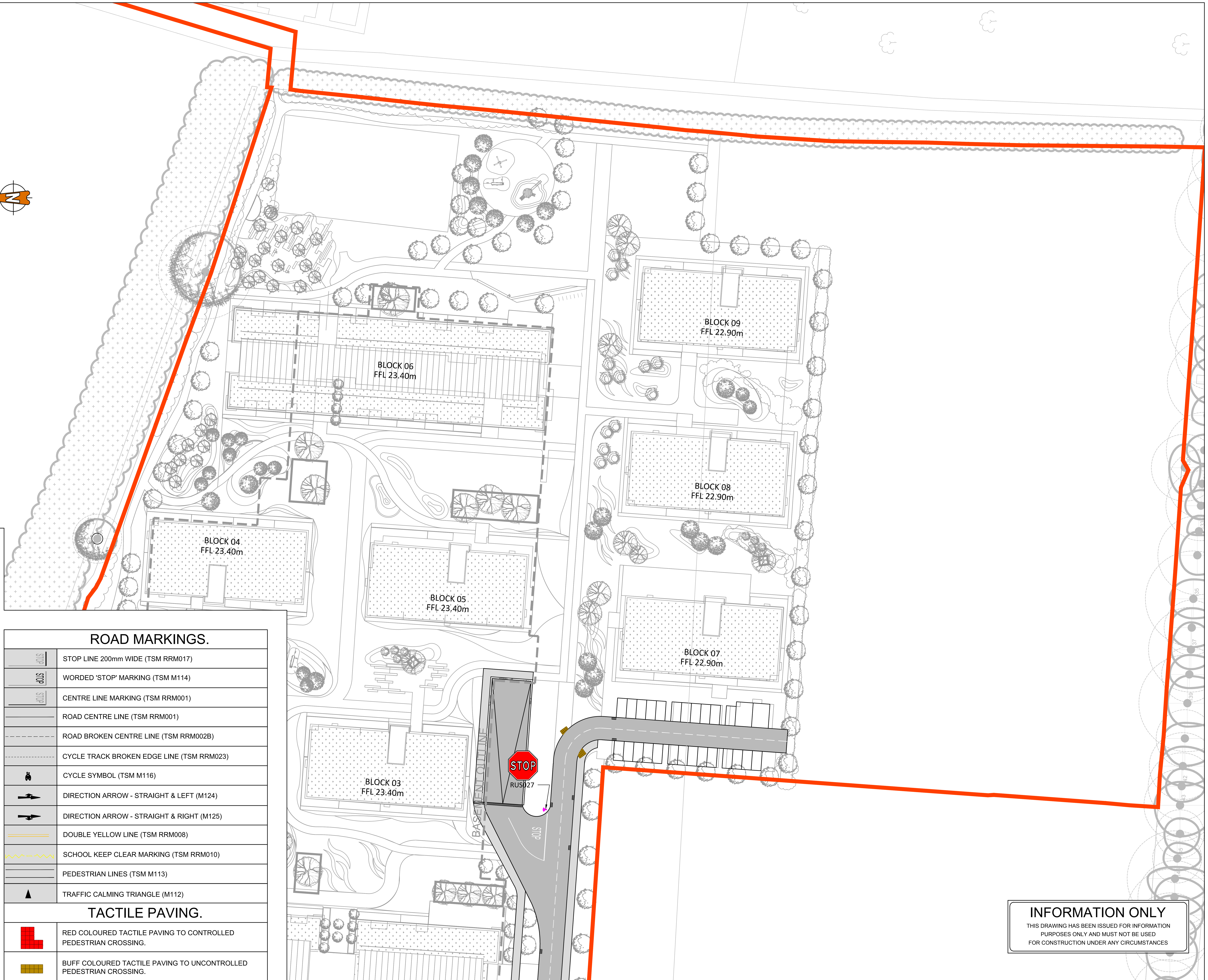

TRAFFIC SIGNS.

SIGNS.	TSM REF.	SIZE.
STOP	STOP SIGN (RUS027)	600mm

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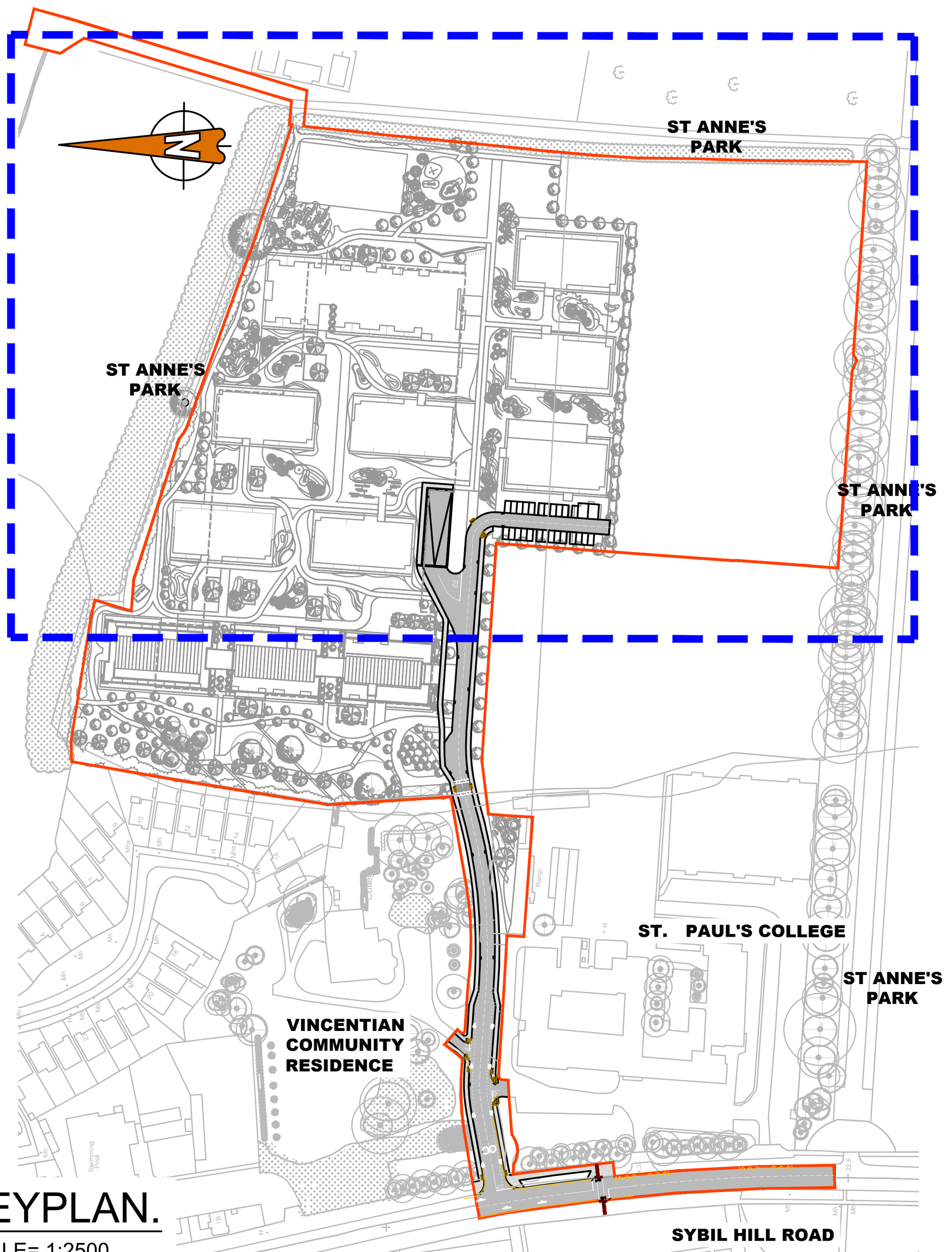

KEYPLAN.
SCALE= 1:2500

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STOP	STOP LINE 200mm WIDE (TSM RRM017)
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	CYCLE TRACK BROKEN EDGE LINE (TSM RRM023)
	CYCLE SYMBOL (TSM M116)
	DIRECTION ARROW - STRAIGHT & LEFT (M124)
	DIRECTION ARROW - STRAIGHT & RIGHT (M125)
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P4	12/04/2019	ISSUED FOR COMPLIANCE	AF	JS
P5	23/05/2019	ISSUED FOR PLANNING	AF	JB
P6	16/08/2019	WORKING IN PROGRESS	MC	JB
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Client	Crekav Trading GP Limited.
Project	St. Paul's Residential Development.
Title	ROAD MARKINGS & TRAFFIC SIGNS SHEET 2 OF 2

Drn by	Chkd by	Aprvd by	Dwg. No.	Revision
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P3	16/05/2018	ISSUED FOR COMPLIANCE	JB	AH
P4	12/04/2019	ISSUED FOR COMPLIANCE	AF	JS
P5	23/05/2019	ISSUED FOR PLANNING	AF	JB
P6	30/08/2019	ISSUED FOR INFORMATION	M	JB

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Client	Crekav Trading GP Limited.
Project	St. Paul's Residential Development.
Title	Proposed SUDs Details

Drn by	Chkd by	Aprvd by	Dwg. No.	Revision
JB	AL	TH	N251 -H05	P6
Date 15.12.17	Scale AS SHOWN			

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Proposed Residential Development - St Paul's, Raheny, Dublin 5

Client: Crekav Trading GP Limited

Traffic & Transport Assessment and Mobility Management Plan

PROPOSED RESIDENTIAL DEVELOPMENT, ST PAUL’S, RAHENY

Description:

Traffic & Transport Assessment and Mobility Management Plan

Author:

Ben Waite

Christy O’Sullivan

Approved By:

Christy O’ Sullivan

1st October 2019

Distribution:

Crekav Trading GP Limited

ILTP
Head Office:
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Dunboyne
Co. Meath
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fax: 01-8255730
info@iltp.ie
www.iltp.ie

PROPOSED RESIDENTIAL DEVELOPMENT, ST PAUL'S, RAHENY

CONTENTS :

FIGURES :

TABLES :

1 INTRODUCTION

1.1 Background

1.1.1 ILTP Consulting were commissioned by Crekav Trading GP Limited to undertake a new Traffic and Transport Assessment (TTA) for a Proposed Development on lands at St Paul's, Raheny, Dublin 5.

1.1.2 The Proposed Development consists of a residential development comprising 657 no. apartment units, in addition to an ancillary commercial creche and public open space.

1.2 Purpose of Report

1.2.1 The primary purpose of this TTA is to assess the potential impact the latest Proposed Development may have on the surrounding road network and to identify measures to mitigate these impacts and promote sustainable transport patterns.

1.2.2 This Traffic & Transport Assessment sets out to assess:

- Existing traffic conditions
- Integration with adjoining developments and surrounding area
- Public transport provisions
- Proposed access arrangements for the development
- Proposed parking arrangements
- Effect on road network of increased traffic volumes from Proposed Development

1.2.3 The report also contains the Mobility Management Plan / Travel Plan for the development and sets out the Construction Traffic Impact Assessment.

1.3 Methodology

1.3.1 In order to assess the traffic impact of the Proposed Development it was first necessary to assess the current traffic situation in the area. Several site visits were undertaken by ILTP, most recently in March 2019, and traffic count data was collated in the environs of the Proposed Development to determine traffic flows.

1.3.2 A desktop study relating to the Proposed Development was undertaken by ILTP in 2019, concluding in September 2019.

1.3.3 ILTP calculated the estimated trip rates from the Proposed Development and added these figures to the base flows. A Picady analysis was also undertaken to assess the capacity of the proposed access onto Sybil Hill Road. LinSig Traffic Signal Junction modelling software was also utilised to assess the capacity of the adjacent Howth Road / Sybil Hill Road junction with the Proposed Development in place.

1.3.4 ILTP then assessed what impact the development had on the road network based on the recent traffic data.

1.3.5 A study of public transport provisions in the area was also carried out to determine the likely usage of PT services by residents in the new development.

1.3.6 As part of this TTA ILTP have prepared a Mobility Management Plan / Travel Plan for the proposed St Paul’s Residential Development, with the specific objectives of reducing in overall terms both the amount of trips generated by the development, and ensuring that greater numbers use the extensive public transport services in the immediate area.

1.3.7 ILTP also assessed the Construction Stage Impacts of the proposed St Paul’s residential development on the wider road network.

1.3.8 This Traffic and Transport Assessment also takes into consideration the views of Dublin City Council as outlined as part of the pre-planning process.

1.4 Report Structure

1.4.1 The proposed St Paul’s residential development and study area are described in Chapter 2.

1.4.2 Chapter 3 sets out the planning context for the Proposed Development.

1.4.3 Chapter 4 presents a description of proposed access arrangements for the development.

1.4.4 An assessment of car and cycle parking provision and arrangements is made in Chapter 5.

1.4.5 Chapter 6 describes the data taken from traffic surveys and site appraisals undertaken by ILTP.

1.4.6 Trip Generation and Trip Distribution figures for the development are set out in Chapter 7.

1.4.7 Picady and LinSig Traffic Modelling results are presented in Chapter 8.

1.4.8 Chapter 9 includes the Construction Traffic Impact Assessment for the development.

1.4.9 The Mobility Management Plan / Travel Plan is included in Chapter 10.

1.4.10 The summary and conclusions are outlined in Chapter 11.

2 OVERVIEW OF PROPOSED DEVELOPMENT AND STUDY AREA

2.1 Proposed Development

2.1.1 The site of the Proposed Development is in Raheny, Dublin 5. The planning application site is approximately 6.4 Ha in area and located approximately 5km from Dublin City Centre. The area is largely residential with established schools, community and social facilities in the vicinity.

2.1.2 The development will consist of the construction of a residential development set out in 9 no. blocks, ranging in height from 5 to 9 storeys accommodating 657 no. apartments, residential tenant amenity spaces and a crèche. At basement level the site will accommodate car parking spaces, bicycle parking, storage, services and plant areas. Landscaping will include extensive communal amenity areas, and a proposed significant area of public open space. The Proposed Development also includes for the widening and realignment of an existing vehicular access onto Sybil Hill Road and the demolition of an existing pre-fab building to facilitate the construction of an access road from Sybil Hill Road between Sybil Hill House (a Protected Structure) and St Paul's College incorporating upgraded accesses to Sybil Hill House and St Paul's College and a proposed pedestrian crossing on Sybil Hill Road. The Proposed Development also includes for the laying of a foul water sewer in Sybil Hill Road and the routing of surface water discharge from the site via St. Anne's Park to the Naniken River and the demolition and reconstruction of existing pedestrian stream crossing in St. Anne's Park with integral surface water discharge to Naniken River.The Proposed Development layout is shown in Figure 2.1.

Figure 2.1: Site Layout (Source: OMP Architects)

2.1.3 The proposed access for the development is off the R808 Sybil Hill Road to the north of St Paul's College, and is the current access for the Vincentian's Residence (Sybil Hill House). It is proposed to upgrade the existing access to the Vincentian's Residence and extend same eastwards to provide access to the new residential development located to the rear of the school. Access to the school will remain unaltered by the Proposed Development and a gated access to the school will also be provided off the Proposed Development access to provide linkage between the Vincentian's Residence and the school.

2.1.4 The proposed residential development is located approximately 200m from Sybil Hill Road. This is beneficial in ensuring that there can be no overspill of car parking on to Sybil Hill Road and that the residential area will also remain free from external car parking.

2.1.5 It is also noted that a planning application was lodged with Dublin City Council (DCC) by Orsigny Company Limited with Guarantee on 4th September 2017, ref. 3777/17, for a new Sports Hall and Playing Pitches on the adjoining St Paul's lands. This was subsequently refused by DCC on 27th March 2018, but later appealed to An Bord Pleanala (ABP) (ABP ref. 301482-18). The Board has not yet adjudicated on this case. As a sensitivity analysis the proposed sports hall and playing pitches development has been included for in this Traffic & Transport Assessment report.

2.2 Description of the Receiving Environment

2.2.1 The site is currently accessed from the R808 Sybil Hill Road and accommodates St Paul's College secondary school. There is also a residential facility for the Vincentian Order adjoining the site to the northeast.

2.2.2 St. Anne's Park borders the site to the north, south and east. There is also a residential development to the northwest of the site. To the west and directly across from the Proposed Development is the *'Little Sisters of the Poor'* nursing home.

2.2.3 The location of the study area is shown in Figure 2.2.

Figure 2.2: Location of Subject Site

2.3 Existing Road Network

2.3.1 The Proposed Development is located off the R808 Sybil Hill Road. This regional roadway runs north south connecting the R807 Clontarf Road with the R105 Howth Road. The R808 is a two-way roadway with pedestrian footpaths on each side and a grass verge with trees on each side in the vicinity of the subject site.

2.3.2 The R105 Howth Road is located 200m to the North of the proposed vehicular access to the residential development.

2.3.3 The Road network in the environs of the subject site is shown in Figure 2.3.

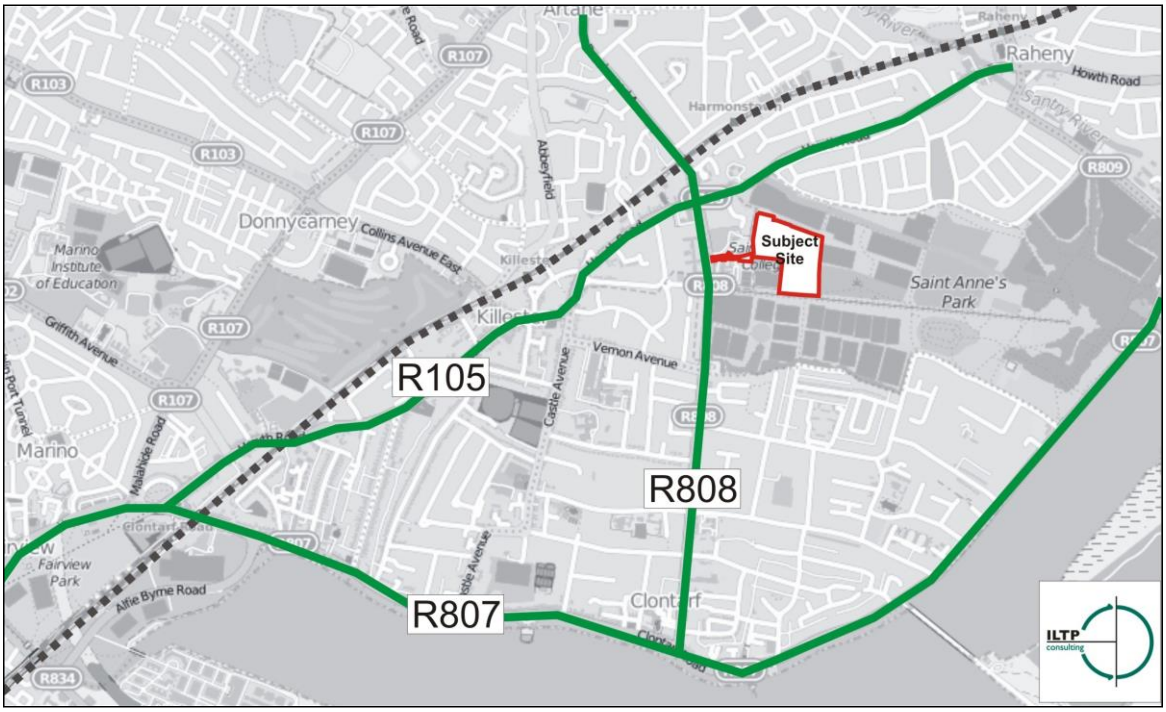


Figure 2.3: Existing Local Road Network

2.3.4 The R105 Howth Road / R808 Sybil Hill Road junction is located 200m to the North of the proposed vehicular access to the residential development. This junction has cycle paths and pedestrian crossing facilities, including a traffic signal pedestrian phase.

2.4 Existing Pedestrian and Cycle Network

2.4.1 Pedestrian facilities including footpaths are provided on the R808 adjacent to the Proposed Development. There is an existing pedestrian crossing on the R808 adjacent to the Proposed Development. This is shown in Figure 2.4.

2.4.2 In addition to the pedestrian facilities adjacent to the existing road network there are pedestrian routes in the adjacent St. Anne's Park which can facilitate pedestrian access if the Board wishes a direct link to be established between the proposed residential development and the adjacent park.

Figure 2.4: Existing Pedestrian Crossing adjacent to St. Pauls

2.4.3 There are no dedicated cycle provisions on the R808 Sybil Hill Road. The R105 Howth Road is located 200m to the north of the access to the Proposed Development, and has dedicated cycle lanes. The cycle facilities at the Howth Road / Sybil Hill Road junction are shown in Figure 2.5.

Figure 2.5: Cycle Facilities at Howth Road / Sybil Hill Road junction

2.5 Existing Rail and Bus Services

2.5.1 The subject site is to the southeast of the DART line running from Greystones to Howth / Malahide via the City Centre, with Killester and Harmonstown rail stations in closest proximity.

2.5.2 The DART Services serving the Killester and Harmonstown stations are high capacity high frequency services connecting the subject site with the city centre and the wider Commuter and Intercity rail services. There are approximately 95 services per day in each direction and up to 6 services per direction per hour at peak times.

2.5.3 The R105 Howth Road to the north of the subject site is currently one of sixteen Quality Bus Corridors (QBCs) in Dublin. There are also regular bus services on the R105 Howth Road, and also on Sybil Hill Road to the west. Howth Road is a primary arterial route connecting the suburbs of north Dublin with the city centre.

2.5.4 The closest bus stop is located on Howth Road approximately 360m walking distance from the subject site, as shown in Figure 2.6. This stop is served by a number of bus services, including 29A, 31, 31A, 31B and 32.

2.5.5 The bus stops to the west of the site on Sybil Hill Road and Vernon Avenue are served by the 130 bus route (also see Figure 2.6).

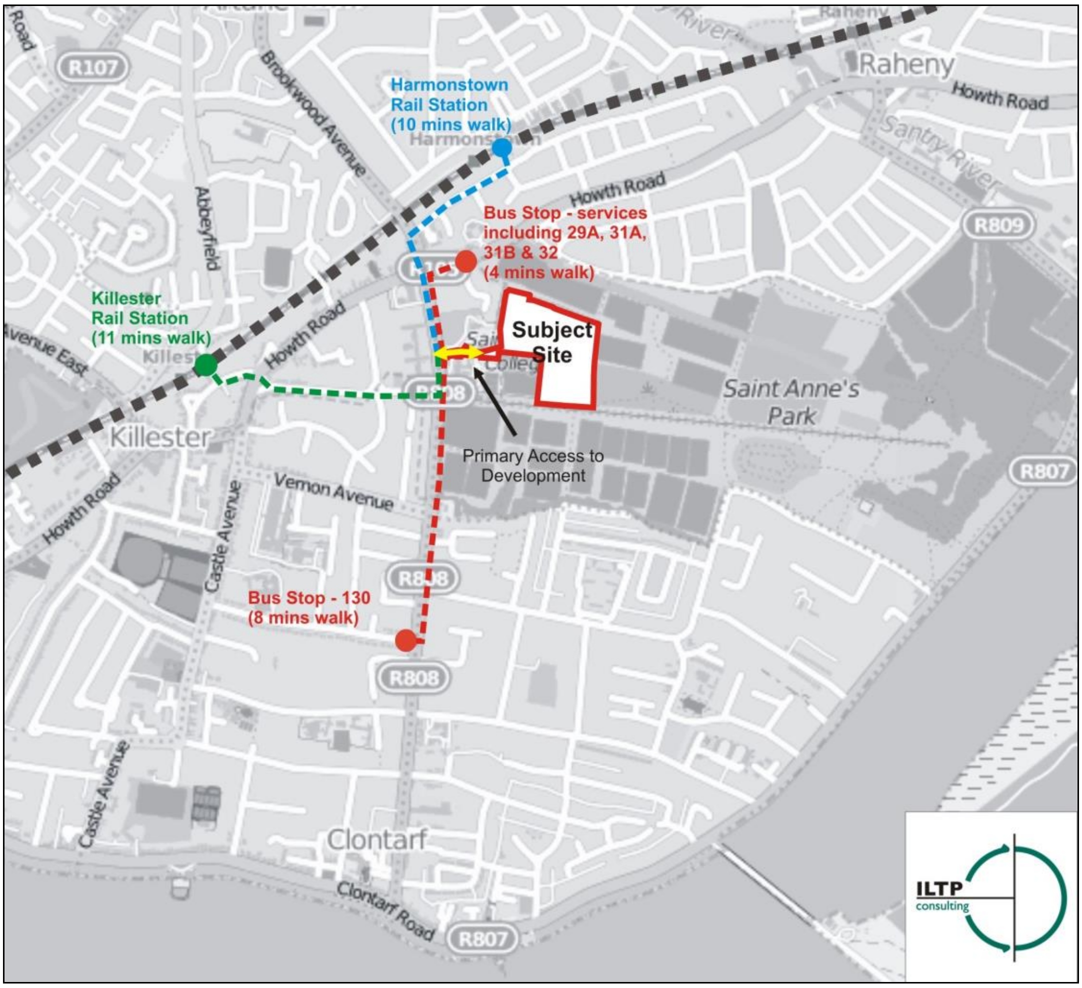


Figure 2.6: Walking Distance from Proposed Development to nearest Rail and Bus Stops

2.5.6 Bus routes in the vicinity of the site are mapped out in Figure 2.7.

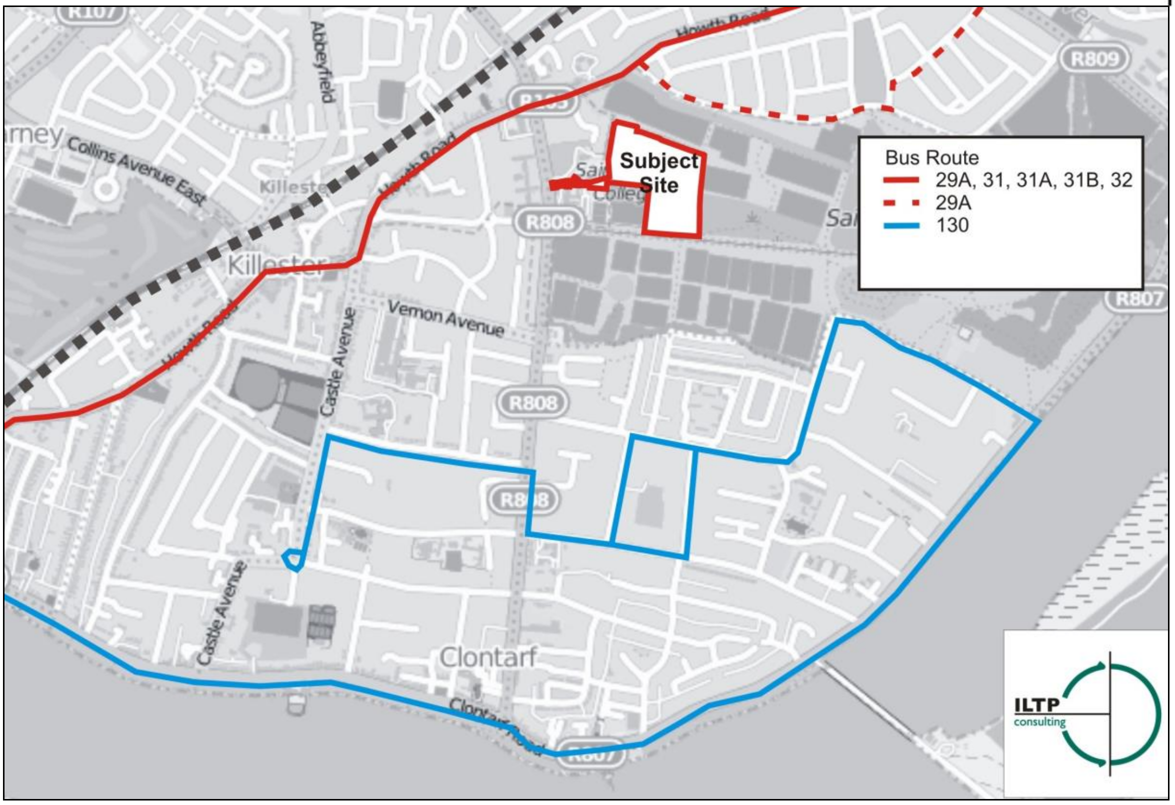


Figure 2.7: Bus Routes in vicinity of Proposed Development

2.5.7 The direction and frequency of travel of the main bus routes are as follows:

- The 130 is a high frequency service running every 8 – 10 minutes in each direction on weekdays between 7.30am and 7.15pm.
- The 29A runs from the city centre to Baldoyle and has approximately 50 services per day per direction, with 3 - 4 services per direction per hour at peak times.
- The 31/31A runs from the city centre to Howth and has approximately 44 services per day per direction, with 3 services per direction per hour at peak times.
- The 32 runs from the city centre to Malahide and has approximately 25 services per day per direction, with 2 services per direction per hour at peak times.

2.6 Future Bicycle Network

2.6.1 There are significant improvements planned for the bicycle network in the vicinity of the subject lands. The planned improvements are set out in the NTA Greater *Dublin Area Cycle Network Plan.* The planned network in the vicinity of the subject site is shown in Figure 2.8.

Figure 2.8: Planned Cycle Network (Source: NTA – GDA Cycle Network Plan)

2.6.2 It can be seen that a secondary cycle network is planned on the R808 adjacent to the subject site and a primary cycle network is planned on the R105 nearby.

2.6.3 An 8.5km section of the Dublin Bay Cycle Path was recently opened in 2017. This off-road cycle path runs from Clontarf to Sutton along Dublin Bay.

2.6.4 The roll out of the cycle network by DCC has already resulted in large increases in cycling.

2.7 Future Rail and Bus Services

2.7.1 The *National Development Plan 2018 - 2027* includes DART expansion on the nearby rail corridor, which includes for new electric / diesel hybrid trains, and further new infrastructure

2.7.2 The currently proposed Bus-Connects Route 1 Clongriffin to City Centre also routes within 1.5km of the proposed access to the St Paul's Residential Development, which would further increase the bus connectivity for the wider community (see Figure 2.9).

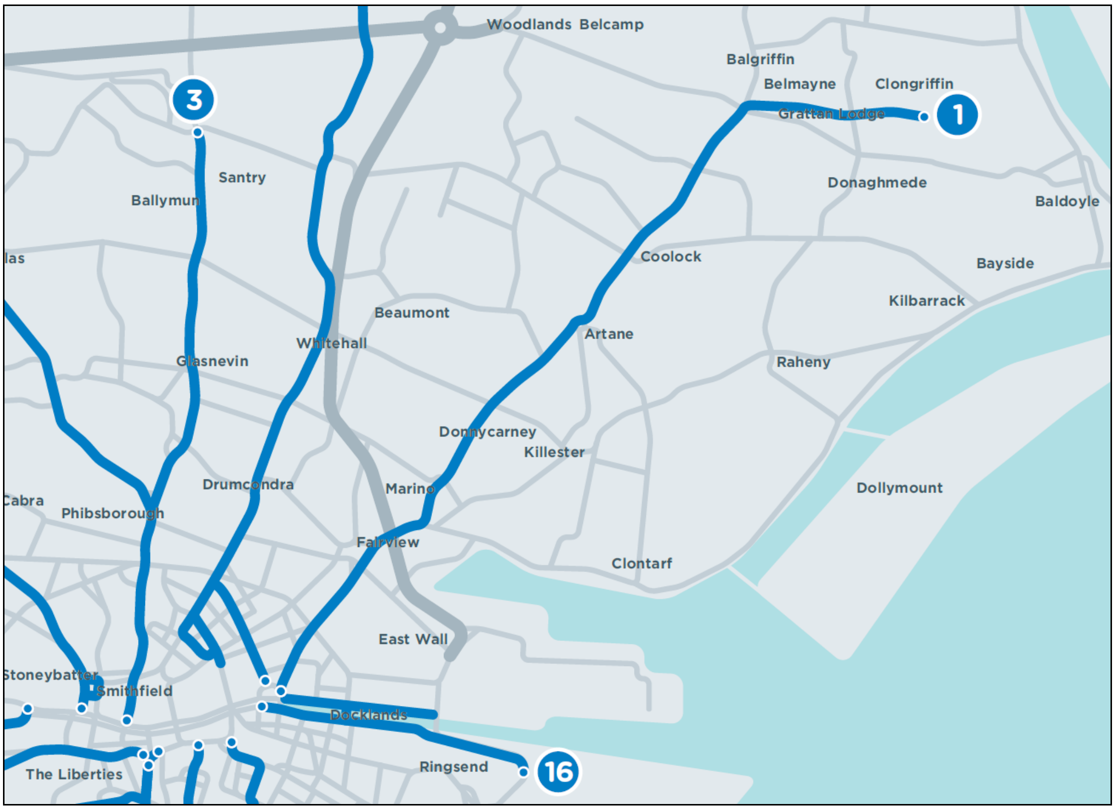


Figure 2.9: Proposed Clongriffin to City Centre BusConnects Route (Source: NTA – *Clongriffin > City Centre Core Bus Corridor Emerging Preferred Route Public Consultation November 2018*)

2.7.3 These Government public transport proposals would further enhance public transport in the area and reduce traffic flows generally in the city by increasing the attractiveness of public transport and a resultant mode shift from private car to public transport. The TTA has however as a worse case scenario not assumed any mode shift as a result of these planned infrastructure improvements.

3 TRANSPORT PLANNING CONTEXT

3.1 Overview

3.1.1 This study is being prepared having regard to key policy documents at national, regional and local levels, particularly:

- Project Ireland 2040 - National Planning Framework and RSES
- Smarter Travel A Sustainable Transport Future
- Dublin City Development Plan 2016 – 2022

3.1.2 This section also includes a brief review of the recent planning history for the subject lands and adjoining lands.

3.2 Project Ireland 2040 – National Planning Framework and RSES

3.2.1 The NPF national policy sets out an overall strategy that will guide the orderly sustainable growth and development of the state over the coming decades. This proposed to concentrate development in existing city and town centres and were existing public transport service are available.

3.2.2 The *Regional Spatial & Economic Strategy 2019 - 2031* for the Eastern Midlands area, which has just undergone a public consultation process, aligns with the NPF in that it targets more compacted and consolidated growth in existing urban centres. The RSES sets out the following as some of the main growth enablers for the Dublin metropolitan area:

- *"To achieve growth of 1.4 million people in Dublin City and Suburbs and 1.65 million people in the Dublin Metropolitan Area by 2031*
- *To realise ambitious compact development targets at least 50% of all new homes within or contiguous to the existing built up area in Dublin and at least 30% in other metropolitan settlements*
- *To deliver identified strategic development areas along high-quality public transport corridors in tandem with the delivery of infrastructure and enabling services to ensure a steady supply of sites."*

3.2.3 The proposed St Paul's SHD is within an existing well established Dublin suburban area and is strategically located in the proximity of high-quality rail and bus public transport services, so is fully consistent with the NPF and RSES policies

3.3 Smarter Travel A Sustainable Transport Future 2009-2020

3.3.1 *Smarter Travel A Sustainable Transport Future 2009-2020*, recognises the vital importance of continued investment in transport to ensure an efficient economy and continued social development, but it also sets out the necessary steps to ensure that people choose more sustainable transport modes such as walking, cycling and public transport. The policy is a response to the fact that continued growth in demand for road transport is not sustainable from a number of angles as it will lead to further congestion, further local air pollution, contribute to global warming, and result in negative impacts to health through promoting increasingly sedentary lifestyles. The aim of the policy document is to;

- Improve quality of life and accessibility to transport for all and, in particular, for people with reduced mobility and those who may experience isolation due to lack of transport.

- Improve economic competitiveness through maximising the efficiency of the transport system and alleviating congestion and infrastructural bottlenecks.
- Minimise the negative impacts of transport on the local and global environment through reducing localised air pollutants and greenhouse gas emissions.
- Reduce overall travel demand and commuting distances travelled by the private car
- Improve security of energy supply by reducing dependency on imported fossil fuels.

3.3.2 These are to be achieved by four main actions;

- Actions to reduce distance travelled by private car and encourage smarter travel, including focusing population growth in areas of employment and to encourage people to live in close proximity to places of employment and the use of pricing mechanisms or fiscal measures to encourage behavioral change,
- Actions aimed at ensuring that alternatives to the car are more widely available, mainly through a radically improved public transport service and through investment in cycling and walking,
- Actions aimed at improving the fuel efficiency of motorised transport through improved fleet structure, energy efficient driving and alternative technologies, and
- Actions aimed at strengthening institutional arrangements.

3.3.3 In order to ensure that the broad goals and detailed targets of the Smarter Travel document are met a series of polices and measures are recommended. These policies focus on co-coordinating land use and transport, the provision of high quality public transport and high quality routes for cycling and walking, aligning employment policy with transport planning, the implementation of mobility management plans and the use of fiscal measures to influence travel behaviour. These include:

- That 10% of all trips be made by bicycle by 2020; and
- Work related commuting by car will be reduced from a current modal share of 65% to 45%.

3.3.4 Intensification of development within established urban areas served by high capacity, high quality public transport services accords with good planning and promotes sustainable transport modes.

3.4 Dublin City Development Plan

3.4.1 The *Dublin City Development Plan 2016 – 2022* sets out the development context for the Proposed Development. The CDP zoning objectives for the area are shown in Figure 3.1

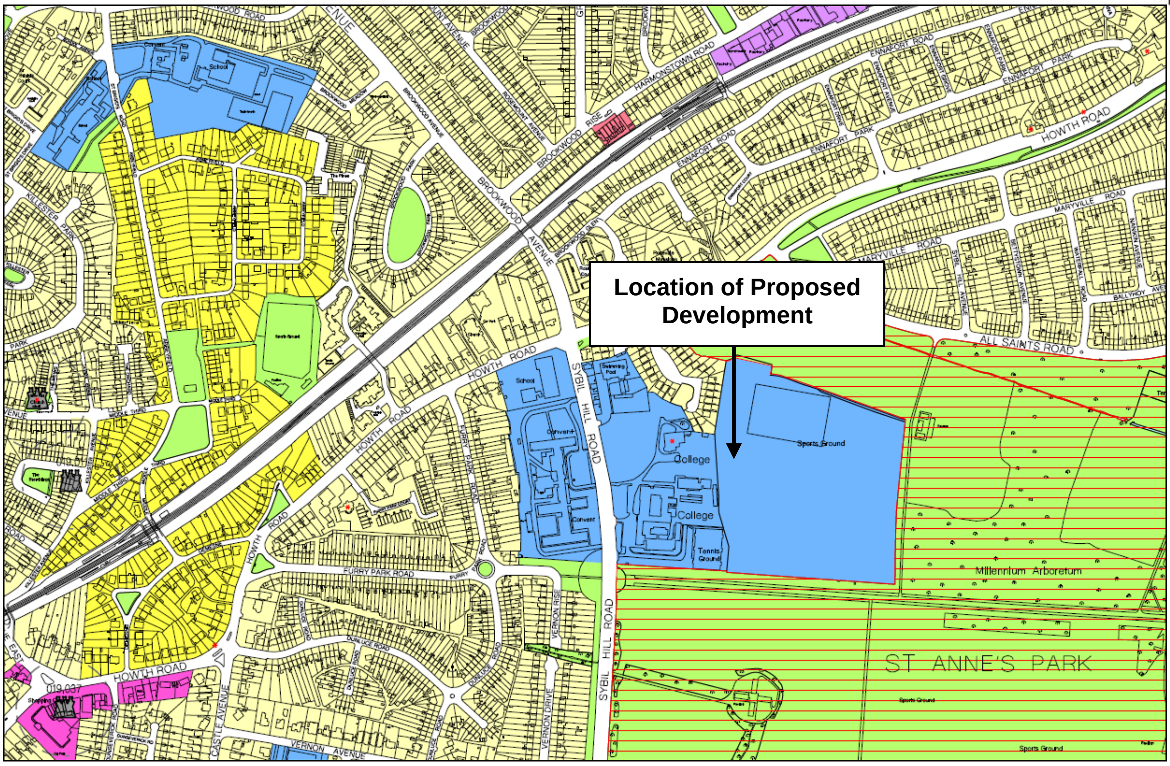


Figure 3.1 Proposed Development in context of DCC Development Plan (Source: *Dublin City Development Plan 2016 – 2022* Map B)

3.4.2 The subject site is zoned Z15 "*To protect and provide for institutional and community uses".* Residential development is "Open for consideration" on Z15 lands.

3.4.3 In terms of mode share targets by Dublin City Council, the CDP states:

> *"Increasing capacity on public transport including bus corridors, DART, suburban railway lines and Luas will continue to reduce the reliance on private car usage and provide opportunities for people to alter their travel behaviour and increase modal shift to more sustainable modes. Promoting modal change also encourages active travel (i.e. walking and cycling) in general and as a means to access public transport routes. Car clubs, whereby cars are rented for short periods, facilitate people who have limited need for a car and these clubs can help reduce car ownership levels and free up road space for more sustainable travel modes."*

3.4.4 The priority of DCC to reduce private car mode share in Dublin City is further reinforced in Policy MT2 of the CDP which states:

> *"**MT2:** Whilst having regard to the necessity for private car usage and the economic benefit to the city centre retail core as well as the city and national economy to continue to promote modal shift from private car use towards increased use of more sustainable forms of transport such as cycling, walking and public transport, and to co-operate with the NTA, Transport Infrastructure Ireland (TII) and other transport agencies in progressing an integrated set of transport objectives. Initiatives contained in the Government's 'Smarter Travel' document and in the NTA's Draft Transport Strategy are key elements of this approach."*

3.4.5 These Government and Council policies and objectives reinforce the need for quality housing and related development in the close confines of existing public transport infrastructure, as is the case with the proposed St Paul's residential development. In addition, the targeted reductions in private car mode share will serve to reduce traffic flows on the wider road network over time, particularly where high quality public transport and non-motorised alternatives are in place, as is the case in the immediate vicinity of the subject site.

3.5 Review of Planning History for Subject Lands

3.5.1 A previous SHD planning application for a development comprising 432 no. apartments and 104 no. housing units on the subject lands was previously lodged with An Bord Pleanala on 22nd December 2017 (ABP ref. 300559-18).

3.5.2 The Inspector's Report included a summary of information submitted by the Planning Authority on the application. The Roads and Traffic Planning division raised no objections, subject to conditions. The report also noted that NTA's view in their submission that the Proposed Development, due to its proximity within 1km to Harmonstown and Killester rail stations and the Howth Road Bus Corridor, aligns closely with prevailing national and regional policy, including the Transport Strategy. The Inspector recommended the following condition 2 b) relating to car parking provision:

> *"2. Prior to commencement of any works on site, revised details shall be submitted to and agreed in writing with the planning authority with regard to the following:*
>
> > *(b) Revised plans at an appropriate scale showing the number of on-street car parking spaces reduced for the proposed 104 houses to 1 space per house. This will result in a reduction of 52 car parking spaces for the house element. The number of car parking spaces shall be further reduced to reflect the reduction in the number of apartments permitted. A further 24 car parking spaces shall be omitted to address this reduction. The total number of car parking spaces permitted is 558 no."*

3.5.3 The application was granted by the Board on 3rd March 2018. The Board Direction did not include the Inspector's recommendation to include a condition to reduce car parking, but listed the following Condition 13 relating to traffic and transportation:

> *"13. The developer shall comply with all requirements of the planning authority in relation to roads, access, lighting and parking arrangements, including facilities for the recharging of electric vehicles. In particular:*
>
> > *(a) The roads and traffic arrangements serving the site (including signage) shall be in accordance with the detailed requirements of the Planning Authority for such works and shall be carried out at the developer's expense.*
> >
> > *(b) The roads layout shall comply with the requirements of the Design Manual for Urban Roads and Streets, in particular carriageway widths and corner radii;*
> >
> > *(c) Pedestrian crossing facilities shall be provided at all junctions within the site;*
> >
> > *(d) The materials used in any roads / footpaths provided by the developer shall comply with the detailed standards of the Planning Authority for such road works, and*

(e) A detailed construction traffic management plan shall be submitted to, and agreed in writing with, the Planning Authority prior to commencement of development. The plan shall include details of arrangements for routes for construction traffic, parking during the construction phase, the location of the compound for storage of plant and machinery and the location for storage of deliveries to the site."

3.5.4 This decision was subsequently quashed by the Board however, on 11th September 2018, by order of the High Court following a judicial review (refer Board Order ABP-302225-18).

3.6 Review of Recent Planning History for Adjacent Lands

3.6.1 A planning application was lodged with Dublin City Council by Orsigny Company Limited with Guarantee on 4th September 2017, ref. 3777/17, for a new Sports Hall and Playing Pitches on the adjoining St Paul's College lands. This application was subsequently refused by DCC on 27th March 2018, but later appealed to the An Bord Pleanala (ABP ref. 301482-18). The Board has not yet adjudicated on this case.

3.6.2 A planning application was submitted by the MKN Property Group on 16th December 2015 (DCC ref. 4242/15) for a development to be located to the immediate north of the St Paul's site, and was granted by DCC. This development includes 68 no. apartments, 8 no. houses, a creche and café/community centre. The Proposed Development was acceptable to the DCC Roads and Traffic Planning Division subject to minor conditions, and was granted on 18th February 2016. A new planning application was subsequently lodged by MKN Property Group on 23rd May 2017 (DCC ref. 2977/17), including for 3 no. apartment units in addition to minor elevational changes. This application was granted planning permission by DCC on 17th July 2017. The development has since been partially occupied by residents, however construction works are still ongoing on the Site.

3.6.3 ILTP took consideration of data and findings from these planning applications as part of this Traffic & Transport Assessment.

4 ACCESS LAYOUT

4.1 Review of Main Access Proposals

4.1.1 The proposed access for the development is off the R808 Sybil Hill Road to the north of St Paul's College, and is the current access for the Vincentian's Residence (Sybil Hill House). The proposal includes an upgraded entrance that can serve both the Proposed Development and the Vincentian's Residence to the north, in addition to providing an additional access point to St Paul's College to the south. The proposed access junction is displayed in Figure 4.1.

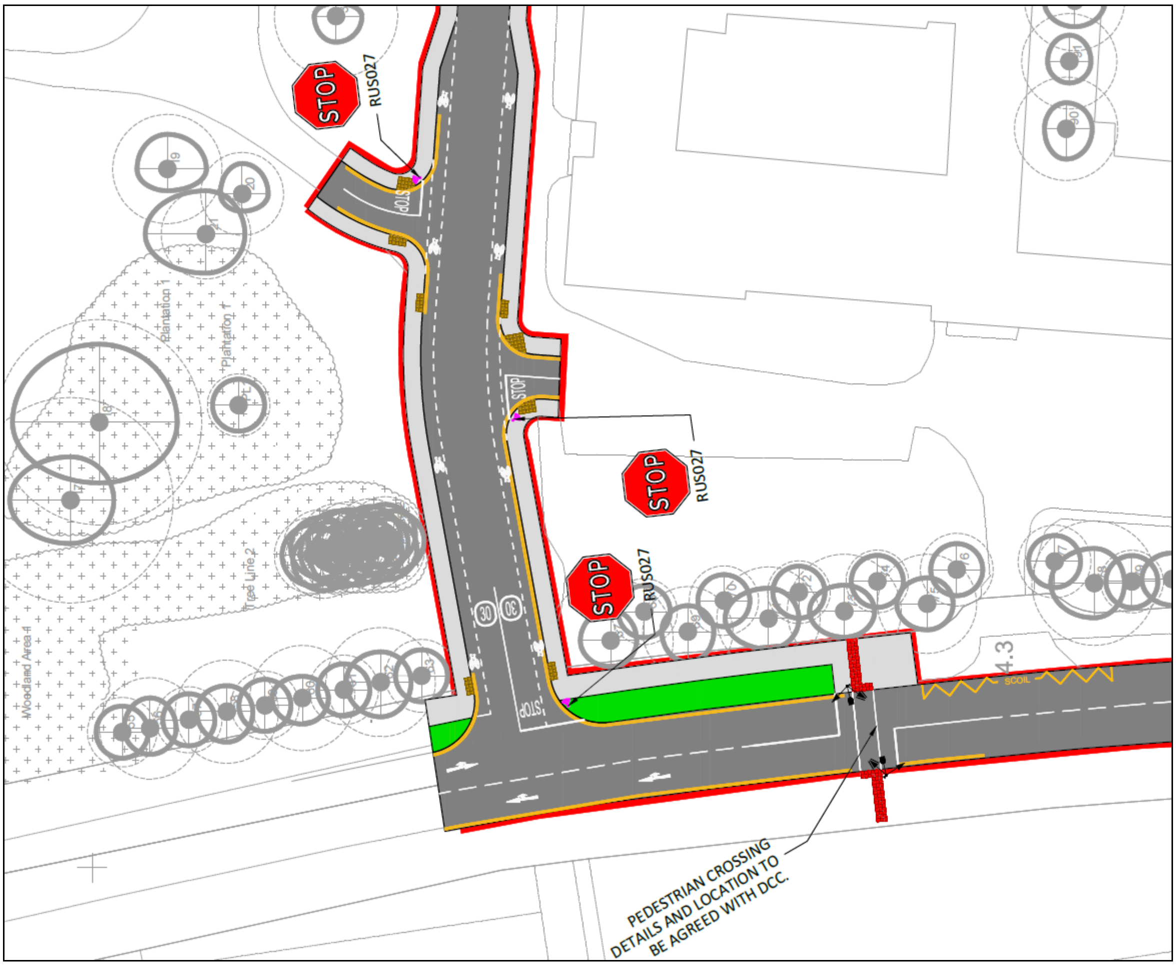


Figure 4.1: Proposed Access Junction (Source: O'Connor Sutton Cronin)

4.1.2 The proposed residential development is located approximately 200m from Sybil Hill Road. This is beneficial in preventing overspill of car parking on to Sybil Hill Road and ensuring that the proposed residential area will also remain free from external car parking.

4.1.3 The cross-section of the proposed access road at the Sybil Hill Road end includes:

- 2 no. 3.0m traffic lanes
- 2.0m Footpath either side of road
- 1.5m wide Cycle lanes between Sybil Hill Road and east of Vincentian's Residence

4.1.4 The proposed access road includes for on-road cycle lanes from the junction with Sybil Hill Road to beyond the access to the Vincentian's Residence, to give a safe cycle route from Sybil Hill Road to beyond the school and Vincentian's Residence access points. This cycle route will link with the DCC Cycle Network planned for the area.

4.1.5 The northern gate to the secondary school from the main access road will be gated. Pedestrians and cyclists will normally use this entrance during school hours, which is in keeping with the existing arrangements. The vehicular entrance will normally be closed and will be only used occasionally.

4.1.6 Beyond the Vincentian's Residence and school side access gate the nature of the new access road will become solely residential in nature, with landscaping and traffic management measures to ensure that cyclists and cars can share the carriageway.

4.1.7 The existing school access arrangements will not be altered by the Proposed Development.

4.2 Review of Pedestrian & Cyclist Accesses

4.2.1 The proposed residential development adjoins St. Anne's Park along three sides, which will be beneficial in providing passive surveillance of the park. Four pedestrian links are proposed (as shown in Figure 2.1) if the Board wishes a direct link to be established between the proposed residential development and the adjacent park. These pedestrian links could also allow direct access to the park for residents, which would further increase the use of the park and would also reduce walk and cycle distance to Bus and Dart services. The Roads Planning section of DCC previously advised that a link to the park would probably need to be gated, with opening times consistent with the park opening times. Public access would be required through the development also during park opening hours.

4.2.2 The pedestrian crossing to the south of the proposed access will provide gaps in the traffic on Sybil Hill Road, which will further aid access and egress to the Proposed Development. The final location of this pedestrian crossing will be agreed with the local authority.

4.2.3 The proposed access arrangements have been designed having regard for the National Transport Authority document *Best Practice Guide on Permeability* (2015).

4.2.4 The layout of the internal streets and pedestrian and cycle linkages to the adjacent school, park and public transport links ensure that the overall design seeks to promote greater use of sustainable travel modes and to provide good permeability for walking and cycle modes consistent with NTA guidance. The locations of the pedestrian and cycle links ensure good connectivity to the adjacent St. Anne's Park and public transport links. This should help foster greater use of public transport and help promote healthy living for the new community.

5 CAR AND CYCLE PARKING ASSESSMENT

5.1 Overview of Car Parking Standards and Car Parking Requirement

5.1.1 The required car parking provision was assessed having regard for the Car Parking Standards section (Section 16.38) of the Dublin City Development Plan 2016 – 2022, the 2018 Apartment Guidelines, the nature of the Proposed Development, the location of the Proposed Development, and the views of DCC as outlined as part of the pre-planning process.

5.1.2 For Residential land-use, Table 16.1 of the CDP Parking Standards includes a maximum provision of 1 no. car parking space per dwelling for Parking Areas / Zones 1 and 2, and a maximum provision of 1.5 per dwelling for Zone 3. The relevant extract of Table 16.1 relating to Residential land-use is shown in Figure 3.1 below, and included in full in Appendix A.

Residential	1 and 2 3	1 per dwelling 1.5 per dwelling

Figure 3.1 Maximum Car Parking Standard for Residential Land-Use for Parking Zones 1, 2 and 3 (Source: *Dublin City Development Plan 2016 – 2022*)

5.1.3 The proposed St Paul's residential development site is located within Parking Zone 2 of the CDP Parking Standards due to its proximity to the QBC and Harmonstown Rail Station, which is shown graphically on *Map J - Strategic Transport and Parking Areas* of the CDP and reproduced in Figure 5.2 below. The southern section of the Site is adjacent to Parking Zone 3.

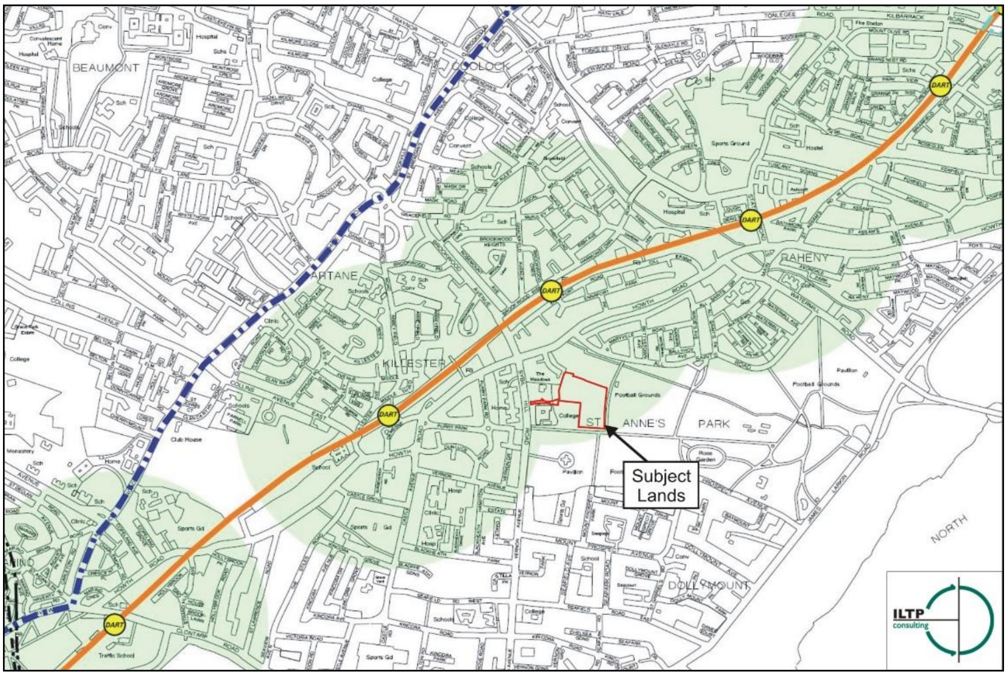


Figure 5.2 Proposed Development Site Location Relative to the CDP Parking Zones (Source: *Dublin City Development Plan 2016 - 2022 - Map J – Strategic Transport and Parking Areas*)

5.1.4 It is noted that the CDP residential parking standards do not differentiate between apartments and houses, nor do they differentiate between 1-bed, 2-bed, 3-bed or 4-bedroom units.

5.2 Proposed Car Parking Allocation - Apartments

5.2.1 The car parking provision set out in this section is proposed for the apartment units in consideration of the CDP and 2018 Apartment Guidelines.

5.2.2 ILTP propose to apply the CDP standard of 1:1 parking space to apartment ratio for 2-bed and 3-bed apartments. ILTP further propose that zero car parking spaces be allocated to the 1-bed apartments. It is proposed that 5% of the residential parking provision be allocated for disabled access parking on an 'as-needs' basis.

5.2.3 For the apartments this equates to an overall average provision of 0.7 car parking spaces per apartment unit (see Table 5.1 below).

5.2.4 The Proposed Development also includes provision at basement level for electric car charge points at car parking spaces to enable those residents who own electric cars to charge them overnight.

5.3 Proposed Car Parking Allocation – Crèche Staff

5.3.1 It is projected that up to 17 staff members will work in the creche at any one time. The 9 no. staff car parking spaces for the crèche are proposed to be located within the underground car park. These car parking spaces are conveniently located to the lifts to allow staff to directly access the crèche via the lifts.

5.3.2 Given the location of the development and its proximity to PT services this is more than adequate to meet the needs of the creche.

5.4 Proposed Shared Car Parking Allocation – Visitors and Crèche Drop-off

5.4.1 The occasional peak parking demands for visitors to the apartments and creche drop-off would typically occur at different times of the day, and on different days of the week. The short-term peak parking demand for creche drop-off is expected to be during weekday morning and evening drop-off / pick-up periods. Similarly, peak parking demand for visitor parking for the residential units is projected to be at night and during the weekend.

5.4.2 Therefore, the level of car parking available for creche drop-off can be higher during weekdays for example when demand is greatest, while the level of apartment visitor spaces can equally be increased at weekends when visitor demand is greatest. The dual / multi-functional use of car spaces in urban locations is an efficient way of providing for these occasional peak parking demands and is also environmentally more sustainable as it reduces building quantity while maintaining an efficient and appropriate level of provision.

5.4.3 As per Table 5.1 below, it is proposed that 28 no. car parking spaces be allocated for shared use, and these will be managed by the Management Company. These spaces will be for shared use to facilitate car parking demand for creche drop-off and visitors to apartments.

5.4.4 Given that the crèche is proposed to mainly facilitate residents of the Proposed Development most will be dropped off at the crèche on foot. Therefore the proposed shared parking provision should be more than adequate to accommodate the peak drop off demand.

5.5 Proposed Car Parking Allocation - Other

5.5.1 In addition, it is proposed to provide an additional 2 no. dedicated electric car parking at surface level to enable those residents who own electric cars to charge them overnight.

5.5.2 A 'Go Car' car club facility is also proposed for the St Paul's Residential Development in order to reduce the need for car ownership whilst making cars available for residents to meet periodic car needs. The Go-Car facility will be exclusively for residential uses and would be operated and managed by the Management Company. It is proposed that 2 no. 'Go-Car' car parking spaces be provided at surface level

5.5.3 It is proposed that 5% of the total parking provision be allocated for disabled access parking on an 'as-needs' basis.

5.6 Summary of Proposed Car Parking

5.6.1 A breakdown of the proposed car parking provision for each specific land use is shown in Table 5.1.

Table 5.1 St Paul's Development – Proposed Car Parking Provision for Development

Land Use / Location	Proposed Car Parking Allocation	No. of Units	No. of Spaces	Total No. of Spaces
Basement Level	1 bed apartment	224	0	465
	2 bed apartment	378	378	
	3 bed apartment	55	55	
	Disabled Access spaces		23	
	Crèche Staff		9	
Surface Level (Other)	Visitor & Crèche Drop-off		28	34
	Disabled		2	
	Electric Car		2	
	Go Car		2	
	Total Car Parking Provision			**499**

*10% of total basement provision to be Electric Vehicle compatible

5.6.2 It is good practice from a sustainable development perspective to apply measures to restrain private car usage. Measures such as parking control are important in encouraging alternative forms of travel to the private car. However, it is desirable that the quantum of parking should be set at a reasonable level in order to ensure illegal parking outside of the subject site is not generated. The proposed parking adheres to these principles, and to Development Plan standards and recent Government guidelines, and is appropriate for a site of this kind and location.

5.7 Proposed Cycle Parking Allocation

5.7.1 The required cycle parking provision for the proposed residential development was also determined with regard to current Development Plan Standards and the Apartment Guidelines. It is proposed to provide 1,314 no. cycle parking spaces in the basement, which equates on average to 2 no. cycle parking spaces per residential unit. It is further proposed to provide an additional 329 no. cycle parking spaces at surface level which is approximately 1 no. cycle parking space per 2 no. residential units. A portion of the proposed cycle parking provision can also be allocated to meet the cycle parking requirements of the creche.

6 TRAFFIC SURVEY & SITE APPRAISAL

6.1 Introduction

6.1.1 In order to assess the traffic impact of the Proposed Development it was first necessary to assess the current traffic situation in the area. Fully classified traffic count data in the environs of the Proposed Development was previously collated by ILTP in 2015 and 2017, with new surveys conducted in February 2019.

6.1.2 In addition, ILTP took consideration of data and findings from a Traffic Appraisal Report, dated November 2015, for the separate MKN development site to the immediate north of the subject site, also located on Sybil Hill Road. This report was part of a planning application (DCC ref. 4242/15) for 68 no. apartments, 8 no. houses, a community / cafe facility and a crèche, which was granted by DCC on 18th February 2016. A new planning application was subsequently lodged by MKN Property Group on 23rd May 2017 (DCC ref. 2977/17), including for 3 no. apartment units in addition to minor elevational changes. This application was granted planning permission by DCC on 17th July 2017.

6.1.3 The MKN development has since been partially occupied by residents, however construction works are still ongoing on the Site. Therefore, in order to ensure a robust and worse case scenario Traffic Impact Assessment is carried out ILTP have assumed in their analysis that no residents have occupied the MKN development, and have applied the full projected trip generation figures from the permitted MKN development to the base flows for the St. Pauls application.

6.1.4 A Picady analysis was also undertaken to assess the capacity of the proposed St Paul's residential development access and adjacent road network.

6.1.5 ILTP also carried out a LinSig analysis of the signalised R105 Howth Road and R808 Sybil Hill Road to ascertain the impact of additional traffic flows from the proposed St Paul's residential development on the junction.

6.1.6 From these results a conclusion could be drawn as to the impact that the development will have on the overall traffic flows. Once details were available ILTP then assessed what impact the development had on the road network.

6.2 ILTP Traffic Count Surveys

6.2.1 Fully classified traffic counts in the environs of the Proposed Development were previously undertaken by ILTP in 2015 and 2017, with new surveys conducted in February 2019. These surveys included the following junctions to allow an appraisal to be made of the effect of the Proposed Development on the wider traffic network:

- The Proposed Access onto Sybil Hill Road
- Existing St Paul's College Vehicular Entrances
- R105 Howth Road / R808 Sybil Hill Road
- R808 Sybil Hill Road / Vernon Avenue

6.2.2 The purpose of the surveys was to measure current traffic flows at the Site and neighbouring junctions during the peak periods. This was of critical interest in gauging the effect the Proposed Development would have on existing traffic patterns and volumes in the area during peak flow periods.

6.2.3 The site survey also allowed sight lines and speed limits to be observed, in addition to signal phasing at nearby junctions.

6.2.4 ILTP also observed pedestrian and cyclist patterns and behaviours in the vicinity of St Paul's College and the Proposed Development.

6.2.5 The AM morning traffic count included the school opening period, and surveyed volumes of through-traffic, in addition to vehicles entering the school grounds and dropping off at the road side.

6.2.6 The existing traffic conditions on the adjoining road network are as expected for Regional and local roads in an urban / suburban location. The most significant volumes of traffic were observed from through traffic along the R105 Howth Road.

6.2.7 The locations of the recorded traffic data are shown in Figure 6.1.

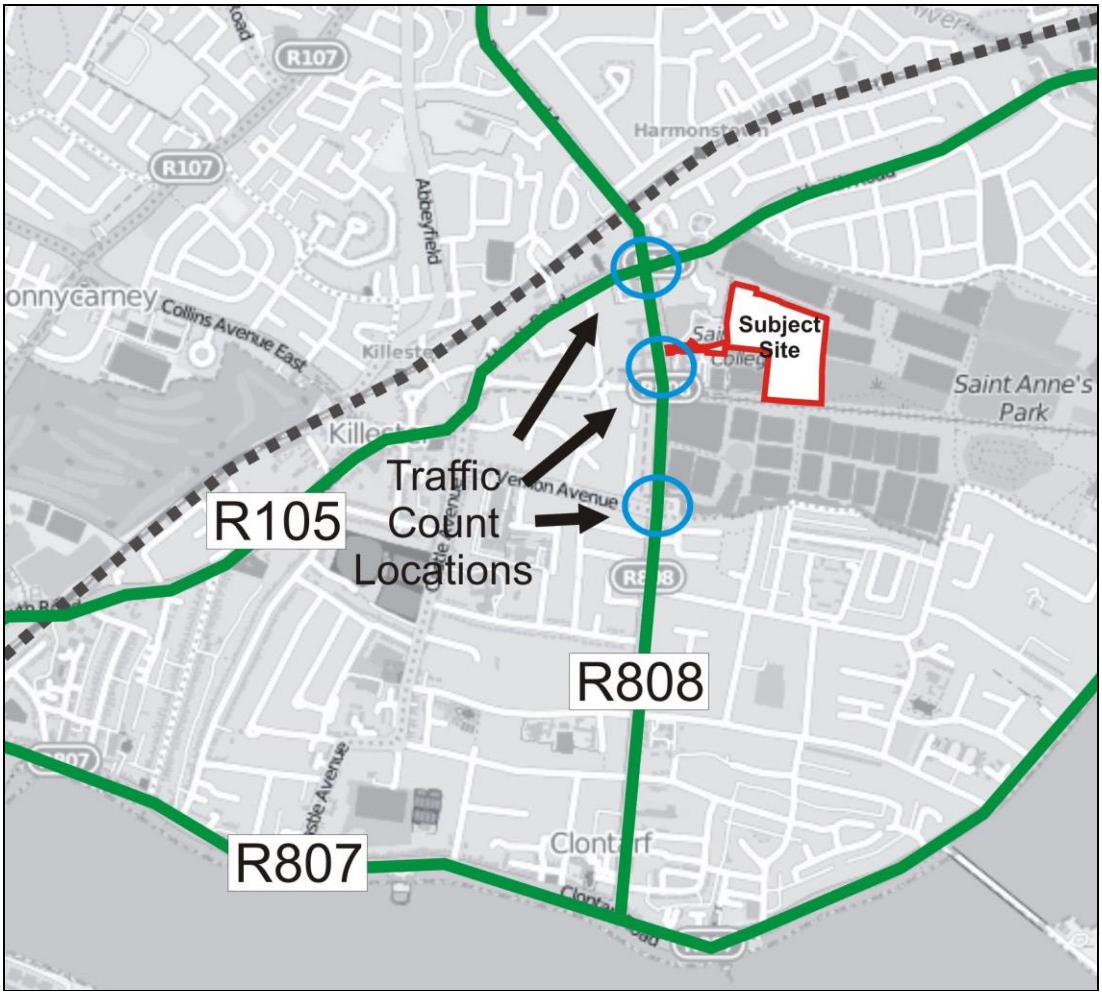


Figure 6.1: Location of Traffic Counts

6.3 R105 Howth Road / R808 Sybil Hill Road junction

6.3.1 The R105 Howth Road / R808 Sybil Hill Road junction is located 200m to the north of the proposed vehicular access to the residential development. This junction has cycle paths and pedestrian crossing facilities, including a traffic signal pedestrian phase.

6.3.2 On-site observations of the Howth Road / Sybil Hill Road intersection were conducted in 2015, 2017 and also most recently in February 2019, in order to assess the traffic signal phasing and staging arrangements, and the overall operation and performance of the junction. Assessment of the junction over this extended period also informed an appraisal of traffic growth patterns in the area.

6.3.3 Traffic on all arms was observed to move relatively freely, with intermittent queues developing on Brookwood Avenue and Sybil Hill Road during peak hours. The longest queue lengths on Sybil Hill Road were observed during the evening peak hour; up to 12 no. left turning and straight-ahead vehicles queuing at the start of the green phase, and up to 5 no. right-turning vehicles queuing. The majority of queues were observed to clear in a single cycle once the signals changed at the junction.

6.3.4 Localised queueing was also observed along Sybil Hill Road during the morning peak hour, which appeared to be largely due to vehicles dropping off pupils at the secondary and primary schools in the vicinity of the junction.

6.3.5 The traffic lights at this junction are under the control of the Dublin City Council Traffic Control System (SCATS). Traffic signal stages were observed on site to vary in duration depending on traffic demand. Detailed site measurements were therefore undertaken during the course of the traffic count surveys to establish the average duration of each stage within the overall traffic signal cycle under peak traffic demand conditions. The typical sequence of the traffic signal stages observed at the junction are shown in Figure 6.2.

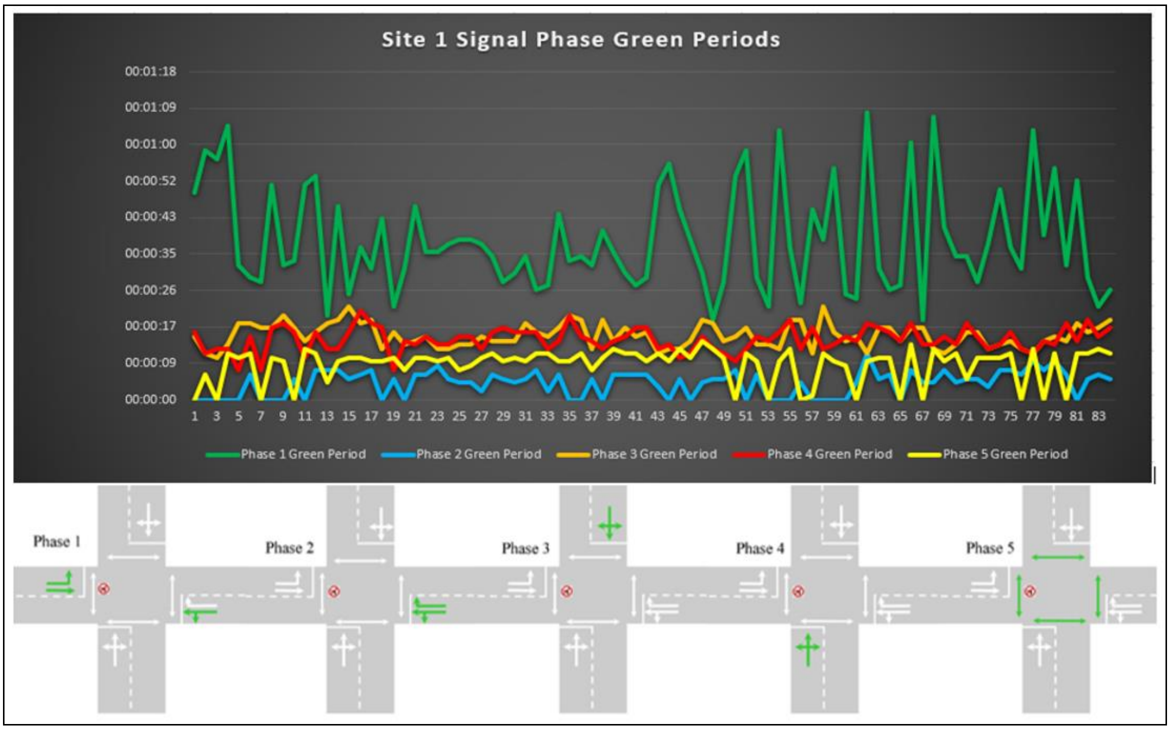


Figure 6.2: Signal Phases, Staging and Typical Green Periods for Howth Road / Sybil Hill Road Junction

6.4 R808 Sybil Hill Road / Vernon Avenue

6.4.1 Traffic count surveys were undertaken for the Sybil Hill Road / Vernon Avenue signalised T-junction in 2015, 2017, and most recently in February 2019. It was observed on site that the junction performed well in peak hour traffic, and appeared to have significant additional capacity. All queuing traffic at the start of the green phase was found to clear the junction in a single cycle.

6.5 Traffic Count Survey results

6.5.1 Detailed traffic flow survey results were obtained from the analysed survey data. In order to establish traffic growth patterns in the immediate vicinity of the subject lands the 2019 traffic count data was compared with previous 2015 and 2017 data in terms of total peak hour junction flows. This comparison is presented in Table 6.1 below.

Table 6.1: Comparison of 2019 Traffic Count Data with Previous 2015 & 2017 Data

Junction	Period	Peak Hour Total Junction Traffic Volume from Combined 2015 & 2017 Data	Peak Hour Total Junction Traffic Volume from 2019 Data	% Difference
R105 Howth Road / R808 Sybil Hill Road	Peak AM: 08:00 – 09:00	2,095 vehicles	2,074 vehicles	-1.0%
	Peak PM: 17:00 – 18:00	1,995 vehicles	1,878 vehicles	-5.9%
R808 Sybil Hill Road / Vernon Avenue	Peak AM: 08:00 – 09:00	910 vehicles	943 vehicles	+3.6%
	Peak PM: 17:00 – 18:00	890 vehicles	833 vehicles	-6.4%

6.5.2 It was found from the collated data that the recorded flows in 2019 had, on average, shown an overall decline for the area from flows previously recorded in 2015 and 2017. This is consistent with wider data, including the DCC / NTA *Canal Cordon Report 2018*, which shows that traffic to and from the city centre has decreased over the past 10 years. To ensure current traffic conditions and flow patterns are accounted for ILTP used the 2019 data as the existing 'Base Year' scenario. This 2019 traffic survey data is included in **Appendix C**.

6.5.3 The turning counts and flows for the AM 08:00 – 09:00 peak hour for the R105 Howth Road / R808 Sybil Hill Road junction are illustrated in Figure 6.3.

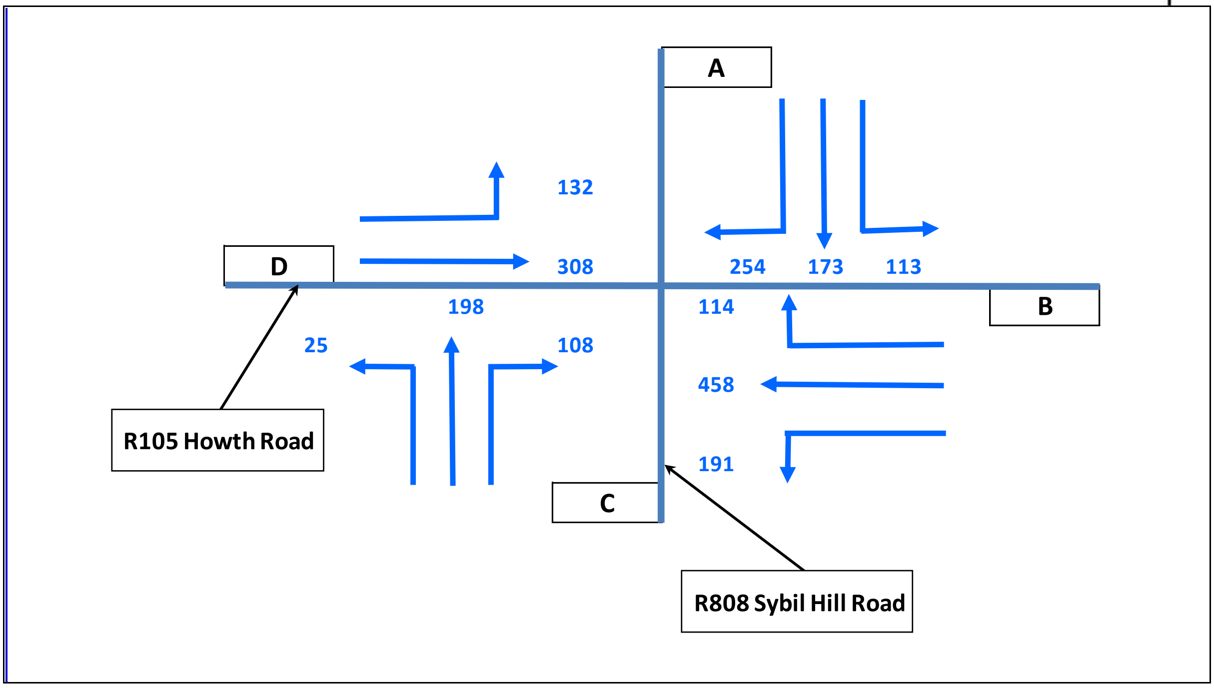


Figure 6.3: 2019 Base Year AM Peak Hour Turning Counts for R105 Howth Road / R808 Sybil Hill Road Junction

6.5.4 The corresponding turning counts and flows for the PM 17:00 – 18:00 peak hour are shown in Figure 6.4.

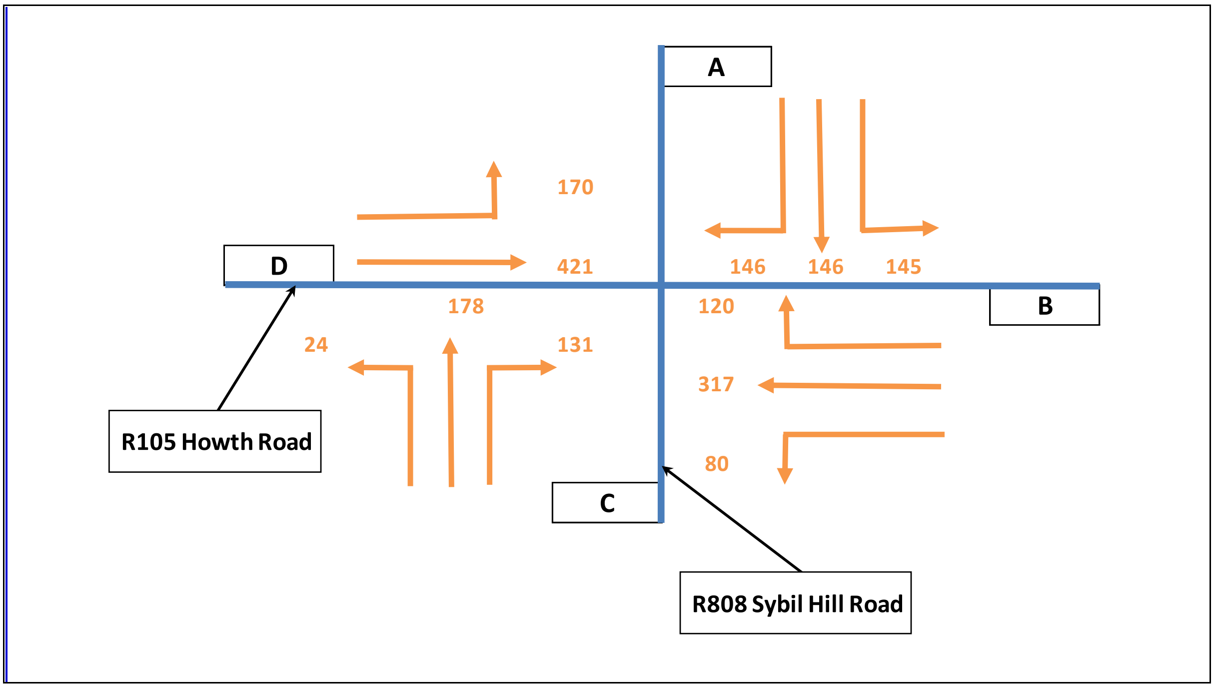


Figure 6.4: 2019 Base Year PM Peak Hour Turning Counts for R105 Howth Road / R808 Sybil Hill Road Junction

6.5.5 The turning movements in and out of the existing St Paul's College and Vincentian's Residence entrances are shown in Figures 6.5 and 6.6, which were recorded during the 2019 traffic count surveys. The turning movements shown include for:

- Northern Access – Current Vincentian Residence and proposed access for development
- Middle Access – Access to St Paul's Secondary School
- Southern Access – Access to St Paul's Secondary School

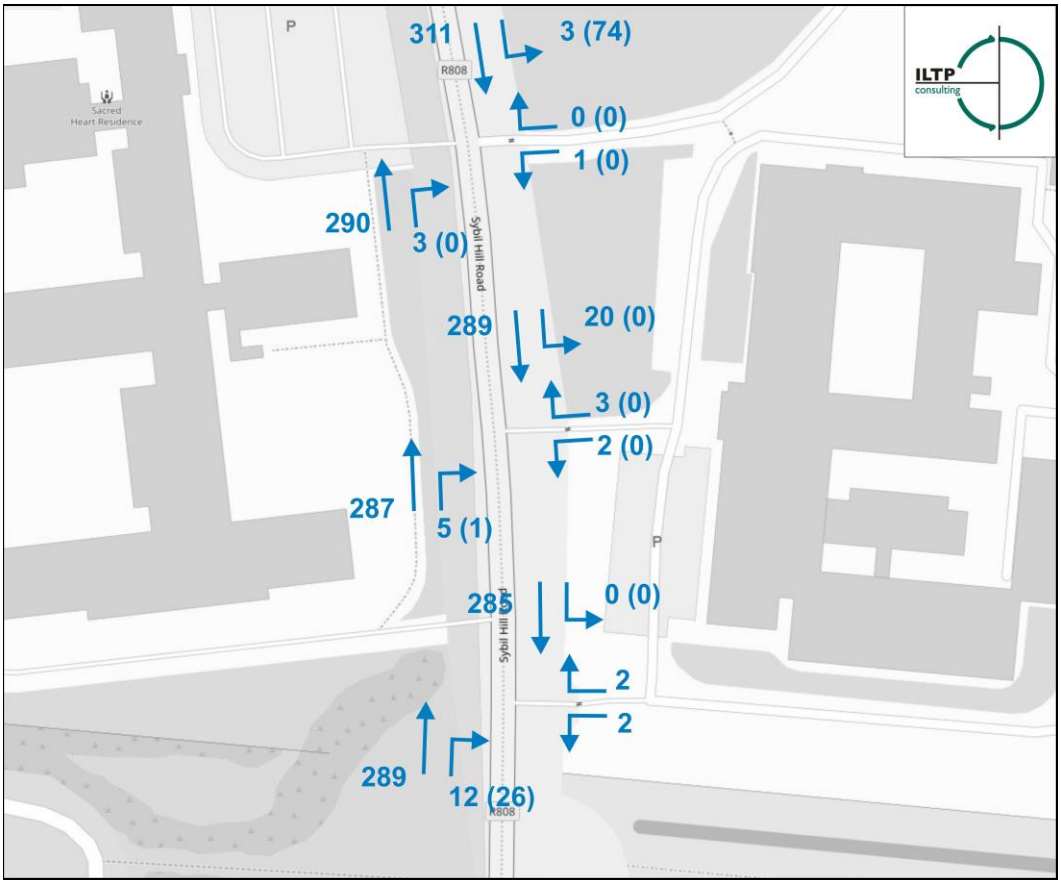


Figure 6.5: 2019 AM Peak Hour Traffic Flows and Turning Counts for St Paul's Secondary School and Vincentian's Residence
Note: ***Cycle movements to and from accesses denoted by ( )***

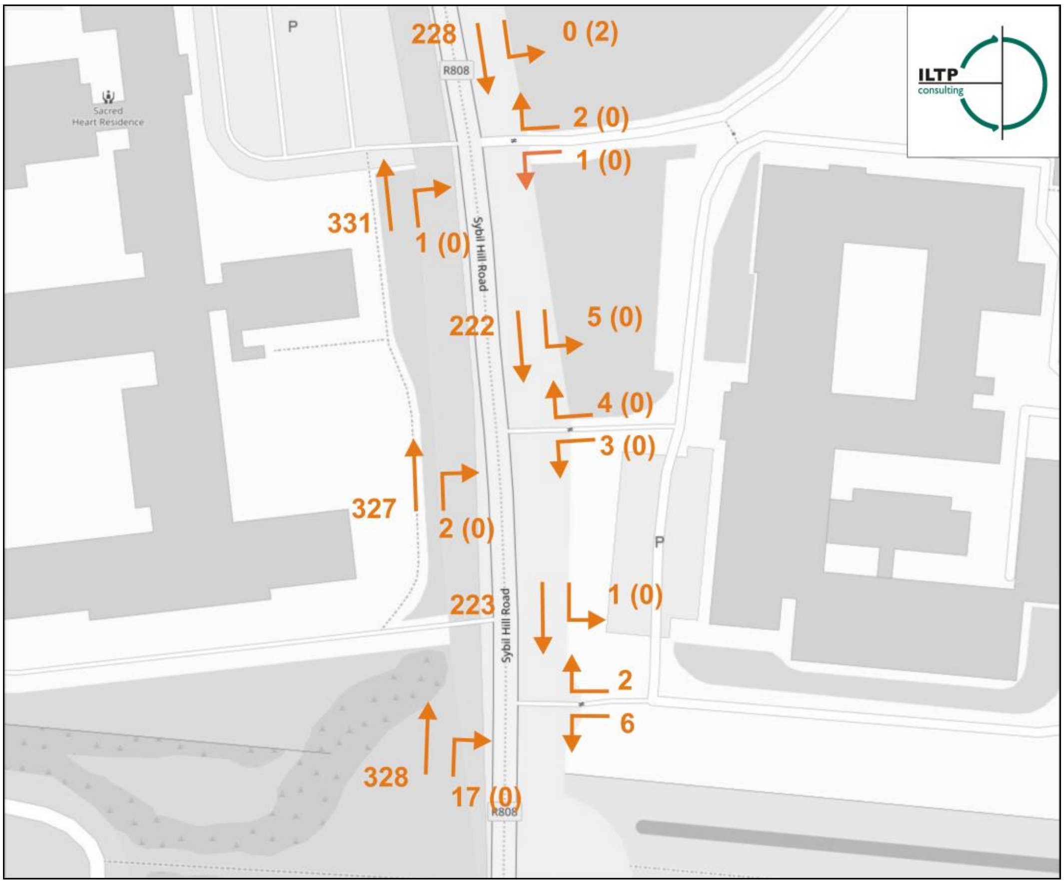


Figure 6.6: 2019 PM Peak Hour Traffic Flows and Turning Counts for St Paul's Secondary School and Proposed Access Junction
***Note:* Cycle movements to and from accesses denoted by ( )**

6.5.6 The traffic count surveys undertaken at the existing St Paul's College and the Vincentian's Residence entrances show that vehicular turning manoeuvres in and out of these accesses are reasonably low during morning and evening peak periods (see Figure 6.5 and 6.6). This recorded data also showed higher cyclist movements (101 no.) into the school than vehicular movements (43 no.) during the AM peak traffic hour (see Figure 6.5), which indicates a high uptake of more sustainable travel modes in St Paul's College.

6.5.7 The traffic count data shows that through-traffic flows on Sybil Hill Road in the vicinity of the Proposed Development are relatively equal in both directions during the AM peak hour (see Figures 6.3 and 6.5). During the PM peak hour however, northbound traffic flows on Sybil Hill Road were higher, which may be partly due to commuter traffic travelling from the city centre. (see Figures 6.4 and 6.6).

6.5.8 From the ILTP traffic surveys undertaken the peak hourly two-way traffic flow for Sybil Hill Road was recorded to be 604 vehicles per hour. For a local distributor road with a lane width exceeding 3 metres, as is the case with Sybil Hill Road, the Peak Hour Flow Capacity would be upwards of 1,100 vehicles per hour (Data source: *Transport in the Urban Environment*, The Institution of Highways & Transportation). Sybil Hill Road is therefore operating at well below its threshold capacity.

7 TRIP GENERATION AND DISTRIBUTION FOR THE PROPOSED DEVELOPMENT

7.1 Trip Generation

7.1.1 The Proposed Development will generate an increased level of traffic on the local road network.

7.1.2 To calculate the likely increase in traffic volumes trip rates were established for each proposed land use type and quantum using ILTP's own experience of comparable developments of similar size and nature in Ireland, and with reference to the TRICS (Trip Rate Information Computer System) database.

7.1.3 In respect to the separate Sports Hall and Playing Pitches development proposed under DCC planning ref. 3777/17, which has not yet been adjudicated on by the Board (ABP ref. 301482-18), these facilities would be for the use of the school during school hours and local community groups and sports organisations outside of school hours. As a sensitivity analysis the projected traffic impact from the proposed sports hall and playing pitches is included for in this Traffic & Transport Assessment report. Therefore for the purpose of Trip Generation no additional trips are projected for the morning peak period, and an additional 20 no. movements over and above current movements are projected during the evening peak period. This is considered a conservative projection given the proposed car parking provision of 24 no. spaces.

7.1.4 The proposed crèche is estimated to cater for up to 115 childcare spaces. The proposed crèche will cater primarily for children from the development. The provision of a crèche will generate some additional staff movements, the majority of which would be likely to be generated outside of the traditional AM and PM peak periods. To provide a robust traffic model however, ILTP have assumed that 40% of vehicular trips to and from the crèche would be dedicated external vehicular trips by staff and parents not residing in the proposed St Paul's development site, and these have been included in Table 7.2.

7.1.5 The final Trip Rates can be seen in Table 7.1, with final Trip Generation figures presented in Table 7.2.

Table 7.1: Proposed Trip Rates for Proposed St Paul's Residential Development & Adjoining Sports Hall / Playing Pitches Development (DCC ref. 3777/17, ABP ref. 301482-18)

Land Use	Number of Units / Area	AM Peak Trip Rates		PM Peak Trip Rates	
		Arr	Dep	Arr	Dep
Residential (Apartment)	657	0.05	0.14	0.1	0.06
Crèche*	612m^2	2.30/100m^2	1.95/100m^2	2.75/100m^2	2.90/100m^2
St Paul's College Sports Hall & Playing Pitches (planning application ref. 3777/17)	NA	0	0	-	-

* Trip Rates for Total Internal & External Vehicular Trips

Table 7.2: Final Trip Generation for Proposed St Paul's Residential Development & Adjoining St Paul's College Sports Hall / Playing Pitches Development (DCC ref. 3777/17, ABP ref. 301482-18)

Land Use	Number of Units / Area	AM Peak Trips		PM Peak Trips	
		Arr	Dep	Arr	Dep
Residential (Apartment)	657	32.9	92.0	65.7	39.4
Crèche (Projected External Trips)	612m²	5.6	4.8	6.7	7.1
St Paul's College Sports Hall & Playing Pitches (DCC planning application ref. 3777/17)	NA	0	0	20	20
Total		**39**	**97**	**93**	**67**

7.1.6 Overall for the combined proposed St Paul's residential development and adjoining St Paul's College Sports Hall / Playing Pitches application, the Trip Generation assessment yielded an estimate of an additional 39 no. inward and 97 no. outward trips for the AM peak hour (08:00 – 09:00). An additional 93 no. inward trips and 67 no. outward trips were estimated for the PM peak hour (17:00 – 18:00).

7.1.7 As the AM and PM peaks are the times of the day with the highest level of traffic volumes it can be assumed that if the road network can perform effectively at these times it will meet all demands placed upon it.

7.2 Trip Generation for Permitted MKN Residential Development Adjoining Subject Site

7.2.1 In order to assess the worse-case scenario for impact of the newly proposed St Paul's Residential Development on the wider traffic network ILTP have also taken account of the recent permitted planning application by MKN for a residential development to the immediate north of the subject site (ref. 4242/15, and amended by ref. 2977/17), which is currently partially occupied by residents, but still under construction. In order to ensure a robust and worse case scenario Traffic Impact Assessment is carried out ILTP have assumed that no residents have occupied the MKN development, and have applied the full projected trip generation figures from the permitted MKN development to the base flows for the St. Pauls application.

7.2.2 The parent application for the MKN development, ref. 4242/15 included 76 no. residential units (68 no. apartments, 8 no. houses) with 105 car parking spaces to be provided. A Crèche and Café / Community Centre were also included in the application.

7.2.3 The parent application also included a *Traffic Appraisal Report* by ORS Consulting Engineers, dated November 2015, which contained trip rates and trip generation figures for the development

7.2.4 The subsequent application ref. 2977/17 proposed a change to the number of houses and apartments, and included 71 no apartments and 7 no. houses. This application did not include a revised traffic assessment however, but the following was stated in the applicant's *Planning Report*, dated May 2017:

"The additional 3 no. units are minor in the context of the overall permitted scheme. There are no proposed increases to car parking provision and no increase in traffic impact over that already assessed and deemed acceptable is expected."

7.2.5 ILTP have therefore used the trip rates and trip generation rates included with the parent MKN application, ref. 4242/15

7.2.6 The combined Trip Generation figures for the proposed St Paul's Residential Development and permitted MKN Residential Development are shown in Table 7.3. The trip rates used by ILTP (St. Pauls) and ORS (MKN) are broadly similar.

Table 7.3: Trip Generation for Proposed St Paul's Residential Development, Proposed Sports Hall & Playing Pitches development (ref. 3777/17) and Permitted MKN Residential Development (ref. 4242/15)

Land Use	Number of Units	AM Peak Trips		PM Peak Trips	
		Arr	Dep	Arr	Dep
Residential (Apartment)	657	32.9	92.0	65.7	39.4
Crèche (Proposed External Trips)	612m^2	5.6	4.8	6.7	7.1
St Paul's College Sports Hall & Playing Pitches (planning application ref. 3777/17)	NA	0	0	20	20
Total		**39**	**97**	**93**	**67**
MKN - Residential (Apartment)	68	3	12	11	5
MKN - Residential (House)	8	1	3	3	2
MKN - Residential (Crèche)	-	4	3	3	4
MKN - Residential (Café / Community)	-	1	0	1	1
MKN Total		**9**	**18**	**18**	**12**
Combined St Paul's Residential, Sports Hall / Playing Pitches and MKN Total		**48**	**115**	**111**	**79**

7.2.7 In order to provide a robust base model ILTP have included the projected traffic from the permitted MKN development (DCC ref. 4242/15) with the 2019 Baseline figures.

7.2.8 ILTP are confident that the assumptions made for determining trip generation volumes are robust and that in reality traffic generated by the development is likely to be lower than predicted. There are a number of factors which influence this:

- The trip generation does not take into account measures proposed in the mobility management plan.
- NTA and Dublin City Council policy encourages less dependency on the private car and promotes public transport use.

7.3 Trip Distribution

7.3.1 Based on the traffic conditions observed during site visits and traffic surveys, the nature of the development, and the proximity to Dublin City Centre, ILTP estimated the Trip Distribution for the proposed St Paul's residential development, separate St Paul's College Sports Hall / Playing Pitches development, and MKN development as follows:

Vehicles departing

- 50% are estimated to turn left onto Sybil Hill Road and 50% to turn right.
- Of the 50% turning right towards the Howth Road junction, 15% are projected to turn left (city bound), 20% to travel north on Brookwood Avenue in the direction of Artane and the M50, and 15% to turn right in an easterly direction towards Howth.
- The 50% turning left onto the R808 Sybil Hill Road are expected to be predominantly city bound traffic. 5% are projected to turn right onto Vernon Avenue, with 45% continuing southbound along the R808 (Vernon Avenue). The Sybil Hill Road / Vernon Avenue junction is signal controlled and was observed to have significant spare capacity to accommodate the projected additional flows from the Proposed Development.
- Given the close proximity to the city centre this traffic is then expected to disperse between the various link roads on the R808; including Mount Prospect Avenue, Seafield Road, Kincora Road and Clontarf Road. The impact of the development at these link road junctions would be expected to dissipate to below the threshold levels included in the TII / NRA document *Traffic and Transport Assessment Guidelines*, May 2014.

Vehicles arriving

- Due to the right-turn restriction at the Howth Road junction, a reduced proportion is expected to arrive at the development from the north. Of the 15% projected to depart the Site and turn left on Howth Road, this traffic is estimated to be redistributed for vehicles arriving to the Site as follows:
  - 5% from Brookwood Avenue
  - 5% from Vernon Avenue (west)
  - 5% from R808 Vernon Avenue / Clontarf Road
- 60% of total traffic arriving to the Site will therefore arrive from the south. This includes 10% turning left from Vernon Avenue onto Sybil Hill Road
- Of the 40% arriving from the north (Howth Road junction), 25% are estimated to be via Brookwood Avenue, and 15% turning left from the Howth Road.

7.3.2 The total estimated combined Trip Distribution for the proposed St Paul's residential development, St Paul's College Sports Hall / Playing Pitches development and MKN development during the morning 08:00 – 09:00 and evening 17:00 – 18:00 peak hours is summarised in Figure 7.1.

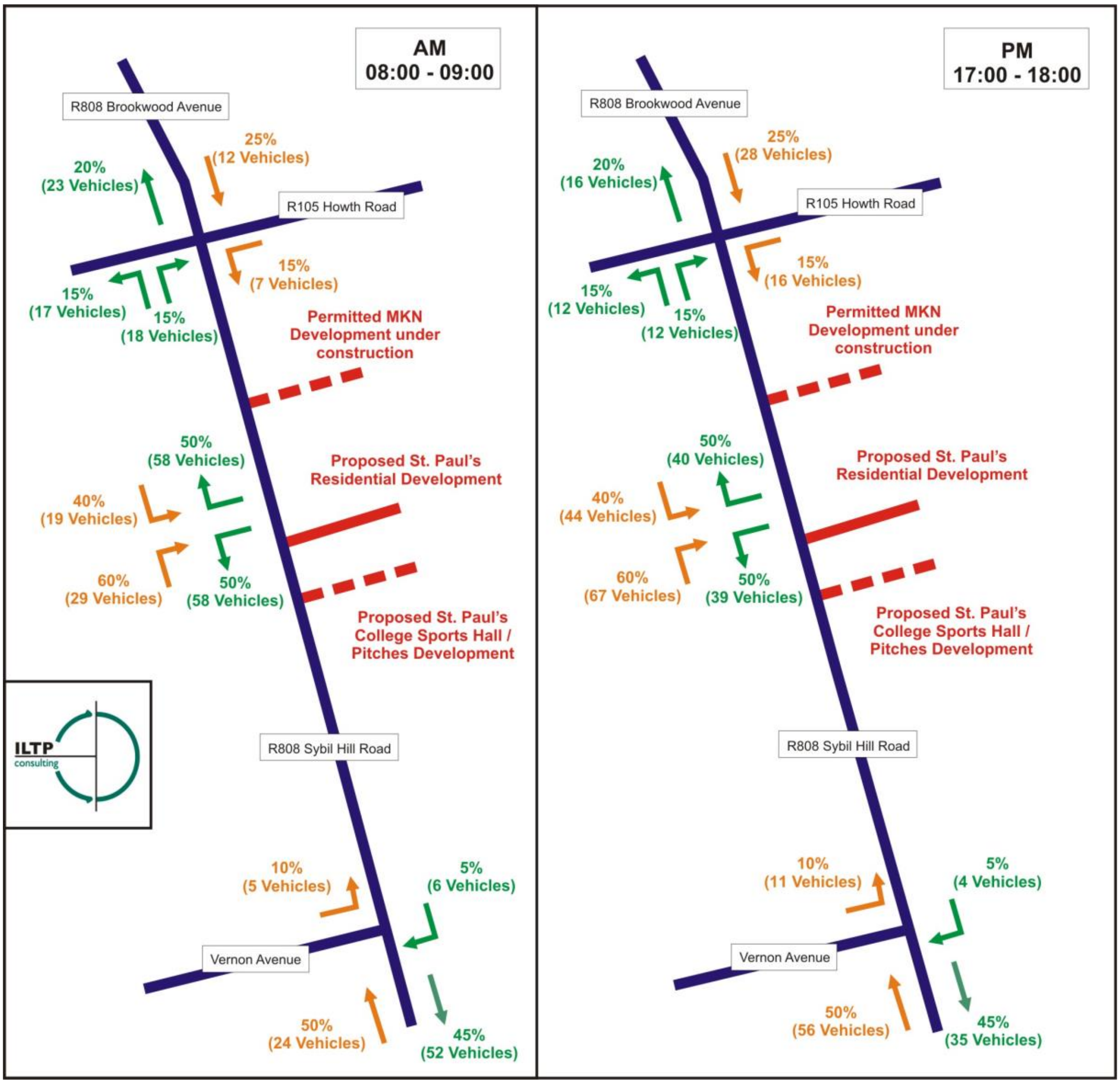


Figure 7.1: ILTP Projected Combined Trip Distribution for Proposed St. Pauls Residential Development, Proposed St Paul's College Sports Hall / Playing Pitches Development (DCC. Ref. 3777/17 & ABP ref. 301482-18) and Permitted MKN Development

8 TRAFFIC MODELLING RESULTS

8.1 Assessment of Future Traffic Conditions

8.1.1 Using the NTA / DCC annual Cordon Count (*Canal Cordon Report 2018 - Report on Trends in Mode Share of Vehicles and People Crossing the Canal Cordon 2006 to 2018*, April 2019) and other data sources ILTP undertook a review of recent trends in traffic volumes for Dublin City Centre and the wider environs. The Cordon Count Report shows that in overall terms there has been a significant decline since 2006 in the number of vehicles coming into Dublin during the Cordon Count period. Car numbers crossing the canal cordon have continued to decline in recent years, with a total reduction of 16.8% between 2006 and 2018.

8.1.2 This decline in private car usage is promoted and supported by Policy objectives at National and Local level. *Smarter Travel a Sustainable Transport Future* has as its goal a shift from car dependency to more sustainable modes of transport as such future planned development will have to have a high level of sustainability. This will in turn lead to a move away from car dependency particularly in city locations served by rail and bus public transport such as the proposed regeneration.

8.1.3 Furthermore the *Smarter Travel* document states that:

> *"The total kilometers travelled by the car fleet in 2020 will not increase significantly from current total car kilometres."*

8.1.4 This will be particularly true in Town Centre locations and on radial routes into and out of Dublin City Centre. It is noted however, that traffic levels on radials routes into and out of Dublin City Centre, have actually declined over the past 10 years, as is shown in sources such as the DCC / NTA *Canal Cordon Report 2018*.

8.1.5 It is further noted that the current *Dublin City Development Plan 2016 - 2022* targets an ongoing reduction in private car trips crossing the Canal Cordon.

8.1.6 On the basis that these Government and Local mode shift targets are met the decline in private car usage recently recorded by the Canal Cordon surveys is set to continue.

8.1.7 In terms of future traffic growth rates, TII has traffic projections for the period 2016 – 2050. There are different growth rates for different areas. The low growth projection within the Dublin metropolitan area is less than 1.5 percent per annum. Sybil Hill Road is an arterial route connecting with Dublin City and as such it can be expected that the growth projections for Dublin City are very relevant to this development.

8.1.8 Due to the subject site also being in a long established urban area with a high degree of public transport provision, possible growth in traffic levels for the future year assessments are considered to be quite limited.

8.1.9 It is considered that background traffic at the subject site will not grow, or if there is any growth it will be extremely low due to the established urban setting, the provision of bus and rail public transport and planned improvements in the cycling and pedestrian environment. This is in line the policies and objectives set down in *Smarter Travel - A Sustainable Transport Future 2009 – 2020* and the current CDP.

8.1.10 It was also confirmed from traffic count surveys conducted between 2015 and 2019 that traffic in the vicinity of the subject site, on average, did not grow but marginally declined in this four year period.

8.1.11 Furthermore, current Government and DCC modal shift targets to more sustainable forms of transport are likely to yield a notable drop in background traffic in the short to medium term, particularly where frequent and reliable PT services are in operation within a convenient short walking distance, as is the case with the Proposed Development.

8.2 PICADY Junction Analysis – Proposed Access Junction

8.2.1 In order to test the performance of the proposed access junction, a PICADY analysis was conducted.

8.2.2 The PICADY software package was used to calculate the RFC (ratio of flow to capacity) factor. This is often used to assess capacity of priority junctions. This measures the observed flow of a link against the theoretical capacity of the link. RFC is calculated thus;-

$$\% \text{ RFC} = \frac{\text{Observed Flow}}{\text{Link capacity}} \times 100$$

8.2.3 In transport Terms, RFC values of 85% or less are considered satisfactory, meaning at levels of RFC below 85% the junction is normally deemed to be operating within the design capacity and that no significant delays or queues arise.

8.3 PICADY Input and Results

8.3.1 The traffic flows and turning movements for the proposed St Paul's access junction, as inputted into Picady, are shown in Figure 8.1. These include the AM and PM periods. The traffic volumes include for the MKN development as straight through traffic as it would have a separate access junction. The analysis also includes for vehicular movements recorded at the existing entrance during peak traffic hour periods.

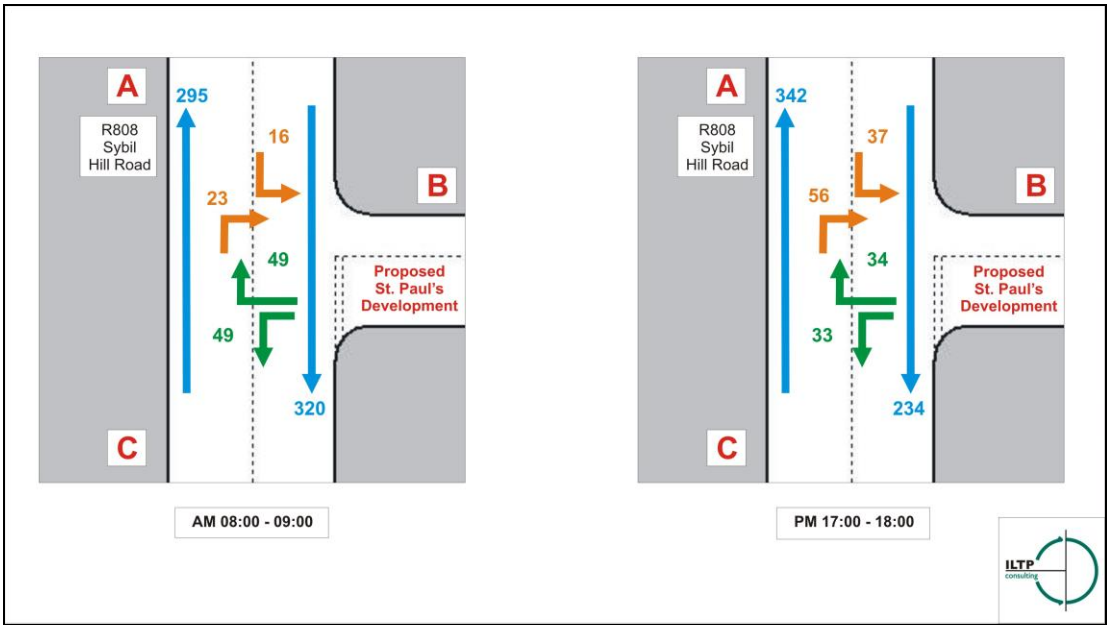


Figure 8.1: Picady Input for Proposed Access Junction

8.3.2 The results of the PICADY Assessment are shown in Tables 8.1 and 8.2.

Table 8.1: AM Peak Hour PICADY Analysis

Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
B-AC	1.63	7.48	0.218	-	0.27	0.28	-	4.1	0.17
C-AB	0.64	11.65	0.055	-	0.08	0.09	-	1.3	0.09
C-A	4.66	-	-	-	-	-	-	-	-
A-B	0.27	-	-	-	-	-	-	-	-
A-C	5.33	-	-	-	-	-	-	-	-

Table 8.2: PM Peak Hour PICADY Analysis

Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
B-AC	1.12	7.56	0.148	-	0.17	0.17	-	2.6	0.16
C-AB	1.71	12.45	0.137	-	0.28	0.28	-	4.2	0.09
C-A	4.92	-	-	-	-	-	-	-	-
A-B	0.62	-	-	-	-	-	-	-	-
A-C	3.90	-	-	-	-	-	-	-	-

8.3.3 The full PICADY model input and output records are included in **Appendix B**.

8.3.4 The PICADY results for the junction show that the proposed junction will operate at or below 22% capacity with the peak hour development traffic in place. This confirms the proposed access has more than adequate capacity for the Proposed Development.

8.4 LinSig Signalised Junction Analysis - R105 Howth Road / R808 Sybil Hill Road - Capacity Assessment

8.4.1 The R105 Howth Road / R808 Sybil Hill Road junction is approximately 200 metres from the proposed access road to the subject site, and experiences relatively high traffic flows particularly during the morning and evening peak hours. As part of this Traffic Impact Assessment ILTP performed an analysis of the capacity of this signalised junction using LinSig Version 3.2.40.0 under the following scenarios:

- **2019 Base Year** – This scenario represents the existing situation and allows for the calibration and validation of the model to existing traffic conditions.

- **2021 Opening Year Without Development** - This scenario considers traffic for the 2021 Opening Year with the permitted MKN development fully constructed and occupied / in use and without the proposed St Paul's residential development and St Paul's College Sports Hall / Pitches development.

- **2021 Opening Year With Development** - This scenario considers traffic for the 2021 Opening Year with the proposed St Paul's residential development, proposed St Paul's College Sports Hall / Pitches development and permitted MKN development fully operational.

8.4.2 The LinSig Model is based on the 1 hour time periods, 08:00 – 09:00 and 17:00 – 18:00, and presents an optimised solution for the network, effectively simulating the Dublin City Council operated SCATS controller on site. The cycle and average stage times input into the model are in line with on-site measurements.

8.4.3 The ILTP LinSig model for the Howth Road / Sybil Hill Road junction is displayed in Figure 8.2.

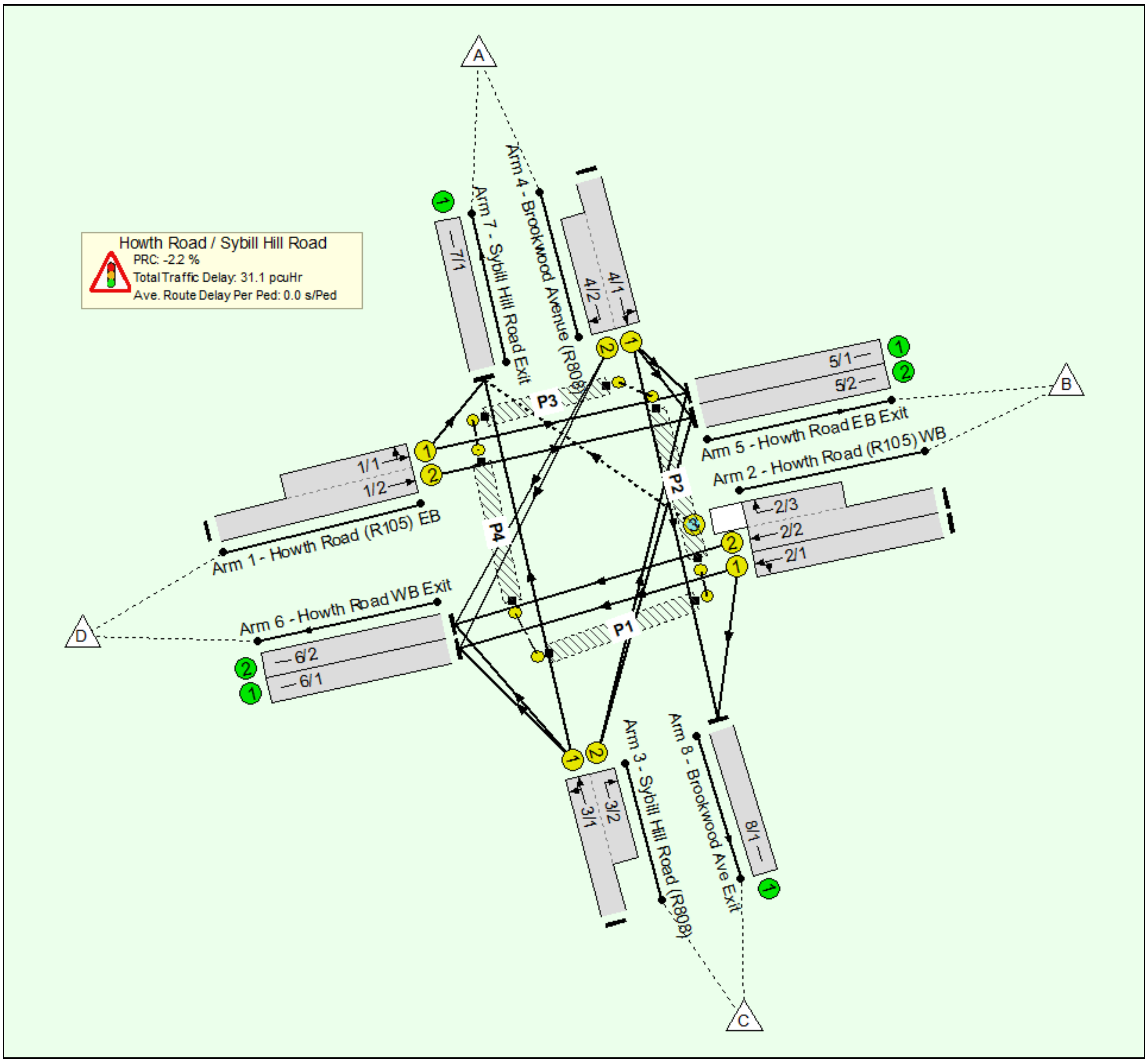


Figure 8.2: LinSig model of R105 Howth Road / R808 Sybil Hill Road junction

8.4.4 As shown in Figure 8.2, the ILTP Linsig model has included for recent upgrades implemented at the junction including changing the Brookwood Avenue and Sybil Hill Road arms from a single lane approach to formal two-lane approach.

8.5 LinSig Input and Results

8.5.1 The Opening Year traffic volume inputs into LinSig, with and without the proposed St Paul's residential development and St Paul's College Sports Hall / Playing Pitches, are shown in Figures 8.3 to 8.6.

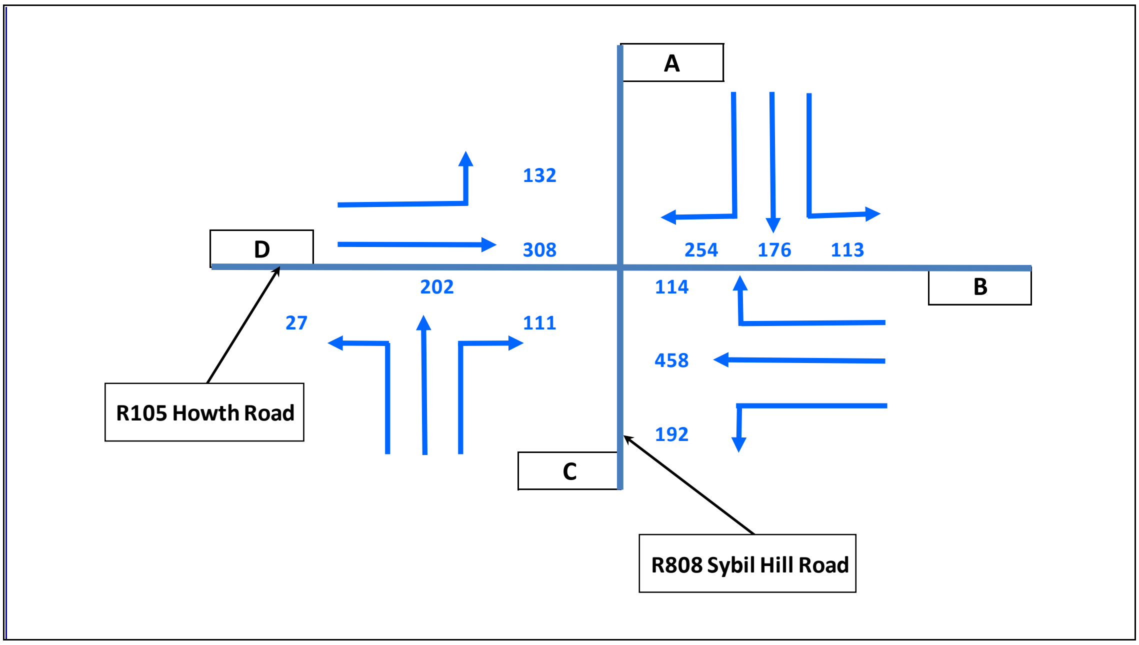


Figure 8.3: 2021 Opening Year with Permitted MKN Development and without Proposed St Paul's Residential Development and St Paul's College Sports Hall / Pitches Development – AM 08:00 – 09:00

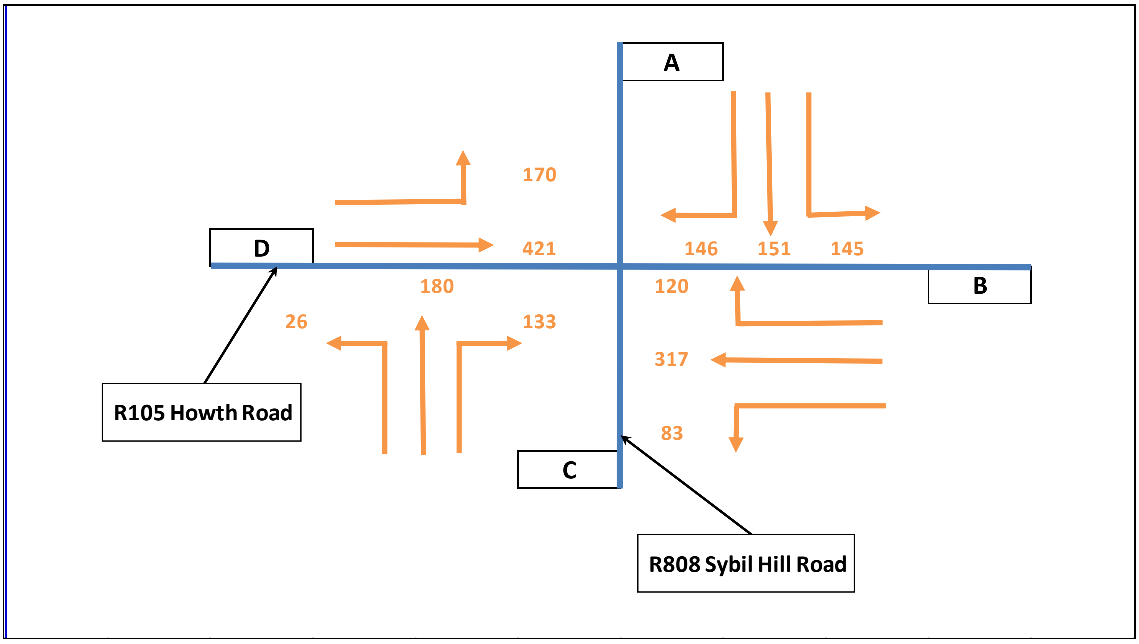


Figure 8.4: 2021 Opening Year with permitted MKN Development and without Proposed St Paul's Residential Development and St Paul's College Sports Hall / Pitches Development – PM 17:00 – 18:00

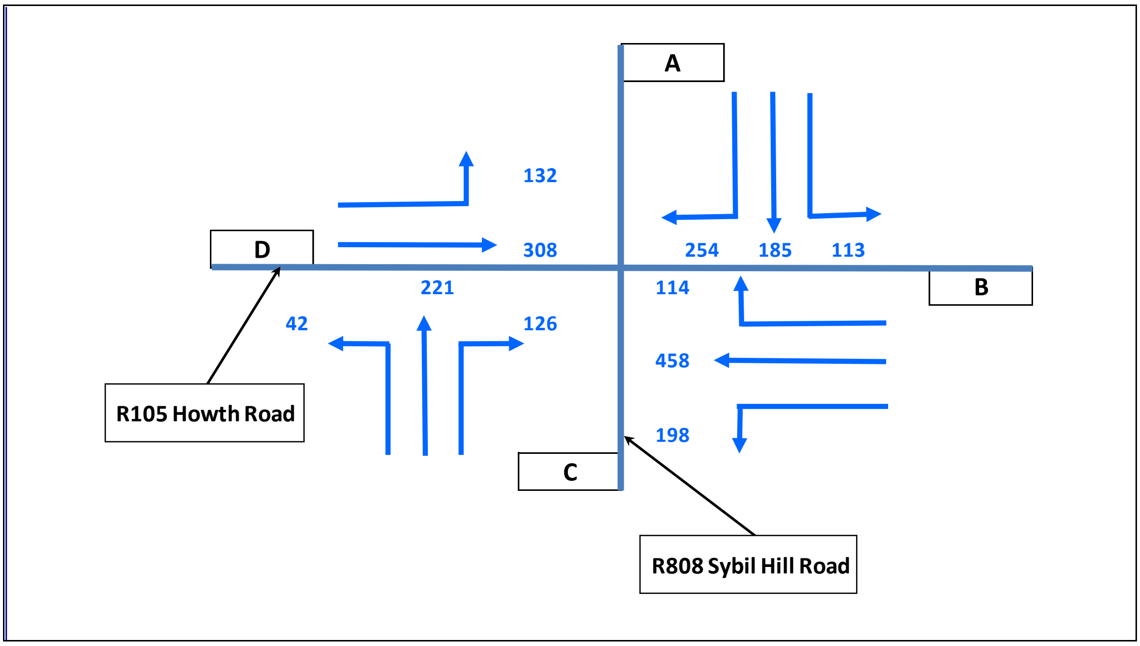


Figure 8.5: 2021 Opening Year with Proposed St Paul's Residential Development, adjoining St Paul's College Sports Hall / Playing Pitches Development and Permitted MKN Development - AM 08:00 – 09:00

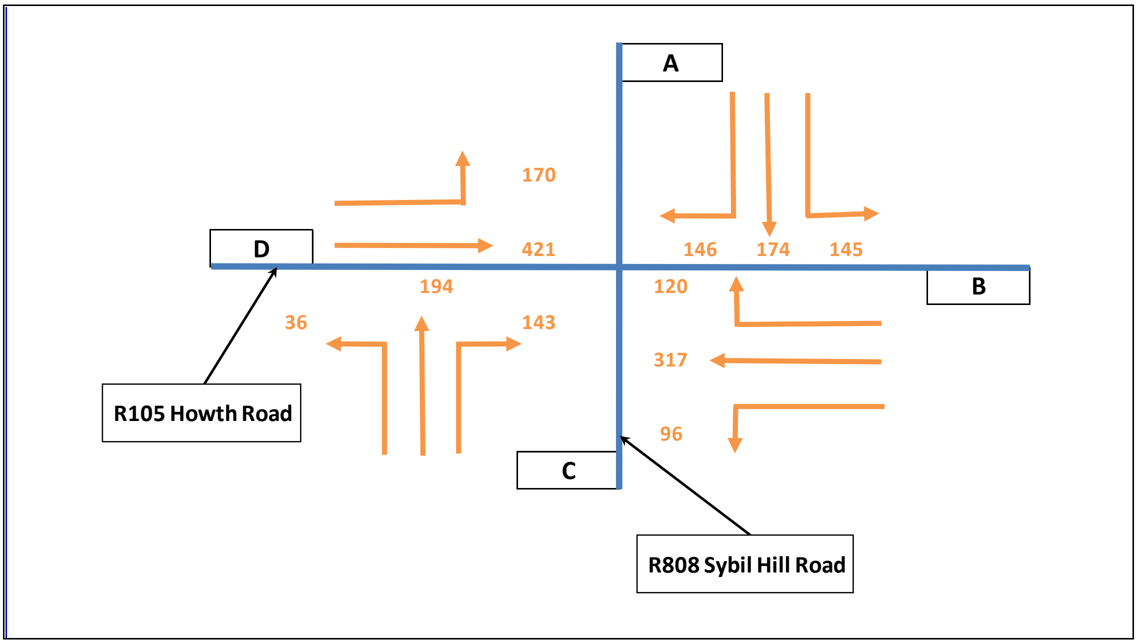


Figure 8.6: 2021 Opening Year with St Paul's Residential Development & adjoining St Paul's College Sports Hall / Playing Pitches Development and Permitted MKN Development – PM 17:00 – 18:00

8.5.2 The overall change in traffic flow through this junction from the proposed St Paul's Residential Development and adjoining St Paul's College Sports Hall / Pitches Development is projected to increase by approximately 3.1% during the morning peak hour and 3.8% during the evening peak hour. These increases are below the 5% Traffic Impact Assessment threshold which would normally be regarded as having a reasonable impact on the junction (TII / NRA document *Traffic and Transport Assessment Guidelines*, May 2014).

8.5.3 The results of the various scenarios modelled in LinSig are presented in Table 8.3 in terms of Degree of Saturation.

Table 8.3: Existing R105 Howth Road / R808 Sybil Hill Road Junction Performance Assessment – LinSig Traffic Model Output Results

Scenario		Degree of Saturation per Arm			
		Howth Road Eastbound	Howth Road Westbound	Sybil Hill Road	Brookwood Avenue
2019 Base Year	**AM**	56.2%	58.4%	84.6%	92.0%
	PM	75.5%	43.8%	78.8%	92.1%
2021 Opening Year, with MKN Development and without St Paul's Residential and St Paul's College Sports Hall / Playing Pitches Developments	**AM**	56.2%	58.5%	86.9%	93.0%
	PM	75.5%	43.8%	80.3%	93.7%
2021 Opening Year, with St Paul's Residential Development, St Paul's College Sports Hall / Playing Pitches Development, & MKN Development	**AM**	56.2%	58.7%	99.7%	95.8%
	PM	75.5%	43.8%	89.4%	100.9%

8.5.4 The results of the various scenarios modelled in LinSig are presented in Table 8.3 in terms of Degree of Saturation. Values over 90% are typically regarded as experiencing occasional traffic congestion, with queues of vehicles beginning to form. It should be noted that at many urban junctions the Degree of Saturation exceeds 100% for a portion of the peak period. The extent and duration of the queues which form as a result are managed, to minimise interference spreading through the network. To this end the control of multiple signalised junctions by specialist vehicle detection controller software such as MOVA (Microprocessor Optimised Vehicle Actuation) is used. The existing Howth Road / Sybil Hill Road junction is also linked and monitored by the DCC SCATS system.

8.5.5 The main LinSig model results can be summarised as follows:

- For the '**Base Year 2019'** model, the existing Howth Road approaches are operating within capacity, however the Brookwood Avenue and Sybil Hill Road approaches are already near capacity during peak traffic hours. This is as expected given that the traffic signals are set in favour of Howth Road which is a high frequency bus route, with the side roads given minimum green time. These results are broadly in line with the observed conditions during the traffic surveys.

- The junction performance is similar for the '**2021 Opening Year model, with the MKN development fully occupied but without the St Paul's residential development**'. All arms remain within capacity.

- For the '**2021 Opening Year, with the St Paul's residential development** model, the Howth Road Eastbound and Westbound arms show marginal increases in the Degree of Saturation, but still have reserve capacity overall. The Sybil Hill Road approach is at capacity during the AM peak traffic period, and the Brookwood Avenue approach is at capacity during the PM peak traffic period. This is typical of many urban junctions during peak traffic periods.

8.5.6 The LinSig traffic modelling analysis undertaken shows that the junction can satisfactorily accommodate the projected additional traffic from the Proposed Development.

8.6 Traffic Signal Optimisation – Sensitivity Test

8.6.1 The Howth Road / Sybil Hill Road junction is operated using vehicle detection and is linked to the DCC SCATS system. The junction can therefore be adapted on a needs basis to assign appropriate priority to various junction approaches, and optimise junction performance by increasing green time for approaches at or nearing capacity.

8.6.2 ILTP therefore undertook a sensitivity analysis for the LinSig traffic model to include an additional 3 seconds of green time on average allocated to each of the Brookwood Avenue and Sybil Hill Road arms. ILTP applied these increased signal times to the LinSig model to determine the effect on the capacity of the junction.

8.6.3 The output results for ILTP's modified Linsig model are summarised in Table 8.4.

Table 8.4: R105 Howth Road / R808 Sybil Hill Road Junction Sensitivity Test – With Proposed Development and Signal Optimisations

Scenario		Degree of Saturation per Arm			
		Howth Road Eastbound	Howth Road Westbound	Sybil Hill Road	Brookwood Avenue
Opening Year 2021, with St Paul's and Sensitivity Test	**AM**	58.9%	62.1%	88.6%	87.8%
	PM	79.4%	46.3%	80.1%	91.3%

8.6.4 These minor signal time modifications result in an improvement in the capacity of the junction with all approaches operating within capacity with the Proposed Development in place.

8.6.5 The Howth Road is a high frequency bus route and it is considered preferable that good bus priority be maintained on Howth Road in line with Government and local policy. ILTP consider therefore that this optimisation of the existing Howth Road / Sybil Hill Road junction is not necessary.

8.7 Summary Findings

8.7.1 This robust assessment assumes combined trip generation figures for the proposed St Paul's residential development and St Paul's College Sports Hall / Playing Pitches development and permitted MKN development, and confirms that the adjoining road network can satisfactorily accommodate the projected development traffic.

8.7.2 It is further noted that if current Government and DCC mode share targets are met, as reaffirmed in the *DCC Development Plan 2016 – 2022*, then significant reductions in background traffic can be expected in the short to medium term in line with greater shift to more sustainable modes of transport The *National Development Plan 2018 - 2027* includes DART expansion on the nearby rail corridor, and there are also significant plans to improve bus connectivity in the area, which will further transport mode shift. Therefore over time overall traffic in the area is likely to decline in line with increased Capital Investment in non-motorised modes of travel.

9 CONSTRUCTION TRAFFIC IMPACT ASSESSMENT

9.1 Construction Activity

9.1.1 The impacts associated with the construction phase of the St Paul's development have been assessed in this section.

9.1.2 This Construction Traffic Impact Assessment has been undertaken with reference to cut and fill estimates provided by O'Connor Sutton Cronin Consulting Engineers.

9.1.3 For further details relating to the construction phase of the Proposed Development refer to the *Construction & Demolition Waste Management Plan (CDWMP)*, and *Construction Environmental Management Plan (CEMP)*, which are included separately with the planning application for the Proposed Development.

9.1.4 It is anticipated that, following grant of planning permission, construction will start in 2021, and the development will be fully completed by end of 2024.

9.1.5 The works will be phased in such a way as to allow the road network to remain open with existing capacity maintained at all times.

9.1.6 The following assumptions were made as part of the evaluation process:

- 11 Hours operation per day Monday - Friday (07.00 – 18.00)
- 6 Hours operation Saturday (08.00 – 14.00)
- 18 tonne (11m^3) capacity vehicles with potential occasional use of 27 tonne capacity articulated lorries
- 45 Months anticipated construction time

9.2 Proposed Haul Route for Construction Traffic

9.2.1 A detailed construction traffic management plan will be prepared and submitted to the Planning Authority prior to commencement of construction of the development.

9.2.2 Various route proposals were assessed for accessing the Site, however, it was decided that the route with the least impact on the adjoining road network would be the most prudent, as it would reduce conflict with other vehicles. In particular the avoidance of use of the local road network was prioritised.

9.2.3 The proposed routes for HGV movements during the construction period are shown in Figure 9.1. The primary R107 Malahide Road route will be used for most HGV movements to facilitate construction traffic movement to and from the M50 and Port Tunnel.

9.2.4 Construction traffic will also access the Site from the north along the R808 Brookwood Avenue, and egress the Site in the same direction. This minimises impact on the nearby Howth Road / Sybil Hill Road junction, as all construction traffic can pass through the junction via 'Straight-Ahead' movements. This negates the need to turn left and right, which can contribute to delays by swinging into adjacent traffic lanes.

9.2.5 The R105 Howth Road was also considered as an alternative route to and from the city centre, however there is no right-turn permitted from Howth Road onto Sybil Hill Road.

9.2.6 The proposed haul route will be agreed with the Local Authority prior to commencement on site.

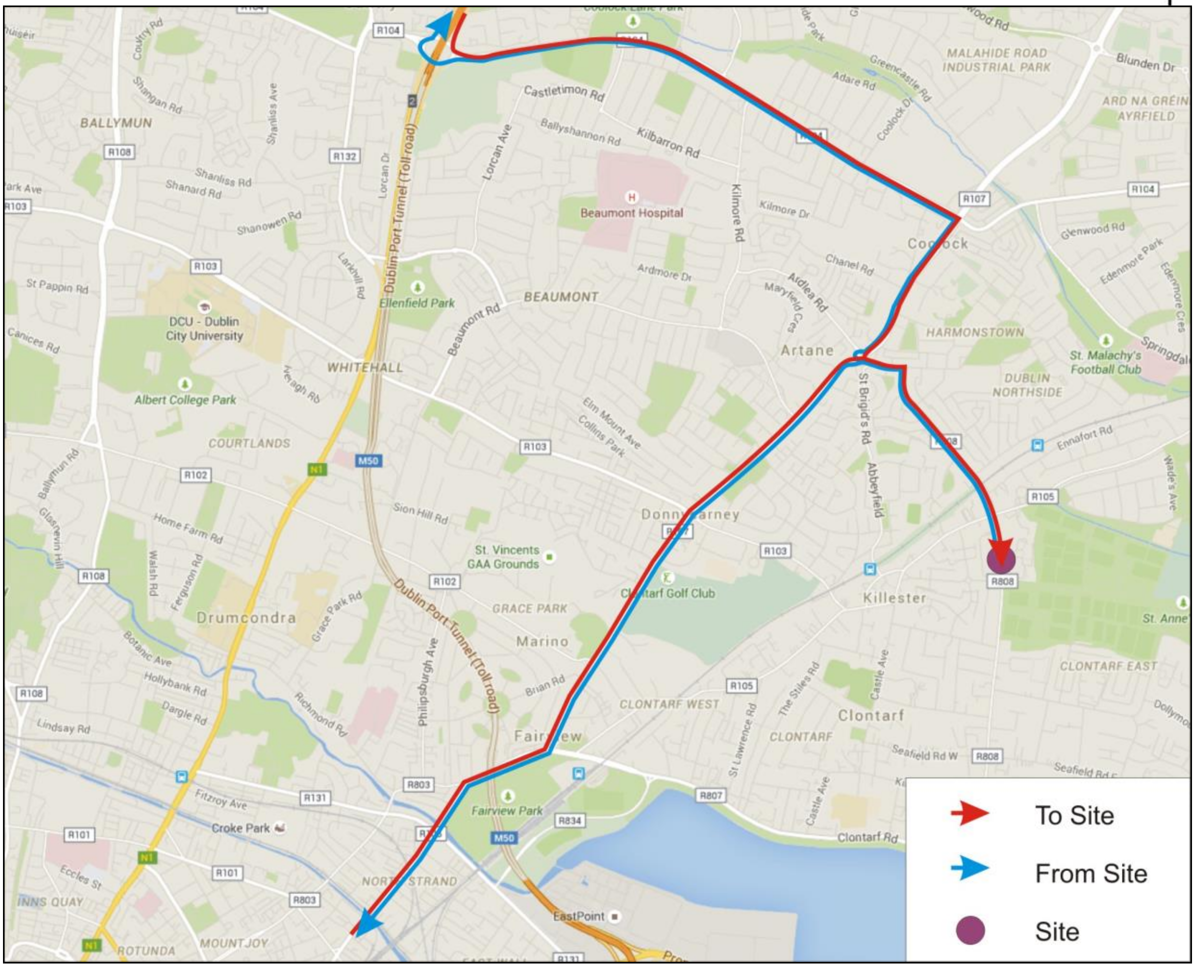


Figure 9.1: Proposed Route for Truck Movements during Construction Period

9.3 Construction HGV Movements

9.3.1 An estimate of total excavation and fill volumes is presented in Table 9.1, as provided by O'Connor Sutton Cronin Consulting Engineers. The balance of excavated material will be generally disposed off site to a licensed facility.

Table 9.1: Estimation of Excavation and Fill Quantities

Total Excavated Volume (m^3)	Total Fill Volume Required on Site (m^3)	Net Cut Volume Exported from Site (m^3)
78,078	2,536	75,542

9.3.2 Based on the quantities of excavation to be moved from the Site, demolition waste removal, and general site deliveries for the intended construction works, the projected HGV movements to and from the site were determined for the relevant construction activities, as presented in Table 9.2.

9.3.3 Demolition waste includes the off-site reuse, recycling and disposal of materials such as glass, concrete, bricks, tiles, ceramics, plasterboard, metals and timber.

Table 9.2: Estimation of HGV Movements

Construction Activity / Stage	Estimated Period	Volume / Tonnes of Material	Total Number of HGVs Required	Average One-Way HGV Movements per Day	Average AM Peak Hour One-Way HGV Movements	Average PM Peak Hour One-Way HGV Movements
Demolition Waste Removal	1 month	195 tonnes + 40 m^3 bituminous products	20	2	1	1
Exporting Excavated Material (Bulk Earthworks Stage)	6 months	75,542 m^3	6,867	100	9	9
Deliveries	39 months	-	-	80	7	7

9.3.4 Of the main construction activities / stages set out in Table 9.2, the highest projected concentration of HGV movements arriving and departing the Site are associated with the bulk earthworks excavation stage. The bulk earthworks stage is projected to take place over a maximum period of 6 months, and require an average of 100 no. one-way HGV movements per day. Allowing for possible short-term intensifications of excavation activities during this 6-month bulk earthworks excavation period, it is further projected that there may be up to 150 no. HGV loads of excavated material departing the Site per day. This equates to a projected peak of 300 no. one-way HGV movements per day.

9.3.5 Beyond the bulk earthworks stage, other stages during construction are estimated to have lower HGV volumes and lower traffic volumes overall.

9.3.6 For completeness, ILTP have undertaken an assessment of the projected peak construction traffic movements associated with the bulk earthworks excavation stage.

9.3.7 It is proposed that all HGVs arriving to and departing from the Site would travel via the designated construction haul route shown in Figure 9.1. Therefore, all HGVs during construction stage are expected to travel via Brockwood Avenue and the Howth Road / Sybil Hill junction to the north of the Proposed Development entrance.

9.3.8 Excluding HGV drivers, it is estimated that the bulk earthworks stage would require a maximum of 15-20 personnel on site. It is further estimated that there will be a maximum of 50 car / light vehicle traffic movements per day associated with these site personnel during the earthworks stage. Given typical construction working hours the majority of these personnel are expected to arrive to site in advance of the 08:00 – 09:00 morning peak hour and after the 17:00 - 18:00 evening peak hour.

9.3.9 The projected peak construction traffic movements associated with the bulk earthworks excavation stage are shown in Table 9.3.

Table 9.3: Estimation of Peak One-Way Construction Traffic Movements during Bulk Earthworks Excavation Stage

Construction Activity / Stage	Estimated Period	Projected HGV Movements per Day	Projected Car / Light Vehicle Movements per Day	Projected Total Movements per Day	Projected Total Vehicle Movements for AM Peak Hour	Projected Total Vehicle Movements for PM Peak Hour
Exporting Excavated Material (Bulk Earthworks Stage)	6 months	300 (150 Loads)	50	350	32	32

9.3.10 The projected peak one-way construction traffic movements during the bulk earthworks excavation stage are 350 no. vehicular movements per day. This is averaged over an 11 hour working day as 32 no. vehicular movements per hour, including the peak traffic hour periods.

9.3.11 This projected peak volume of construction traffic, including both truck and staff movements, is lower than the daily and peak hour traffic volumes projected for the fully occupied development during the operational stage, which included up to 160 no. vehicular movements per hour during the PM peak traffic hour (see Table 7.2).

9.3.12 Therefore, in Traffic Impact Assessment terms, the most onerous scenario to assess in terms of capacity and traffic impact is the operational stage of the development.

9.4 Traffic Management Plan

9.4.1 As part of the construction works the appointed contractor shall prepare a Construction Traffic Management Plan which will outline their approach to the project and detail potential impacts for the public road system. This may include provision of transport facilities and the encouragement of car sharing and public transport usage by staff. It will also include measures to mitigate any potential noise and air quality impacts resulting from construction activities, namely from traffic movements in and out of the Site.

9.4.2 A more detailed Traffic Management Plan will be prepared and agreed with the Transportation Department of Dublin City Council to provide for mitigation of the impact of construction traffic associated with the Proposed Development.

9.5 Construction Traffic Mitigation Measures

9.5.1 The Traffic Management Plan will include the following measures to mitigate the impact of construction traffic:

General:

- Tracked excavators will be moved to and from the Site on low-loaders and will not be permitted to drive onto the adjacent roadway.
- Vehicles delivering or removing material with potential for dust emissions to an off-site location shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust.

- The applicant shall at all times keep all public and private roads and footpaths entirely free of excavated materials, debris and rubbish.

- Public roads outside the Site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary. A road sweeper will be made available to ensure that public roads are kept free of debris.

- If practicable, a wheel wash facility will be employed at the exit of the Site so that traffic leaving the site compound will not generate dust or cause the build-up of aggregates and fine material in the public domain.

- The applicant is committed to implementing sustainable construction practices and as such will be seeking to reduce the quantities of waste material being carried off the Site to a minimum.

- A site liaison officer will be identified as a single contact point for the Planning Authority and local community to deal with any issues that may arise in a prompt and efficient manner.

- Construction work will be limited to normal working hours; that are 07.00 – 18.00 on weekdays and 08.00 – 14.00 on Saturdays. All deliveries of materials, plant and machinery to the Site and removals of waste or other material will take place within the permitted hours of work. Vehicle movements will be planned to ensure arrival and departure times are maintained inside the agreed working hours.

- Deliveries will be co-ordinated to prevent queuing of vehicles adversely affecting traffic flow and to minimise disruption to local traffic. They will be timed and coordinated to avoid conflict with collection of waste, other deliveries (particularly to adjoining owners), and rush hour traffic. Large deliveries will be scheduled outside peak traffic hours to minimise disruption.

- No day time or night time parking of site vehicles or construction staff vehicles will be permitted outside agreed areas.

- The applicant shall be responsible for and make good any damages to existing roads or footpaths caused by his own contractors or suppliers transporting to and from the Site.

- The contractor shall confine his activities to the area of the Site occupied by the works and the builders' compound, as far as practicably possible, during any particular phase of the works.

- Properly designed and designated access and egress points to the construction site will be used to minimise impact on external traffic.

- Banksman and/or traffic lights will be used to control the exit of construction vehicles from the Site onto the public road, if required.

- Establishment and maintenance of a Truck holding area within the Site.

- All construction workers will be encouraged to use public transport, and also to car share. On site staff car parking can also be provided to ensure no construction workers will be required to park on adjacent roads or streets.

Safety on the Public Road:

- Priority to keep vehicles and pedestrians apart.
- Separate entry and exit gateways will be provided for pedestrians and vehicles with a gate man in attendance to interface with the traffic and public to facilitate safe access and egress of vehicles.
- Firm, level, and well-drained pedestrian walkways will be provided.
- Measures will be implemented to ensure drivers driving out onto public roads can see both ways along the footway before they move on to it.
- Footpaths will not be blocked resulting in pedestrians having to step onto the carriageway.

9.6 Summary of Construction Traffic Impact Assessment

9.6.1 The overall level of traffic generated by the construction works is projected to be lower than that included in this TIA for the operational stage of the Proposed Development. A number of steps will be implemented to ensure the existing road network continues to operate efficiently throughout the construction process.

9.6.2 All construction HGV traffic will be directed via the main designated construction traffic haul routes.

10 MOBILITY MANAGEMENT PLAN / TRAVEL PLAN

10.1 Introduction

10.1.1 A Mobility Management Plan (MMP), or Travel Plan, is a wide range of policies, programmes, services and products that influence how, why, when & where people travel to make travel behaviour more sustainable.

10.1.2 Figure 10.1 represent graphically the interlinking approaches and strategies utilised in the preparation of Mobility Management Plan. Within this MMP we have sought to consider transportation demand, transportation supply and land use.

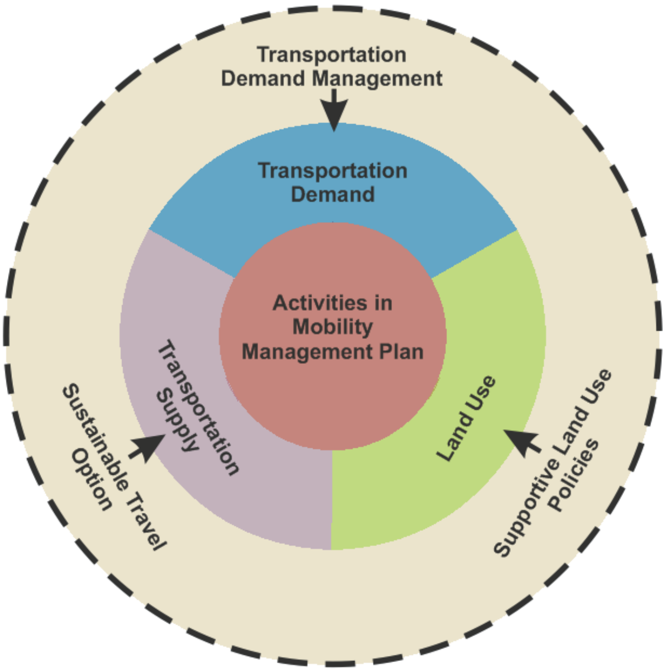


Figure 10.1: Mobility Management Plan Strategies

10.1.3 Mobility Management can be described, as a transport demand management mechanism that seeks to provide for the transportation needs of people and goods. It can be applied as a strategic demand management tool or as a site-specific tool measure. The aim is to reduce the demand for and use of cars by increasing the attractiveness and practicality of other modes of transport. Mobility Management encourages individuals, companies or institutions to satisfy their transport needs by the efficient and integrated use of available transport facilities.

10.1.4 The UK Dept of Transport has produced a document entitled *'Making residential travel plans work – guidelines for new development'*." This document has guided the preparation and drafting of this MMP strategy. In addition the DTO guideline document "*Route to Sustainable Commuting: an Employer's guide to travel plans*" and "*A Sustainable Transport Future*" produced by the Department of Transport have influenced the preparation of this MMP.

10.1.5 The use of MMP is an important element in meeting targets set down in the *Smarter Travel A Sustainable Transport Future.*

10.1.6 The Department of Transport published the policy document *Smarter Travel A Sustainable Transport Future – A New Transport Policy Document for Ireland 2009 –2020* in early 2009. This document sets down the policies and measures required to reduce travel demand and ensure that a far greater proportion of travel is done using sustainable modes of transport.

10.2 Objectives of Mobility Management Plan

10.2.1 A Mobility Management Plan would have the effect of reducing in overall terms both the amount of trips generated by a particular development, and would ensure that greater numbers use public transport. A mobility management strategy would therefore act as a form of mitigation by reducing the overall level of traffic that would be on the surrounding roads in the future.

10.2.2 This Mobility Management Plan includes provision for the appointment of a Mobility Manager, and details of access to the appointed Mobility Manager by the residents in the development.

10.3 Mobility Management Plan Study

10.3.1 ILTP have undertaken a comprehensive study of the proposed future traffic management within the study area involved consideration of the following:

- Public Transport Network Upgrades
- Non Motorised Transport Upgrades
- Car and Bicycle Parking

10.4 Public Transport Network Upgrades

10.4.1 The recently Government published *Infrastructure and Capital Investment 2016 –2021* includes DART expansion on the nearby rail corridor and includes for further upgrades to the QBC network. This will further enhance public transport in the area.

10.5 Non-Motorised Transport Network Upgrades

10.5.1 There are significant improvements planned for the bicycle network in the vicinity of the subject lands. The planned improvements are set out in the NTA *Greater Dublin Area Cycle Network Plan*. This includes a secondary cycle network planned on the R808 adjacent to the subject site and a primary cycle network planed on the R105 nearby.

10.5.2 An 8.5km section of the Dublin Bay Cycle Path has also recently been opened. This off-road cycle path which runs from Clontarf to Sutton along Dublin bay has been completed 25 years after work began.

10.6 Car and Bicycle Parking

10.6.1 ILTP propose to apply the CDP standard of 1:1 parking space to apartment ratio for 2-bed and 3-bed apartments. ILTP further propose that zero car parking spaces be allocated to the 1-bed apartments. It is proposed that 5% of the residential parking provision be allocated for disabled access parking on an 'as-needs' basis.

10.6.2 For the apartments this equates to an overall average provision of 459 no. car parking spaces for the apartment units.

10.6.3 A further provision of 28 no. visitor spaces is proposed, which is 6% of the dedicated apartment spaces.

10.6.4 The Proposed Development also includes provision at basement level for electric car charge points at car parking spaces to enable those residents who own electric cars to charge them overnight.

10.6.5 It is projected that up to 8 staff members will work in the creche at any one time. The 6 no. staff car parking spaces for the crèche are proposed to be located within the underground car park. These car parking spaces are conveniently located to the lifts to allow staff to directly access the crèche via the lifts.

10.6.6 It is proposed that 28 no. car parking spaces be allocated for shared use, and these will be managed by the Management Company. These spaces will be for shared use to facilitate car parking demand for creche drop-off and visitors to apartments.

10.6.7 Given that the crèche is proposed to mainly facilitate residents of the Proposed Development most will be dropped off at the crèche on foot. Therefore the proposed shared parking provision should be more than adequate to accommodate the peak drop off demand.

10.6.8 In addition, it is proposed to provide an additional 2 no. dedicated electric car parking at surface level to enable those residents who own electric cars to charge them overnight.

10.6.9 A 'Go Car' car club facility is also proposed for the St Paul's Residential Development in order to reduce the need for car ownership whilst making cars available for residents to meet periodic car needs. The Go-Car facility will be exclusively for residential uses and would be operated and managed by the Management Company. It is proposed that 2 no. 'Go-Car' car parking spaces be provided at surface level

10.6.10 It is proposed that 5% of the total parking provision be allocated for disabled access parking on an 'as-needs' basis.

10.6.11 The required cycle parking provision for the proposed residential development was also determined with regard to current Development Plan Standards and the Apartment Guidelines. It is proposed to provide 1,314 no. cycle parking spaces in the basement, which equates on average to 2 no. cycle parking spaces per residential unit. It is further proposed to provide an additional 329 no. cycle parking spaces at surface level which is approximately 1 no. cycle parking space per 2 no. residential units. A portion of the proposed cycle parking provision can also be allocated to meet the cycle parking requirements of the creche.

10.6.12 It is good practice from a sustainable development perspective to apply measures to restrain private car usage. Measures such as parking control are important in encouraging alternative forms of travel to the private car. However, it is desirable that the quantum of parking should be set at a reasonable level in order to ensure illegal parking outside of the subject site is not generated. The proposed parking adheres to these principles, and to Development Plan standards, and is appropriate for a site of this kind and location.

10.7 Mobility Management Plan

10.7.1 **Mobility Manager -** Most fundamental to the success of such a venture is the appointment of a Mobility Manager by the Management Company for the residential units. This individual will be responsible for the delivery of the programme and will act as an interface between the various stakeholder groups within the development.

10.7.2 The Mobility Manager will also be involved in monitoring of the mode of travel from the residential development. This ideally will be done on an annual basis. Monitoring of travel patterns will facilitate the provision of sustainable transport modes and ensure that once modal targets are met that there is no slippage and instead efforts made to further improve the situation. The Management Company concierge will also be located at the entrance to the scheme which will help with monitoring.

10.7.3 A Mobility Manager for the proposed residential development will be appointed after the completion and occupation of the first residential block. The Mobility Manager will have a role in promoting and monitoring the provisions of travel plans within the residential development.

10.7.4 The Mobility Manager will at the outset of the occupation of the first block of residential units implement a number of key measures. These will include

- Providing new residents with a Travel Welcome Pack giving full details of transport options, cycle/walking maps and information on local services
- Instigate and regularly update a travel notice board in each of the blocks providing travel information. This may also be provided online subject to demand.
- Promote the use of Go Car and car share scheme within the development

10.8 Personalised Travel Planning

10.8.1 Alongside the roll-out of these standardised measures a travel plan will be implemented with the objective of developing a sustainable transportation and access policy for residents of the Proposed Development both during and after the construction.

10.8.2 The travel plan aims to create:

- Healthier, stress free and cheaper commutes to work and school for residents
- Manage travel options that provide realistic alternatives to single occupant car commutes
- More informed travel choices for residents
- Integration with other relevant initiatives such as the Green Schools Travel Programme and work based mobility management plans

10.8.3 Central to the plan is the creation and communication of travel options available to all those accessing the proposed and planned developments.

10.9 Application of Personalised Travel Planning

10.9.1 In order to maximise its effectiveness it should be implemented from the outset of the scheme in order to establish sustainable travel patterns at an early stage. A detailed PTP will need to be established and agreed between the developers of the scheme, the Council and any other relevant bodies, all of whom will have a stake in the initiative. Broadly it will include the following elements:

10.9.2 **Personalised Travel Programme -** A programme that will assess the targets of the plan, the most appropriate means of delivering those targets and a system of ongoing monitoring, feedback and improvement;

10.9.3 **Information tailoring and provision -** The success of the scheme is based on the provision of tailored and relevant information to each user.

10.9.4 **Incentivisation -** As part of a marketing strategy, incentives can be organised to promote increased use of public transport and promote the financial benefits of becoming a non car owning household.

10.9.5 **Monitoring -** In order to measure the success of the scheme entire as well as individual initiatives within the scheme, regular monitoring and evaluation against key performance indicators should be undertaken. This will be done on an annual basis.

10.9.6 **Formulation of individual initiatives -** The overall programme will be a composite of several sub-initiatives, as deemed appropriate to the local area. These may include, among others, all or some of the following: -

- Car-sharing / Pooling / Car Club initiatives;
- Cycle/ Walk to work initiatives;
- Walk to School initiatives;
- PT Incentivisation schemes
- Tele-working initiatives
- Cycle training
- Community Travel Forum

10.10 Evaluation and Reporting

10.10.1 The functioning of the Mobility Management Plan will be overseen on an ongoing basis. This will ensure that travel notice boards are kept up to date and that new residents are provided with travel packs and a full induction session.

10.10.2 More formal measurement of the travel behaviour can be undertaken on an annual basis, to include seeking input from the local authority and the Management Company. This can determine if the objectives of the Mobility Management Plan are being met.

10.10.3 Following on from this analysis measures required to remedy any deficiencies can be identified and implemented.

11 SUMMARY & CONCLUSIONS

11.1 Summary

11.1.1 ILTP Consulting were commissioned by Crekav Trading GP Ltd to undertake a Traffic & Transport Assessment (TTA) for a proposed residential development on lands at St Paul's, Raheny, Dublin 5. The primary purpose of this TTA is to assess the potential impact this development may have on the surrounding road network and to identify measures to mitigate these impacts and promote sustainable transport patterns. The TTA also provided the traffic and transport inputs into the EIAR.

11.1.2 A previous SHD planning application for development of the subject lands was previously lodged with An Bord Pleanala on 22nd December 2017, and granted by the Board on 3rd March 2018. However, the Boards's decision was subsequently quashed by order of the High Court following a judicial review.

11.1.3 The Proposed Development comprises a total of 657 no. apartments in 9 no. separate 5-9 storey residential blocks, in addition to a basement car parking facility. The proposed scheme also includes a 612 sq. m commercial crèche.

11.1.4 The proposed residential development will be accessed via R808 Sybil Hill Road, at a point 200m to the south of the Howth Road junction. Howth Road is a primary arterial road connecting the suburbs of North Dublin with the City Centre.

11.1.5 The Proposed Development site is well served by both existing bus and rail services which are within short walking distances, which offer an attractive alternative to the use of private car for commuting and other purposes. This significantly reduces the impact from the Proposed Development on the surrounding road network.

11.1.6 Site appraisals and fully classified traffic counts in the environs of the Proposed Development were previously undertaken by ILTP in 2015 and 2017, with new surveys conducted in February 2019. These showed an overall slight decline in traffic in the AM and PM peaks. This is consistent with overall traffic patterns in Dublin City as confirmed by the recently published NTA *Canal Cordon Report 2018* which shows continuing decline in radial traffic in and out of the city centre in the AM and PM traffic periods.

11.1.7 Trip Generation figures for the new development were devised using comparable development trip generation rates, which were verified by the TRICS software. The trip generation rates used are likely to be an overestimation on the net new trip generation rates due to the location of the Proposed Development and the Mobility Management Plan proposals.

11.1.8 ILTP carried out a junction capacity assessment for the proposed upgraded access road off Sybil Hill Road using the PICADY software.

11.1.9 The traffic flow levels on Sybil Hill Road are relatively low in comparison with other urban roads in the area and the route is currently running well within the link capacity of this type of urban route.

11.1.10 It is proposed to upgrade the existing access to the Vincentian's Residence and extend same to provide access to the new residential development located to the rear of the school. Access to the school will remain unaltered by the Proposed Development and a gated access to the school will also be provided off the Proposed Development access to provide linkage between the Vincentian's Residence and the school.

11.1.11 An upgraded priority junction is proposed off Sybil Hill Road to serve the new development. The proposed access road also includes for on-road cycle lanes from the junction with Sybil Hill Road to beyond the access to the Vincentian's Residence, to give a safe cycle route from Sybil Hill Road to beyond the school and Vincentian's Residence access points. This cycle route will link with the DCC Cycle Network planned for the area. Beyond the side entrances to the development the nature of the new access road will become solely residential in nature, with landscaping and traffic management measure to ensure that cyclists and cars can share the carriageway.

11.1.12 The proposed residential development is located approximately 200m from Sybil Hill Road. This is beneficial in preventing overspill of car parking on to Sybil Hill Road and ensuring that the proposed residential area will also remain free from external car parking.

11.1.13 The proposed residential development adjoins St. Anne's Park along three sides, which will be beneficial in providing passive surveillance of the park. Four pedestrian links are proposed if the Board wishes a direct link to be established between the school and the adjacent park. These pedestrian links could also allow direct access to the park for residents, which would further increase the use of the park and would also reduce walk and cycle distance to Bus and Dart services.

11.1.14 The Picady analysis has found that the proposed access junction onto Sybil Hill Road will operate at less than 22% of its capacity with the development in place.

11.1.15 The pedestrian crossing to the south of the proposed access will provide gaps in the traffic on Sybil Hill Road, which will further aid access and egress to the Proposed Development. The final location of this pedestrian crossing will be agreed with the local authority.

11.1.16 Based on the traffic conditions observed during site visits and traffic surveys, the nature of the development, and the proximity to Dublin City Centre, ILTP estimated a 50/50 split in Trip Distribution for traffic exiting the development. Therefore the traffic flow will dissipate left and right, with less that one additional vehicle per minute from the development being added to Sybil Hill Road in either direction.

11.1.17 The traffic flows at Sybil Hill Road/Vernon Avenue are signal controlled and the overall impact of the Proposed Development will be very low at this location. Beyond this the traffic dissipates further to well below threshold levels.

11.1.18 The junction of Howth Road/Sybil Hill Road is currently heavily used at peak times and particularly so during school opening and closing times at the nearby primary school. The current signal setting gives priority to the main road with minimum green time allocated to Sybil Hill Road and Brookwood Avenue. This is appropriate as Howth Road is a high frequency bus route.

11.1.19 The capacity of this junction was assessed using the LinSig Signalised Junction Modelling software. This shows that, by applying robust traffic generation figures, the overall change in traffic flow through this junction from the proposed St Paul's Residential Development and adjoining St Paul's College Sports Hall / Pitches Development is projected to increase by approximately 3.1% during the morning peak hour and 3.8% during the evening peak hour. These increases are below the 5% Traffic Impact Assessment threshold which would normally be regarded as having a reasonable impact on the junction. However based on our experience the increase in traffic from the new development is likely to result in changes to traffic patterns in the area rather than an increase in traffic on the wider network. Therefore the traffic increases assumed in both this TIA ad the EIAR for the Proposed Development represent a worse case scenario.

11.1.20 The LinSig Traffic Model shows that the existing Howth Road approaches are operating within capacity, which is a high frequency bus corridor. This is as expected given that the traffic signals are set in favour of Howth Road, with the side roads given minimum green time.

11.1.21 The LinSig traffic modelling analysis undertaken shows that the junction can satisfactorily accommodate the projected additional traffic from the Proposed Development.

11.1.22 A sensitivity test showed that minor signal time modifications to the Howth Road / Sybil Hill Road junction would result in a further improvement in the capacity of the Brookwood Avenue and Sybil Hill Road approaches with the Proposed Development in place. ILTP consider however that optimisation of the existing Howth Road / Sybil Hill Road junction is not necessary as it is preferable that higher priority is afforded to the Howth Road which is a high frequency bus corridor.

11.1.23 Analysis of radial traffic movement to the city centre using the Annual Cordon Counts collated by DCC shows that radial traffic flows into the city centre are in gradual decline. The roll out of the cycle network by DCC has already resulted in large increases in cycling numbers. Proposed enhancements of public transport infrastructure in the area, such as the proposed Bus Connects upgrades in the area and also the *National Development Plan 2018 - 2027* proposed DART expansion on the nearby rail corridor, will further promote modal shift in the area. It is also further noted that if current Government and DCC mode share targets are met, as reaffirmed in the *DCC Development Plan 2016 – 2022*, then further reductions in background traffic can be expected in the short to medium term in line with greater shift to more sustainable modes of transport.

11.1.24 The internal layout car parking provision and Mobility Management Plan initiatives proposed will further promote greater use of more sustainable travel modes. In addition to providing adequate parking for the needs of the new residents, Go Car, electric car parking points and disabled access spaces are also to be provided. Generous cycle parking is provided for within the development and provision is made for some visitor car parking spaces also. The MMP includes for the appointment of a Mobility Manager by the Management Company for the residential development, which will ensure active participation of the new residents in promoting sustainable travel patterns.

11.1.25 The construction traffic will not have a significant negative impact on the local road network and will be directed via designated construction traffic routes. The proposed construction phasing and traffic management plan will minimise impact on local residents, schools, care facilities and businesses and ensure that Sybil Hill Road and the adjoining road network remains operational at all times.

11.2 Conclusions

11.2.1 This robust assessment assumes combined trip generation figures for the proposed St Paul's residential, Sports Hall / Playing Pitches and permitted MKN developments, and confirms that the adjoining road network can satisfactorily accommodate the projected development traffic.

11.2.2 The newly proposed St Paul's residential development accords with the policies as set down in the *Dublin City Development Plan 2016 – 2022*. The Proposed Development is fully supported by National, Regional and Local Plan policies and has evolved in a manner so that it fully supports the principles for sustainable transport as set out in Smarter Travel.

11.2.3 While this new Traffic & Transport Assessment assumed very robust, worse case scenario assumptions in respect to traffic flows and traffic generation, it demonstrates that with the proposed access and egress arrangement the net overall traffic impact would be readily accommodated in the road network. The proposed residential development will promote sustainable travel patterns due to its location, layout, design and proximity to the public transport and cycle networks. These will be complimented with a MMP and the appointment of a Mobility Manager to promote sustainable travel patterns by residents. The proposed residential development is located such that it will not have any significant traffic impact on the existing residential development in the area and should improve overall use of and provide for passive surveillance of the adjacent St. Anne's Park. The access and internal layout is designed in accordance with DMURS and includes for good permeability and will promote and facilitate sustainable travel patterns as part of the overall development.

A APPENDIX

A.1 *Dublin City Development Plan 2016 – 2022* Car Parking Standards

A APPENDIX

A.1 *Dublin City Development Plan 2016 – 2022* Car Parking Standards

Table 16.1 – Maximum Car Parking Standards for Various Land-Uses

Land-Use	Zone	Car Spaces
Enterprise and Employment/Offices/ General Industry (inc warehousing)	1 2 3	1 per 400 sq.m GFA (Gross floor area) 1 per 200 sq.m GFA 1 per 100 sq.m GFA
Retail Supermarkets exceeding 1,000sq.m GFA	1 2 3	None 1 per 100 sq.m GFA[1] 1 per 30 sq.m GFA[1]
Other Retail and Main Street, Financial Offices (excl. retail warehouse)	1 2 3	1 per 350 sq.m GFA 1 per 275 sq.m GFA 1 per 75 sq.m GFA
Industry	1 2 3	1 per 400 sq.m GFA 1 per 200 sq.m GFA 1 per 75 sq.m GFA
Warehouse Retail (non-food)	1 2 3	1 per 300 sq.m GFA 1 per 200 sq.m GFA 1 per 35 sq.m GFA
Warehouse	1 and 2 3	1 per 450 sq.m GFA 1 per 200 sq.m GFA
Residential	1 and 2 3	1 per dwelling 1.5 per dwelling
Elderly Persons Dwellings/ Warden-Supervised Dwellings/ Sheltered Housing	1 2 and 3	1 per 4 dwellings 1 per 2 dwellings
Youth Hostel	1 2 3	None 1 per 30 bed-spaces 1 per 15 bed-spaces
Student Hostel/Student Accommodation	1 2 3	None (see section 16.10.7 for requirements) 1 per 20 bed-spaces 1 per 10 bed-spaces
Residential Institution	1 2 3	None 1 per 20 bed-spaces 1 per 10 bed-spaces
Hotels and Guest Houses	1 2 3	1 per 4 rooms 1 per 3 rooms 1 per 1 room
Clinics and Group Practices	1 2 and 3	1 per consulting room 2 per consulting room
Churches, Theatres, Cinemas and Auditoriums	1 2 3	1 per 100 seats 1 per 25 seats 1 per 10 seats
Restaurants, Cafés and Take-aways	1 2 and 3	None 1 per 150 sq.m seating area

Land-Use	Zone	Car Spaces
Public Houses	1 2 3	None 1 per 300 sq.m NFA (net floor area) 1 per 50 sq.m NFA
Schools	1 2 and 3	None 1 per Classroom
Colleges of Further Education	1 2 and 3	None 1 per classroom and 1 per 30 students
Funeral Homes	1, 2 and 3	4 off-street parking spaces
Hospitals (Out-patient facilities)	1 2 3	1 per 150 sq.m GFA 1 per 100 sq.m GFA 1 per 60 sq.m GFA
Nursing Home	1 2 and 3	1 per 3 patient beds 1 per 2 patient beds
Cultural and Recreational Buildings	1 2 3	1 per 400 sq.m GFA 1 per 250 sq.m GFA 1 per 100 sq.m GFA
Nightclub/Dance Hall/Dance Club	1 2 3	None 1 per 10 sq.m floor area 1 per 3 sq.m floor area
Other Cultural and Recreational and Leisure Uses	1, 2 and 3	Dependent on nature and location of use

[1] Car parking above maximum permitted standards may be acceptable in very limited circumstances at the discretion of Dublin City Council. Such circumstances could include proposals where overspill car parking may arise, where the need to protect the primacy of the city in the regional retail hierarchy is identified, or where the need to accommodate car parking as part of a larger scheme of civic importance is apparent. In all cases, the applicant must fully engage with Dublin City Council at pre-planning stage regarding the acceptability of departure from maximum standards.

Where a deviation from maximum standards is to be considered, the acceptability of proposals will be assessed against a number of criteria including, inter alia:

- The civic importance of the scheme
- The identified need for public car parking in the area
- The accessibility of the surrounding area
- Road capacity and impact on the road network
- The mix and appropriateness of uses proposed
- The impact on the public realm, streetscape and urban fabric of the city
- The impact on the grain and vitality of city streets
- Compliance with Section 4.5.5, 'The Public Realm'
- Compliance with policies to make efficient use of finite urban land and consolidate the city
- Compliance with policies to safeguard investment in public transport and encourage modal shift.

In addition, proposals will be informed by a Transport Assessment, the scope of which must be agreed by Dublin City Council prior

B APPENDIX

B.1 PICADY Analysis

PICADY		
GUI Version: 5.1 AE Analysis Program Release: 5.0 (MAY 2010) © Copyright TRL Limited, 2010 Adapted from PICADY/3 which is Crown Copyright by permission of the controller of HMSO		
For sales and distribution information, program advice and maintenance, contact:		
TRL Limited Crowthorne House Nine Mile Ride Wokingham, Berks. RG40 3GA, UK		Tel: +44 (0)1344 770758 Fax:+44 (0)1344 770864 E-mail: software@trl.co.uk Web: www.trlsoftware.co.uk
The user of this computer program for the solution of an engineering problem is in no way relieved of their responsibility for the correctness of the solution		

Run Analysis

Parameter	Values
File Run	I:\ILTP Projects\StPauls\Data\Picady\2019 TTA\2021 Opening Year.vpi
Date Run	16 August 2019
Time Run	12:22:57
Driving Side	Drive On The Left

Arm Names and Flow Scaling Factors

Arm	Arm Name	Flow Scaling Factor (%)
Arm A	R808	100
Arm B	Proposed Access	100
Arm C	R808	100

Stream Labelling Convention

Stream A-B contains traffic going from A to B etc.

Run Information

Parameter	Values
Run Title	St Pauls Residential Development Proposed Access
Location	Sybill Hill Road
Date	16 August 2019
Enumerator	-
Job Number	STPAULS
Status	TIA
Client	Crekav Trading GP Limited
Description	2021 Opening Year Assessment of Proposed Access Junction onto Sybil Hill Road

Errors and Warnings

Parameter	Values
Warning	No Errors Or Warnings

Geometric Data

Geometric Parameters

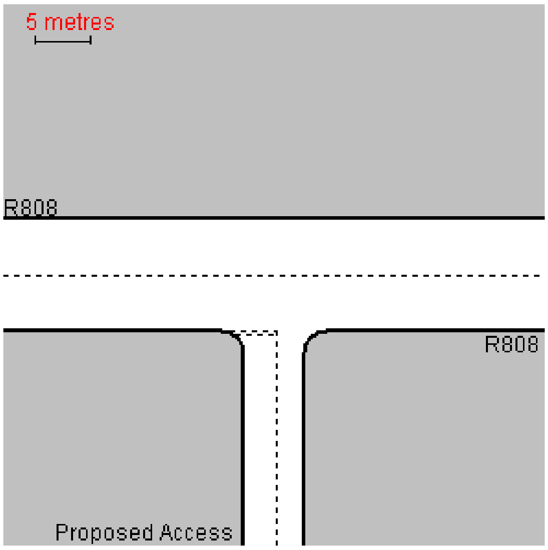
Parameter	Minor Arm B
Major Road Carriageway Width (m)	8.00
Major Road Kerbed Central Reserve Width (m)	0.00
Major Road Right Turning Lane Width (m)	2.20
Minor Road First Lane Width (m)	3.00
Minor Road Visibility To Right (m)	100
Minor Road Visibility To Left (m)	100
Major Road Right Turn Visibility (m)	100
Major Road Right Turn Blocks Traffic	Yes (if over 0 veh)

Slope and Intercept Values

Stream	Intercept for Stream	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	560.751	0.093	0.236	0.148	0.337
B-C	686.890	0.096	0.243	-	-
C-B	631.874	0.224	0.224	-	-

Note: Streams may be combined in which case capacity will be adjusted
These values do not allow for any site-specific corrections

Junction Diagram



Demand Data

Modelling Periods

Parameter	Period	Duration (min)	Segment Length (min)
First Modelling Period	08:00-09:00	60	15
Second Modelling Period	17:00-18:00	60	15

Direct Entry Flows

Demand Set: St Pauls Proposed Access - AM Peak
Modelling Period: 08:00-09:00

Segment: 08:00-08:15

Arm	Flow (veh/min)
Arm A	5.60
Arm B	1.63
Arm C	5.30

Segment: 08:15-08:30

Arm	Flow (veh/min)
Arm A	5.60
Arm B	1.63
Arm C	5.30

Segment: 08:30-08:45

Arm	Flow (veh/min)
Arm A	5.60
Arm B	1.63
Arm C	5.30

Segment: 08:45-09:00

Arm	Flow (veh/min)
Arm A	5.60
Arm B	1.63
Arm C	5.30

Demand Set: St Pauls Proposed Access - PM Peak
Modelling Period: 17:00-18:00

Segment: 17:00-17:15

Arm	Flow (veh/min)
Arm A	4.52
Arm B	1.12
Arm C	6.63

Segment: 17:15-17:30

Arm	Flow (veh/min)
Arm A	4.52
Arm B	1.12
Arm C	6.63

Segment: 17:30-17:45

Arm	Flow (veh/min)
Arm A	4.52
Arm B	1.12
Arm C	6.63

Segment: 17:45-18:00

Arm	Flow (veh/min)
Arm A	4.52
Arm B	1.12
Arm C	6.63

Turning Counts

Demand Set: St Pauls Proposed Access - AM Peak
Modelling Period: 08:00-09:00

From/To	Arm A	Arm B	Arm C
Arm A	-	16	320
Arm B	49	-	49
Arm C	295	23	-

Demand Set: St Pauls Proposed Access - PM Peak
Modelling Period: 17:00-18:00

From/To	Arm A	Arm B	Arm C
Arm A	-	37	234
Arm B	34	-	33
Arm C	342	56	-

Turning proportions are calculated from turning count data

Turning Proportions

Demand Set: St Pauls Proposed Access - AM Peak
Modelling Period: 08:00-09:00

From/To	Arm A	Arm B	Arm C
Arm A	0.000	0.048	0.952
Arm B	0.500	0.000	0.500
Arm C	0.928	0.072	0.000

Demand Set: St Pauls Proposed Access - PM Peak
Modelling Period: 17:00-18:00

From/To	Arm A	Arm B	Arm C
Arm A	0.000	0.137	0.863
Arm B	0.507	0.000	0.493
Arm C	0.859	0.141	0.000

Heavy Vehicles Percentages

Demand Set: St Pauls Proposed Access - AM Peak
Modelling Period: 08:00-09:00

From/To	Arm A	Arm B	Arm C
Arm A	-	10.0	10.0
Arm B	10.0	-	10.0
Arm C	10.0	10.0	-

Demand Set: St Pauls Proposed Access - PM Peak
Modelling Period: 17:00-18:00

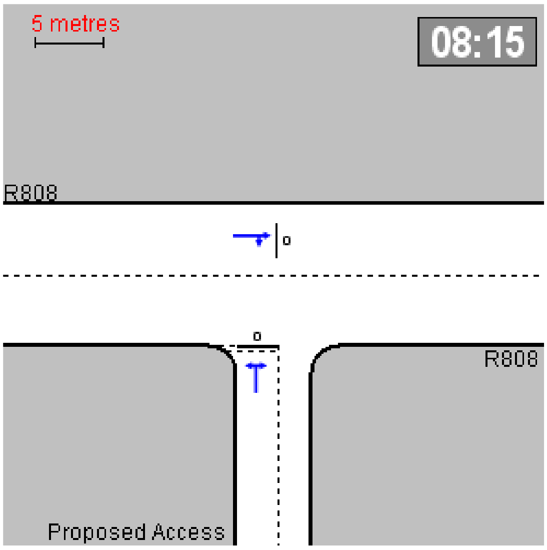
From/To	Arm A	Arm B	Arm C
Arm A	-	10.0	10.0
Arm B	10.0	-	10.0
Arm C	10.0	10.0	-

Default proportions of heavy vehicles are used

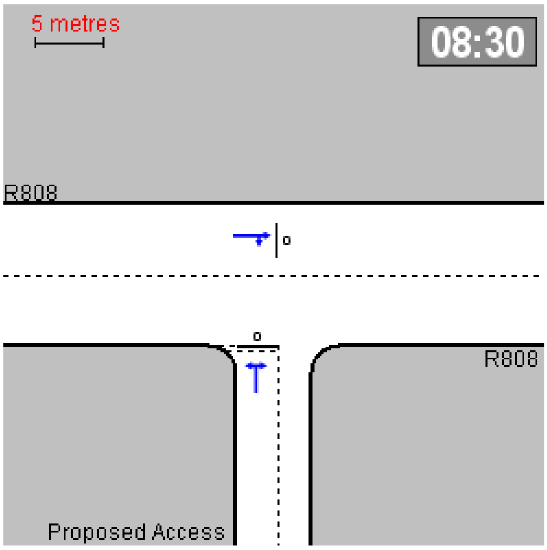
Queue Diagrams

Demand Set: Sum of Demand Sets for Modelling Period: 08:00 - 09:00
Modelling Period: 08:00-09:00
View Extent: 40m

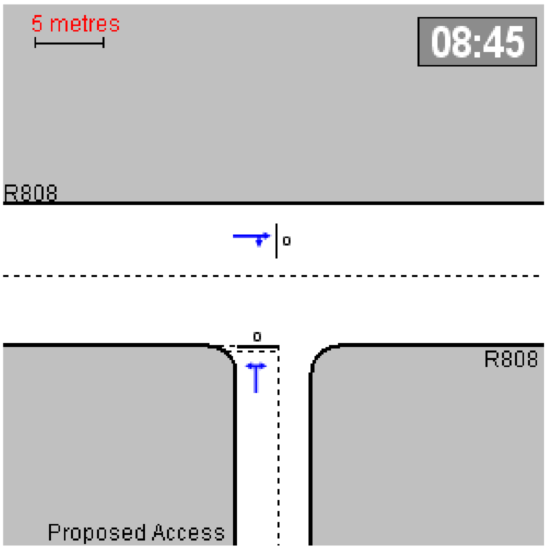
Queue Interval 1: 08:00-08:15



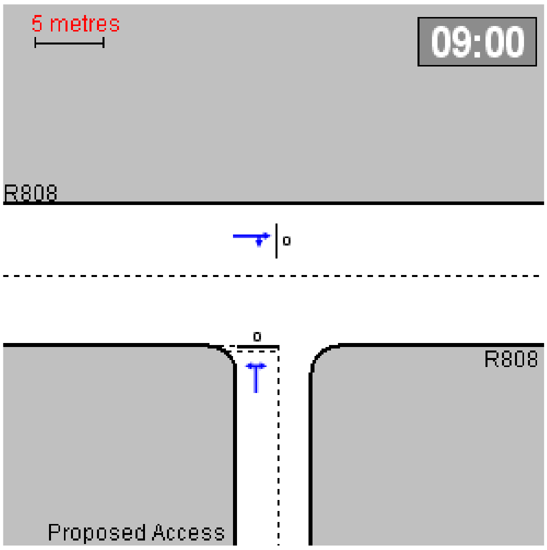
Queue Interval 2: 08:15-08:30



Queue Interval 3: 08:30-08:45



Queue Interval 4: 08:45-09:00



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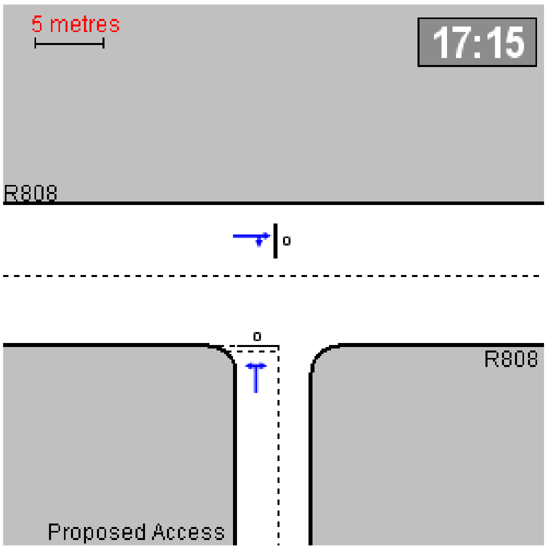
Modelling Period: 17:00-18:00
View Extent: 40m

Queue Interval 1: 17:00-17:15



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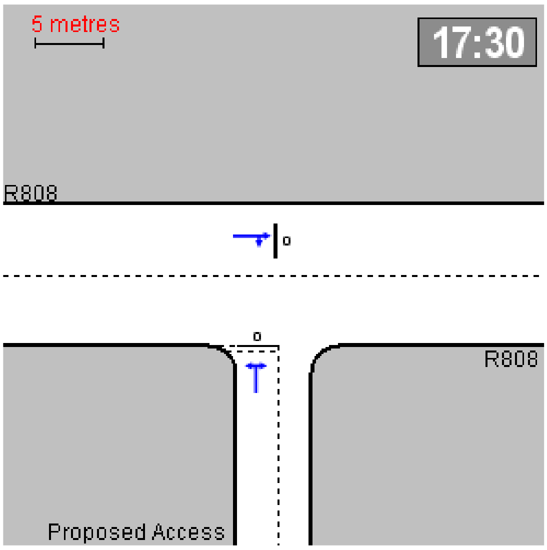
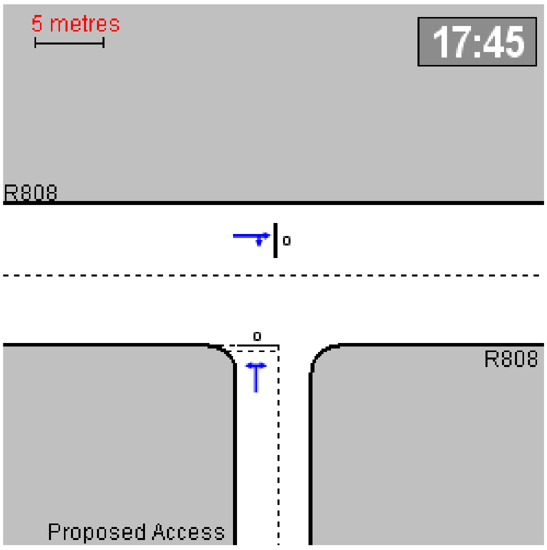
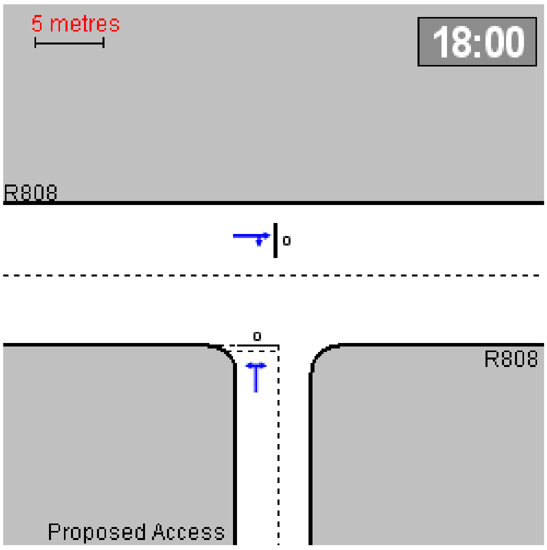


Queue Interval 3: 17:30-17:45

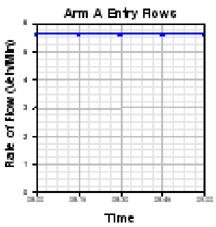


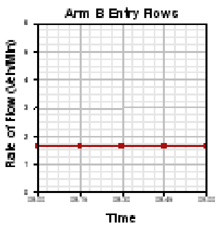
Queue Interval 4: 17:45-18:00

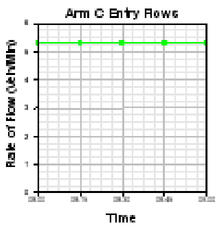


Demand Data Graph

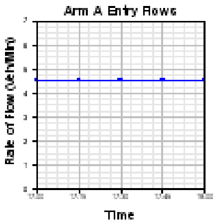
Demand Set: St Pauls Proposed Access - AM Peak
Modelling Period: 08:00-09:00

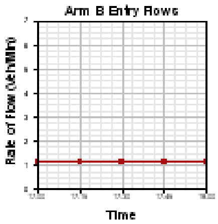


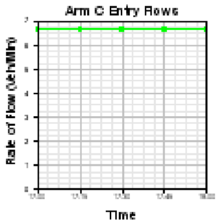




Demand Set: St Pauls Proposed Access - PM Peak
Modelling Period: 17:00-18:00

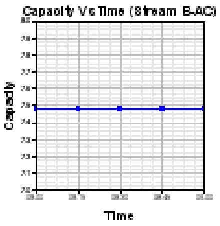

Arm A Entry Flows
Rate of Flow (Veh/Min)
Time

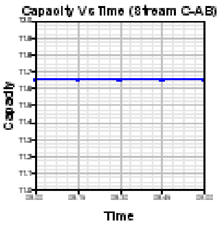

Arm B Entry Flows
Rate of Flow (Veh/Min)
Time


Arm C Entry Flows
Rate of Flow (Veh/Min)
Time

Capacity Graph

Demand Set: Sum of Demand Sets for Modelling Period: 08:00 - 09:00
Modelling Period: 08:00-09:00





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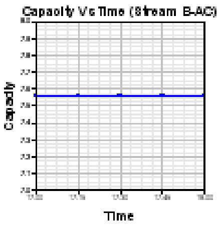
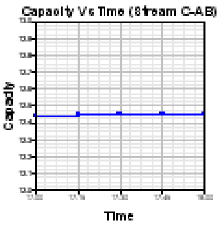
Modelling Period: 17:00-18:00





RFC Graph

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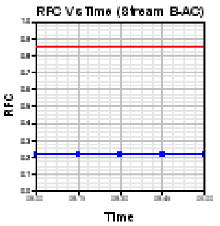
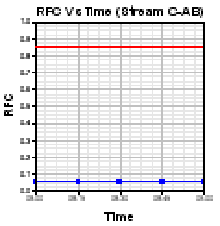
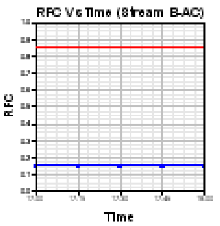
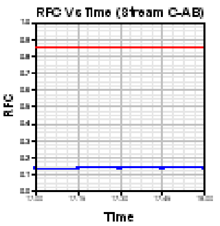
Modelling Period: 08:00-09:00





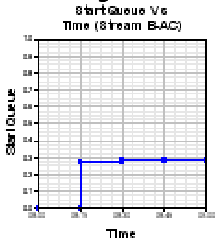
Demand Set: Sum of Demand Sets for Modelling Period: 17:00 - 18:00
Modelling Period: 17:00-18:00

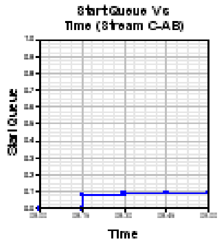




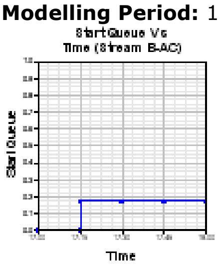
Start Queue Graph

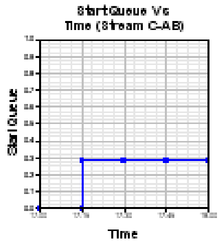
Demand Set: Sum of Demand Sets for Modelling Period: 08:00 - 09:00
Modelling Period: 08:00-09:00





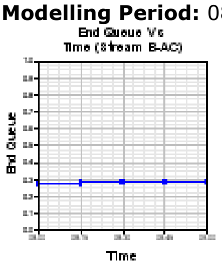
Demand Set: Sum of Demand Sets for Modelling Period: 17:00 - 18:00
Modelling Period: 17:00-18:00

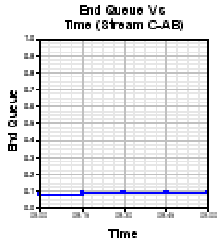




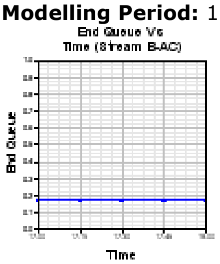
End Queue Graph

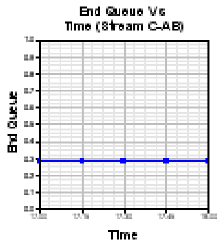
Demand Set: Sum of Demand Sets for Modelling Period: 08:00 - 09:00
Modelling Period: 08:00-09:00





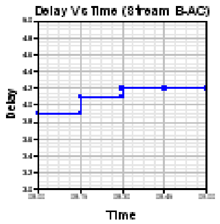
Demand Set: Sum of Demand Sets for Modelling Period: 17:00 - 18:00
Modelling Period: 17:00-18:00

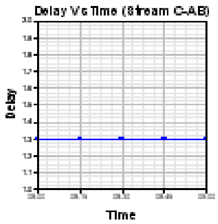




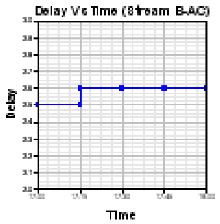
Delay Graph

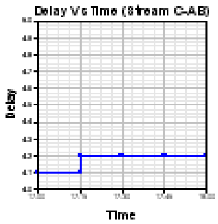
Demand Set: Sum of Demand Sets for Modelling Period: 08:00 - 09:00
Modelling Period: 08:00-09:00





Demand Set: Sum of Demand Sets for Modelling Period: 17:00 - 18:00
Modelling Period: 17:00-18:00





Queues & Delays

Demand Set: Sum of Demand Sets for Modelling Period: 08:00 - 09:00
Modelling Period: 08:00-09:00

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:00-08:15	B-AC	1.63	7.48	0.218	-	0.00	0.27	-	3.9	0.17
	C-AB	0.63	11.65	0.054	-	0.00	0.08	-	1.3	0.09
	C-A	4.67	-	-	-	-	-	-	-	-
	A-B	0.27	-	-	-	-	-	-	-	-
	A-C	5.33	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:15-08:30	B-AC	1.63	7.48	0.218	-	0.27	0.28	-	4.1	0.17
	C-AB	0.64	11.65	0.055	-	0.08	0.09	-	1.3	0.09
	C-A	4.66	-	-	-	-	-	-	-	-
	A-B	0.27	-	-	-	-	-	-	-	-
	A-C	5.33	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:30-08:45	B-AC	1.63	7.48	0.218	-	0.28	0.28	-	4.2	0.17
	C-AB	0.64	11.65	0.055	-	0.09	0.09	-	1.3	0.09
	C-A	4.66	-	-	-	-	-	-	-	-
	A-B	0.27	-	-	-	-	-	-	-	-
	A-C	5.33	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:45-09:00	B-AC	1.63	7.48	0.218	-	0.28	0.28	-	4.2	0.17
	C-AB	0.64	11.65	0.055	-	0.09	0.09	-	1.3	0.09
	C-A	4.66	-	-	-	-	-	-	-	-
	A-B	0.27	-	-	-	-	-	-	-	-
	A-C	5.33	-	-	-	-	-	-	-	-

Demand Set: Sum of Demand Sets for Modelling Period: 17:00 - 18:00
Modelling Period: 17:00-18:00

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:00-17:15	B-AC	1.12	7.56	0.148	-	0.00	0.17	-	2.5	0.15
	C-AB	1.70	12.44	0.136	-	0.00	0.28	-	4.1	0.09
	C-A	4.93	-	-	-	-	-	-	-	-
	A-B	0.62	-	-	-	-	-	-	-	-
	A-C	3.90	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:15-17:30	B-AC	1.12	7.56	0.148	-	0.17	0.17	-	2.6	0.16
	C-AB	1.71	12.45	0.137	-	0.28	0.28	-	4.2	0.09
	C-A	4.92	-	-	-	-	-	-	-	-
	A-B	0.62	-	-	-	-	-	-	-	-
	A-C	3.90	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:30-17:45	B-AC	1.12	7.56	0.148	-	0.17	0.17	-	2.6	0.16
	C-AB	1.71	12.45	0.137	-	0.28	0.28	-	4.2	0.09
	C-A	4.92	-	-	-	-	-	-	-	-
	A-B	0.62	-	-	-	-	-	-	-	-
	A-C	3.90	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:45-18:00	B-AC	1.12	7.56	0.148	-	0.17	0.17	-	2.6	0.16
	C-AB	1.71	12.45	0.137	-	0.28	0.28	-	4.2	0.09
	C-A	4.92	-	-	-	-	-	-	-	-
	A-B	0.62	-	-	-	-	-	-	-	-
	A-C	3.90	-	-	-	-	-	-	-	-

Entry capacities marked with an '(X)' are dominated by a pedestrian crossing in that time segment.
In time segments marked with a '(B)', traffic leaving the junction may block back from a crossing so impairing normal operation of the junction.
Delays marked with '##' could not be calculated.

Overall Queues & Delays

Queueing Delay Information Over Whole Period

Demand Set: Sum of Demand Sets for Modelling Period: 08:00 - 09:00
Modelling Period: 08:00-09:00

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	97.8	97.8	16.4	0.2	16.4	0.2
C-AB	38.1	38.1	5.1	0.1	5.1	0.1
C-A	279.9	279.9	-	-	-	-
A-B	16.0	16.0	-	-	-	-
A-C	320.0	320.0	-	-	-	-
All	**751.8**	**751.8**	**21.5**	**0.0**	**21.5**	**0.0**

Demand Set: Sum of Demand Sets for Modelling Period: 17:00 - 18:00
Modelling Period: 17:00-18:00

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	67.2	67.2	10.2	0.2	10.3	0.2
C-AB	102.3	102.3	16.7	0.2	16.7	0.2
C-A	295.5	295.5	-	-	-	-
A-B	37.0	37.0	-	-	-	-
A-C	234.2	234.2	-	-	-	-
All	**736.2**	**736.2**	**27.0**	**0.0**	**27.0**	**0.0**

Delay is that occurring only within the time period.
Inclusive delay includes delay suffered by vehicles which are still queuing after the end of the time period.
These will only be significantly different if there is a large queue remaining at the end of the time period.

PICADY 5 Run Successful

C APPENDIX

C.1 Traffic Survey DAta

IDASO
Innovative Data Solutions
Idaso Ltd
National Science Park,
Dublin Road, Mullingar,
Co Westmeath, Ireland
Office
Ph: +353 (0) 4493 18019
Email: info@idaso.ie
www.idaso.ie

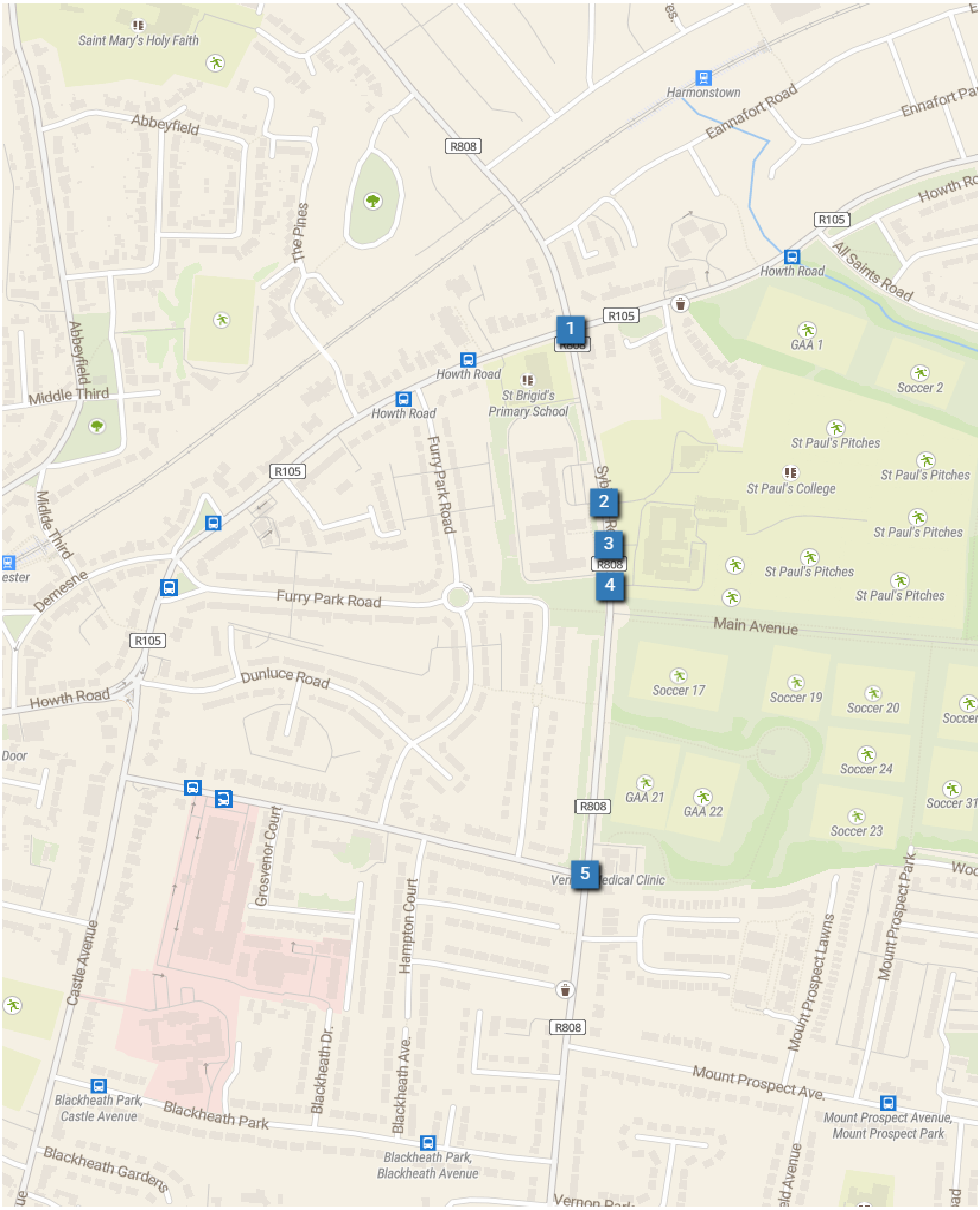
Data Analysis Services
Traffic-Transportation- Commercial-Innovation

031 19050 Raheny

with compliments

IDASO

Survey Name: 031 19050 Raheny
Date: 13 Feb 2019



IDASO

Survey Name: 031 19050 Raheny
Site: 1
Location: Brookwood Ave / Howth Rd / Sybil Hill Rd
Date: 13-Feb-2019

	A => A								A => B							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	0	0	7	2	1	0	10	12.3
07:15	0	0	0	0	0	0	0	0	0	0	8	1	0	0	9	9.5
07:30	0	0	0	0	0	0	0	0	0	0	17	3	3	0	23	28.4
07:45	0	0	0	0	0	0	0	0	0	0	19	2	0	1	22	24
H/TOT	0	0	0	0	0	0	0	0	0	0	51	8	4	1	64	74.2
08:00	0	0	0	0	0	0	0	0	0	0	31	0	0	0	31	31
08:15	0	0	0	0	0	0	0	0	0	0	17	1	0	0	18	18.5
08:30	0	0	0	0	0	0	0	0	0	0	25	0	0	0	25	25
08:45	0	0	0	0	0	0	0	0	0	0	33	6	0	0	39	42
H/TOT	0	0	0	0	0	0	0	0	0	0	106	7	0	0	113	116.5
09:00	0	0	0	0	0	0	0	0	0	0	33	3	0	0	36	37.5
09:15	0	0	0	0	0	0	0	0	0	0	13	4	2	0	19	23.6
09:30	0	0	0	0	0	0	0	0	0	0	15	3	1	0	19	21.8
09:45	0	0	0	0	0	0	0	0	0	0	19	2	0	0	21	22
H/TOT	0	0	0	0	0	0	0	0	0	0	80	12	3	0	95	104.9
10:00	0	0	0	0	0	0	0	0	0	0	18	3	0	0	21	22.5
10:15	0	0	0	0	0	0	0	0	0	0	20	1	0	0	21	21.5
10:30	0	0	0	0	0	0	0	0	0	0	21	2	1	0	24	26.3
10:45	0	0	0	0	0	0	0	0	0	0	13	1	0	0	14	14.5
H/TOT	0	0	0	0	0	0	0	0	0	0	72	7	1	0	80	84.8
11:00	0	0	0	0	0	0	0	0	0	0	27	5	0	0	32	34.5
11:15	0	0	0	0	0	0	0	0	0	0	22	5	1	0	28	31.8
11:30	0	0	0	0	0	0	0	0	0	0	32	4	0	0	36	38
11:45	0	0	0	0	0	0	0	0	1	0	32	3	0	0	36	36.7
H/TOT	0	0	0	0	0	0	0	0	1	0	113	17	1	0	132	141
12:00	0	0	0	0	0	0	0	0	0	0	25	1	2	0	28	31.1
12:15	0	0	0	0	0	0	0	0	0	0	17	2	2	0	21	24.6
12:30	0	0	0	0	0	0	0	0	0	0	32	8	1	0	41	46.3
12:45	0	0	0	0	0	0	0	0	0	1	27	4	0	0	32	33.4
H/TOT	0	0	0	0	0	0	0	0	0	1	101	15	5	0	122	135.4
13:00	0	0	0	0	0	0	0	0	0	0	35	7	0	0	42	45.5
13:15	0	0	0	0	0	0	0	0	1	0	32	2	0	0	35	35.2
13:30	0	0	0	0	0	0	0	0	0	0	32	3	0	0	35	36.5
13:45	0	0	0	0	0	0	0	0	0	0	28	1	0	0	29	29.5
H/TOT	0	0	0	0	0	0	0	0	1	0	127	13	0	0	141	146.7
14:00	0	0	0	0	0	0	0	0	0	0	36	3	0	0	39	40.5
14:15	0	0	0	0	0	0	0	0	0	0	39	3	0	0	42	43.5
14:30	0	0	0	0	0	0	0	0	1	0	21	1	0	1	24	24.7
14:45	0	0	0	0	0	0	0	0	0	0	27	2	0	0	29	30
H/TOT	0	0	0	0	0	0	0	0	1	0	123	9	0	1	134	138.7
15:00	0	0	0	0	0	0	0	0	2	0	25	5	1	0	33	35.2
15:15	0	0	0	0	0	0	0	0	0	0	22	0	0	0	22	22
15:30	0	0	0	0	0	0	0	0	0	0	21	2	0	0	23	24
15:45	0	0	0	0	0	0	0	0	0	1	38	3	0	0	42	42.9
H/TOT	0	0	0	0	0	0	0	0	2	1	106	10	1	0	120	124.1
16:00	0	0	0	0	0	0	0	0	1	0	24	2	0	0	27	27.2
16:15	0	0	0	0	0	0	0	0	0	0	29	0	0	0	29	29
16:30	0	0	0	0	0	0	0	0	0	0	32	0	0	0	32	32
16:45	0	0	0	0	0	0	0	0	0	0	43	3	0	0	46	47.5
H/TOT	0	0	0	0	0	0	0	0	1	0	128	5	0	0	134	135.7
17:00	0	0	0	0	0	0	0	0	0	0	32	1	0	0	33	33.5
17:15	0	0	0	0	0	0	0	0	1	0	36	2	0	0	39	39.2
17:30	0	0	0	0	0	0	0	0	0	0	27	3	0	0	30	31.5
17:45	0	0	0	0	0	0	0	0	1	0	44	0	0	0	45	44.2
H/TOT	0	0	0	0	0	0	0	0	2	0	139	6	0	0	147	148.4
18:00	0	0	0	0	0	0	0	0	1	0	44	1	0	0	46	45.7
18:15	0	0	0	0	0	0	0	0	0	0	31	1	0	0	32	32.5
18:30	0	0	0	0	0	0	0	0	1	0	24	0	1	0	26	26.5
18:45	0	0	0	0	0	0	0	0	0	0	29	1	0	0	30	30.5
H/TOT	0	0	0	0	0	0	0	0	2	0	128	3	1	0	134	135.2
12 TOT	0	0	0	0	0	0	0	0	10	2	1274	112	16	2	1416	1485.6

IDASO

Survey Name: 031 19050 Raheny
Site: 1
Location: Brookwood Ave / Howth Rd / Sybil Hill Rd
Date: 13-Feb-2019

	A => C								A => D							
TIME	**PCL**	**MCL**	**CAR**	**LGV**	**HGV**	**SV (BUS**	**TOT**	**PCU**	**PCL**	**MCL**	**CAR**	**LGV**	**HGV**	**SV (BUS**	**TOT**	**PCU**
07:00	2	0	18	4	0	0	24	24.4	1	0	46	6	2	0	55	59.8
07:15	1	0	35	5	2	0	43	47.3	5	2	49	3	1	0	60	57.6
07:30	0	1	28	7	2	0	38	43.5	3	1	41	1	3	0	49	50.4
07:45	4	1	36	8	2	0	51	53.8	7	0	48	8	0	0	63	61.4
H/TOT	7	2	117	24	6	0	156	169	16	3	184	18	6	0	227	229.2
08:00	7	0	48	2	1	0	58	54.7	4	0	54	7	0	0	65	65.3
08:15	21	0	42	5	0	0	68	53.7	14	0	57	6	1	0	78	71.1
08:30	22	0	37	3	2	0	64	50.5	17	2	57	3	1	0	80	68
08:45	9	0	28	4	1	0	42	38.1	11	1	58	7	0	0	77	71.1
H/TOT	59	0	155	14	4	0	232	197	46	3	226	23	2	0	300	275.5
09:00	2	0	33	3	1	0	39	40.2	5	0	54	3	2	0	64	64.1
09:15	0	0	30	4	0	1	35	38	6	0	35	2	1	0	44	41.5
09:30	0	1	29	3	2	0	35	38.5	2	0	34	5	0	0	41	41.9
09:45	3	0	23	8	0	1	35	37.6	2	0	24	7	0	0	33	34.9
H/TOT	5	1	115	18	3	2	144	154.3	15	0	147	17	3	0	182	182.4
10:00	0	0	18	3	2	0	23	27.1	1	0	24	9	1	1	36	42
10:15	0	0	31	7	0	0	38	41.5	0	0	31	7	0	0	38	41.5
10:30	3	0	21	5	1	0	30	31.4	0	0	24	2	0	0	26	27
10:45	1	0	39	4	2	0	46	49.8	0	1	34	2	1	0	38	39.7
H/TOT	4	0	109	19	5	0	137	149.8	1	1	113	20	2	1	138	150.2
11:00	2	1	26	2	1	0	32	32.1	2	2	24	0	1	0	29	27.5
11:15	0	0	40	3	0	0	43	44.5	0	0	25	4	3	0	32	37.9
11:30	1	0	30	4	2	0	37	40.8	0	0	18	5	1	0	24	27.8
11:45	0	0	22	2	1	0	25	27.3	3	0	18	1	1	0	23	22.4
H/TOT	3	1	118	11	4	0	137	144.7	5	2	85	10	6	0	108	115.6
12:00	0	0	32	4	0	0	36	38	1	0	32	2	0	0	35	35.2
12:15	2	0	34	3	1	1	41	43.2	1	0	21	5	0	0	27	28.7
12:30	0	0	37	1	1	0	39	40.8	2	0	27	4	0	0	33	33.4
12:45	2	0	41	4	2	0	49	52	2	0	22	1	0	0	25	23.9
H/TOT	4	0	144	12	4	1	165	174	6	0	102	12	0	0	120	121.2
13:00	0	1	32	4	1	0	38	40.7	0	0	45	5	0	1	51	54.5
13:15	2	0	24	2	1	0	29	29.7	2	0	29	2	1	0	34	34.7
13:30	0	0	43	2	1	0	46	48.3	1	0	40	0	0	0	41	40.2
13:45	0	0	38	4	0	0	42	44	0	0	35	3	0	0	38	39.5
H/TOT	2	1	137	12	3	0	155	162.7	3	0	149	10	1	1	164	168.9
14:00	4	0	38	6	0	0	48	47.8	1	0	31	5	0	1	38	40.7
14:15	0	0	27	4	0	0	31	33	1	0	37	2	0	0	40	40.2
14:30	2	0	34	2	0	0	38	37.4	1	1	27	3	1	1	34	36.4
14:45	1	0	38	2	2	0	43	45.8	4	0	28	4	3	0	39	41.7
H/TOT	7	0	137	14	2	0	160	164	7	1	123	14	4	2	151	159
15:00	2	0	35	5	0	0	42	42.9	1	1	40	7	0	0	49	51.1
15:15	0	0	33	3	2	0	38	42.1	2	2	24	2	0	0	30	28.2
15:30	3	0	35	3	1	0	42	42.4	0	0	35	4	0	0	39	41
15:45	2	0	33	4	0	0	39	39.4	0	0	32	5	0	1	38	41.5
H/TOT	7	0	136	15	3	0	161	166.8	3	3	131	18	0	1	156	161.8
16:00	1	0	39	4	0	0	44	45.2	3	0	39	4	1	0	47	47.9
16:15	1	0	34	2	0	0	37	37.2	0	1	28	3	0	0	32	32.9
16:30	2	0	33	1	0	0	36	34.9	1	0	38	2	0	0	41	41.2
16:45	3	0	39	3	0	0	45	44.1	0	0	36	5	0	0	41	43.5
H/TOT	7	0	145	10	0	0	162	161.4	4	1	141	14	1	0	161	165.5
17:00	5	0	29	1	0	0	35	31.5	0	0	31	1	0	0	32	32.5
17:15	1	1	43	1	0	0	46	45.1	0	1	29	2	0	0	32	32.4
17:30	2	0	41	0	1	0	44	43.7	1	0	32	0	0	0	33	32.2
17:45	1	0	28	1	0	0	30	29.7	1	0	48	2	0	0	51	51.2
H/TOT	9	1	141	3	1	0	155	150	2	1	140	5	0	0	148	148.3
18:00	0	0	30	1	0	0	31	31.5	1	0	22	0	1	0	24	24.5
18:15	0	0	39	0	0	0	39	39	1	0	35	1	1	0	38	39
18:30	0	0	31	2	0	0	33	34	2	0	43	1	1	0	47	47.2
18:45	0	0	38	3	0	0	41	42.5	1	0	56	4	1	0	62	64.5
H/TOT	0	0	138	6	0	0	144	147	5	0	156	6	4	0	171	175.2
12 TOT	114	6	1592	158	35	3	1908	1940.7	113	15	1697	167	29	5	2026	2052.8

IDASO

Survey Name: 031 19050 Raheny
Site: 1
Location: Brookwood Ave / Howth Rd / Sybil Hill Rd
Date: 13-Feb-2019

	B => A								B => B							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	12	0	0	0	12	12	0	0	0	0	0	0	0	0
07:15	0	0	21	1	2	0	24	27.1	0	0	0	0	0	0	0	0
07:30	1	0	24	0	0	0	25	24.2	0	0	0	0	0	0	0	0
07:45	0	0	16	0	1	0	17	18.3	0	0	0	0	0	0	0	0
H/TOT	1	0	73	1	3	0	78	81.6	0	0	0	0	0	0	0	0
08:00	0	0	27	0	3	0	30	33.9	0	0	0	0	0	0	0	0
08:15	0	0	29	1	0	0	30	30.5	0	0	0	0	0	0	0	0
08:30	0	0	30	2	0	0	32	33	0	0	0	0	0	0	0	0
08:45	1	0	20	2	0	0	23	23.2	0	0	0	0	0	0	0	0
H/TOT	1	0	106	5	3	0	115	120.6	0	0	0	0	0	0	0	0
09:00	0	0	36	1	0	0	37	37.5	0	0	0	0	0	0	0	0
09:15	0	0	30	4	1	0	35	38.3	0	0	0	0	0	0	0	0
09:30	0	0	23	2	1	0	26	28.3	0	0	0	0	0	0	0	0
09:45	0	0	20	3	2	0	25	29.1	0	0	0	0	0	0	0	0
H/TOT	0	0	109	10	4	0	123	133.2	0	0	0	0	0	0	0	0
10:00	0	0	22	3	1	0	26	28.8	0	0	0	0	0	0	0	0
10:15	0	0	33	3	2	0	38	42.1	0	0	0	0	0	0	0	0
10:30	0	0	19	7	1	0	27	31.8	0	0	0	0	0	0	0	0
10:45	0	0	23	1	1	0	25	26.8	0	0	0	0	0	0	0	0
H/TOT	0	0	97	14	5	0	116	129.5	0	0	0	0	0	0	0	0
11:00	0	0	22	3	1	1	27	30.8	0	0	0	0	0	0	0	0
11:15	0	0	25	7	2	0	34	40.1	0	0	0	0	0	0	0	0
11:30	0	0	21	2	1	0	24	26.3	0	0	0	0	0	0	0	0
11:45	0	0	22	6	1	0	29	33.3	0	0	0	0	0	0	0	0
H/TOT	0	0	90	18	5	1	114	130.5	0	0	0	0	0	0	0	0
12:00	1	0	30	3	1	0	35	37	0	0	0	0	0	0	0	0
12:15	2	0	23	2	2	0	29	31	0	0	0	0	0	0	0	0
12:30	0	0	30	0	1	1	32	34.3	0	0	0	0	0	0	0	0
12:45	0	0	25	7	0	0	32	35.5	0	0	0	0	0	0	0	0
H/TOT	3	0	108	12	4	1	128	137.8	0	0	0	0	0	0	0	0
13:00	1	0	26	2	0	0	29	29.2	0	0	0	0	0	0	0	0
13:15	0	0	28	4	0	1	33	36	0	0	0	0	0	0	0	0
13:30	1	0	26	1	0	0	28	27.7	0	0	0	0	0	0	0	0
13:45	0	0	38	0	1	0	39	40.3	0	0	0	0	0	0	0	0
H/TOT	2	0	118	7	1	1	129	133.2	0	0	0	0	0	0	0	0
14:00	0	0	32	3	0	0	35	36.5	0	0	0	0	0	0	0	0
14:15	0	0	32	1	0	0	33	33.5	0	0	0	0	0	0	0	0
14:30	1	0	32	3	0	0	36	36.7	0	0	0	0	0	0	0	0
14:45	0	0	37	0	1	0	38	39.3	0	0	0	0	0	0	0	0
H/TOT	1	0	133	7	1	0	142	146	0	0	0	0	0	0	0	0
15:00	0	0	44	5	0	0	49	51.5	0	0	0	0	0	0	0	0
15:15	1	0	25	4	1	0	31	33.5	0	0	0	0	0	0	0	0
15:30	0	0	24	2	3	0	29	33.9	0	0	0	0	0	0	0	0
15:45	0	0	31	6	0	0	37	40	0	0	0	0	0	0	0	0
H/TOT	1	0	124	17	4	0	146	158.9	0	0	0	0	0	0	0	0
16:00	0	0	24	3	1	0	28	30.8	0	0	0	0	0	0	0	0
16:15	0	0	33	1	0	0	34	34.5	0	0	0	0	0	0	0	0
16:30	0	0	24	4	1	0	29	32.3	0	0	0	0	0	0	0	0
16:45	0	0	29	5	0	0	34	36.5	0	0	0	0	0	0	0	0
H/TOT	0	0	110	13	2	0	125	134.1	0	0	0	0	0	0	0	0
17:00	0	0	29	3	0	0	32	33.5	0	0	0	0	0	0	0	0
17:15	1	0	24	1	0	0	26	25.7	0	0	0	0	0	0	0	0
17:30	0	0	24	0	0	0	24	24	0	0	0	0	0	0	0	0
17:45	0	0	35	4	0	0	39	41	0	0	0	0	0	0	0	0
H/TOT	1	0	112	8	0	0	121	124.2	0	0	0	0	0	0	0	0
18:00	0	0	31	1	0	0	32	32.5	0	0	0	0	0	0	0	0
18:15	0	0	38	0	0	0	38	38	0	0	0	0	0	0	0	0
18:30	0	1	22	1	0	0	24	23.9	0	0	0	0	0	0	0	0
18:45	0	0	28	1	1	0	30	31.8	0	0	0	0	0	0	0	0
H/TOT	0	1	119	3	1	0	124	126.2	0	0	0	0	0	0	0	0
12 TOT	10	1	1299	115	33	3	1461	1555.8	0	0	0	0	0	0	0	0

IDASO

Survey Name: 031 19050 Raheny
Site: 1
Location: Brookwood Ave / Howth Rd / Sybil Hill Rd
Date: 13-Feb-2019

	B => C								B => D							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	2	0	6	0	1	0	9	8.7	9	1	144	13	0	1	168	167.7
07:15	2	0	10	2	1	0	15	15.7	12	2	149	17	6	1	187	193.5
07:30	0	0	17	2	2	0	21	24.6	20	2	147	10	2	3	184	177.4
07:45	0	0	24	3	1	0	28	30.8	27	0	115	4	2	2	150	135
H/TOT	4	0	57	7	5	0	73	79.8	68	5	555	44	10	7	689	673.6
08:00	3	0	30	0	0	0	33	30.6	35	1	96	4	0	5	141	119.4
08:15	3	0	64	3	0	0	70	69.1	37	2	113	13	0	4	169	148.7
08:30	6	0	59	0	0	0	65	60.2	35	4	90	1	0	3	133	106.1
08:45	5	0	33	0	2	0	40	38.6	27	2	109	7	1	3	149	134
H/TOT	17	0	186	3	2	0	208	198.5	134	9	408	25	1	15	592	508.2
09:00	1	0	20	4	0	0	25	26.2	11	3	114	7	1	3	139	136.2
09:15	0	0	10	4	0	0	14	16	8	2	115	7	1	2	135	134.2
09:30	0	0	14	2	1	0	17	19.3	8	0	103	7	1	0	119	117.4
09:45	1	0	18	4	0	0	23	24.2	3	2	94	9	2	2	112	117.5
H/TOT	2	0	62	14	1	0	79	85.7	30	7	426	30	5	7	505	505.3
10:00	0	0	15	1	0	0	16	16.5	3	0	71	7	4	4	89	99.3
10:15	0	0	16	1	1	0	18	19.8	5	0	89	9	2	2	107	112.1
10:30	0	0	20	1	0	0	21	21.5	4	1	72	5	5	1	88	94.2
10:45	0	0	37	1	0	0	38	38.5	1	0	92	8	0	1	102	106.2
H/TOT	0	0	88	4	1	0	93	96.3	13	1	324	29	11	8	386	411.8
11:00	0	0	18	1	1	0	20	21.8	2	1	93	7	2	4	109	116.9
11:15	2	1	14	1	0	0	18	16.3	1	1	62	7	3	1	75	82
11:30	0	0	19	2	1	0	22	24.3	0	1	72	8	1	1	83	88.7
11:45	0	0	11	0	1	0	12	13.3	3	1	67	8	0	2	81	84
H/TOT	2	1	62	4	3	0	72	75.7	6	4	294	30	6	8	348	371.6
12:00	0	1	24	3	1	0	29	31.2	1	0	73	10	2	2	88	96.8
12:15	2	0	13	2	1	0	18	18.7	4	1	79	6	2	2	94	97.8
12:30	1	0	24	0	0	0	25	24.2	5	1	80	8	1	3	98	101.7
12:45	0	0	30	2	2	0	34	37.6	2	0	68	5	2	0	77	80.5
H/TOT	3	1	91	7	4	0	106	111.7	12	2	300	29	7	7	357	376.8
13:00	0	0	30	1	0	0	31	31.5	1	2	79	6	0	2	90	93
13:15	0	1	13	3	0	0	17	17.9	1	1	87	8	1	1	99	103.9
13:30	0	0	20	1	0	0	21	21.5	2	0	69	8	1	2	82	87.7
13:45	1	0	24	1	0	0	26	25.7	2	0	79	7	0	2	90	93.9
H/TOT	1	1	87	6	0	0	95	96.6	6	3	314	29	2	7	361	378.5
14:00	0	0	29	2	0	0	31	32	3	1	76	6	0	1	87	88
14:15	0	0	16	4	0	0	20	22	1	0	70	5	2	1	79	84.3
14:30	0	0	22	4	0	0	26	28	0	0	85	13	1	3	102	112.8
14:45	0	0	20	1	1	0	22	23.8	0	0	49	4	1	1	55	59.3
H/TOT	0	0	87	11	1	0	99	105.8	4	1	280	28	4	6	323	344.4
15:00	2	0	21	0	3	0	26	28.3	2	1	93	6	1	1	104	107.1
15:15	0	0	21	0	0	0	21	21	3	0	94	4	0	1	102	102.6
15:30	0	0	18	1	1	0	20	21.8	0	1	79	7	0	3	90	95.9
15:45	1	0	22	0	0	0	23	22.2	2	0	71	6	2	1	82	87
H/TOT	3	0	82	1	4	0	90	93.3	7	2	337	23	3	6	378	392.6
16:00	1	0	18	0	0	0	19	18.2	3	0	74	2	1	2	82	83.9
16:15	0	0	20	0	1	1	22	24.3	2	0	73	9	0	3	87	92.9
16:30	2	0	32	1	0	0	35	33.9	2	0	87	7	0	3	99	103.9
16:45	0	0	23	4	1	0	28	31.3	3	0	74	9	0	2	88	92.1
H/TOT	3	0	93	5	2	1	104	107.7	10	0	308	27	1	10	356	372.8
17:00	0	0	16	1	0	0	17	17.5	3	0	67	4	1	2	77	79.9
17:15	1	0	21	0	0	0	22	21.2	2	0	66	4	0	1	73	74.4
17:30	0	0	15	0	0	0	15	15	6	1	79	5	1	5	97	100.4
17:45	0	0	27	0	0	0	27	27	0	0	75	5	0	1	81	84.5
H/TOT	1	0	79	1	0	0	81	80.7	11	1	287	18	2	9	328	339.2
18:00	0	1	21	1	0	0	23	22.9	1	0	74	7	0	2	84	88.7
18:15	0	0	20	2	0	0	22	23	2	0	66	4	0	1	73	74.4
18:30	0	0	18	1	0	0	19	19.5	1	0	70	3	0	2	76	78.7
18:45	2	0	32	2	0	0	36	35.4	2	0	73	5	0	1	81	82.9
H/TOT	2	1	91	6	0	0	100	100.8	6	0	283	19	0	6	314	324.7
12 TOT	38	4	1065	69	23	1	1200	1232.6	307	35	4116	331	52	96	4937	4999.5

IDASO

Survey Name: 031 19050 Raheny
Site: 1
Location: Brookwood Ave / Howth Rd / Sybil Hill Rd
Date: 13-Feb-2019

	C => A								C => B							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	18	1	0	1	20	21.5	1	0	2	0	2	0	5	6.8
07:15	2	0	28	3	1	0	34	35.2	0	0	6	1	1	0	8	9.8
07:30	3	0	44	5	2	0	54	56.7	0	0	3	3	0	0	6	7.5
07:45	2	0	43	4	0	0	49	49.4	1	0	7	0	1	0	9	9.5
H/TOT	7	0	133	13	3	1	157	162.8	2	0	18	4	4	0	28	33.6
08:00	2	0	46	0	0	0	48	46.4	0	0	15	1	0	1	17	18.5
08:15	2	0	54	4	0	0	60	60.4	0	0	23	2	2	0	27	30.6
08:30	4	0	50	1	2	1	58	58.9	0	0	33	2	0	0	35	36
08:45	2	0	38	1	0	1	42	41.9	2	0	27	2	0	0	31	30.4
H/TOT	10	0	188	6	2	2	208	207.6	2	0	98	7	2	1	110	115.5
09:00	0	0	26	3	1	0	30	32.8	0	0	19	0	0	0	19	19
09:15	1	0	23	2	2	0	28	30.8	0	0	11	0	0	0	11	11
09:30	1	0	31	2	0	0	34	34.2	1	0	14	0	0	0	15	14.2
09:45	0	0	36	3	0	0	39	40.5	0	0	15	6	1	0	22	26.3
H/TOT	2	0	116	10	3	0	131	138.3	1	0	59	6	1	0	67	70.5
10:00	0	0	41	3	2	0	46	50.1	0	0	21	1	0	0	22	22.5
10:15	0	0	28	7	0	0	35	38.5	0	0	11	1	0	0	12	12.5
10:30	5	0	41	3	2	1	52	53.1	6	0	18	1	0	0	25	20.7
10:45	1	0	24	3	0	0	28	28.7	0	0	12	1	1	0	14	15.8
H/TOT	6	0	134	16	4	1	161	170.4	6	0	62	4	1	0	73	71.5
11:00	0	0	23	5	1	0	29	32.8	0	0	12	0	1	0	13	14.3
11:15	1	0	34	9	1	0	45	50	0	0	23	4	0	0	27	29
11:30	1	1	24	1	0	0	27	26.1	2	0	17	4	0	0	23	23.4
11:45	1	0	38	4	0	0	43	44.2	2	0	16	1	1	0	20	20.2
H/TOT	3	1	119	19	2	0	144	153.1	4	0	68	9	2	0	83	86.9
12:00	1	0	33	4	1	0	39	41.5	1	0	15	1	1	0	18	19
12:15	0	0	35	4	0	0	39	41	1	0	24	2	0	0	27	27.2
12:30	5	0	22	4	1	0	32	31.3	0	0	12	0	1	0	13	14.3
12:45	3	0	47	4	0	0	54	53.6	1	0	15	1	0	0	17	16.7
H/TOT	9	0	137	16	2	0	164	167.4	3	0	66	4	2	0	75	77.2
13:00	33	0	61	3	0	0	97	72.1	6	0	30	4	1	0	41	39.5
13:15	5	0	43	2	0	0	50	47	0	0	26	3	0	0	29	30.5
13:30	5	0	23	5	0	0	33	31.5	0	1	28	1	1	0	31	32.2
13:45	1	0	33	7	0	0	41	43.7	0	0	15	0	0	0	15	15
H/TOT	44	0	160	17	0	0	221	194.3	6	1	99	8	2	0	116	117.2
14:00	1	0	40	1	1	0	43	44	0	0	20	1	0	0	21	21.5
14:15	4	0	44	8	0	0	56	56.8	1	0	19	1	0	0	21	20.7
14:30	1	0	39	2	0	0	42	42.2	1	0	33	1	0	0	35	34.7
14:45	2	0	34	5	2	0	43	46.5	1	0	22	1	0	0	24	23.7
H/TOT	8	0	157	16	3	0	184	189.5	3	0	94	4	0	0	101	100.6
15:00	1	0	53	4	0	1	59	61.2	1	0	25	4	0	0	30	31.2
15:15	1	0	39	8	3	0	51	58.1	0	0	21	1	0	0	22	22.5
15:30	0	1	39	11	2	0	53	60.5	1	0	19	3	0	0	23	23.7
15:45	1	0	38	5	1	0	45	48	2	0	31	1	0	0	34	32.9
H/TOT	3	1	169	28	6	1	208	227.8	4	0	96	9	0	0	109	110.3
16:00	1	0	36	5	1	0	43	46	0	0	17	1	0	0	18	18.5
16:15	3	0	46	9	0	0	58	60.1	0	0	25	0	0	0	25	25
16:30	4	0	32	6	1	0	43	44.1	1	0	22	0	0	0	23	22.2
16:45	0	0	43	15	0	0	58	65.5	3	0	29	1	0	0	33	31.1
H/TOT	8	0	157	35	2	0	202	215.7	4	0	93	2	0	0	99	96.8
17:00	4	1	37	8	1	0	51	52.5	0	0	30	2	0	0	32	33
17:15	1	1	47	4	0	0	53	53.6	1	0	42	1	0	0	44	43.7
17:30	1	0	36	3	1	0	41	43	0	0	22	1	0	0	23	23.5
17:45	3	0	39	0	0	0	42	39.6	2	0	31	2	0	0	35	34.4
H/TOT	9	2	159	15	2	0	187	188.7	3	0	125	6	0	0	134	134.6
18:00	1	0	39	5	0	0	45	46.7	2	0	30	2	0	0	34	33.4
18:15	4	0	40	3	0	0	47	45.3	1	0	19	3	0	0	23	23.7
18:30	0	0	33	4	1	0	38	41.3	0	0	27	1	0	0	28	28.5
18:45	1	1	48	3	0	0	53	53.1	0	0	19	1	0	0	20	20.5
H/TOT	6	1	160	15	1	0	183	186.4	3	0	95	7	0	0	105	106.1
12 TOT	115	5	1789	206	30	5	2150	2202	41	1	973	70	14	1	1100	1120.8

IDASO

Survey Name: 031 19050 Raheny
Site: 1
Location: Brookwood Ave / Howth Rd / Sybil Hill Rd
Date: 13-Feb-2019

	C => C								C => D							
TIME	**PCL**	**MCL**	**CAR**	**LGV**	**HGV**	**SV (BUS**	**TOT**	**PCU**	**PCL**	**MCL**	**CAR**	**LGV**	**HGV**	**SV (BUS**	**TOT**	**PCU**
07:00	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
07:15	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
07:30	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	3
07:45	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
H/TOT	0	0	0	0	0	0	0	0	0	0	9	0	0	0	9	9
08:00	0	0	0	0	0	0	0	0	1	0	2	0	0	0	3	2.2
08:15	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	5
08:30	0	0	0	0	0	0	0	0	1	0	10	1	0	0	12	11.7
08:45	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7	7
H/TOT	0	0	0	0	0	0	0	0	2	0	24	1	0	0	27	25.9
09:00	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	5
09:15	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	6
09:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
09:45	0	0	0	0	0	0	0	0	1	0	6	0	0	0	7	6.2
H/TOT	0	0	0	0	0	0	0	0	1	0	18	0	0	0	19	18.2
10:00	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	4
10:15	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	5
10:30	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	6
10:45	0	0	0	0	0	0	0	0	0	0	8	1	0	0	9	9.5
H/TOT	0	0	0	0	0	0	0	0	0	0	23	1	0	0	24	24.5
11:00	0	0	0	0	0	0	0	0	0	0	2	0	1	0	3	4.3
11:15	0	0	0	0	0	0	0	0	0	0	11	0	0	0	11	11
11:30	0	0	0	0	0	0	0	0	0	0	6	0	1	0	7	8.3
11:45	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	5
H/TOT	0	0	0	0	0	0	0	0	0	0	24	0	2	0	26	28.6
12:00	0	0	0	0	0	0	0	0	0	0	5	1	0	0	6	6.5
12:15	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3	3.5
12:30	0	0	0	0	0	0	0	0	1	1	6	1	0	0	9	8.1
12:45	0	0	0	0	0	0	0	0	1	0	4	0	1	0	6	6.5
H/TOT	0	0	0	0	0	0	0	0	2	1	17	3	1	0	24	24.6
13:00	0	0	0	0	0	0	0	0	1	0	10	1	0	0	12	11.7
13:15	0	0	0	0	0	0	0	0	1	0	12	1	0	1	15	15.7
13:30	0	0	0	0	0	0	0	0	0	0	8	1	0	0	9	9.5
13:45	0	0	0	0	0	0	0	0	1	0	6	0	1	0	8	8.5
H/TOT	0	0	0	0	0	0	0	0	3	0	36	3	1	1	44	45.4
14:00	0	0	0	0	0	0	0	0	0	0	6	2	0	0	8	9
14:15	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	5
14:30	0	0	0	0	0	0	0	0	0	0	15	0	0	0	15	15
14:45	0	0	0	0	0	0	0	0	0	0	6	2	1	0	9	11.3
H/TOT	0	0	0	0	0	0	0	0	0	0	32	4	1	0	37	40.3
15:00	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
15:15	0	0	0	0	0	0	0	0	0	0	5	1	0	0	6	6.5
15:30	0	0	0	0	0	0	0	0	0	0	9	0	0	0	9	9
15:45	0	0	0	0	0	0	0	0	1	0	5	0	0	0	6	5.2
H/TOT	0	0	0	0	0	0	0	0	1	0	21	1	0	0	23	22.7
16:00	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7	7
16:15	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	6
16:30	0	0	0	0	0	0	0	0	1	0	3	1	0	0	5	4.7
16:45	0	0	0	0	0	0	0	0	0	0	10	0	0	0	10	10
H/TOT	0	0	0	0	0	0	0	0	1	0	26	1	0	0	28	27.7
17:00	0	0	0	0	0	0	0	0	1	0	11	0	0	0	12	11.2
17:15	0	0	0	0	0	0	0	0	0	0	6	1	0	0	7	7.5
17:30	0	0	0	0	0	0	0	0	2	0	3	0	0	0	5	3.4
17:45	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	3
H/TOT	0	0	0	0	0	0	0	0	3	0	23	1	0	0	27	25.1
18:00	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7	7
18:15	0	0	0	0	0	0	0	0	0	0	8	0	0	0	8	8
18:30	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	6
18:45	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	5
H/TOT	0	0	0	0	0	0	0	0	0	0	26	0	0	0	26	26
12 TOT	0	0	0	0	0	0	0	0	13	1	279	15	5	1	314	318

IDASO

Survey Name: 031 19050 Raheny
Site: 1
Location: Brookwood Ave / Howth Rd / Sybil Hill Rd
Date: 13-Feb-2019

	D => A								D => B							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	1	0	9	0	0	0	10	9.2	0	0	8	3	0	0	11	12.5
07:15	0	0	7	2	1	0	10	12.3	0	0	22	5	2	2	31	38.1
07:30	0	0	11	2	0	1	14	16	2	1	36	4	0	2	45	46.8
07:45	1	0	17	2	0	0	20	20.2	1	0	35	4	0	1	41	43.2
H/TOT	2	0	44	6	1	1	54	57.7	3	1	101	16	2	5	128	140.6
08:00	1	0	22	2	0	0	25	25.2	5	0	58	2	0	2	67	66
08:15	1	0	24	1	0	0	26	25.7	4	0	76	7	1	2	90	93.6
08:30	4	0	30	3	1	0	38	37.6	1	0	68	2	1	2	74	77.5
08:45	1	0	45	3	1	0	50	52	3	1	76	8	1	1	90	93.3
H/TOT	7	0	121	9	2	0	139	140.5	13	1	278	19	3	7	321	330.4
09:00	0	0	25	2	2	0	29	32.6	2	0	53	7	0	2	64	67.9
09:15	0	1	13	1	0	0	15	14.9	1	0	44	4	2	3	54	60.8
09:30	0	0	13	1	1	0	15	16.8	0	0	42	5	1	1	49	53.8
09:45	1	0	31	6	0	0	38	40.2	2	1	55	11	3	2	74	83.2
H/TOT	1	1	82	10	3	0	97	104.5	5	1	194	27	6	8	241	265.7
10:00	0	0	17	4	0	0	21	23	3	0	57	6	3	2	71	77.5
10:15	1	0	26	1	0	0	28	27.7	1	0	59	4	2	0	66	69.8
10:30	0	0	61	4	1	3	69	75.3	2	1	28	3	0	0	34	33.3
10:45	2	0	68	8	1	2	81	86.7	0	0	24	3	0	0	27	28.5
H/TOT	3	0	172	17	2	5	199	212.7	6	1	168	16	5	2	198	209.1
11:00	1	0	19	0	0	0	20	19.2	0	1	58	20	2	3	84	99
11:15	1	1	18	2	1	0	23	23.9	3	0	50	7	3	1	64	70
11:30	1	0	30	2	0	0	33	33.2	4	1	67	6	3	2	83	88.1
11:45	0	1	24	2	0	0	27	27.4	2	1	64	8	4	2	81	90
H/TOT	3	2	91	6	1	0	103	103.7	9	3	239	41	12	8	312	347.1
12:00	1	0	34	5	0	0	40	41.7	1	0	64	7	1	2	75	81
12:15	0	0	31	2	0	0	33	34	3	0	66	9	3	2	83	91
12:30	0	0	30	3	2	0	35	39.1	1	1	76	13	2	1	94	102.7
12:45	2	0	30	6	1	0	39	41.7	0	0	81	4	3	3	91	99.9
H/TOT	3	0	125	16	3	0	147	156.5	5	1	287	33	9	8	343	374.6
13:00	0	1	27	3	0	0	31	31.9	2	0	78	7	0	1	88	90.9
13:15	1	0	25	4	0	0	30	31.2	2	2	92	6	2	1	105	108.8
13:30	3	0	48	3	0	0	54	53.1	5	0	81	4	1	3	94	96.3
13:45	2	0	24	4	1	0	31	32.7	6	0	76	8	0	1	91	91.2
H/TOT	6	1	124	14	1	0	146	148.9	15	2	327	25	3	6	378	387.2
14:00	0	0	30	5	0	0	35	37.5	1	0	82	10	0	3	96	103.2
14:15	1	0	26	2	0	0	29	29.2	3	1	91	7	2	1	105	109.1
14:30	12	1	55	6	2	0	76	71.4	3	1	96	7	0	3	110	113.5
14:45	1	1	40	3	0	0	45	45.1	3	2	82	5	2	2	96	99.5
H/TOT	14	2	151	16	2	0	185	183.2	10	4	351	29	4	9	407	425.3
15:00	4	1	34	7	0	0	46	45.7	1	2	87	5	1	0	96	97.8
15:15	0	0	32	2	1	0	35	37.3	2	0	97	10	2	5	116	127
15:30	1	0	34	4	2	0	41	44.8	1	0	81	13	0	2	97	104.7
15:45	3	2	21	2	0	0	28	25.4	3	1	62	5	1	2	74	76.8
H/TOT	8	3	121	15	3	0	150	153.2	7	3	327	33	4	9	383	406.3
16:00	2	0	38	4	0	0	44	44.4	6	1	100	15	2	2	126	132.7
16:15	4	0	51	1	1	0	57	55.6	5	1	88	7	0	2	103	103.9
16:30	2	0	32	9	1	0	44	48.2	4	3	84	6	0	2	99	99
16:45	2	0	34	4	0	0	40	40.4	6	3	99	8	0	0	116	113.4
H/TOT	10	0	155	18	2	0	185	188.6	21	8	371	36	2	6	444	449
17:00	6	1	35	5	0	0	47	44.1	5	2	108	10	0	5	130	134.8
17:15	7	1	41	8	2	0	59	59.4	17	2	86	5	0	1	111	99.7
17:30	5	0	42	6	0	0	53	52	16	5	90	8	0	2	121	111.2
17:45	8	0	26	3	0	0	37	32.1	13	1	92	3	0	1	110	101.5
H/TOT	26	2	144	22	2	0	196	187.6	51	10	376	26	0	9	472	447.2
18:00	4	0	37	3	0	0	44	42.3	28	2	99	4	0	3	136	117.4
18:15	6	0	35	2	0	0	43	39.2	19	0	110	7	2	3	141	134.9
18:30	7	0	38	2	0	0	47	42.4	20	1	125	5	0	4	155	144.9
18:45	1	1	23	6	1	0	32	34.9	8	4	95	3	1	3	114	111
H/TOT	18	1	133	13	1	0	166	158.8	75	7	429	19	3	13	546	508.2
12 TOT	101	12	1463	162	23	6	1767	1795.9	220	42	3448	320	53	90	4173	4290.7

IDASO

Survey Name: 031 19050 Raheny
Site: 1
Location: Brookwood Ave / Howth Rd / Sybil Hill Rd
Date: 13-Feb-2019

	D => C								D => D							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	1	0	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0
08:15	3	0	0	0	0	0	3	0.6	0	0	0	0	0	0	0	0
08:30	2	0	0	0	0	0	2	0.4	0	0	0	0	0	0	0	0
08:45	2	0	0	0	0	0	2	0.4	0	0	0	0	0	0	0	0
H/TOT	8	0	0	0	0	0	8	1.6	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	1	0	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0
09:30	1	0	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	2	0	0	0	0	0	2	0.4	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15	1	0	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	1	0	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	1	0	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	1	0	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	1	0	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	1	0	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0
12 TOT	13	0	1	0	0	0	14	3.6	0	0	0	0	0	0	0	0

IDASO

Survey Name: 031 19050 Raheny
Site: 2
Location: Sybil Hill Rd / St Pauls College
Date: 13-Feb-2019

	A => A								A => B							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.5
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.5
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
16:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
17:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
18:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
12 TOT	0	0	0	0	0	0	0	0	0	0	6	1	0	0	7	7.5

IDASO

Survey Name: 031 19050 Raheny
Site: 2
Location: Sybil Hill Rd / St Pauls College
Date: 13-Feb-2019

	A => C								B => A							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
08:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
08:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
H/TOT	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	3
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
09:45	0	0	1	1	0	0	2	2.5	0	0	0	0	0	0	0	0
H/TOT	0	0	2	1	0	0	3	3.5	0	0	0	0	0	0	0	0
10:00	1	0	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0
10:15	0	0	0	1	0	0	1	1.5	0	0	2	0	0	0	2	2
10:30	7	0	1	0	0	0	8	2.4	0	0	1	0	0	0	1	1
10:45	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
H/TOT	8	0	2	1	0	0	11	5.1	0	0	3	0	0	0	3	3
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	1	0	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0
11:30	1	0	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0
11:45	3	0	0	0	0	0	3	0.6	0	0	0	0	0	0	0	0
H/TOT	5	0	0	0	0	0	5	1	0	0	0	0	0	0	0	0
12:00	1	0	0	0	0	0	1	0.2	0	0	2	0	0	0	2	2
12:15	1	0	1	0	0	0	2	1.2	0	0	0	0	0	0	0	0
12:30	7	0	0	0	0	0	7	1.4	0	0	0	0	0	0	0	0
12:45	1	0	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0
H/TOT	10	0	1	0	0	0	11	3	0	0	2	0	0	0	2	2
13:00	48	0	0	0	0	0	48	9.6	0	0	0	0	0	0	0	0
13:15	2	0	0	0	0	0	2	0.4	0	0	1	0	0	0	1	1
13:30	3	0	1	0	0	0	4	1.6	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	53	0	1	0	0	0	54	11.6	0	0	1	0	0	0	1	1
14:00	1	0	1	0	0	0	2	1.2	0	0	0	0	0	0	0	0
14:15	1	0	0	0	0	0	1	0.2	0	0	1	0	0	0	1	1
14:30	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
14:45	1	0	2	0	0	0	3	2.2	0	0	0	0	0	0	0	0
H/TOT	3	0	4	0	0	0	7	4.6	0	0	1	0	0	0	1	1
15:00	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	2	0	0	0	2	2	0	0	1	0	0	0	1	1
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	2	0	0	0	2	2	0	0	1	0	0	0	1	1
18:00	7	0	0	0	0	0	7	1.4	0	0	1	0	0	0	1	1
18:15	1	0	1	0	0	0	2	1.2	0	0	0	0	0	0	0	0
18:30	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	8	0	2	0	0	0	10	3.6	0	0	1	0	0	0	1	1
12 TOT	87	0	15	2	0	0	104	35.4	0	0	13	0	0	0	13	13

IDASO

Survey Name: 031 19050 Raheny
Site: 2
Location: Sybil Hill Rd / St Pauls College
Date: 13-Feb-2019

	B => B								B => C							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	1	0	23	1	1	1	27	29
07:15	0	0	0	0	0	0	0	0	2	1	41	4	1	0	49	50.1
07:30	0	0	0	0	0	0	0	0	2	0	48	8	2	0	60	65
07:45	0	0	0	0	0	0	0	0	2	0	47	2	1	0	52	52.7
H/TOT	0	0	0	0	0	0	0	0	7	1	159	15	5	1	188	196.8
08:00	0	0	0	0	0	0	0	0	3	0	56	1	0	1	61	60.1
08:15	0	0	1	0	0	0	1	1	1	0	75	4	2	0	82	85.8
08:30	0	0	1	0	0	0	1	1	3	0	80	3	2	1	89	91.7
08:45	0	0	1	0	0	0	1	1	1	0	61	3	0	1	66	67.7
H/TOT	0	0	3	0	0	0	3	3	8	0	272	11	4	3	298	305.3
09:00	0	0	0	0	0	0	0	0	0	0	42	3	1	0	46	48.8
09:15	0	0	0	0	0	0	0	0	2	0	42	2	2	0	48	50
09:30	0	0	0	0	0	0	0	0	2	0	41	2	0	0	45	44.4
09:45	0	0	0	0	0	0	0	0	1	0	60	10	1	0	72	77.5
H/TOT	0	0	0	0	0	0	0	0	5	0	185	17	4	0	211	220.7
10:00	0	0	0	0	0	0	0	0	0	0	64	3	1	0	68	70.8
10:15	0	0	0	0	0	0	0	0	0	0	49	7	0	0	56	59.5
10:30	0	0	0	0	0	0	0	0	3	0	58	4	2	1	68	71.2
10:45	0	0	0	0	0	0	0	0	2	0	50	4	1	0	57	58.7
H/TOT	0	0	0	0	0	0	0	0	5	0	221	18	4	1	249	260.2
11:00	0	0	1	0	0	0	1	1	1	0	33	4	2	0	40	43.8
11:15	0	0	0	0	0	0	0	0	1	0	61	11	2	0	75	82.3
11:30	0	0	0	0	0	0	0	0	2	1	42	5	0	0	50	50.3
11:45	0	0	0	0	0	0	0	0	1	0	61	5	1	0	68	71
H/TOT	0	0	1	0	0	0	1	1	5	1	197	25	5	0	233	247.4
12:00	0	0	0	0	0	0	0	0	0	0	55	7	2	0	64	70.1
12:15	0	0	0	0	0	0	0	0	0	0	58	7	1	0	66	70.8
12:30	0	0	1	0	0	0	1	1	0	1	38	4	1	0	44	46.7
12:45	0	0	0	0	0	0	0	0	4	0	71	5	0	0	80	79.3
H/TOT	0	0	1	0	0	0	1	1	4	1	222	23	4	0	254	266.9
13:00	0	0	0	0	0	0	0	0	2	0	86	7	1	0	96	99.2
13:15	0	0	0	0	0	0	0	0	1	0	73	2	0	1	77	78.2
13:30	0	0	0	0	0	0	0	0	2	1	55	6	1	0	65	67.1
13:45	0	0	0	0	0	0	0	0	2	0	44	7	1	0	54	57.2
H/TOT	0	0	0	0	0	0	0	0	7	1	258	22	3	1	292	301.7
14:00	0	0	0	0	0	0	0	0	1	0	76	4	1	0	82	84.5
14:15	0	0	0	0	0	0	0	0	3	0	66	6	0	0	75	75.6
14:30	0	0	0	0	0	0	0	0	4	0	83	4	2	0	93	94.4
14:45	0	0	0	0	0	0	0	0	2	0	45	6	1	1	55	58.7
H/TOT	0	0	0	0	0	0	0	0	10	0	270	20	4	1	305	313.2
15:00	0	0	0	0	0	0	0	0	3	0	79	6	0	0	88	88.6
15:15	0	0	0	0	0	0	0	0	1	0	60	11	4	0	76	85.9
15:30	0	0	0	0	0	0	0	0	0	1	64	15	1	0	81	89.2
15:45	0	0	0	0	0	0	0	0	5	0	64	5	1	0	75	74.8
H/TOT	0	0	0	0	0	0	0	0	9	1	267	37	6	0	320	338.5
16:00	0	0	0	0	0	0	0	0	1	0	63	6	0	0	70	72.2
16:15	0	0	0	0	0	0	0	0	3	0	69	8	0	0	80	81.6
16:30	0	0	0	0	0	0	0	0	6	0	61	9	1	0	77	78
16:45	0	0	0	0	0	0	0	0	2	0	74	14	0	0	90	95.4
H/TOT	0	0	0	0	0	0	0	0	12	0	267	37	1	0	317	327.2
17:00	0	0	0	0	0	0	0	0	6	0	82	7	1	0	96	96
17:15	0	0	0	0	0	0	0	0	1	1	88	5	0	0	95	96.1
17:30	0	0	0	0	0	0	0	0	3	0	68	3	1	0	75	75.4
17:45	0	0	0	0	0	0	0	0	3	0	72	3	0	0	78	77.1
H/TOT	0	0	0	0	0	0	0	0	13	1	310	18	2	0	344	344.6
18:00	0	0	0	0	0	0	0	0	7	0	78	3	0	0	88	83.9
18:15	0	0	0	0	0	0	0	0	2	0	66	6	0	0	74	75.4
18:30	0	0	0	0	0	0	0	0	1	0	69	3	1	0	74	76
18:45	0	0	1	0	0	0	1	1	1	1	63	3	0	0	68	68.1
H/TOT	0	0	1	0	0	0	1	1	11	1	276	15	1	0	304	303.4
12 TOT	0	0	6	0	0	0	6	6	96	7	2904	258	43	7	3315	3425.9

IDASO

Survey Name: 031 19050 Raheny
Site: 2
Location: Sybil Hill Rd / St Pauls College
Date: 13-Feb-2019

	C => A								C => B							
TIME	**PCL**	**MCL**	**CAR**	**LGV**	**HGV**	**SV (BUS**	**TOT**	**PCU**	**PCL**	**MCL**	**CAR**	**LGV**	**HGV**	**SV (BUS**	**TOT**	**PCU**
07:00	0	0	0	0	0	0	0	0	4	0	22	3	1	0	30	29.6
07:15	0	0	0	0	0	0	0	0	3	0	35	5	3	0	46	50
07:30	0	0	0	0	0	0	0	0	0	0	40	11	4	0	55	65.7
07:45	0	0	2	0	0	0	2	2	2	1	52	9	3	0	67	73.2
H/TOT	0	0	2	0	0	0	2	2	9	1	149	28	11	0	198	218.5
08:00	4	0	0	0	0	0	4	0.8	5	0	67	2	1	0	75	73.3
08:15	22	0	0	1	0	0	23	5.9	10	0	78	3	0	0	91	84.5
08:30	32	0	0	0	0	0	32	6.4	3	0	89	5	2	0	99	101.7
08:45	16	0	2	0	0	0	18	5.2	2	0	57	4	3	0	66	70.3
H/TOT	74	0	2	1	0	0	77	18.3	20	0	291	14	6	0	331	329.8
09:00	2	0	0	0	0	0	2	0.4	1	0	47	6	1	0	55	58.5
09:15	1	0	0	0	0	0	1	0.2	0	0	40	7	0	1	48	52.5
09:30	0	0	2	1	0	0	3	3.5	1	1	40	4	3	0	49	53.5
09:45	0	0	0	0	0	0	0	0	4	0	42	12	0	1	59	62.8
H/TOT	3	0	2	1	0	0	6	4.1	6	1	169	29	4	2	211	227.3
10:00	0	0	0	0	0	0	0	0	0	0	33	5	2	0	40	45.1
10:15	0	0	0	0	0	0	0	0	0	0	39	8	1	0	48	53.3
10:30	1	0	0	0	0	0	1	0.2	3	0	41	7	1	0	52	54.4
10:45	0	0	0	0	0	0	0	0	1	0	66	3	2	0	72	75.3
H/TOT	1	0	0	0	0	0	1	0.2	4	0	179	23	6	0	212	228.1
11:00	0	0	0	0	0	0	0	0	2	1	43	5	1	0	52	53.6
11:15	0	0	0	0	0	0	0	0	2	1	55	3	0	0	61	60.3
11:30	0	0	0	0	0	0	0	0	1	0	50	6	3	0	60	66.1
11:45	0	0	0	0	0	0	0	0	0	0	40	1	1	0	42	43.8
H/TOT	0	0	0	0	0	0	0	0	5	2	188	15	5	0	215	223.8
12:00	0	0	0	0	0	0	0	0	0	1	55	6	1	0	63	66.7
12:15	0	0	0	0	0	0	0	0	3	0	44	4	3	1	55	59.5
12:30	0	0	0	0	0	0	0	0	1	0	52	1	1	0	55	56
12:45	0	0	1	0	0	0	1	1	1	0	65	6	2	0	74	78.8
H/TOT	0	0	1	0	0	0	1	1	5	1	216	17	7	1	247	261
13:00	0	0	0	0	0	0	0	0	1	1	60	4	1	0	67	68.9
13:15	1	0	0	0	0	0	1	0.2	1	1	40	5	1	0	48	50.4
13:30	0	0	0	0	0	0	0	0	1	0	55	2	1	0	59	60.5
13:45	0	0	1	0	0	0	1	1	1	0	63	5	0	0	69	70.7
H/TOT	1	0	1	0	0	0	2	1.2	4	2	218	16	3	0	243	250.5
14:00	0	0	0	0	0	0	0	0	4	0	66	5	0	0	75	74.3
14:15	0	0	0	0	0	0	0	0	0	0	41	6	0	0	47	50
14:30	0	0	1	0	0	0	1	1	2	0	54	5	0	0	61	61.9
14:45	0	0	0	0	0	0	0	0	2	0	55	3	3	0	63	66.8
H/TOT	0	0	1	0	0	0	1	1	8	0	216	19	3	0	246	253
15:00	0	0	0	0	0	0	0	0	2	0	51	4	3	0	60	64.3
15:15	0	0	0	0	0	0	0	0	0	0	57	3	2	0	62	66.1
15:30	0	0	0	0	0	0	0	0	3	0	49	2	1	0	55	54.9
15:45	0	0	0	0	0	0	0	0	4	0	60	5	0	0	69	68.3
H/TOT	0	0	0	0	0	0	0	0	9	0	217	14	6	0	246	253.6
16:00	0	0	0	0	0	0	0	0	1	0	52	4	0	0	57	58.2
16:15	0	0	0	0	0	0	0	0	3	0	53	1	1	1	59	59.4
16:30	0	0	1	0	0	0	1	1	4	0	63	3	0	0	70	68.3
16:45	2	0	0	0	0	0	2	0.4	2	0	59	7	0	0	68	69.9
H/TOT	2	0	1	0	0	0	3	1.4	10	0	227	15	1	1	254	255.8
17:00	2	0	0	0	0	0	2	0.4	2	0	47	2	0	0	51	50.4
17:15	0	0	0	0	0	0	0	0	1	1	61	0	0	0	63	61.6
17:30	0	0	0	0	0	0	0	0	2	0	59	1	1	0	63	63.2
17:45	0	0	0	0	0	0	0	0	1	0	55	1	0	0	57	56.7
H/TOT	2	0	0	0	0	0	2	0.4	6	1	222	4	1	0	234	231.9
18:00	0	0	0	0	0	0	0	0	0	1	51	1	0	0	53	52.9
18:15	0	0	0	0	0	0	0	0	0	0	56	0	0	0	56	56
18:30	0	0	1	0	0	0	1	1	1	0	55	2	0	0	58	58.2
18:45	0	0	1	0	0	0	1	1	1	1	67	5	0	0	74	75.1
H/TOT	0	0	2	0	0	0	2	2	2	2	229	8	0	0	241	242.2
12 TOT	83	0	12	2	0	0	97	31.6	88	10	2521	202	53	4	2878	2975.5

IDASO

Survey Name: 031 19050 Raheny
Site: 2
Location: Sybil Hill Rd / St Pauls College
Date: 13-Feb-2019

	C => C							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
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
H/TOT	0	0	0	0	0	0	0	0
08:00	0	0	3	0	0	0	3	3
08:15	0	0	4	1	0	0	5	5.5
08:30	0	0	3	0	0	0	3	3
08:45	0	0	3	0	0	0	3	3
H/TOT	0	0	13	1	0	0	14	14.5
09:00	0	0	1	0	0	0	1	1
09:15	0	0	1	0	0	0	1	1
09:30	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0
H/TOT	0	0	2	0	0	0	2	2
10:00	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0
10:30	0	0	2	0	0	0	2	2
10:45	0	0	1	0	0	0	1	1
H/TOT	0	0	3	0	0	0	3	3
11:00	0	0	0	0	0	0	0	0
11:15	0	0	2	0	0	0	2	2
11:30	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0
H/TOT	0	0	2	0	0	0	2	2
12:00	0	0	2	0	0	0	2	2
12:15	0	0	0	0	0	0	0	0
12:30	0	0	1	0	0	0	1	1
12:45	0	0	2	0	0	0	2	2
H/TOT	0	0	5	0	0	0	5	5
13:00	0	0	3	0	0	0	3	3
13:15	0	0	2	0	0	0	2	2
13:30	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0
H/TOT	0	0	5	0	0	0	5	5
14:00	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0
16:45	0	0	1	0	0	0	1	1
H/TOT	0	0	1	0	0	0	1	1
17:00	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
12 TOT	0	0	31	1	0	0	32	32.5

IDASO

Survey Name: 031 19050 Raheny
Site: 3
Location: Sybil Hill Rd / St Pauls College
Date: 13-Feb-2019

	A => A								A => B							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
08:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
H/TOT	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
10:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
H/TOT	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
13:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
13:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
H/TOT	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	3
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
17:00	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	3
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	3
18:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
12 TOT	0	0	0	0	0	0	0	0	0	0	16	0	0	0	16	16

IDASO

Survey Name: 031 19050 Raheny
Site: 3
Location: Sybil Hill Rd / St Pauls College
Date: 13-Feb-2019

	A => C								B => A							
TIME	**PCL**	**MCL**	**CAR**	**LGV**	**HGV**	**SV (BUS**	**TOT**	**PCU**	**PCL**	**MCL**	**CAR**	**LGV**	**HGV**	**SV (BUS**	**TOT**	**PCU**
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
08:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
08:15	0	0	0	1	0	0	1	1.5	0	0	1	0	0	0	1	1
08:30	0	0	0	0	0	0	0	0	1	0	2	0	0	0	3	2.2
08:45	0	0	2	0	0	0	2	2	0	0	1	0	0	0	1	1
H/TOT	0	0	2	1	0	0	3	3.5	1	0	5	0	0	0	6	5.2
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
09:45	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
H/TOT	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0	0
10:00	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0	0
10:15	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
10:30	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
10:45	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
H/TOT	0	0	5	0	0	0	5	5	0	0	0	0	0	0	0	0
11:00	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
11:45	0	0	1	0	0	0	1	1	0	0	1	0	0	0	1	1
H/TOT	0	0	2	0	0	0	2	2	0	0	2	0	0	0	2	2
12:00	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0	0
12:15	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
12:30	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0	0
12:45	0	0	1	0	0	0	1	1	0	0	1	0	0	0	1	1
H/TOT	0	0	6	0	0	0	6	6	0	0	1	0	0	0	1	1
13:00	0	0	5	1	0	0	6	6.5	0	0	1	0	0	0	1	1
13:15	0	0	3	0	0	0	3	3	0	0	0	0	0	0	0	0
13:30	0	0	2	0	0	0	2	2	0	0	1	0	0	0	1	1
13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	10	1	0	0	11	11.5	0	0	2	0	0	0	2	2
14:00	0	0	3	1	0	0	4	4.5	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	4	1	0	0	5	5.5	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
15:30	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
H/TOT	0	0	2	0	0	0	2	2	0	0	1	0	0	0	1	1
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0	0
16:30	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0	0
16:45	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
H/TOT	0	0	5	0	0	0	5	5	0	0	0	0	0	0	0	0
17:00	0	0	1	0	0	0	1	1	0	0	1	0	0	0	1	1
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
17:45	0	0	2	0	0	0	2	2	0	0	1	0	0	0	1	1
H/TOT	0	0	4	0	0	0	4	4	0	0	2	0	0	0	2	2
18:00	0	0	4	0	0	0	4	4	0	0	0	0	0	0	0	0
18:15	0	0	2	0	0	0	2	2	0	0	1	0	0	0	1	1
18:30	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
18:45	0	0	1	0	0	0	1	1	0	0	4	0	0	0	4	4
H/TOT	0	0	8	0	0	0	8	8	0	0	5	0	0	0	5	5
12 TOT	0	0	50	3	0	0	53	54.5	1	0	19	0	0	0	20	19.2

IDASO

Survey Name: 031 19050 Raheny
Site: 3
Location: Sybil Hill Rd / St Pauls College
Date: 13-Feb-2019

	B => B								B => C							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	1	0	22	2	0	1	26	27.2
07:15	0	0	0	0	1	0	1	2.3	3	0	41	3	2	0	49	50.7
07:30	0	0	0	0	0	0	0	0	3	0	48	8	2	0	61	65.2
07:45	0	0	0	0	0	0	0	0	2	0	48	2	1	0	53	53.7
H/TOT	0	0	0	0	1	0	1	2.3	9	0	159	15	5	1	189	196.8
08:00	0	0	0	0	0	0	0	0	3	0	55	1	0	1	60	59.1
08:15	0	0	1	0	0	0	1	1	2	0	74	4	2	0	82	85
08:30	0	0	0	0	0	0	0	0	3	0	79	4	2	1	89	92.2
08:45	0	0	1	0	0	0	1	1	1	0	60	3	0	1	65	66.7
H/TOT	0	0	2	0	0	0	2	2	9	0	268	12	4	3	296	303
09:00	0	0	0	0	0	0	0	0	0	0	42	2	1	0	45	47.3
09:15	0	0	0	0	0	0	0	0	2	0	41	2	2	0	47	49
09:30	0	0	0	0	0	0	0	0	2	0	41	1	0	0	44	42.9
09:45	0	0	0	0	0	0	0	0	1	0	61	10	1	0	73	78.5
H/TOT	0	0	0	0	0	0	0	0	5	0	185	15	4	0	209	217.7
10:00	0	0	0	0	0	0	0	0	0	0	60	3	1	0	64	66.8
10:15	0	0	0	0	0	0	0	0	0	0	51	8	0	0	59	63
10:30	0	0	0	0	0	0	0	0	2	0	56	3	2	1	64	67.5
10:45	0	0	0	0	0	0	0	0	1	0	48	5	1	0	55	58
H/TOT	0	0	0	0	0	0	0	0	3	0	215	19	4	1	242	255.3
11:00	0	0	0	0	0	0	0	0	1	0	34	4	2	0	41	44.8
11:15	0	0	0	0	0	0	0	0	1	0	61	11	2	0	75	82.3
11:30	0	0	0	0	0	0	0	0	2	1	42	4	0	0	49	48.8
11:45	0	0	0	0	0	0	0	0	1	0	60	5	1	0	67	70
H/TOT	0	0	0	0	0	0	0	0	5	1	197	24	5	0	232	245.9
12:00	0	0	0	0	0	0	0	0	0	0	54	7	2	0	63	69.1
12:15	0	0	0	0	0	0	0	0	0	0	57	8	1	0	66	71.3
12:30	0	0	0	0	0	0	0	0	0	1	36	4	1	0	42	44.7
12:45	0	0	1	0	0	0	1	1	5	0	72	5	0	0	82	80.5
H/TOT	0	0	1	0	0	0	1	1	5	1	219	24	4	0	253	265.6
13:00	0	0	0	0	0	0	0	0	3	0	76	6	1	0	86	87.9
13:15	0	0	0	0	0	0	0	0	1	0	70	2	0	1	74	75.2
13:30	0	0	0	0	0	0	0	0	2	1	51	7	1	0	62	64.6
13:45	0	0	0	0	0	0	0	0	2	0	46	7	1	0	56	59.2
H/TOT	0	0	0	0	0	0	0	0	8	1	243	22	3	1	278	286.9
14:00	0	0	1	0	0	0	1	1	1	0	71	3	1	0	76	78
14:15	0	0	0	0	0	0	0	0	3	0	66	6	0	0	75	75.6
14:30	0	0	0	0	0	0	0	0	1	0	82	4	2	0	89	92.8
14:45	0	0	0	0	0	0	0	0	2	0	46	5	1	1	55	58.2
H/TOT	0	0	1	0	0	0	1	1	7	0	265	18	4	1	295	304.6
15:00	0	0	0	0	0	0	0	0	2	0	79	6	0	0	87	88.4
15:15	0	0	0	0	0	0	0	0	0	0	61	9	4	0	74	83.7
15:30	0	0	0	0	0	0	0	0	0	1	63	15	1	0	80	88.2
15:45	0	0	0	0	0	0	0	0	2	0	63	5	1	0	71	73.2
H/TOT	0	0	0	0	0	0	0	0	4	1	266	35	6	0	312	333.5
16:00	0	0	0	0	0	0	0	0	1	0	62	6	0	0	69	71.2
16:15	0	0	0	0	0	0	0	0	3	0	67	8	0	0	78	79.6
16:30	0	0	0	0	0	0	0	0	3	0	59	9	1	0	72	75.4
16:45	0	0	0	0	0	0	0	0	1	0	69	14	0	0	84	90.2
H/TOT	0	0	0	0	0	0	0	0	8	0	257	37	1	0	303	316.4
17:00	0	0	0	0	0	0	0	0	5	0	85	6	1	0	97	97.3
17:15	0	0	0	0	0	0	0	0	1	1	85	5	0	0	92	93.1
17:30	0	0	0	0	0	0	0	0	2	0	67	3	1	0	73	74.2
17:45	0	0	0	0	0	0	0	0	3	0	70	3	0	0	76	75.1
H/TOT	0	0	0	0	0	0	0	0	11	1	307	17	2	0	338	339.7
18:00	0	0	0	0	0	0	0	0	4	0	76	3	0	0	83	81.3
18:15	0	0	0	0	0	0	0	0	2	0	66	4	0	0	72	72.4
18:30	0	0	0	0	0	0	0	0	1	0	71	3	0	0	75	75.7
18:45	0	0	0	0	0	0	0	0	1	1	62	2	0	0	66	65.6
H/TOT	0	0	0	0	0	0	0	0	8	1	275	12	0	0	296	295
12 TOT	0	0	4	0	1	0	5	6.3	82	6	2856	250	42	7	3243	3360.4

IDASO

Survey Name: 031 19050 Raheny
Site: 3
Location: Sybil Hill Rd / St Pauls College
Date: 13-Feb-2019

	C => A								C => B							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	4	0	23	2	1	0	30	29.1
07:15	0	0	0	0	0	0	0	0	2	1	36	4	3	0	46	49.7
07:30	0	0	0	0	0	0	0	0	0	0	40	11	4	0	55	65.7
07:45	0	0	1	0	0	0	1	1	2	0	49	9	3	0	63	69.8
H/TOT	0	0	1	0	0	0	1	1	8	1	148	26	11	0	194	214.3
08:00	0	0	2	0	0	0	2	2	4	0	63	3	1	0	71	70.6
08:15	0	0	10	1	0	0	11	11.5	8	0	67	3	0	0	78	73.1
08:30	0	0	7	0	0	0	7	7	3	0	82	5	2	0	92	94.7
08:45	0	0	0	0	0	0	0	0	2	0	56	4	3	0	65	69.3
H/TOT	0	0	19	1	0	0	20	20.5	17	0	268	15	6	0	306	307.7
09:00	0	0	0	0	0	0	0	0	1	0	47	5	1	0	54	57
09:15	0	0	0	0	0	0	0	0	0	0	41	8	0	1	50	55
09:30	0	0	1	0	0	0	1	1	1	1	39	4	3	0	48	52.5
09:45	0	0	1	0	0	0	1	1	3	0	40	11	0	1	55	59.1
H/TOT	0	0	2	0	0	0	2	2	5	1	167	28	4	2	207	223.6
10:00	0	0	1	0	0	0	1	1	1	0	34	5	2	0	42	46.3
10:15	0	0	1	1	0	0	2	2.5	0	0	38	7	1	0	46	50.8
10:30	0	0	3	0	0	0	3	3	1	0	37	7	1	0	46	50
10:45	0	0	3	0	0	0	3	3	1	0	63	3	2	0	69	72.3
H/TOT	0	0	8	1	0	0	9	9.5	3	0	172	22	6	0	203	219.4
11:00	0	0	1	0	0	0	1	1	2	1	41	1	1	0	46	45.6
11:15	0	0	0	0	0	0	0	0	2	1	55	3	0	0	61	60.3
11:30	0	0	1	0	0	0	1	1	1	0	49	6	3	0	59	65.1
11:45	0	0	0	0	0	0	0	0	0	0	41	0	1	0	42	43.3
H/TOT	0	0	2	0	0	0	2	2	5	2	186	10	5	0	208	214.3
12:00	0	0	1	0	0	0	1	1	0	1	54	6	1	0	62	65.7
12:15	0	0	1	0	0	0	1	1	4	0	42	4	3	1	54	57.7
12:30	0	0	2	0	0	0	2	2	1	0	50	1	1	0	53	54
12:45	0	0	3	0	0	0	3	3	1	0	60	6	2	0	69	73.8
H/TOT	0	0	7	0	0	0	7	7	6	1	206	17	7	1	238	251.2
13:00	0	0	3	0	0	0	3	3	1	1	58	4	1	0	65	66.9
13:15	0	0	0	0	0	0	0	0	1	1	48	5	1	0	56	58.4
13:30	0	0	0	0	0	0	0	0	1	0	55	2	1	0	59	60.5
13:45	0	0	0	1	0	0	1	1.5	1	0	63	4	0	0	68	69.2
H/TOT	0	0	3	1	0	0	4	4.5	4	2	224	15	3	0	248	255
14:00	0	0	0	0	0	0	0	0	4	0	66	5	0	0	75	74.3
14:15	0	0	1	0	0	0	1	1	0	0	39	6	0	0	45	48
14:30	0	0	2	0	0	0	2	2	2	0	51	6	0	0	59	60.4
14:45	0	0	2	0	0	0	2	2	2	0	53	3	3	0	61	64.8
H/TOT	0	0	5	0	0	0	5	5	8	0	209	20	3	0	240	247.5
15:00	0	0	0	0	0	0	0	0	3	0	50	4	3	0	60	63.5
15:15	0	0	0	0	0	0	0	0	0	0	57	2	2	0	61	64.6
15:30	0	0	0	0	0	0	0	0	1	0	49	3	1	0	54	56
15:45	0	0	0	0	0	0	0	0	3	0	59	4	0	0	66	65.6
H/TOT	0	0	0	0	0	0	0	0	7	0	215	13	6	0	241	249.7
16:00	0	0	1	1	0	0	2	2.5	1	0	51	3	0	0	55	55.7
16:15	0	0	0	0	0	0	0	0	2	0	51	1	1	1	56	57.2
16:30	0	0	1	0	0	0	1	1	3	0	61	3	0	0	67	66.1
16:45	0	0	1	0	0	0	1	1	2	0	57	7	0	0	66	67.9
H/TOT	0	0	3	1	0	0	4	4.5	8	0	220	14	1	1	244	246.9
17:00	0	0	0	0	0	0	0	0	2	0	48	2	0	0	52	51.4
17:15	0	0	0	0	0	0	0	0	1	1	60	0	0	0	62	60.6
17:30	0	0	3	0	0	0	3	3	0	0	56	1	1	0	58	59.8
17:45	0	0	2	0	0	0	2	2	1	0	52	1	0	0	54	53.7
H/TOT	0	0	5	0	0	0	5	5	4	1	216	4	1	0	226	225.5
18:00	0	0	3	0	0	0	3	3	1	0	51	1	0	0	53	52.7
18:15	0	0	3	0	0	0	3	3	0	0	53	0	0	0	53	53
18:30	0	0	5	0	0	0	5	5	1	0	53	2	0	0	56	56.2
18:45	0	0	16	0	0	0	16	16	2	0	50	5	0	0	57	57.9
H/TOT	0	0	27	0	0	0	27	27	4	0	207	8	0	0	219	219.8
12 TOT	0	0	82	4	0	0	86	88	79	8	2438	192	53	4	2774	2874.9

IDASO

Survey Name: 031 19050 Raheny
Site: 3
Location: Sybil Hill Rd / St Pauls College
Date: 13-Feb-2019

	C => C							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
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
H/TOT	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0
08:15	0	0	1	0	0	0	1	1
08:30	0	0	1	0	0	0	1	1
08:45	0	0	1	0	0	0	1	1
H/TOT	0	0	3	0	0	0	3	3
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
H/TOT	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
H/TOT	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	1	0	0	0	1	1
H/TOT	0	0	1	0	0	0	1	1
12:00	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0
12:45	0	0	1	0	0	0	1	1
H/TOT	0	0	1	0	0	0	1	1
13:00	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0
14:15	0	0	1	0	0	0	1	1
14:30	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0
H/TOT	0	0	1	0	0	0	1	1
15:00	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0
15:45	0	0	1	0	0	0	1	1
H/TOT	0	0	1	0	0	0	1	1
16:00	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0
16:30	0	0	1	0	0	0	1	1
16:45	0	0	2	0	0	0	2	2
H/TOT	0	0	3	0	0	0	3	3
17:00	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
12 TOT	0	0	10	0	0	0	10	10

IDASO

Survey Name: 031 19050 Raheny
Site: 4
Location: R808 / St Pauls College
Date: 13-Feb-2019

	A => A								A => B							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
08:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
09:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.5
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.5
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.2
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.2
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.2
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.2
12:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.2
12:15	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
12:30	0	0	0	0	0	0	0	0	3	0	1	0	0	1	5	3.6
12:45	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.2
H/TOT	0	0	0	0	0	0	0	0	5	0	3	0	0	1	9	6
13:00	0	0	0	0	0	0	0	0	11	0	2	0	0	0	13	4.2
13:15	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	4
13:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
13:45	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	0.6
H/TOT	0	0	0	0	0	0	0	0	14	0	7	0	0	0	21	9.8
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
15:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
15:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
H/TOT	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	3
16:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
16:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
16:30	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	1.2
16:45	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	2.2
H/TOT	0	0	0	0	0	0	0	0	2	0	3	0	0	1	6	5.4
17:00	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	3
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3	3.5
H/TOT	0	0	0	0	0	0	0	0	0	0	5	1	0	0	6	6.5
18:00	0	0	0	0	0	0	0	0	1	0	7	0	0	0	8	7.2
18:15	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	6
H/TOT	0	0	0	0	0	0	0	0	1	0	15	0	0	0	16	15.2
12 TOT	0	0	0	0	0	0	0	0	24	0	39	2	0	2	67	50.8

IDASO

Survey Name: 031 19050 Raheny
Site: 4
Location: R808 / St Pauls College
Date: 13-Feb-2019

	A => C								B => A							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
08:00	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
08:15	0	0	0	0	0	0	0	0	5	0	2	0	0	0	7	3
08:30	0	0	1	0	0	0	1	1	13	0	5	0	0	0	18	7.6
08:45	0	0	1	0	0	0	1	1	8	0	3	0	0	0	11	4.6
H/TOT	0	0	2	0	0	0	2	2	26	0	12	0	0	0	38	17.2
09:00	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	1.7
09:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
09:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	1	0	2	1	0	0	4	3.7
10:00	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
10:15	0	0	0	1	0	0	1	1.5	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	1	0	0	1	1.5	0	0	2	0	0	0	2	2
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	3	0	3	0	0	0	6	3.6	0	0	0	0	0	0	0	0
13:15	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	3	0	5	0	0	0	8	5.6	0	0	0	0	0	0	0	0
14:00	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	0	1	0	0	0	1	1	0	0	1	0	0	0	1	1
14:45	0	0	1	0	0	0	1	1	0	0	2	0	0	0	2	2
H/TOT	0	0	3	0	0	0	3	3	0	0	3	0	0	0	3	3
15:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
15:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
15:30	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	1.2
15:45	0	0	1	0	0	0	1	1	1	0	2	0	0	0	3	2.2
H/TOT	0	0	1	0	0	0	1	1	2	0	5	0	0	0	7	5.4
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	1	0	0	1	1.5	0	0	0	0	0	0	0	0
16:30	0	0	1	0	0	0	1	1	0	0	1	0	0	0	1	1
16:45	0	0	2	0	0	0	2	2	0	0	4	0	0	1	5	6
H/TOT	0	0	3	1	0	0	4	4.5	0	0	5	0	0	1	6	7
17:00	0	0	1	0	0	0	1	1	0	0	4	0	0	0	4	4
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	1	0	0	0	1	1	0	0	13	0	0	0	13	13
H/TOT	0	0	2	0	0	0	2	2	0	0	17	0	0	0	17	17
18:00	0	0	3	0	0	0	3	3	0	0	15	0	0	0	15	15
18:15	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	5
18:45	0	0	2	0	0	0	2	2	0	0	33	0	0	0	33	33
H/TOT	0	0	6	0	0	0	6	6	0	0	53	0	0	0	53	53
12 TOT	3	0	22	2	0	0	27	25.6	29	0	101	1	0	1	132	110.3

IDASO

Survey Name: 031 19050 Raheny
Site: 4
Location: R808 / St Pauls College
Date: 13-Feb-2019

	B => B								B => C							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	1	0	22	2	0	1	26	27.2
07:15	0	0	0	0	0	0	0	0	3	0	42	3	3	0	51	54
07:30	0	0	0	0	0	0	0	0	2	0	47	8	2	0	59	64
07:45	0	0	0	0	0	0	0	0	3	0	49	2	1	0	55	54.9
H/TOT	0	0	0	0	0	0	0	0	9	0	160	15	6	1	191	200.1
08:00	0	0	0	0	0	0	0	0	2	0	55	2	0	1	60	60.4
08:15	0	0	1	0	0	0	1	1	3	0	74	5	2	0	84	86.7
08:30	0	0	1	0	0	0	1	1	3	0	79	3	2	1	88	90.7
08:45	0	0	3	0	0	0	3	3	1	0	60	3	0	1	65	66.7
H/TOT	0	0	5	0	0	0	5	5	9	0	268	13	4	3	297	304.5
09:00	0	0	1	0	0	0	1	1	0	0	40	3	1	0	44	46.8
09:15	0	0	0	0	0	0	0	0	2	0	41	2	2	0	47	49
09:30	0	0	0	0	0	0	0	0	2	0	41	1	0	0	44	42.9
09:45	0	0	0	0	0	0	0	0	1	0	59	10	1	0	71	76.5
H/TOT	0	0	1	0	0	0	1	1	5	0	181	16	4	0	206	215.2
10:00	0	0	0	0	0	0	0	0	0	0	60	4	1	0	65	68.3
10:15	0	0	0	0	0	0	0	0	0	0	48	7	0	0	55	58.5
10:30	0	0	2	0	0	0	2	2	3	0	56	4	2	1	66	69.2
10:45	0	0	0	0	0	0	0	0	1	0	48	4	1	0	54	56.5
H/TOT	0	0	2	0	0	0	2	2	4	0	212	19	4	1	240	252.5
11:00	0	0	1	0	0	0	1	1	1	0	33	4	2	0	40	43.8
11:15	0	0	1	0	0	0	1	1	1	0	60	11	2	0	74	81.3
11:30	0	0	0	0	0	0	0	0	2	1	39	5	0	0	47	47.3
11:45	0	0	0	0	0	0	0	0	1	0	59	5	1	0	66	69
H/TOT	0	0	2	0	0	0	2	2	5	1	191	25	5	0	227	241.4
12:00	0	0	0	0	0	0	0	0	0	0	54	7	2	0	63	69.1
12:15	0	0	0	0	0	0	0	0	0	0	58	7	1	0	66	70.8
12:30	0	0	0	0	0	0	0	0	0	1	34	4	1	0	40	42.7
12:45	0	0	0	0	0	0	0	0	5	0	76	5	0	0	86	84.5
H/TOT	0	0	0	0	0	0	0	0	5	1	222	23	4	0	255	267.1
13:00	0	0	0	0	0	0	0	0	1	0	68	5	1	0	75	78
13:15	0	0	0	0	0	0	0	0	1	0	68	2	0	1	72	73.2
13:30	0	0	0	0	0	0	0	0	2	1	51	7	1	0	62	64.6
13:45	0	0	0	0	0	0	0	0	2	0	46	7	1	0	56	59.2
H/TOT	0	0	0	0	0	0	0	0	6	1	233	21	3	1	265	275
14:00	0	0	0	0	0	0	0	0	1	0	67	4	1	0	73	75.5
14:15	0	0	0	0	0	0	0	0	3	0	65	6	0	0	74	74.6
14:30	0	0	0	0	0	0	0	0	4	0	80	5	2	0	91	92.9
14:45	0	0	0	0	0	0	0	0	2	0	45	4	1	1	53	55.7
H/TOT	0	0	0	0	0	0	0	0	10	0	257	19	4	1	291	298.7
15:00	0	0	0	0	0	0	0	0	3	0	78	6	0	0	87	87.6
15:15	0	0	0	0	0	0	0	0	2	0	60	10	4	0	76	84.6
15:30	0	0	0	0	0	0	0	0	0	1	62	14	1	0	78	85.7
15:45	0	0	0	0	0	0	0	0	5	0	62	5	1	0	73	72.8
H/TOT	0	0	0	0	0	0	0	0	10	1	262	35	6	0	314	330.7
16:00	0	0	1	0	0	0	1	1	1	0	62	6	0	0	69	71.2
16:15	0	0	0	0	0	0	0	0	3	0	66	7	0	0	76	77.1
16:30	0	0	0	0	0	0	0	0	6	0	57	9	1	0	73	74
16:45	0	0	0	0	0	0	0	0	4	0	65	14	0	0	83	86.8
H/TOT	0	0	1	0	0	0	1	1	14	0	250	36	1	0	301	309.1
17:00	0	0	0	0	0	0	0	0	6	0	84	6	1	0	97	96.5
17:15	0	0	0	0	0	0	0	0	1	1	85	5	0	0	92	93.1
17:30	0	0	0	0	0	0	0	0	3	0	70	3	1	0	77	77.4
17:45	0	0	1	0	0	0	1	1	3	0	69	3	0	0	75	74.1
H/TOT	0	0	1	0	0	0	1	1	13	1	308	17	2	0	341	341.1
18:00	0	0	0	0	0	0	0	0	6	0	72	3	0	0	81	77.7
18:15	0	0	0	0	0	0	0	0	2	0	63	5	0	0	70	70.9
18:30	0	0	0	0	0	0	0	0	1	0	69	4	1	0	75	77.5
18:45	0	0	0	0	0	0	0	0	1	1	62	2	0	0	66	65.6
H/TOT	0	0	0	0	0	0	0	0	10	1	266	14	1	0	292	291.7
12 TOT	0	0	12	0	0	0	12	12	100	6	2810	253	44	7	3220	3327.1

IDASO

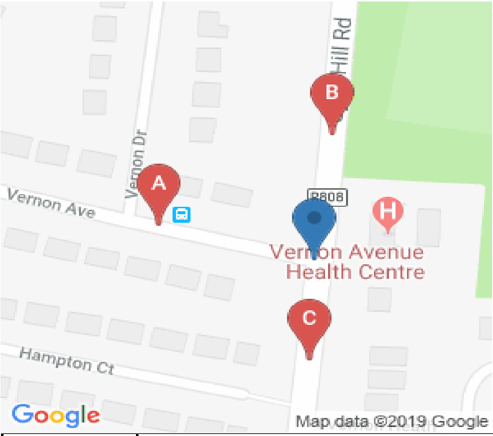
Survey Name: 031 19050 Raheny
Site: 4
Location: R808 / St Pauls College
Date: 13-Feb-2019

	C => A								C => B							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	3	1	34	2	0	0	40	38
07:15	0	0	0	0	0	0	0	0	1	0	37	4	5	0	47	54.7
07:30	0	0	0	1	0	0	1	1.5	0	0	40	10	4	0	54	64.2
07:45	0	0	0	0	0	0	0	0	2	0	47	9	3	0	61	67.8
H/TOT	0	0	0	1	0	0	1	1.5	6	1	158	25	12	0	202	224.7
08:00	0	0	0	0	0	0	0	0	5	0	66	2	1	0	74	72.3
08:15	0	0	0	0	0	0	0	0	8	0	65	3	0	0	76	71.1
08:30	0	0	0	0	0	0	0	0	3	0	79	5	2	0	89	91.7
08:45	0	0	0	0	0	0	0	0	2	0	55	4	3	0	64	68.3
H/TOT	0	0	0	0	0	0	0	0	18	0	265	14	6	0	303	303.4
09:00	0	0	0	0	0	0	0	0	1	0	46	5	1	0	53	56
09:15	0	0	0	0	0	0	0	0	0	0	42	8	0	1	51	56
09:30	0	0	0	0	0	0	0	0	1	1	38	5	3	0	48	53
09:45	0	0	0	0	0	0	0	0	3	0	39	10	0	1	53	56.6
H/TOT	0	0	0	0	0	0	0	0	5	1	165	28	4	2	205	221.6
10:00	1	0	0	0	0	0	1	0.2	0	0	35	5	2	0	42	47.1
10:15	0	0	0	0	0	0	0	0	0	0	36	7	1	0	44	48.8
10:30	0	0	0	0	0	0	0	0	1	0	38	7	1	0	47	51
10:45	0	0	0	0	0	0	0	0	1	0	62	3	2	0	68	71.3
H/TOT	1	0	0	0	0	0	1	0.2	2	0	171	22	6	0	201	218.2
11:00	0	0	0	0	0	0	0	0	0	1	41	5	1	0	48	51.2
11:15	0	0	0	0	0	0	0	0	4	1	55	3	0	0	63	60.7
11:30	0	0	0	0	0	0	0	0	0	0	48	5	3	0	56	62.4
11:45	0	0	0	0	0	0	0	0	0	0	39	2	1	0	42	44.3
H/TOT	0	0	0	0	0	0	0	0	4	2	183	15	5	0	209	218.6
12:00	0	0	1	0	0	0	1	1	0	1	50	6	1	0	58	61.7
12:15	0	0	2	0	0	1	3	4	0	3	42	4	3	0	52	56.1
12:30	0	0	0	0	0	0	0	0	1	0	49	1	1	0	52	53
12:45	0	0	0	0	0	0	0	0	1	0	56	6	1	0	64	67.5
H/TOT	0	0	3	0	0	1	4	5	2	4	197	17	6	0	226	238.3
13:00	0	0	0	0	0	0	0	0	2	1	59	4	2	0	68	70.4
13:15	0	0	0	0	0	0	0	0	1	1	42	5	1	0	50	52.4
13:30	0	0	0	0	0	0	0	0	1	0	53	2	1	0	57	58.5
13:45	0	0	0	0	0	0	0	0	1	0	63	4	0	0	68	69.2
H/TOT	0	0	0	0	0	0	0	0	5	2	217	15	4	0	243	250.5
14:00	0	0	0	0	0	0	0	0	4	0	66	5	0	0	75	74.3
14:15	0	0	0	0	0	0	0	0	0	0	39	6	0	0	45	48
14:30	0	0	0	0	0	0	0	0	2	0	51	5	0	0	58	58.9
14:45	0	0	0	0	0	0	0	0	1	0	51	2	3	0	57	61.1
H/TOT	0	0	0	0	0	0	0	0	7	0	207	18	3	0	235	242.3
15:00	0	0	0	0	0	0	0	0	2	0	49	4	2	0	57	60
15:15	0	0	0	0	0	0	0	0	0	0	57	3	3	0	63	68.4
15:30	0	0	0	0	0	0	0	0	3	0	50	2	1	0	56	55.9
15:45	0	0	0	0	0	0	0	0	3	0	58	5	0	0	66	66.1
H/TOT	0	0	0	0	0	0	0	0	8	0	214	14	6	0	242	250.4
16:00	0	0	1	0	0	0	1	1	1	0	50	3	0	0	54	54.7
16:15	0	0	0	0	0	0	0	0	2	0	48	1	1	1	53	54.2
16:30	0	0	1	0	0	0	1	1	3	0	62	3	0	0	68	67.1
16:45	0	0	0	0	0	0	0	0	2	0	56	8	0	0	66	68.4
H/TOT	0	0	2	0	0	0	2	2	8	0	216	15	1	1	241	244.4
17:00	0	0	0	0	0	0	0	0	2	0	53	2	0	0	57	56.4
17:15	0	0	0	0	0	0	0	0	1	1	58	0	0	0	60	58.6
17:30	0	0	0	0	0	0	0	0	2	0	57	1	1	0	61	61.2
17:45	0	0	1	0	0	0	1	1	2	0	49	1	0	0	52	50.9
H/TOT	0	0	1	0	0	0	1	1	7	1	217	4	1	0	230	227.1
18:00	0	0	1	0	0	0	1	1	0	1	51	1	0	0	53	52.9
18:15	0	0	1	0	0	0	1	1	3	0	52	0	0	0	55	52.6
18:30	0	0	0	0	0	0	0	0	1	0	50	2	0	0	53	53.2
18:45	0	0	8	0	0	0	8	8	2	0	40	2	0	0	44	43.4
H/TOT	0	0	10	0	0	0	10	10	6	1	193	5	0	0	205	202.1
12 TOT	1	0	16	1	0	1	19	19.7	78	12	2403	192	54	3	2742	2841.6

IDASO

Survey Name: 031 19050 Raheny
Site: 4
Location: R808 / St Pauls College
Date: 13-Feb-2019

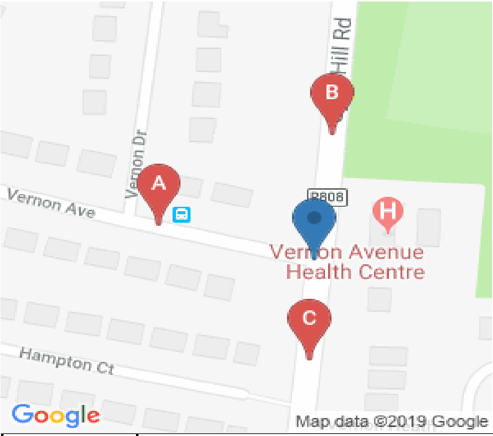
	C => C							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0
08:15	0	0	1	0	0	0	1	1
08:30	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0
H/TOT	0	0	1	0	0	0	1	1
09:00	0	0	0	0	0	0	0	0
09:15	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
H/TOT	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
H/TOT	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
H/TOT	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0
12:45	0	0	2	0	0	0	2	2
H/TOT	0	0	2	0	0	0	2	2
13:00	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0
14:45	0	0	0	1	0	0	1	1.5
H/TOT	0	0	0	1	0	0	1	1.5
15:00	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
18:00	0	0	1	0	0	0	1	1
18:15	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0
H/TOT	0	0	1	0	0	0	1	1
12 TOT	0	0	4	1	0	0	5	5.5



IDASO

Survey Name: 031 19050 Raheny
Site: 5
Location: R808 / Sybil Hill Rd
Date: 13-Feb-2019

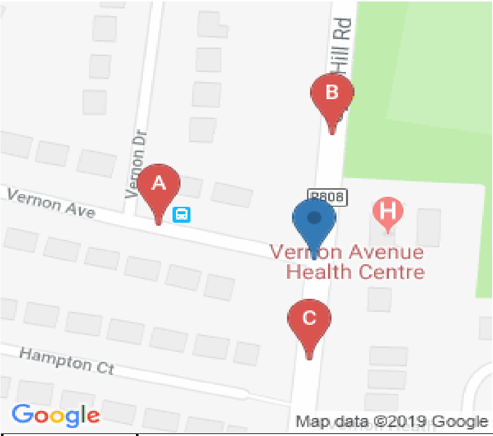
	A => A								A => B							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	3
07:15	0	0	0	0	0	0	0	0	0	0	4	1	0	0	5	5.5
07:30	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	4
07:45	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	3
H/TOT	0	0	0	0	0	0	0	0	0	0	14	1	0	0	15	15.5
08:00	0	0	0	0	0	0	0	0	0	0	4	1	0	0	5	5.5
08:15	0	0	0	0	0	0	0	0	5	0	6	1	1	0	13	10.8
08:30	0	0	0	0	0	0	0	0	0	0	21	1	0	0	22	22.5
08:45	0	0	0	0	0	0	0	0	0	0	17	0	0	0	17	17
H/TOT	0	0	0	0	0	0	0	0	5	0	48	3	1	0	57	55.8
09:00	0	0	0	0	0	0	0	0	0	0	6	1	0	0	7	7.5
09:15	0	0	0	0	0	0	0	0	0	0	10	0	0	0	10	10
09:30	0	0	0	0	0	0	0	0	0	0	9	0	0	0	9	9
09:45	0	0	0	0	0	0	0	0	0	0	11	0	0	0	11	11
H/TOT	0	0	0	0	0	0	0	0	0	0	36	1	0	0	37	37.5
10:00	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	6
10:15	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7	7
10:30	0	0	0	0	0	0	0	0	0	0	8	1	0	0	9	9.5
10:45	0	0	0	0	0	0	0	0	1	0	11	0	0	0	12	11.2
H/TOT	0	0	0	0	0	0	0	0	1	0	32	1	0	0	34	33.7
11:00	0	0	0	0	0	0	0	0	0	0	8	0	0	0	8	8
11:15	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	3
11:30	0	0	0	0	0	0	0	0	1	0	8	0	0	0	9	8.2
11:45	0	0	0	0	0	0	0	0	0	0	9	1	0	0	10	10.5
H/TOT	0	0	0	0	0	0	0	0	1	0	28	1	0	0	30	29.7
12:00	0	0	0	0	0	0	0	0	0	0	6	2	1	0	9	11.3
12:15	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7	7
12:30	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	5
12:45	0	0	0	0	0	0	0	0	0	0	9	0	0	0	9	9
H/TOT	0	0	0	0	0	0	0	0	0	0	27	2	1	0	30	32.3
13:00	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7	7
13:15	0	0	0	0	0	0	0	0	0	0	14	0	0	0	14	14
13:30	0	0	0	0	0	0	0	0	0	0	15	0	0	0	15	15
13:45	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7	7
H/TOT	0	0	0	0	0	0	0	0	0	0	43	0	0	0	43	43
14:00	0	0	0	0	0	0	0	0	0	0	11	0	0	0	11	11
14:15	0	0	0	0	0	0	0	0	0	0	18	1	0	0	19	19.5
14:30	0	0	0	0	0	0	0	0	0	0	22	1	0	0	23	23.5
14:45	0	0	0	0	0	0	0	0	0	0	5	2	0	0	7	8
H/TOT	0	0	0	0	0	0	0	0	0	0	56	4	0	0	60	62
15:00	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7	7
15:15	0	0	0	0	0	0	0	0	0	0	10	1	0	0	11	11.5
15:30	0	0	0	0	0	0	0	0	0	0	11	2	0	0	13	14
15:45	0	0	0	0	0	0	0	0	1	0	6	0	0	0	7	6.2
H/TOT	0	0	0	0	0	0	0	0	1	0	34	3	0	0	38	38.7
16:00	0	0	0	0	0	0	0	0	0	0	19	0	0	0	19	19
16:15	0	0	0	0	0	0	0	0	1	0	12	0	0	0	13	12.2
16:30	0	0	0	0	0	0	0	0	2	0	13	1	0	0	16	14.9
16:45	0	0	0	0	0	0	0	0	0	0	16	0	0	0	16	16
H/TOT	0	0	0	0	0	0	0	0	3	0	60	1	0	0	64	62.1
17:00	0	0	0	0	0	0	0	0	0	0	20	1	0	0	21	21.5
17:15	0	0	0	0	0	0	0	0	0	0	18	1	0	0	19	19.5
17:30	0	0	0	0	0	0	0	0	0	0	9	0	0	0	9	9
17:45	0	0	0	0	0	0	0	0	0	0	18	0	0	0	18	18
H/TOT	0	0	0	0	0	0	0	0	0	0	65	2	0	0	67	68
18:00	0	0	0	0	0	0	0	0	0	0	18	1	0	0	19	19.5
18:15	0	0	0	0	0	0	0	0	1	0	8	1	0	0	10	9.7
18:30	0	0	0	0	0	0	0	0	1	0	17	0	0	0	18	17.2
18:45	0	0	0	0	0	0	0	0	0	0	25	0	0	0	25	25
H/TOT	0	0	0	0	0	0	0	0	2	0	68	2	0	0	72	71.4
12 TOT	0	0	0	0	0	0	0	0	13	0	511	21	2	0	547	549.7



IDASO

Survey Name: 031 19050 Raheny
Site: 5
Location: R808 / Sybil Hill Rd
Date: 13-Feb-2019

	A => C								B => A							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	4	1	0	0	5	5.5	0	0	3	0	0	0	3	3
07:15	0	0	5	1	0	0	6	6.5	0	0	3	0	1	0	4	5.3
07:30	0	0	9	2	1	1	13	16.3	0	0	5	0	0	0	5	5
07:45	1	2	19	1	0	0	23	21.5	1	0	11	1	0	0	13	12.7
H/TOT	1	2	37	5	1	1	47	49.8	1	0	22	1	1	0	25	26
08:00	3	0	32	2	1	0	38	37.9	0	0	11	0	0	0	11	11
08:15	7	0	28	0	0	0	35	29.4	0	0	16	1	0	0	17	17.5
08:30	3	0	25	2	0	0	30	28.6	0	0	26	1	0	0	27	27.5
08:45	1	0	29	1	2	0	33	35.3	1	0	20	0	0	0	21	20.2
H/TOT	14	0	114	5	3	0	136	131.2	1	0	73	2	0	0	76	76.2
09:00	0	0	28	1	1	1	31	33.8	0	0	5	0	0	0	5	5
09:15	0	0	13	2	0	0	15	16	0	0	6	0	0	0	6	6
09:30	1	0	16	1	2	0	20	22.3	0	0	7	0	0	0	7	7
09:45	1	0	24	1	0	1	27	27.7	0	0	5	0	0	0	5	5
H/TOT	2	0	81	5	3	2	93	99.8	0	0	23	0	0	0	23	23
10:00	1	0	20	2	1	0	24	25.5	0	0	2	1	0	0	3	3.5
10:15	1	0	16	2	0	0	19	19.2	0	0	3	0	1	0	4	5.3
10:30	0	0	26	0	1	0	27	28.3	0	0	2	0	0	0	2	2
10:45	0	0	20	0	1	1	22	24.3	0	0	10	0	0	0	10	10
H/TOT	2	0	82	4	3	1	92	97.3	0	0	17	1	1	0	19	20.8
11:00	1	0	14	2	1	0	18	19.5	0	0	3	0	0	0	3	3
11:15	0	0	15	1	0	0	16	16.5	0	0	6	0	0	0	6	6
11:30	0	1	13	4	0	0	18	19.4	2	0	4	1	0	0	7	5.9
11:45	0	0	12	2	1	1	16	19.3	0	0	6	0	0	0	6	6
H/TOT	1	1	54	9	2	1	68	74.7	2	0	19	1	0	0	22	20.9
12:00	1	0	21	1	0	0	23	22.7	0	0	5	0	0	0	5	5
12:15	1	0	28	1	0	0	30	29.7	0	0	6	0	0	0	6	6
12:30	0	0	24	0	0	0	24	24	0	0	6	0	0	0	6	6
12:45	0	0	28	2	1	1	32	35.3	0	0	5	2	0	0	7	8
H/TOT	2	0	101	4	1	1	109	111.7	0	0	22	2	0	0	24	25
13:00	1	0	34	1	0	0	36	35.7	1	0	9	0	0	0	10	9.2
13:15	0	0	27	1	1	0	29	30.8	0	0	6	0	0	0	6	6
13:30	1	0	25	2	0	0	28	28.2	0	0	8	0	0	0	8	8
13:45	3	0	44	0	0	1	48	46.6	1	0	8	1	0	0	10	9.7
H/TOT	5	0	130	4	1	1	141	141.3	2	0	31	1	0	0	34	32.9
14:00	1	0	25	2	1	0	29	30.5	2	0	7	1	0	0	10	8.9
14:15	1	0	23	0	0	0	24	23.2	0	0	8	1	0	0	9	9.5
14:30	0	1	24	0	1	0	26	26.7	0	0	4	0	0	0	4	4
14:45	4	0	32	3	2	0	41	41.9	0	0	6	1	0	0	7	7.5
H/TOT	6	1	104	5	4	0	120	122.3	2	0	25	3	0	0	30	29.9
15:00	1	0	29	0	0	0	30	29.2	0	0	5	2	0	0	7	8
15:15	1	0	31	0	1	0	33	33.5	0	0	7	0	0	0	7	7
15:30	0	0	27	0	0	1	28	29	0	0	8	0	0	0	8	8
15:45	1	0	27	3	0	1	32	33.7	1	0	13	0	0	0	14	13.2
H/TOT	3	0	114	3	1	2	123	125.4	1	0	33	2	0	0	36	36.2
16:00	2	0	30	1	0	0	33	31.9	0	0	4	0	0	0	4	4
16:15	0	0	31	2	0	0	33	34	0	0	6	0	0	0	6	6
16:30	0	0	24	1	0	0	25	25.5	0	0	5	1	0	0	6	6.5
16:45	1	0	30	0	0	0	31	30.2	0	0	16	1	0	0	17	17.5
H/TOT	3	0	115	4	0	0	122	121.6	0	0	31	2	0	0	33	34
17:00	1	0	28	2	0	1	32	33.2	0	0	10	0	0	0	10	10
17:15	1	0	34	1	0	0	36	35.7	1	0	6	0	0	0	7	6.2
17:30	3	1	41	0	0	0	45	42	0	0	3	0	0	0	3	3
17:45	4	1	34	1	0	0	40	36.7	0	0	5	0	0	0	5	5
H/TOT	9	2	137	4	0	1	153	147.6	1	0	24	0	0	0	25	24.2
18:00	2	1	28	1	0	1	33	32.3	0	0	9	0	0	0	9	9
18:15	5	0	42	1	1	0	49	46.8	0	0	5	0	0	0	5	5
18:30	2	0	34	0	0	0	36	34.4	0	0	0	0	0	0	0	0
18:45	1	0	31	1	1	1	35	37	0	0	5	0	0	0	5	5
H/TOT	10	1	135	3	2	2	153	150.5	0	0	19	0	0	0	19	19
12 TOT	58	7	1204	55	21	12	1357	1373.2	10	0	339	15	2	0	366	368.1



IDASO

Survey Name: 031 19050 Raheny
Site: 5
Location: R808 / Sybil Hill Rd
Date: 13-Feb-2019

	B => B								B => C							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	5	0	20	2	0	0	27	24
07:15	0	0	0	0	0	0	0	0	2	0	32	6	4	0	44	50.6
07:30	0	0	0	0	0	0	0	0	0	0	35	10	4	0	49	59.2
07:45	0	0	0	0	0	0	0	0	1	1	33	9	3	0	47	54
H/TOT	0	0	0	0	0	0	0	0	8	1	120	27	11	0	167	187.8
08:00	0	0	0	0	0	0	0	0	5	0	52	2	1	0	60	58.3
08:15	0	0	0	0	0	0	0	0	9	0	49	2	0	0	60	53.8
08:30	0	0	0	0	0	0	0	0	5	0	53	4	2	0	64	64.6
08:45	0	0	0	0	0	0	0	0	3	0	43	4	3	0	53	56.5
H/TOT	0	0	0	0	0	0	0	0	22	0	197	12	6	0	237	233.2
09:00	0	0	0	0	0	0	0	0	1	0	40	6	1	0	48	51.5
09:15	0	0	0	0	0	0	0	0	1	0	39	7	0	1	48	51.7
09:30	0	0	0	0	0	0	0	0	0	1	29	3	3	0	36	40.8
09:45	0	0	0	0	0	0	0	0	2	0	37	11	0	1	51	55.9
H/TOT	0	0	0	0	0	0	0	0	4	1	145	27	4	2	183	199.9
10:00	0	0	0	0	0	0	0	0	0	0	29	4	2	0	35	39.6
10:15	0	0	0	0	0	0	0	0	0	0	35	7	0	0	42	45.5
10:30	0	0	0	0	0	0	0	0	2	0	35	6	1	0	44	46.7
10:45	0	0	0	0	0	0	0	0	0	0	52	4	2	0	58	62.6
H/TOT	0	0	0	0	0	0	0	0	2	0	151	21	5	0	179	194.4
11:00	0	0	0	0	0	0	0	0	0	1	39	5	1	0	46	49.2
11:15	0	0	0	0	0	0	0	0	2	1	51	3	0	0	57	56.3
11:30	0	0	0	0	0	0	0	0	0	0	42	3	3	0	48	53.4
11:45	0	0	0	0	0	0	0	0	0	0	32	1	1	0	34	35.8
H/TOT	0	0	0	0	0	0	0	0	2	2	164	12	5	0	185	194.7
12:00	0	0	0	0	0	0	0	0	1	1	44	6	1	0	53	55.9
12:15	0	0	0	0	0	0	0	0	0	0	35	4	3	0	42	47.9
12:30	0	0	0	0	0	0	0	0	3	0	47	1	1	1	53	53.4
12:45	0	0	0	0	0	0	0	0	1	0	46	5	1	0	53	56
H/TOT	0	0	0	0	0	0	0	0	5	1	172	16	6	1	201	213.2
13:00	0	0	0	0	0	0	0	0	1	1	54	5	2	0	63	66.7
13:15	0	0	0	0	0	0	0	0	3	1	37	6	1	0	48	49.3
13:30	0	0	0	0	0	0	0	0	0	0	47	2	1	0	50	52.3
13:45	0	0	0	0	0	0	0	0	2	0	56	3	0	0	61	60.9
H/TOT	0	0	0	0	0	0	0	0	6	2	194	16	4	0	222	229.2
14:00	0	0	0	0	0	0	0	0	3	0	62	4	0	0	69	68.6
14:15	0	0	0	0	0	0	0	0	1	0	34	5	0	0	40	41.7
14:30	0	0	0	0	0	0	0	0	1	0	44	4	0	0	49	50.2
14:45	0	0	0	0	0	0	0	0	1	0	41	1	3	0	46	49.6
H/TOT	0	0	0	0	0	0	0	0	6	0	181	14	3	0	204	210.1
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H/TOT	0	0	0	0	0	0	0	0	6	0	184	13	6	0	209	218.5
16:00	0	0	0	0	0	0	0	0	2	0	44	2	0	0	48	47.4
16:15	0	0	0	0	0	0	0	0	2	0	43	2	1	1	49	50.7
16:30	0	0	0	0	0	0	0	0	2	0	57	2	0	0	61	60.4
16:45	0	0	0	0	0	0	0	0	3	0	47	6	0	1	57	58.6
H/TOT	0	0	0	0	0	0	0	0	9	0	191	12	1	2	215	217.1
17:00	0	0	0	0	0	0	0	0	2	0	46	2	0	0	50	49.4
17:15	0	0	0	0	0	0	0	0	1	1	56	0	0	0	58	56.6
17:30	0	0	0	0	0	0	0	0	0	0	56	1	1	0	58	59.8
17:45	0	0	0	0	0	0	0	0	2	0	48	1	0	0	51	49.9
H/TOT	0	0	0	0	0	0	0	0	5	1	206	4	1	0	217	215.7
18:00	0	0	0	0	0	0	0	0	1	1	52	1	0	0	55	54.1
18:15	0	0	0	0	0	0	0	0	4	0	51	0	0	0	55	51.8
18:30	0	0	0	0	0	0	0	0	0	0	50	2	0	0	52	53
18:45	0	0	0	0	0	0	0	0	1	0	39	2	0	0	42	42.2
H/TOT	0	0	0	0	0	0	0	0	6	1	192	5	0	0	204	201.1
12 TOT	0	0	0	0	0	0	0	0	81	9	2097	179	52	5	2423	2514.9

IDASO

Survey Name: 031 19050 Raheny
Site: 5
Location: R808 / Sybil Hill Rd
Date: 13-Feb-2019

	C => A								C => B							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
07:00	1	0	15	0	0	1	17	17.2	2	0	22	2	0	1	27	27.4
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07:45	1	0	85	1	0	0	87	86.7	3	0	52	1	1	0	57	56.4
H/TOT	3	0	171	4	3	1	182	186.5	7	0	152	14	6	1	180	190.2
08:00	3	0	55	1	1	1	61	61.4	2	0	51	0	0	1	54	53.4
08:15	4	0	54	3	1	0	62	61.6	3	0	79	3	1	0	86	86.4
08:30	6	0	42	2	0	0	50	46.2	4	0	66	2	2	1	75	76.4
08:45	5	1	49	2	0	0	57	53.4	1	0	56	3	1	1	62	65
H/TOT	18	1	200	8	2	1	230	222.6	10	0	252	8	4	3	277	281.2
09:00	1	0	47	2	0	0	50	50.2	1	0	34	3	0	0	38	38.7
09:15	1	0	40	1	0	0	42	41.7	1	0	33	2	2	0	38	40.8
09:30	0	0	25	3	1	1	30	33.8	1	0	34	2	0	0	37	37.2
09:45	1	0	22	5	0	0	28	29.7	0	0	45	10	1	0	56	62.3
H/TOT	3	0	134	11	1	1	150	155.4	3	0	146	17	3	0	169	179
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10:30	0	0	13	2	0	0	15	16	0	0	51	3	2	1	57	62.1
10:45	2	0	19	2	1	0	24	24.7	1	0	43	3	1	0	48	50
H/TOT	2	0	64	7	1	1	75	79.2	2	0	187	16	4	1	210	222.6
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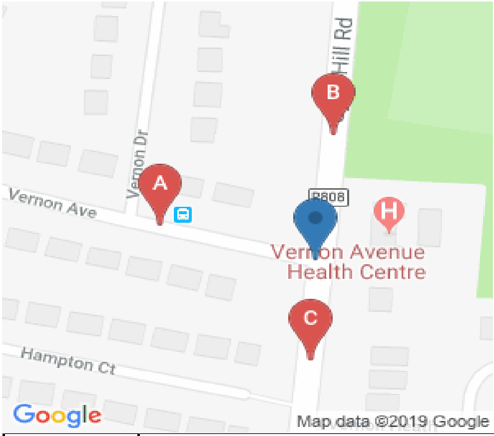
11:45	2	0	23	2	2	0	29	31	1	0	42	4	1	0	48	50.5
H/TOT	6	0	106	10	2	1	125	128.8	1	0	163	23	5	1	193	211.2
12:00	0	0	26	0	1	1	28	30.3	0	0	52	6	1	0	59	63.3
12:15	1	0	24	0	0	0	25	24.2	0	1	45	6	1	0	53	56.7
12:30	1	0	24	0	1	0	26	26.5	0	0	28	4	1	0	33	36.3
12:45	2	0	17	0	2	0	21	22	2	0	67	5	0	0	74	74.9
H/TOT	4	0	91	0	4	1	100	103	2	1	192	21	3	0	219	231.2
13:00	2	0	30	0	1	1	34	34.7	0	0	62	6	1	0	69	73.3
13:15	1	0	30	1	0	0	32	31.7	3	0	53	3	0	1	60	60.1
13:30	0	0	20	2	0	0	22	23	2	1	39	7	1	0	50	52.6
13:45	0	1	32	2	0	0	35	35.4	1	0	37	6	0	1	45	48.2
H/TOT	3	1	112	5	1	1	123	124.8	6	1	191	22	2	2	224	234.2
14:00	4	0	32	0	1	0	37	35.1	2	0	54	4	1	0	61	62.7
14:15	1	0	32	4	0	1	38	40.2	2	0	50	5	0	0	57	57.9
14:30	3	0	36	0	0	0	39	36.6	9	0	60	3	2	0	74	70.9
14:45	1	0	27	3	0	0	31	31.7	3	0	44	6	1	1	55	57.9
H/TOT	9	0	127	7	1	1	145	143.6	16	0	208	18	4	1	247	249.4
15:00	1	0	26	2	1	0	30	31.5	3	0	69	5	0	0	77	77.1
15:15	0	0	19	3	0	0	22	23.5	1	0	49	11	4	0	65	74.9
15:30	2	0	21	2	1	0	26	26.7	2	1	46	11	1	0	61	65.6
15:45	0	0	21	0	2	1	24	27.6	3	0	59	5	1	0	68	69.4
H/TOT	3	0	87	7	4	1	102	109.3	9	1	223	32	6	0	271	287
16:00	0	0	28	0	0	0	28	28	1	0	49	6	0	0	56	58.2
16:15	0	0	29	0	0	1	30	31	3	0	51	7	0	0	61	62.1
16:30	4	0	27	0	0	0	31	27.8	5	0	43	10	1	0	59	61.3
16:45	3	0	35	1	0	0	39	37.1	0	0	54	13	0	1	68	75.5
H/TOT	7	0	119	1	0	1	128	123.9	9	0	197	36	1	1	244	257.1
17:00	3	0	20	2	0	0	25	23.6	5	0	65	6	1	0	77	77.3
17:15	0	0	27	1	0	1	29	30.5	1	1	59	5	0	0	66	67.1
17:30	1	0	30	1	0	0	32	31.7	5	0	63	4	1	0	73	72.3
17:45	0	1	30	1	0	0	32	31.9	2	0	65	2	0	0	69	68.4
H/TOT	4	1	107	5	0	1	118	117.7	13	1	252	17	2	0	285	285.1
18:00	1	0	18	0	0	0	19	18.2	5	0	63	2	0	0	70	67
18:15	3	1	33	0	0	0	37	34	1	0	56	6	0	0	63	65.2
18:30	1	1	24	0	0	0	26	24.6	2	0	54	3	1	0	60	61.2
18:45	3	0	38	0	0	0	41	38.6	2	1	72	2	0	0	77	75.8
H/TOT	8	2	113	0	0	0	123	115.4	10	1	245	13	1	0	270	269.2
12 TOT	70	5	1431	65	19	11	1601	1610.2	88	5	2408	237	41	10	2789	2897.4



IDASO

Survey Name: 031 19050 Raheny
Site: 5
Location: R808 / Sybil Hill Rd
Date: 13-Feb-2019

	C => C							
TIME	PCL	MCL	CAR	LGV	HGV	SV (BUS	TOT	PCU
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
H/TOT	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
H/TOT	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
H/TOT	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
H/TOT	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
H/TOT	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0
12 TOT	0	0	0	0	0	0	0	0

Energy & Sustainability Report

St. Paul's Residential Development

Project No. N324

30th August 2019

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary Consulting Engineers

Energy & Sustainability Report

St Paul's Residential Development

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary
Consulting Engineers

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OCSC Job No.: N324	Project Code	Originator Code	Zone Code	Level Code	File Type	Role Type	Number Series	Status/ Suitability Code	Revision
	N324	OCSC	XX	XX	RP	YS	0001	S4	P06

Rev.	Status	Authors	Checked	Authorised	Issue Date
6	For Planning	DM	MT	DO'C	30/08/2019
5	For Comment	DM	MT	DO'C	23/05/2019
4	For Comment	DM	MT	DO'C	22/05/2019
3	For Comment	DM	MT	DO'C	22/03/2019
2	For Comment	MT	DO'C	DO'C	18/12/2017
1	For Comment	MT	DO'C	DO'C	06/12/2017
0	Rev 01	MT	PF	RB	28/7/2017

Energy & Sustainability Report

PROJECT NO. N324

1. INTRODUCTION

The intention of this report is to identify the energy efficiency measures associated with the design, construction, ongoing management and maintenance of St Paul's residential development, located in Sybill Hill, Raheny, Co. Dublin.

The proposed development will comply with Part L (2019). As part of the development's efforts to further reduce energy consumption, the project is targeting an A2/A3 BER (Building Energy Rating). Extensive work has been carried out to develop a balanced design approach to achieve these onerous targets with a number of sustainable features being incorporated into the design from the early design stages.

Energy Performance Target		
Standard/Rating	**Mandatory**	**Target**
Part L	**Yes**	**Part L (2019)**
BER	**Yes**	**A2/A3**

Table 1: Energy Performance Target

The following sections identify a range of energy efficient measures that have been considered for the proposed St Paul's residential development.

2. SITE CONTEXT AND PROPOSED DEVELOPMENT

The development will consist of the construction of a residential development set out in 9 no. blocks, ranging in height from 5 to 9 storeys accommodating 661 no. apartments, residential tenant amenity spaces and a crèche.

At basement level the site will accommodate car parking spaces, bicycle parking, storage, services and plant areas. Landscaping will include extensive communal amenity areas, and a proposed significant area of public open space. The proposed development also includes for the widening and realignment of an existing vehicular access onto Sybil Hill Road and the demolition of an existing pre-fab building to facilitate the construction of an access road with from Sybil Hill Road between Sybil Hill House (a Protected Structure) and St Paul's College incorporating upgraded accesses to Sybil Hill House and St Paul's College and a proposed pedestrian crossing on Sybil Hill Road.

The proposed development also includes for the laying of a foul water sewer in Sybil Hill Road and the routing of surface water discharge from the site via St. Anne's Park to the Naniken River and the demolition and reconstruction of existing pedestrian stream crossing in St. Anne's Park with integral surface water discharge to Naniken River.

Furthermore the Building Energy Rating (BER) target for the development is A2/A3 and the proposed strategy for achieving this is outlined in the following sections.

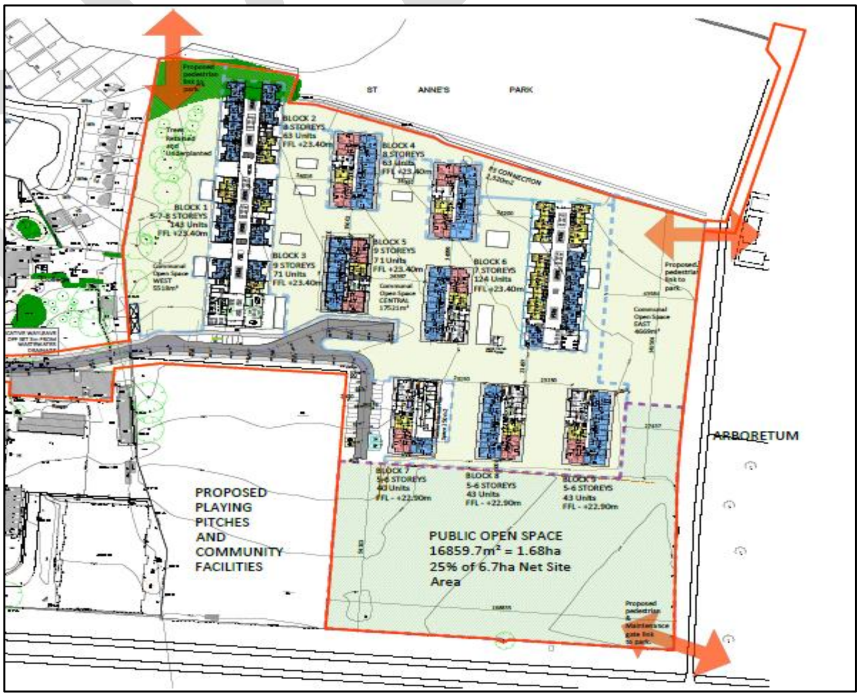

Figure 1: Proposed Site Plan

3. PART L BUILDING REGULATIONS

3.1. PART L (2019)

The new Part L (2019) of the Technical Guidance Document has been issued by the Minister for Housing, Planning and Local Government. This document is due to be the new standard for dwellings constructed from November 2019.

The Part L (2019) Regulations set energy performance requirements to achieve Nearly Zero Energy Buildings performance as required by Article 4 (1) of the Directive for new buildings.

The definition of Nearly Zero Energy Buildings is defined as:

"'Nearly zero-energy building' means a building that has a very high energy performance, as defined in Annex 1. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby".

Renewable Energy Ratio (RER):

For the new Part L (2019) NZEB requirements, a Renewable Energy Ratio (RER) is to replace the current Part L (2011) renewable requirements. A RER of 20% is currently required.

In line with the requirements detailed within the Technical Guidance Document, renewable energy technologies are defined as technologies that derive their energy directly from a renewable energy source, such as:

- Solar Photo-Voltaic Systems;
- Wind Power;
- Solar Thermal System;
- CHP Units (Combined Heat & Power);
- Biomass Systems (using Biofuels);
- Heat Pumps.

To demonstrate that an acceptable primary energy consumption rate has been achieved, the calculated Energy Performance Coefficient (EPC) of the dwelling being assessed should be no greater than the Maximum Permitted Energy Performance Coefficient (MPEPC).

The MPEPC is 0.3 (NZEB compliant)

To demonstrate that an acceptable CO2 emission rate has been achieved, the calculated Carbon Performance Coefficient (CPC) of the dwelling being assessed should be no greater than the Maximum Permitted Carbon Performance Coefficient (MPCPC).

The MPCPC is 0.35 (NZEB compliant)

3.2. PART L TRANSITIONAL ARRANGEMENTS:

As it stands, the new Part L 2019 (NZEB) standard is due to come into effect with the following transitional arrangements:

- Part L 2011 will cease to have effect from 31st October 2019.
- However, the 2011 document may continue to be used in the case of:
    - Where work has started on or before 31st October 2019, or
    - Where planning approval has been applied for on or before 31st October 2019 and substantial work** has been completed by 31st October 2020.

** "Substantial work" means that:

- For houses, the structure of external walls (up to wall-plate) has been erected.
- For apartments, the structure of the roof deck has been completed.

Due to the timeline for completion, the proposed development will be targeting compliance under Part L 2019 (NZEB).

4. BUILDING ENERGY RATING (BER)

As of 1st July 2009, all newly built domestic buildings and existing residential buildings that are for sale or rent require a BER (Building Energy Rating) certificate. The St Paul's residential development is targeting an A2/A3 BER throughout.

The actual building energy rating is based on the primary energy used for one year and is classified on a scale of A1 to G with A1 being the most energy efficient. It also provides the anticipated carbon emissions for a year of occupation based on the type of fuel that the building systems use. The following variables determines the extent of primary energy consumption within the building:

- Building type (office, retail, etc.)
- Building orientation
- Thermal envelope (insulation levels of the façade, roofs, ground floor etc)
- Air permeability (how much air infiltrates into the building through the façade)
- Heating systems (what type of plant is used and how efficient it is)
- Cooling systems (what type of plant is used and how efficient it is)
- Ventilation (what form of ventilation is used - natural ventilation, mixed mode mechanical ventilation)
- Fan and pump efficiency (how efficient are the pumps and fans)
- Domestic hot water generation (what type of plant is used and how efficient it is)
- Lighting systems (how efficient is the lighting)

The variables identified above will be described within this report and categorised under three main headings through "The Energy Hierarchy Plan". i.e. Be Mean, Be Lean, Be Green.

5. COMPLIANCE WITH PART F OF BUILDING REGULATIONS

This report is primarily focused around achieving compliance with Part L of the building regulations, but in doing so, the ventilation systems proposed must also comply with Part F (Ventilation) of the Technical Guidance Documents (TGD).

The new version of TGD Part F (2019) document revolves around two requirements as outlined below:

Means of ventilation.

- *F1 – Adequate and effective means of ventilation shall be provided for people in buildings. This shall be achieved by:*
  - *a) Limiting the moisture content of the air within the building so that it does not contribute to condensation and mould growth, and*
  - *b) Limiting the concentration of harmful pollutants in the air within the building.*

Condensation in roofs.

- *F2 - Adequate provision shall be made to prevent excessive condensation in the floor or in a roof void above an insulated ceiling.*

In relation to F1, the proposed design for the apartments will comply with the requirements.
In relation to F2, all roof systems throughout will be effectively ventilated in order to avoid condensation.

The new Part F 2019 standard will come into effect with the following transitional arrangements:

- Part F (2009) will cease to have effect from 31st October 2019.
- However, the 2009 document may continue to be used in the case of:
  - Where work has started on or before 31st October 2019, or
  - Where planning approval has been applied for on or before 31st October 2019 and substantial work** has been completed by 31st October 2020.

Due to the timeline for completion, the St. Paul's development will be targeting compliance under Part F (2019).

6. THE ENERGY HIERARCHY PLAN

Through the specification of an energy efficient façade and HVAC systems, the energy consumption of a building will be reduced compared to a set baseline. This ensures the environmental and economic impact of the operation of the building is reduced.

The key steps in the Energy Hierarchy Plan are outlined as follows:

1. The key philosophy of this plan is to first reduce energy demand by improving the building's thermal envelope, increasing air tightness, improving thermal transmittance and applying passive design techniques.

2. The second step is to utilise energy in the most efficient way through the selection and installation of energy efficient plant and equipment.

3. The final step is to introduce energy from renewable sources to reduce the burden on fossil fuels.

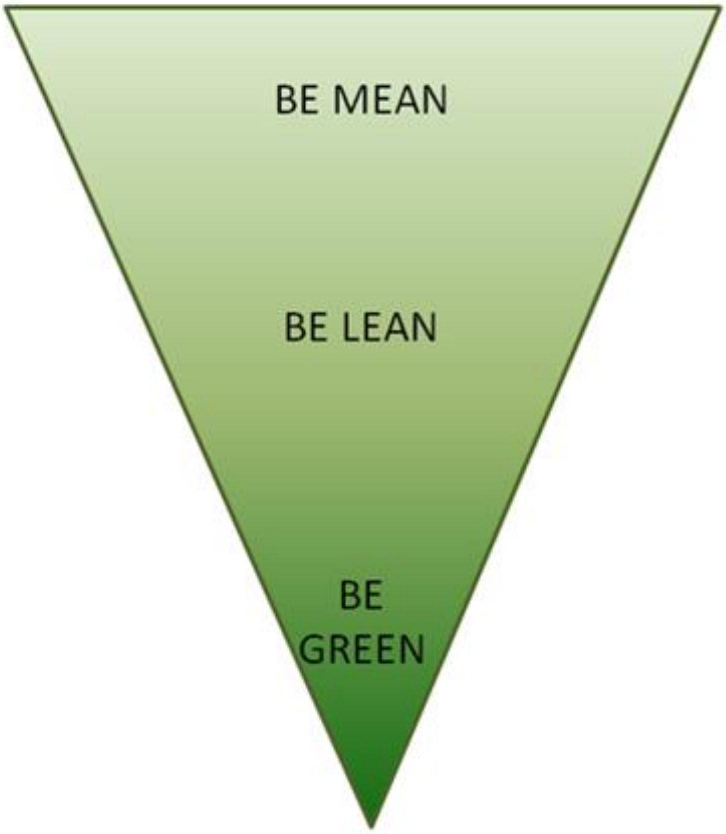

Figure 2: Energy Hierarchy Plan

6.1. STEP 1 (BE MEAN) – USE LESS RESOURCES

The following measures will be implemented to reduce the energy consumption of the proposed development:

- High performance U-values;
- Air tightness;
- Thermal transmittance;
- Passive design measures.

6.1.1. HIGH PERFORMANCE U-VALUES

To limit the heat loss through the façade, careful consideration must be demonstrated when designing the external façade. The specification of the insulation utilised, and the continuity of insulation are crucial. Insulation slows the rate at which heat is lost to the outdoors. Heat flows in three ways: by conduction, convection and radiation.

The target average elemental U-Values for the new build elements are set out in Table 2 below and demonstrates how the proposed development will comply with Part L (2019) performance requirements. In addition, the currently proposed design is achieving a BER rating of A2/A3 for all apartments in the St. Paul's residential development.

Fabric Element	Part L 2019 (NZEB) Maximum Average Elemental U-value ($W/m^2.K$)	St Paul's Target Elemental U-value ($W/m^2.K$)
External Walls	0.18	0.18
Flat Roof	0.20	0.18
Ground Contact & Exposed Floor	0.18	0.18
External Windows & Doors	1.40	1.40
Air Permeability		
$m^3/hr/m^2$@50Pa	5	3

Table 2: Building Envelope Thermal Performance Requirements (Apartments)

6.1.2. AIR TIGHTNESS

One major contributing factor to unnecessary heat loss is infiltration. Infiltration is the air leakage of external air into a building due to the pressure difference associated with internal and external temperatures.

Under Part L (2019), a performance level of 5 $m^3/hr/m^2$ @ 50 Pa represents a reasonable upper limit for air permeability.

It is intended the proposed development will target an air permeability rate of 3 $m^3/hr/m^2$ @ 50 Pa.

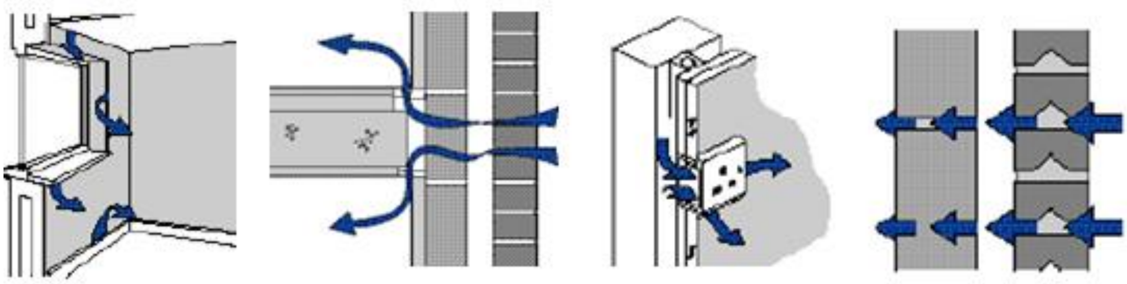

Figure 3: Typical Air Leakage Paths

Information on air tightness testing requirements are summarised in Appendix A.

6.1.3. THERMAL TRANSMITTANCE

Thermal bridges occur where the insulation layer is penetrated by a material with a relatively high thermal conductivity and at interfaces between building elements where there is a discontinuity in the insulation. The development will be designed to achieve low thermal bridging values where possible. A Y value of ≤0.05 $W/m^2.k$ is to be achieved, in accordance with Part L (2019) stipulations.

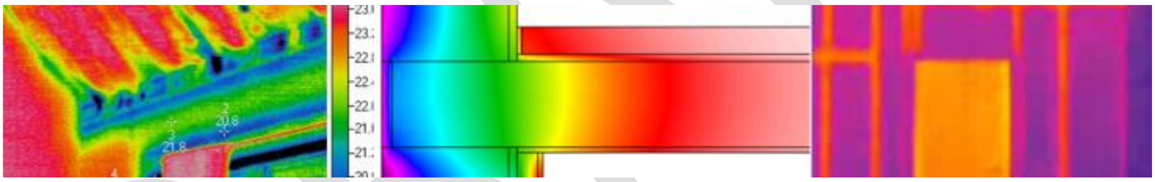

Figure 4: Typical Thermal Bridging Details

6.1.4. PASSIVE DESIGN

The proposed St. Paul's residential development has been evaluated and analysed with respect to daylight/ sunlight/ overshadowing, in order to determine the following:

- The expected daylight levels within the living and bedroom areas of selected apartments, to give an indication of the expected daylight levels throughout the proposed development.
- The quality of amenity space being provided as part of the development, in relation to sunlight.
- Any potential overshadowing impact the proposed development may have on properties adjacent to the site.

Calculations and methodology used are in accordance with BRE Guidelines for daylight and sunlight and based on the British Research Establishments "Site Layout Planning for Daylight and Sunlight: A Good Practice Guide" by PJ Littlefair, 2011 Second Edition.

6.2. STEP 2 (BE LEAN) – USE RESOURCES EFFICIENTLY

To maximise the effectiveness of changes to the construction, it is important to use the energy sources within the building as efficiently as possible.

6.2.1. LOW ENERGY PLANT

To improve the overall energy efficiency of the heating system, plant is to be selected on the basis of performance and energy efficiency.

Space Heating: Combined Heat and Power (CHP) is being proposed in order to satisfy the space heating requirements for each apartment.

Domestic Hot Water: Combined Heat and Power (CHP) is being proposed in order to satisfy the domestic hot water requirements for each apartment.

Ventilation: The ventilation system is to be Mechanical Ventilation Heat Recovery (MVHR) for all apartments.

6.2.2. LIGHTING

The design intent for internal lighting design is to introduce artificial lighting in all applicable areas. Energy efficient light (LED) fittings will be installed throughout. The design of the building façade also allows high levels of natural daylight into occupied zones.

6.2.3. ONGOING MONITORING AND CONTORLS

A BEMS (Building Energy Management System) system is to be installed to monitor and control the use of all major systems in the apartments, including:

- Space heating;
- Water consumption.

The BEMS system is a graphical interface, which allows the facilities/building manager to monitor and control all systems throughout the building. The development manager can view operational temperatures for the heating systems to ensure that they are operating at maximum efficiency.

6.3. STEP 3 (BE GREEN) – USE OF LOW OR ZERO CARBON (LZC) TECHNOLOGY

CHP (Combined Heat and Power) and solar PV panels are being considered to serve the apartments. The CHP plant will be utilised within a central energy centre in order to supply heat and DHW services to each dwelling throughout the apartment blocks. This method of heating will aid in achieving Part L compliance in terms of the required renewable energy contribution. A solar PV system will also be installed to work in combination with the CHP system to ensure the renewable energy contribution target is achieved.

6.3.1. COMBINED HEAT AND POWER

Combined Heat and Power, or CHP as it is commonly referred to, is the simultaneous generation of usable heat and power in a single process. The system utilises the heat produced in electrical generation rather than releasing it wastefully into the atmosphere. A centralised plantroom will be utilised and will contain the CHP unit, along with all associated pipework and equipment.

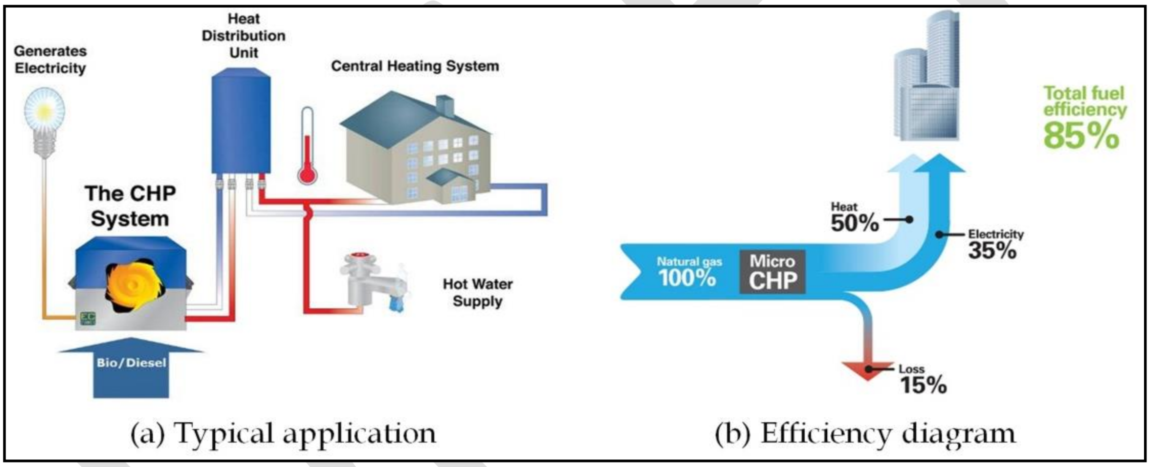

Figure 5: CHP Benefit Diagram

The CHP unit will be sized to meet the base thermal load and the high efficiency boilers will meet the remaining loads during times of peak demand.

6.3.2. SOLAR PHOTOVOLTAICS

Solar photovoltaic (PV) panels convert solar radiation into electricity, which can be connected to the mains supply of a building. Rooftop solar PV is being considered for incorporation into the design due to the Part L and BER targets currently proposed for the St. Paul's residential development.

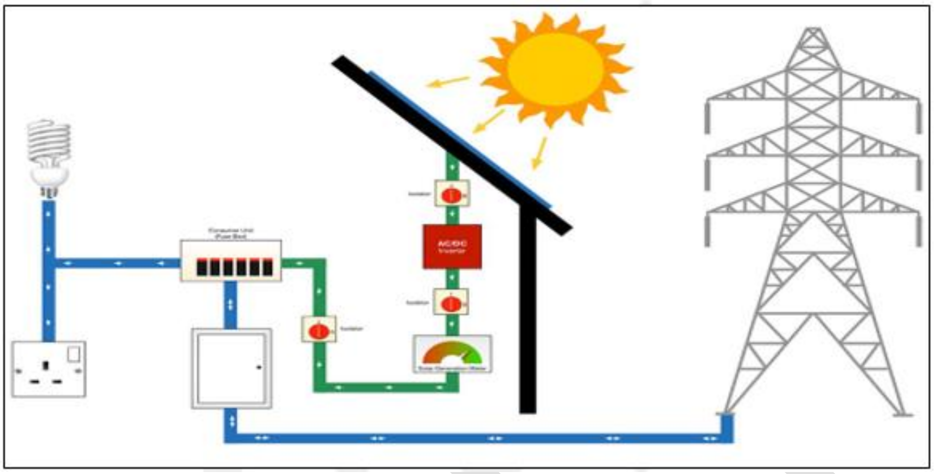

Figure 6: Solar Photovoltaic System Schematic

7. KEY SUSTAINABLE FEATURES

Key sustainability features of the St Paul's residential development are accessibility to alternative modes of transportation, commissioning of the building's systems, a reduction of waste generation, use of water efficient fixtures and good indoor air quality for the building occupants.

7.1. LOCATION AND TRANSPORTATION

The proposed development will offer occupants travelling to and from the development alternative modes of transport other than the need to rely on a car. Developing in an area that has strong public transport nodes offers users the opportunity to travel to and from the site using alternative modes of transport. As a result, the increased density of the development will result in efficient use of public transportation.

Figures 7, 8 and 9 identify the local Dublin bicycle lanes, bicycle trails, Dublin bus stations, Dublin dart stations and car sharing locations and their proximity to the proposed development.

Figure 7: Bicycle Lanes and Trails

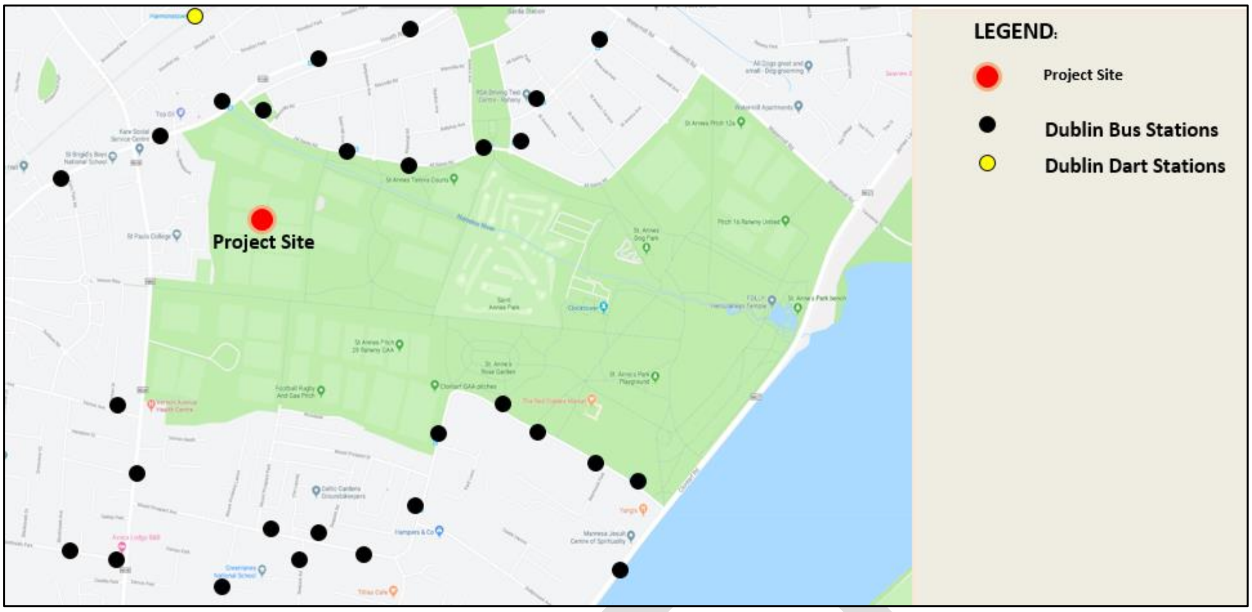

Figure 8: Dublin Bus and Dart Stations

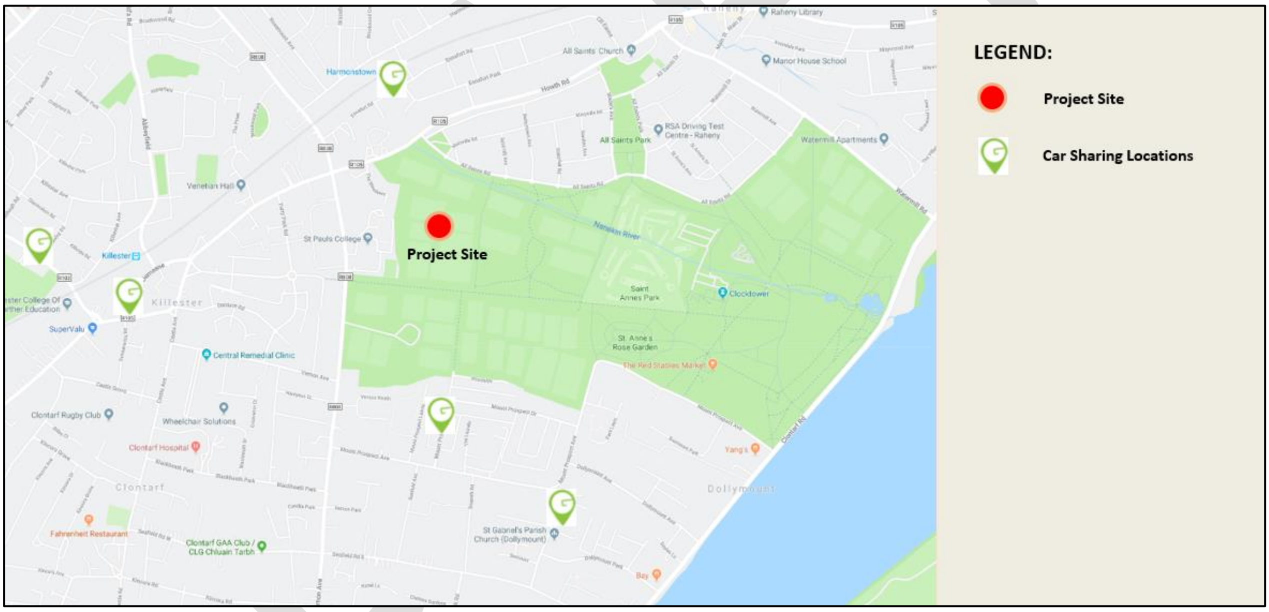

Figure 9: Car Sharing Locations

7.2. COMMISSIONING

To ensure efficient operation of the building all systems will be commissioned. Commissioning of a building's systems ensures that the sustainable energy-design can be fully realised, with fewer operational issues during the building's lifetime. Building users' productivity improves and operational costs decrease also.

7.3. MATERIALS AND RESOURCES

The building will be designed and operated with the aim to reduce waste generation throughout construction and operation. Where possible, waste streams will be separated on site and recycled or re-used. Where possible local materials will be specified, and in addition materials that contain recycled content will be considered as preferable.

7.4. WATER EFFICIENCY

With increasing costs associated with potable water use in commercial buildings, the proposed development will incorporate measures to reduce water usage through the appropriate selection of low consumption sanitary fittings and water monitoring facilities.

7.5. INDOOR ENVIRONMENTAL QUALITY

As part of the sustainable design strategy, consideration of occupants and staff will be an integral part of the design process. As the productivity and well-being of building users depends strongly on the quality of the indoor environment, the following aspects will be addressed:

- Adequate ventilation and filtration;
- Low-emitting materials; and
- Natural daylight and views to the external environment.

7.6. BICYCLE FACILITIES

Cycling offers a sustainable alternative to personal vehicle use, which reduces gas and particulate emissions, noise pollution and congestion in busy urban areas. The proposed development will provide bicycle facilities for the building occupants.

8. CONCLUSION

A sustainable approach has been adopted by the design team for the St Paul's residential development. Through detailed design, a number of sustainability and efficiency features have been considered throughout.

The proposed development will comply with Part L (2019), as well as targeting an A2/A3 BER.

The optimised approach is based on the Energy Hierarchy Plan - Be Mean, Be Lean, Be Green.

Be Mean

- The façade performance specification has been optimised to limit heat loss, improve air tightness and thermal transmittance and to maximise natural daylight.

Be Lean

- High efficiency plant will be specified to take advantage of the optimised façade design measures that have been introduced.
- A low energy lighting design will be utilised to further reduce energy consumption and increase occupant thermal comfort.

Be Green

- The apartments will utilise CHP plant in order to supply heating and DHW to each apartment within the development. Solar PV panels are also being proposed within the development. This will also help ensure the renewable energy contribution target is achieved.

A number of sustainable design features have been considered within the design to achieve the sustainability targets of the proposed refurbishment. These include:

- The proximity of the development to public transportation networks;
- Water efficiency measures such as low consumption sanitary fittings; and
- Improved indoor environmental quality.

This report confirms that if the energy and sustainability strategy is successfully implemented, the proposed St. Paul's residential development will satisfy all Part L and BER requirements.

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Appendix 13

13.1 – Asbestos Survey

ASBESTOS DEMOLITION SURVEY REPORT

Of

St Paul's College

Sybil Hill Road

Clontarf

Dublin 3

On behalf of

Marlet Ltd

Unit 2BeaT Centre,
Stephenstown Industrial Estate,
Balbriggan, Co. Dublin
Tel: (01) 6905907
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Project Number

27913

Directors: Deirdre Corry, Keith Foran **Company Reg no:** 354843

DOCUMENT CONTROL

Client	Marlet Ltd
Project Title	27913 St Paul's College Prefab Asbestos Survey
Document Title	Asbestos Demolition Report
Report No.	27913

Rev	Status	Author(s)	Revision History	Approved By	Issue Date
D01	Final	Paul Foran	Initial Release to Client	Deirdre Corry	2/9/19

Contents

1 EXECUTIVE SUMMARY

OHSS carried out an asbestos survey to HSG264 requirements for the purposes of identifying asbestos containing materials in the premises(s) prior to planned demolition. It should be noted that this survey only includes areas within the scope of the survey and should not be read as an extensive assessment of all possible asbestos containing materials (ACMs) in the premises.

The findings of this survey are contained within the summary tables and risk assessment in the results section of this report.

- Asbestos containing cellulose board was found in the walls and ceiling of the older prefabs. This asbestos board is on both side of the partition walls and on the ceilings. In many places the board is covered over with particle board and hard board.
- Asbestos containing slates were found under the floor joists of the older prefabs where they were used to level the timbers during construction.
- Asbestos containing green floor tiles were found in Room X6 of the prefab
- As the prefab was still in use at the time of the survey it was not possible to core through the roof. Once the prefab is decanted a core should be drilled to assess the makeup of the roof. Asbestos may be present in lower layers of felt or on strawboard

The survey undertaken complies with the company's legal duty to identify the presence of asbestos containing materials and carryout a risk assessment in respect of these materials at the premises. The risk assessment will form part of the overall safety management system for the contractor carrying out any asbestos removal works. The results of the risk assessment must be communicated to the employees and made available to them. This report may be used by the Project Supervisor for Design Process and the designers to highlight the presence of asbestos containing materials found in the buildings.

While every effort has been taken to ensure the accuracy of this report OHSS do not accept responsibility for any omissions or areas of the building not addressed in the report. This report is intended to assist in reducing the possibility of accidents and ill health by bringing to the client's attention identified asbestos containing materials. Within the constraints of time and resources every effort has been made to identify

ACM's. It is not implied that all other hazards are under control at the time of inspections.

THIS REPORT SHOULD BE READ IN ITS ENTIRETY AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF OHSS AND THE CLIENT.

Questions arising from the survey report should be directed, in the first instance, to the author of this report, who will clarify any technical issues raised.

Further information on previous surveys should be sought from the client.

1.1.1 ABBREVIATIONS

Throughout the report the following terms and abbreviations may be used:

ACM	Asbestos containing material.
AND	Asbestos not detected.
MMMF	This describes any machine made mineral fibre, fibreglass, Rockwool, ceramic fibres and other such material.
MA	Material Assessment Score as defined in HSG264 relates to the friability of the product. It is used to indicate the level of risk posed by the product
AIB	Asbestos Insulating Board.
AC	Asbestos Cement
Chrysotile	Commonly known as white asbestos.
Amosite	Commonly known as brown asbestos.
Crocidolite	Commonly known as blue asbestos.
Amphibole	Generic name for all asbestos types, excluding Chrysotile.
BOHS	British Occupational Hygiene Society
INAB	Irish National Accreditation Board

2 SCOPE OF WORK

2.1 GENERAL

The scope of the survey included a demolition survey of the prefabricated building on the site. Due to continued occupancy it was not possible to expose the roof construction adequately and this should be completed prior to demolition.

The purpose of the survey is to identify and risk assess asbestos containing materials (ACM's) in the premises or area where planned demolition works are to take place. The survey aims to provide sufficient information for designers and the project supervisor for design process to take account of identified asbestos risks. The design team must take account of known locations where ACM's are identified and plan to eliminate the risk or prevent exposure to asbestos during the construction phase. Asbestos is a particular risk within the definitions of "particular risk" in the Safety Health and Welfare at Work (Constructions) Regulations 2013 and should be highlighted in the design risk assessments accompanying the Preliminary Safety and Health Plan.

The surveyor undertook as far as reasonably practicable to, record the location, extent and product type of any presumed or known ACMs. All areas identified in the survey were inspected and the information recorded on the accessibility, condition and surface treatment of any presumed or known ACMs. The asbestos type was identified either by collecting representative samples of suspect materials for laboratory identification, or by making a presumption based on the product type and its appearance.

3 GENERAL SITE AND SURVEY INFORMATION

Client Details:	
Client Address:	Marlet Ltd Heritage House, 23 St Stephen's Green, Dublin, D02 AR55
Site Address:	Prefabricated Building St Paul's College Sybil Hill Road Clontarf Dublin 3
Commissioned By:	Marc McDermott
Surveyor:	Paul Foran
Staff Consulted during the survey	Marc McDermott
Date of Survey:	26/8/19
Date of Report:	2/9/19
Description of the Areas Surveyed:	All accessible areas of the prefab
Excluded Areas:	The roof of the prefab could not be opened due to continued use of the building.

Survey Methodology:

On-site inspection bulk sampling and risk assessment were conducted in accordance with OHSS documented in-house work instructions.

Analysis of asbestos fibres in bulk materials is carried out at the OHSS laboratory. OHSS is accredited to INAB and meet the requirements of International Standard BS EN ISO/IEC 17025 for the analysis of asbestos fibres in bulk materials.

The surveyor conducted a systematic inspection of the nominated areas. Where access for sampling purposes was not possible, a visual assessment has been made if possible. For similar/repetitive elements, a representative bulk sampling protocol has been adopted following visual examination and assessment.

Bulk Samples are obtained using fibre suppression techniques in order to minimise respirable fibre release. Each sample was double bagged, uniquely labelled on site and then returned to the laboratory for analysis using plane and polarised light microscopy and dispersion staining techniques as defined in UK HSE Guidelines HSG248 and the OHSS documented in-house work instructions.

The results of the survey together with the laboratory bulk sample analysis records are given in further sections to this report.

The Safety Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010 allows materials to be 'presumed' to contain asbestos. Therefore in the asbestos survey, materials can be presumed to contain asbestos.

There are two levels of 'presumption':

- **Strongly presumed**: in this case the material looks as if it is an ACM, or that it might contain asbestos. This conclusion can be reached through visual inspection alone by an experienced, well-trained surveyor, familiar with the range of asbestos products. Examples of ‘strong presumption’ are:

- where laboratory analysis has confirmed the presence of asbestos in a similar construction material;
- materials in which asbestos is known to have been commonly used in the manufactured product at the time of installation (eg corrugated cement roof and wall sheeting, cement gutters and drainpipes, cement water tanks, ceiling tiles, insulating boards);
- materials which have the appearance of asbestos but no sample has been taken, eg thermal insulation on a pipe where fibres are clearly visible
- where the laboratory has sampled the same material in a different location and subsequent laboratory analysis has found that it does not contain asbestos.

- **Presumed**: is the ‘default’ situation where a material is **presumed** to contain asbestos because there is insufficient evidence (eg no analysis) to confirm that it is asbestos free, or where a surveyor decides that it is easier under the planned management arrangements to presume certain materials contain asbestos. Many non-asbestos materials will also be presumed to contain asbestos using this system.

  There is a further default situation where materials must be **presumed** to contain asbestos. **The default applies to areas which cannot be accessed or inspected. In this situation any area not accessed or inspected must be presumed to contain asbestos, unless there is strong evidence that it does not.**

The risk assessment process (also known as risk algorithms) designed by HSE, allow asbestos containing materials to be ranked according to a Material Assessment algorithm and a HSE have related the scores obtained in the materials assessment algorithms in HSG 264 to a number of risk categories that may be used to guide the employers as to the best course of action to take to mitigate the risk. These are further explained in our risk assessment sheets contained within this report.

These scores can then be ranked and so decisions can be taken as to what actions are required to control the risks from asbestos containing materials during demolition.

4 Conclusions and Actions

Where asbestos containing materials were identified in the survey recommendations are provided in the asbestos register and risk assessments. A further explanation of the terms used in the management of asbestos containing materials risks are given below.

Asbestos is a known human carcinogen (cancer causing agent) that was used extensively in Ireland up to 2000 when it was finally banned from use. Asbestos fibres may cause fatal lung disease when inhaled. These diseases are not sudden and may take many years to develop from the first exposures. **Asbestos containing materials constitute a particular risk within the meaning of the Safety Health and Welfare at Work (Construction) Regulations 2006-2013 and should be addressed in the Preliminary Health and Safety Plan by the designers and the Project Supervisor Design Process.**

Asbestos is a fibrous material and has excellent insulating and fire resistant properties. Asbestos was seldom used as pure asbestos fibres but rather combined with other products to add strength and stability or fire resistance to them. Asbestos may be found in products from a few percent up to 90% depending on the type of material.

Asbestos is a hazard to humans but the risks posed by asbestos containing materials (ACM) will depend on the type of ACM found. In simple terms where asbestos products are flaky and would crumble under hand pressure quite easily they are termed friable. The more friable the ACM the more risk there is to the individual handling the material. This is reflected in the material assessment scores in the risk assessments

No person is permitted to work with asbestos containing materials unless they have received training and have taken all reasonable steps to prevent exposure to asbestos. The requirement for training is detailed in Regulation 17 of the Safety Health and Welfare at Work (Exposure to Asbestos) Regulations, 2006-2010

4.1 Demolition Options

ACM are found in many industrial buildings, hospitals, schools and homes. These materials were installed before 2000 with the peak period for installation occurring from the 1970's to the late 1980's. ACM's installed some 20-30 years ago will vary in condition depending on the type of product and the use of that product. The Safety health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010 requires a managed approach to asbestos containing materials in workplaces. These regulations require employers to identify the presence of asbestos containing materials and to assess the risk posed to workers by these

ACM's based on the likely work activities and the potential for these work activities to disturb ACM's.

The outcome of these risk assessments are as follows;

1. **Remove**

   Prior to demolition of the building or structure asbestos containing materials must be removed and disposed of by a competent contractor. ACM removal will form part of a construction project and will require careful coordination to be carried out safely. Following removal of the asbestos containing materials a site clearance for re-occupation certificate must be obtained from a competent independent analyst prior to demolition of the structure in accordance with **Regulation 15 (10) of the Safety Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010.**

4.2 Materials Assessment Scoring

4.2.1 Asbestos Risk Assessment

Employers are required under the Safety Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010 to perform a risk assessment whenever they identify asbestos containing materials within the working environment. The risk posed by asbestos is determined by the current and potential level of employee exposure to asbestos fibres. The following parameters are used in developing a risk assessment for asbestos containing materials;

4.2.2 Asbestos Type

There are six regulated types of asbestos. The common names associated with some of the asbestos types are shown in brackets below;

- Crocidolite (Blue Asbestos)
- Amosite (Brown Asbestos)
- Actinolite
- Anthophyllite
- Tremolite
- Chrysotile (White Asbestos)

International studies have identified that they have different potential to cause harm. Crocidolite is the most dangerous and Chysotile the least.

4.2.3 Surface Treatment

Surface treatment is a term used to describe how the fibres in the material are protected from release. The safest materials are composites such as cement and plastic where the fibres are contained within a material within a strong matrix. At the other end of the scale are materials that damage easily and have no protective coating such as sprayed asbestos and boiler lagging.

4.2.4 Friability

Products that damage easily such as sprayed asbestos are clearly more likely to release fibres than strong materials such as cement. This 'likelihood of fibre release' or crumbliness is commonly referred to as friability. Materials with high friability (such as insulation) are higher risk than those with low friability (such as vinyl floor tiles).

4.2.5 Condition

Products which are damaged are more likely to release fibres than those in good condition and are ranked according to the extent of damage observed.

4.3 Calculating risk assessments

The Health and Safety Executive developed a risk assessment process within HSG264 which takes these four factors into account and attributes values to each of the factors allowing you to calculate a material risk assessment.

4.3.1 Material Assessment Algorithm

The material assessment algorithm is commonly used by most surveying organisations to give an indication of how dangerous a material is. Each of the four risk factors (friability, condition, surface treatment and asbestos type) are attributed a score of between 0 and 3 (see below). These scores are accumulated to give a risk score of between 0 and 12 (where 12 is the highest risk).

When using this algorithm it is commonly accepted that materials can be divided into the following risk groups;

Material Risk Rating		Description
10-12		High risk
7-9		Medium risk
5-6		Low risk
2-4		Very low risk

These are colour coded within our risk assessment as outlined above.

4.3.2 HSG264 Material Assessment Table

Sample Variable	Score	Example of Score
Product type (or debris from product)	1	Asbestos reinforced composites (Plastics, resins, mastics, roofing felts, vinyl floor tiles, semi-rigid paints or decorative finishes, asbestos cement etc)
	2	Asbestos insulation board, mill boards, other low density boards, asbestos textiles, gaskets, ropes and woven textiles, asbestos paper and felt
	3	Thermal insulation (pipe and boiler lagging), Sprayed Asbestos, loose asbestos, asbestos mattresses and packing
Extent of damage / deterioration	0	Good condition: no visible damage
	1	Low Damage: a few scratches or surface marks; broken edges on boards, tiles etc
	2	Medium damage; significant breakage of materials or several small areas where material has been damaged revealing loose asbestos fibres
	3	High damage or delamination of materials, sprays or insulation. Visible asbestos debris
Surface Treatment	0	Composite materials containing asbestos: reinforced plastics, resins, vinyl tiles
	1	Enclosed sprays and lagging, AIB (with exposed face painted or encapsulated), asbestos cement sheets
	2	Unsealed AIB, or encapsulated lagging and sprays
	3	Unsealed lagging and sprays
Asbestos Type	1	Chrysotile
	2	Amphibole asbestos excluding crocidolite
	3	Crocidolite

4.4 References

Safety Health and Welfare at Work Act 2005

Safety Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010

Safety Health and Welfare at Work (Construction) Regulations 2013

HSG264 The Survey Guide, HSE Books

HSG248 The Analysts Guide, HSE Books

HSG247 The Contractors Guide, HSE Books

5 SURVEY RESULTS

Survey Results

Customer	Marlet Ltd	**Type**	Demolition
Site	St Paul's College	**Report Number**	27913
Survey Date	26/8/2019	**Surveyor**	Paul Foran
Valid Until	26/8/2020	**Review Date**	26/8/2020
Commissioned by	Marc McDermott	**Method**	WI-02 & WI-03

ACM REGISTER

The following areas were found to contain ACM's

Risk Assessment	351459	**Location**	RA:351459 St Paul's College Building C Under Prefab structure Sub structure
Notes:	Slates used to level timbers		

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile & Crocidolite		Sample Taken	6	6	Priority 1 : Remove ACM's Prior to Refurbishment or Demolition.

Risk Assessment	351464	**Location**	RA:351464 St Paul's College Building C Sub floor Sub floor
Notes:	Slates may have been used to adjust levels		

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile & Crocidolite		Strongly presumed	6	6	Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

Risk Assessment	351457	**Location**	RA:351457 St Paul's College Building C Boxing Room C6 Walls and ceilings

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile		Strongly presumed	4	4	Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

Risk Assessment	351443	**Location**	RA:351443 St Paul's College Building C Store Room Walls and ceilings
Notes:	Board to ceilings and both sides of partition walls		

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile		Strongly presumed	4	4	Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

Customer	Marlet Ltd	**Type**	Demolition
Site	St Paul's College	**Report Number**	27913
Survey Date	26/8/2019	**Surveyor**	Paul Foran
Valid Until	26/8/2020	**Review Date**	26/8/2020
Commissioned by	Marc McDermott	**Method**	WI-02 & WI-03

ACM REGISTER

The following areas were found to contain ACM's

Risk Assessment	351444	**Location**	RA:351444 St Paul's College Building C Store Room Walls and ceilings
Notes:	New partition wall in the photo is made of plasterboard		

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile		Strongly presumed	4	4	Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

Risk Assessment	351445	**Location**	RA:351445 St Paul's College Building C Toilets x5 Walls and ceilings
Notes:	No asbestos in the toilet cistern or floor		

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile		Sample Taken	4	4	Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

Risk Assessment	351446	**Location**	RA:351446 St Paul's College Building C Toilet Walls and ceilings

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile		Strongly presumed	4	4	Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

Risk Assessment	351447	**Location**	RA:351447 St Paul's College Building C School Room Walls and ceilings

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile		Strongly presumed	4	4	Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

Customer	Marlet Ltd	**Type**	Demolition
Site	St Paul's College	**Report Number**	27913
Survey Date	26/8/2019	**Surveyor**	Paul Foran
Valid Until	26/8/2020	**Review Date**	26/8/2020
Commissioned by	Marc McDermott	**Method**	WI-02 & WI-03

ACM REGISTER

The following areas were found to contain ACM's

Risk Assessment	351448	**Location**	RA:351448 St Paul's College Building C Toilet Walls and ceilings
Notes:	Walls and Ceilings		

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile		Strongly presumed	4	4	Priority 1 : Remove ACM's Prior to Refurbishment or Demolition.

Risk Assessment	351449	**Location**	RA:351449 St Paul's College Building C Accessible Toilet Walls and ceilings
Notes:	Walls and ceilings		

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile		Strongly presumed	4	4	Priority 1 : Remove ACM's Prior to Refurbishment or Demolition.

Risk Assessment	351450	**Location**	RA:351450 St Paul's College Building C Toilets Walls and ceilings
Notes:	Cisterns tested and non asbestos		

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile		Strongly presumed	4	4	Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

Risk Assessment	351451	**Location**	RA:351451 St Paul's College Building C Store room Walls and ceilings
Notes:	Walls and ceilings		

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile		Strongly presumed	4	4	Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

Customer	Marlet Ltd	**Type**	Demolition
Site	St Paul's College	**Report Number**	27913
Survey Date	26/8/2019	**Surveyor**	Paul Foran
Valid Until	26/8/2020	**Review Date**	26/8/2020
Commissioned by	Marc McDermott	**Method**	WI-02 & WI-03

ACM REGISTER

The following areas were found to contain ACM's

Risk Assessment	351452	**Location**	RA:351452 St Paul's College Building C Art Room Walls and ceilings
Notes:	Locked and no key available		

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile		Strongly presumed	4	4	Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

Risk Assessment	351453	**Location**	RA:351453 St Paul's College Building C Room C1 Walls and ceilings
Notes:	Walls and ceilings		

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile		Strongly presumed	4	4	Priority 1 : Remove ACM's Prior to Refurbishment or Demolition.

Risk Assessment	351454	**Location**	RA:351454 St Paul's College Building C Store Room x1 Walls and ceilings

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile		Strongly presumed	4	4	Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

Risk Assessment	351455	**Location**	RA:351455 St Paul's College Building C Corridor Walls and ceilings

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Asbestos Cement	Chrysotile		Strongly presumed	4	4	Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

Customer	Marlet Ltd	**Type**	Demolition
Site	St Paul's College	**Report Number**	27913
Survey Date	26/8/2019	**Surveyor**	Paul Foran
Valid Until	26/8/2020	**Review Date**	26/8/2020
Commissioned by	Marc McDermott	**Method**	WI-02 & WI-03

ACM REGISTER

The following areas were found to contain ACM's

Risk Assessment	351456	**Location**	RA:351456 St Paul's College Building C Classroom Walls and ceilings

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Cement based procducts	--N\A--	--N\A--	Low	Composite Materials	Chrysotile		Strongly presumed	3	3	Priority 1 : Restrict Access Until ACM's are Removed.

Risk Assessment	351461	**Location**	RA:351461 St Paul's College Building C Roof Roofing
Notes:	Not possible to put a hole in the roof as the building is still in use. We will need to revisit and assess the make up of the roof. External felts were tested		

Type of Product	Quantity	Accessibility	Condition	Surface Treatment	Asbestos Type	Sample No.	Confirmation	MA	PA	Action
Asbestos Bitumen Products	--N\A--	--N\A--	Low	Composite materials containing asbestos	Chrysotile		Presumed	3	3	Priority 3 : Investigate prior to disturbing (RDAS)

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Client and Survey Details

Client :	Marlet Ltd	Date of Survey :	26 Aug 2019
Site :	St Paul's College	Review Survey :	26 Aug 2020
Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Under Prefab structure	Confirmation :	Sample Taken
Location :	Sub structure	Access :	Full Access
Description :	BFB20190826.13	Normal Use :	School

Material Risk Assessment 351459

		Score	Risk Rating
Asbestos Type :	Chrysotile & Crocidolite	3	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
	Material Assessment Score :	6	Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph

Recommendations and Notes

Priority 1 : Remove ACM's Prior to Refurbishment or Demolition. Slates used to level timbers

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Site :	St Paul's College	Review Survey :	26 Aug 2020
Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Sub floor	Confirmation :	Strongly presumed
Location :	Sub floor	Access :	Full Access
Description :		Normal Use :	School

Material Risk Assessment 351464

		Score	Risk Rating
Asbestos Type :	Chrysotile & Crocidolite	3	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
	Material Assessment Score :	6	Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph

Recommendations and Notes

Priority 1: Remove ACM's Prior to Refurbishment or Demolition. Slates may have been used to adjust levels

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Site :	St Paul's College	Review Survey :	26 Aug 2020
Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Boxing Room C6	Confirmation :	Strongly presumed
Location :	Walls and ceilings	Access :	Full Access
Description :		Normal Use :	School

Material Risk Assessment 351457

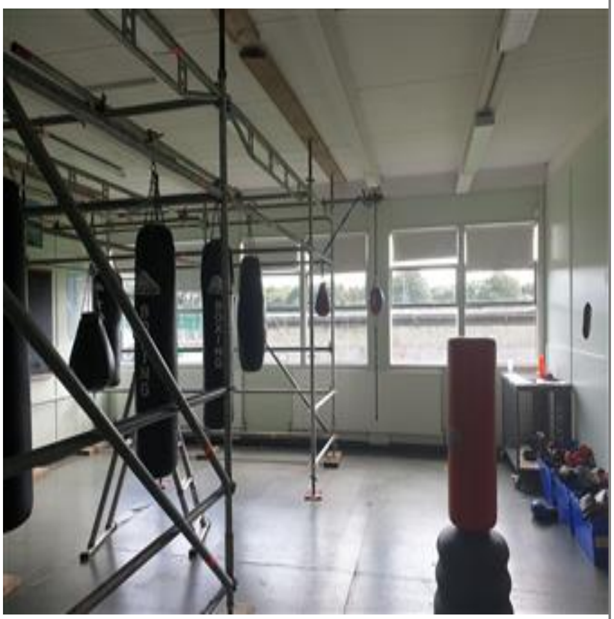
		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
Material Assessment Score :		4	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph



Recommendations and Notes

Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

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Site :	St Paul's College	Review Survey :	26 Aug 2020
Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Store Room	Confirmation :	Strongly presumed
Location :	Walls and ceilings	Access :	Full Access
Description :		Normal Use :	School

Material Risk Assessment 351443

		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
	Material Assessment Score :	4	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph

Recommendations and Notes

Priority 1: Remove ACM's Prior to Refurbishment or Demolition. Board to ceilings and both sides of partition walls

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Client and Survey Details

Client :	Marlet Ltd	Date of Survey :	26 Aug 2019
Site :	St Paul's College	Review Survey :	26 Aug 2020
Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Store Room	Confirmation :	Strongly presumed
Location :	Walls and ceilings	Access :	Full Access
Description :		Normal Use :	School

Material Risk Assessment 351444

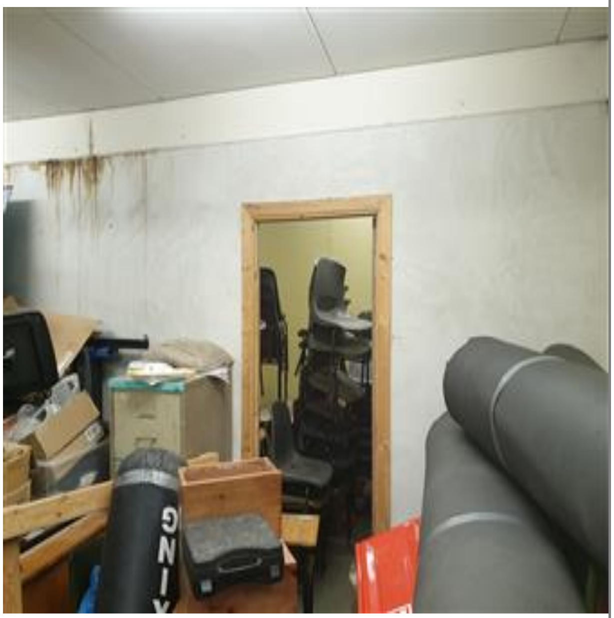
		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
	Material Assessment Score :	4	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph



Recommendations and Notes

Priority 1: Remove ACM's Prior to Refurbishment or Demolition. New partition wall in the photo is made of plasterboard

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Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Toilets x5	Confirmation :	Sample Taken
Location :	Walls and ceilings	Access :	Full Access
Description :		Normal Use :	School

Material Risk Assessment 351445

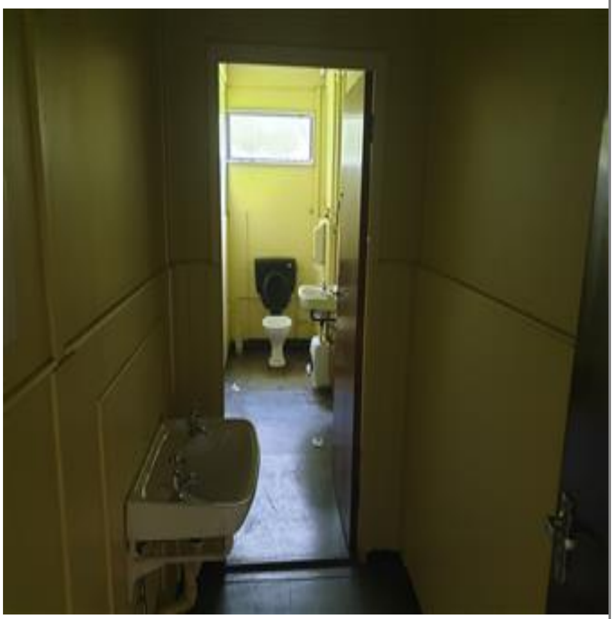
		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
Material Assessment Score :		4	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph



Recommendations and Notes

Priority 1: Remove ACM's Prior to Refurbishment or Demolition. No asbestos in the toilet cistern or floor

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Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Toilet	Confirmation :	Strongly presumed
Location :	Walls and ceilings	Access :	Full Access
Description :	Walls and ceilings	Normal Use :	School

Material Risk Assessment 351446

		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
Material Assessment Score :		4	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph

Recommendations and Notes

Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

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	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	School Room	Confirmation :	Strongly presumed
Location :	Walls and ceilings	Access :	Full Access
Description :	Boar to walls and ceiling	Normal Use :	School

Material Risk Assessment 351447

		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
	Material Assessment Score :	4	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph

Recommendations and Notes

Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

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Site :	St Paul's College	Review Survey :	26 Aug 2020
Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Toilet	Confirmation :	Strongly presumed
Location :	Walls and ceilings	Access :	Full Access
Description :		Normal Use :	School

Material Risk Assessment 351448

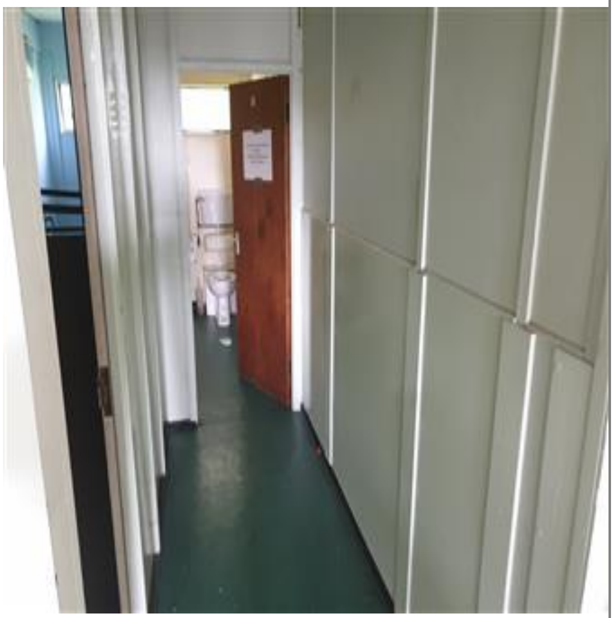
		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
Material Assessment Score :		4	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph



Recommendations and Notes

Priority 1 : Remove ACM's Prior to Refurbishment or Demolition. Walls and Ceilings

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Client and Survey Details

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Site :	St Paul's College	Review Survey :	26 Aug 2020
Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Accessible Toilet	Confirmation :	Strongly presumed
Location :	Walls and ceilings	Access :	Full Access
Description :		Normal Use :	School

Material Risk Assessment 351449

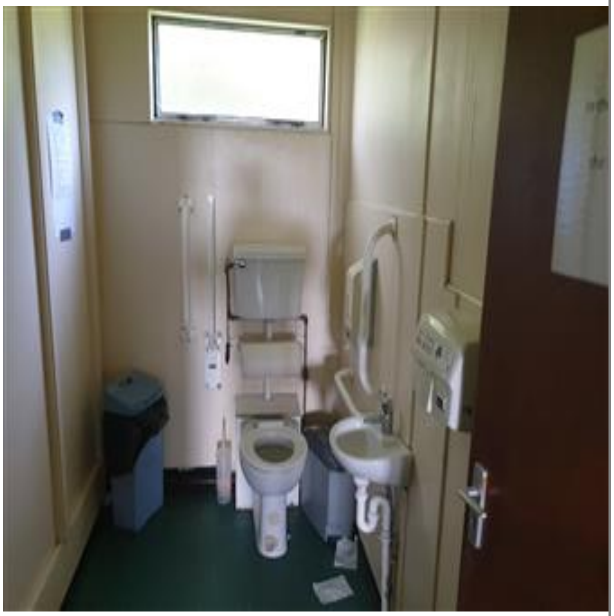
		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
Material Assessment Score :		4	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph



Recommendations and Notes

Priority 1 : Remove ACM's Prior to Refurbishment or Demolition. Walls and ceilings

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Client and Survey Details

Client : Marlet Ltd
Site : St Paul's College
Address : Sybil Hill Road
Clontarf

Date of Survey : 26 Aug 2019
Review Survey : 26 Aug 2020
Surveyor : Paul Foran
Method : WI02 & WI03
Report No. : 27913

Location Details

Building/Area : St Paul's College Building C
Room/Section : Toilets
Location : Walls and ceilings
Description : Walls and ceilings

Sample No. :
Confirmation : Strongly presumed
Access : Full Access
Normal Use : School

Material Risk Assessment 351450

		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
	Material Assessment Score :	4	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph

Recommendations and Notes

Priority 1: Remove ACM's Prior to Refurbishment or Demolition. Cisterns tested and non asbestos

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	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Store room	Confirmation :	Strongly presumed
Location :	Walls and ceilings	Access :	Full Access
Description :		Normal Use :	School

Material Risk Assessment 351451

		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
	Material Assessment Score :	4	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph

Recommendations and Notes

Priority 1: Remove ACM's Prior to Refurbishment or Demolition. Walls and ceilings

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	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Art Room	Confirmation :	Strongly presumed
Location :	Walls and ceilings	Access :	Partial Access (Notes)
Description :		Normal Use :	School

Material Risk Assessment 351452

		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
	Material Assessment Score :	4	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph

Recommendations and Notes

Priority 1: Remove ACM's Prior to Refurbishment or Demolition. Locked and no key available

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Client and Survey Details

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	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Room C1	Confirmation :	Strongly presumed
Location :	Walls and ceilings	Access :	Full Access
Description :		Normal Use :	School

Material Risk Assessment 351453

		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
Material Assessment Score :		4	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph

Recommendations and Notes

Priority 1 : Remove ACM's Prior to Refurbishment or Demolition. Walls and ceilings

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Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Store Room x1	Confirmation :	Strongly presumed
Location :	Walls and ceilings	Access :	Full Access
Description :		Normal Use :	School

Material Risk Assessment 351454

		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
	Material Assessment Score :	4	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph

Recommendations and Notes

Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

Asbestos Containing Materials Risk Assessment

DEMOLITION Survey

in accordance with HSG264

Unit 2BEaT Centre, Stephenstown Industrial Estate, Balbriggan, Co. Dublin Tel: (01) 6905907 Fax: (01) 8020439 Email: info@ohss.ie Website: www.ohss.ie

Client and Survey Details

Client : Marlet Ltd

Site : St Paul's College

Address : Sybil Hill Road
Clontarf

Date of Survey : 26 Aug 2019

Review Survey : 26 Aug 2020

Surveyor : Paul Foran

Method : WI02 & WI03

Report No. : 27913

Location Details

Building/Area : St Paul's College Building C

Room/Section : Corridor

Location : Walls and ceilings

Description :

Sample No. :

Confirmation : Strongly presumed

Access : Full Access

Normal Use : School

Material Risk Assessment 351455

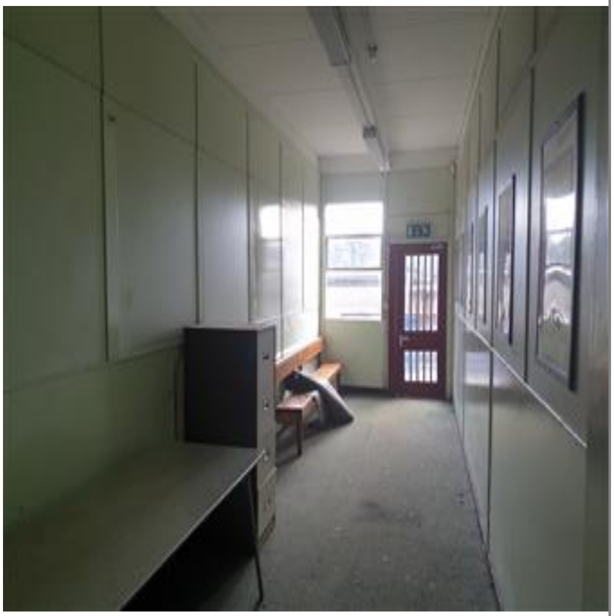
		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Asbestos Cement	1	Very Low Risk
Material Assessment Score :		4	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph



Recommendations and Notes

Priority 1: Remove ACM's Prior to Refurbishment or Demolition.

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Site :	St Paul's College	Review Survey :	26 Aug 2020
Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Classroom	Confirmation :	Strongly presumed
Location :	Walls and ceilings	Access :	Full Access
Description :		Normal Use :	School

Material Risk Assessment 351456

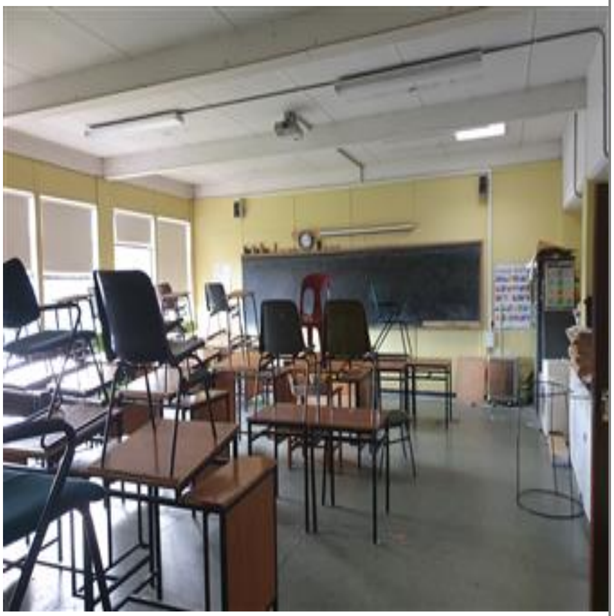
		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Cement based procducts	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Composite Materials	0	Very Low Risk
Material Assessment Score :		3	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph



Recommendations and Notes

Priority 1 : Restrict Access Until ACM's are Removed.

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Client and Survey Details

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Site :	St Paul's College	Review Survey :	26 Aug 2020
Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details

Building/Area :	St Paul's College Building C	Sample No. :	
Room/Section :	Roof	Confirmation :	Presumed
Location :	Roofing	Access :	Partial Access (Notes)
Description :	Felt	Normal Use :	School

Material Risk Assessment 351461

		Score	Risk Rating
Asbestos Type :	Chrysotile	1	High Risk
Type Of Product :	Asbestos Bitumen Products	1	Medium Risk
Condition :	Low	1	Low Risk
Surface Treatment :	Composite materials containing asbestos	0	Very Low Risk
	Material Assessment Score :	3	Very Low Risk

Removal/Encapsulation Estimate

To be completed by the estimating contractor

	Costs	Notes
Labour		
Equipment		
Disposal		
Analytical		
Totals		

Photograph

Recommendations and Notes

Priority 3 : Investigate prior to disturbing (RDAS) Not possible to put a hole in the roof as the building is still in use. We will need to revisit and assess the make up of the roof. External felts were tested

AREAS INSPECTED

Area(s) inspected during the survey where no ACM's where identified.

Risk Assessment	351463	**Location**	RA:351463 St Paul's College Building C Under floors Sub floor

Risk Assessment	351465	**Location**	RA:351465 St Paul's College Building C Sub floor Floor Walls and ceilings
Notes:	DPC under floor sampled		

Risk Assessment	351458	**Location**	RA:351458 St Paul's College Building C External Panels Walls
Notes:	Fiberglass external panel.		

Risk Assessment	351460	**Location**	RA:351460 St Paul's College Building C External Panels Panels

Risk Assessment	351437	**Location**	RA:351437 St Paul's College Building C Entrance Floor Walls and ceilings

Risk Assessment	351438	**Location**	RA:351438 St Paul's College Building C Hall to Newer prefab Floor Walls and ceilings

Risk Assessment	351439	**Location**	RA:351439 St Paul's College Building C Store Room Floor Walls and ceilings

Risk Assessment	351440	**Location**	RA:351440 St Paul's College Building C Boxing Room Floor Walls and ceilings

Risk Assessment	351441	**Location**	RA:351441 St Paul's College Building C Training Room Floor Walls and ceilings

Risk Assessment	351442	**Location**	RA:351442 St Paul's College Building C Floor Walls and ceilings

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Client and Survey Details

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Site :	St Paul's College	Review Survey :	26 Aug 2020
Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details 351463 No Asbestos Found

Building/Area : St Paul's College Building C
Room/Section : Under floors
Location : Sub floor
Description :
Sample No. :
Comfirmation : --N\A--
Access : Full Access
Normal Use : School
Recommendations :
;

Location Details 351465 No Asbestos Found

Building/Area : St Paul's College Building C
Room/Section : Sub floor
Location : Floor Walls and ceilings
Description :
Sample No. : BFB20190826.15
Comfirmation : Sample Taken
Access : Full Access
Normal Use : School
Recommendations :
DPC under floor sampled;

Location Details 351458 No Asbestos Found

Building/Area : St Paul's College Building C
Room/Section : External Panels
Location : Walls
Description :
Sample No. :
Comfirmation : Sample Taken
Access : Full Access
Normal Use : School
Recommendations :
Fiberglass external panel.;

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Client and Survey Details

Client : Marlet Ltd
Site : St Paul's College
Address : Sybil Hill Road
Clontarf

Date of Survey : 26 Aug 2019
Review Survey : 26 Aug 2020
Surveyor : Paul Foran
Method : WI02 & WI03
Report No. : 27913

Location Details 351460 No Asbestos Found

Building/Area : St Paul's College Building C
Room/Section : External Panels
Location : Panels
Description :
Sample No. : BFB20190826.09
Comfirmation : Sample Taken
Access : Full Access
Normal Use : School
Recommendations :
;

Location Details 351437 No Asbestos Found

Building/Area : St Paul's College Building C
Room/Section : Entrance
Location : Floor Walls and ceilings
Description :
Sample No. :
Comfirmation : --N\A--
Access : Full Access
Normal Use : School
Recommendations :
;

Location Details 351438 No Asbestos Found

Building/Area : St Paul's College Building C
Room/Section : Hall to Newer prefab
Location : Floor Walls and ceilings
Description : Plater board walls
Sample No. :
Comfirmation : --N\A--
Access : Full Access
Normal Use : School
Recommendations :
;

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Client and Survey Details

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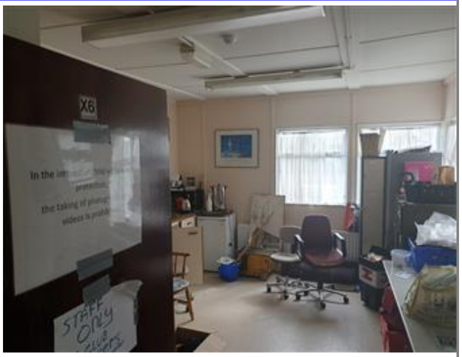
Site :	St Paul's College	Review Survey :	26 Aug 2020
Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details 351439 No Asbestos Found



Building/Area : St Paul's College Building C
Room/Section : Store Room
Location : Floor Walls and ceilings
Description :
Sample No. :
Comfirmation : --N\A--
Access : Full Access
Normal Use : School
Recommendations :
;

Location Details 351440 No Asbestos Found

Building/Area : St Paul's College Building C
Room/Section : Boxing Room
Location : Floor Walls and ceilings
Description :
Sample No. :
Comfirmation : --N\A--
Access : Full Access
Normal Use : School
Recommendations :
;

Location Details 351441 No Asbestos Found

Building/Area : St Paul's College Building C
Room/Section : Training Room
Location : Floor Walls and ceilings
Description :
Sample No. :
Comfirmation : --N\A--
Access : Full Access
Normal Use : School
Recommendations :
;

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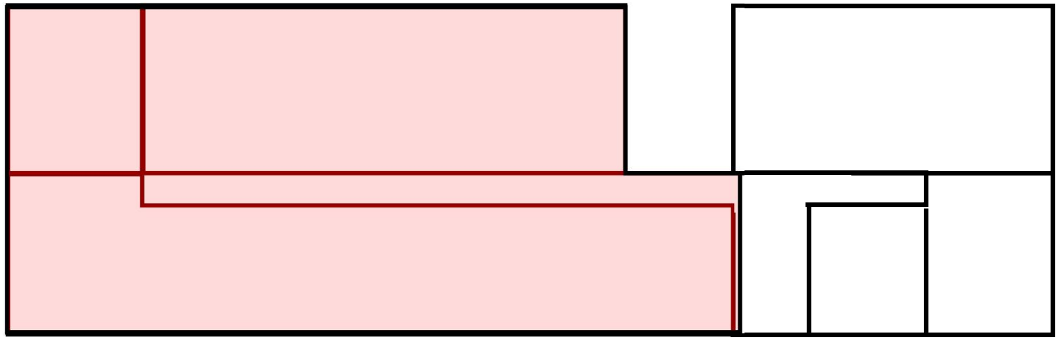
Client and Survey Details

Client :	Marlet Ltd	Date of Survey :	26 Aug 2019
Site :	St Paul's College	Review Survey :	26 Aug 2020
Address :	Sybil Hill Road	Surveyor :	Paul Foran
	Clontarf	Method :	WI02 & WI03
		Report No. :	27913

Location Details 351442 No Asbestos Found

Building/Area : St Paul's College Building C
Room/Section :
Location : Floor Walls and ceilings
Description :
Sample No. :
Comfirmation : --N\A--
Access : Full Access
Normal Use : School
Recommendations :
;

Drawings



Drawing Legend				Drawing Revisions			Date	Scale	Project Number		
Contains Asbestos		Not Accessed Presumed To Contain Asbestos		Rev #	Revision Description	Date	26/8/19	This drawing is for illustration purposes only	27913	St Paul's Asbestos Survey	QMF 139 Rev 1
Sample Point Location	*	No Access Under Fixed Floor Coverings Investigate Prior To Disturbance					Drawing No		Drawn By		
							1 of 1		BF		

Sample Analysis

Test Certificate

Certificate Number: 26426 **Issue No:** 1

Client Details

Marlet Ltd
Marc McDermott
8-10 Hanover Street East
Dublin 2

Site Details

St Paul's College
Sybil Hill Road
Clontarf
Dublin 3

Job No: 27913
Date Received: 26-Aug-2019
Date Tested: 30-Aug-2019
Date Reported: 30-Aug-2019
Number of Samples: 15
Specification: WI 05
Samples Taken By: OHSS

Bulk Identification of Asbestos in Materials

Sample Reference	Description	Asbestos Detected	Asbestos Type
BFB20190826.01	Cream Lino from Room C9	Asbestos not detected	
BFB20190826.02	Sink Pad from Room X6	Asbestos not detected	
BFB20190826.03	Toilet Cistern from Room X5	Asbestos not detected	
BFB20190826.04	Bitumen to Green Floor Tile from Room X6	Asbestos not detected	
BFB20190826.04	Green Floor Tile from Room X6	Present	**Chrysotile**
BFB20190826.05	Light Green Floor Tile and Bitumen from Room C1	Asbestos not detected	
BFB20190826.06	Green Lino from Room C6	Asbestos not detected	
BFB20190826.07	Old Prefab Walls from Room C6	Present	**Chrysotile**
BFB20190826.08	Door Surround from Room C6	Present	**Chrysotile**
BFB20190826.09	Facing Panel Brown Paint from Outside Walls	Asbestos not detected	
BFB20190826.10	Wall Panels from Exterior	Asbestos not detected	
BFB20190826.11	Felt & silverex from Roof over newer prefab	Asbestos not detected	
BFB20190826.12	Felt & Silverex from Roof over door	Asbestos not detected	
BFB20190826.13	Slate from Under prefab	Present	**Chrysotile**
BFB20190826.13	Slate from Under prefab	Present	**Crocidolite**
BFB20190826.14	Textured Paint from Fascia	Asbestos not detected	
BFB20190826.15	DPC under floor from Floor Void	Asbestos not detected	

Comments

1 The Bulk sample(s) referred to above were analysed for asbestos content using dispersion staining and polarised light microscopy in accordance with the requirements of HSG 248 and using OHSS Documented Work Instruction –WI 05 Bulk Sampling Analysis.

2 Any work (removal, repair etc.) involving asbestos containing materials must be carried out in accordance with the Safety Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010 or the Control of Asbestos Regulations NI 2012 and all other relevant national legislation.

3 In the case of samples supplied by the client, Occupational Hygiene and Safety Services Ltd. (OHSS) cannot accept responsibility for the sampling strategies employed and the sampling information supplied to OHSS. OHSS cannot accept responsibility for the interpretation of the sampling information contained on this report by any parties.

4 OHSS is an INAB accredited laboratory for the sampling and identification of Asbestos containing materials

5 Comments, observations and opinions are outside the scope of INAB accreditation

Analyst: Frances Shaw

Signed: Frances Shaw

Frances Shaw
For and on authority of OHSS

OHSS, Unit 2 BEaT Centre, Stephenstown Industrial Estate, Balbriggan, Co.Dublin.
Tel: 01 6905907. Fax: 01 8020439 E-mail info@ohss.ie Web: www.ohss.ie

Appendix 14 - not used

Appendix 15 - not used